RESSOURCES PMET RESOURCES

Shaakichiuwaanaan Mining Project

Environmental Impact Assessment

Volume 1

March 2026

CA0001724.3318

CHAPTER LIST– VOLUME 1

PMET RESSOURCES INC.

SHAAKICHIUWAANAAN MINING PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT

EEYOU ISTCHEE JAMES BAY

MARCH 2026

REFERENCE WSP: CA0001724.3318 FINAL VERSION

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REFERENCE FOR CITATION

WSP. 2026. Shaakichiuwaanaan Mining Project. Environmental Impact Assessment. Eeyou Istchee James Bay. Rapport produit pour PMET Ressources Inc. Reference WSP: CA0001724.3318. Multiple pagination and appendices.

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CROSS-REFERENCE TABLE

The following table shows the concordance between the information contained in this Environmental Impact Statement (EIS) for the Corvette (Shaakichiuwaanaan) Mining Project to the requirements set forth in:

- Tailored guidelines for the Impact Statement of the Shaakichiuwaanaan Mining Project by the Impact Assessment Agency of Canada/Cree Nation Government (August 2025).

Table of concordance between IAAC and GNC guidelines

Guidelines section (2025)		Corresponding chapter or section in the EIS
1. Introduction	The purpose of the federal impact assessment process is to prevent or mitigate significant adverse effects within federal jurisdiction—as well as significant direct or incidental adverse effects—by anticipating, identifying, and assessing the potential effects of designated projects to inform decision-making under the Impact Assessment Act (IAA). The Joint Assessment Committee (the Committee), composed of representatives from the IAAC and the Cree Nation Government, has prepared these tailored guidelines for the Shaakichiuwaanaan Mining Project (the Project) proposed by Patriot Battery Metals (the Proponent). The Committee will use the proponent's impact statement and other information received during the impact assessment process to prepare an impact assessment report. The guidelines identify the studies and information that the Committee considers necessary to assess adverse effects falling within a federal jurisdiction, or the direct or incidental adverse effects (hereinafter referred to as "adverse federal effects") of the Project that could potentially be significant. The tailored approach taken in this document is based on the nature, complexity, and context of the Project, and was informed by consultations with and engagement of Indigenous groups, the public, and federal authorities, as well as by information provided by the proponent.	N/A
1.1 Scope of the impact assessment	In determining the information and studies to be included in the proponent's impact statement for the federal impact assessment process, the Committee took into account the factors set out in subsection 22(1) of the IAA. In support of the Government of Canada's objective to promote the "one project, one assessment" principle, these guidelines identify cases where the federal impact assessment and the Province of Quebec's environmental and social assessment process have similar information requirements. To this end, the Committee referred to the Directive for the Corvette Mining Project (the Project's former name) issued by the Environmental and Social Impact Evaluating Committee (COMEV), hereinafter referred to as the COMEV Directive, for the purpose of developing these guidelines. In addition, the COMEV Directive refers to several other documents (directives and guidelines), including Directive 019 on the mining industry, which should serve as a framework for the preparation of the impact statement. The guidelines do not refer directly to these other documents. However, when the guidelines refer to the COMEV Directive and the COMEV Directive refers to other documents, the proponent must also comply with those documents and include the information required therein in the impact statement.	N/A
1.2 Selection of Valued Components	The impact assessment focuses on the Valued Components (VCs) whose analysis is anticipated to be material for decision-making under the IAA. The Valued Components serve as the focal points for the impact statement and will inform the conclusions of the impact assessment report. Each VC must be assessed in accordance with the Generic Requirements for Impact Statements as well as the specific requirements for VCs set forth in the guidelines. The assessment of impacts must take into account the pathway of effects, which are causal links between a project component or activity and the VC.	Chapter 7, Section 7.3, Table 7-1

Guidelines section (2025)		Corresponding chapter or section in the EIS
	The impact statement must include, at a minimum, the following VCs:	

Selected valued component	Rationale for inclusion
Valued Components for assessing adverse effects falling under federal jurisdiction, as defined in Section 2 of the IAA	
Fish and fish habitat	Physical changes to the aquatic habitat could have potential negative effects on fish and fish habitat due to habitat destruction and loss, habitat degradation and disturbance, fish displacement, and possibly fish mortality. Changes in water quality and quantity resulting from physicochemical changes, the release of contaminants, and sensory disturbances (vibration and explosions) could also have negative effects on fish and fish habitat.
Migratory birds	Habitat loss and fragmentation, the destruction of nests and eggs, sensory disturbances caused by noise, vibrations, and light, changes in air and water quality, and an increased risk of mortality from collisions could have negative effects on migratory birds.
The natural and cultural heritage of Indigenous Peoples and any structure, site, or thing that is of archaeological, paleontological, or architectural significance.	Excavation work and the construction of new infrastructure could have a negative impact on historical and archaeological sites that are of significance to Indigenous Peoples.
The current use of lands and resources by Indigenous Peoples for traditional purposes.	Changes to the terrestrial environment could adversely affect traditional caribou hunting, while changes to the aquatic environment could adversely affect traditional fishing and recreational boating.
Health, social, and economic conditions of Indigenous Peoples.	Construction and mining activities could have negative impacts on the physical, mental, and social health and well-being of Indigenous Peoples, particularly due to air emissions, changes in water quality, increased noise and light levels, and heightened risks of gender-based violence. The Project could bring back some of the trauma caused by the hydroelectric development in the region, affect social cohesion, cause stress, and exacerbate certain social problems within the community.
Additional Valued Components to be considered in making decisions under Section 63 of the IAA	
Job creation	The Project could create job opportunities that would contribute to sustainability.

Guidelines section (2025)		Corresponding chapter or section in the EIS
	<table><tr><td>Clean energy transition</td><td>The Project's impact could help promote the development of renewable energy.</td></tr><tr><td>Economic partnerships</td><td>The Project could lead to economic partnerships that benefit local communities and contribute to sustainability.</td></tr></table>The proponent may choose other VCs, in consultation with Indigenous groups and participants, and taking into account Indigenous knowledge and community expertise. The impact statement must provide a justification if a VC proposed by an Indigenous group is excluded from the impact statement.	
1.3 Preparation of the impact statement	When preparing the impact statement, the proponent must adhere to the ethical principles and cultural protocols governing research, data collection, and confidentiality. The proponent must comply with the obligation to protect personal information and adhere to established standards for the management of Indigenous data (e.g., First Nations' principles of ownership, control, access, and possession, or standards adopted by an Indigenous group) and disaggregated data from various population groups. The Committee recommends that the impact statement follow the structure of the guidelines or include a table of concordance indicating where in the impact statement the information set forth in these guidelines has been provided. The impact statement must meet all the requirements set forth in the guidelines, including those relating to the requirements of the COMEV Directive. The impact statement must also meet the requirements set forth in the Generic Requirements for Impact Statements. The proponent may submit a single document that meets the requirements of the Committee and COMEV. If the proponent believes that certain required information is unnecessary, the proponent should contact the Committee before submitting the impact statement to confirm whether the reason given for omitting the information is appropriate. This justification must also be included in the impact statement. Where applicable, the proponent is also encouraged to refer to the impact assessment requirements of other jurisdictions, as well as to the measures implemented by other jurisdictions to address the Project's impacts, and to indicate in the impact statement how these measures were utilized to assess the impacts. The proponent should also inform the Committee of any changes made to the Project as described in the initial project description. The impact statement must take into account, where applicable, the following factors: – any relevant regional or strategic assessment; – any relevant assessment of the Project's impacts conducted by or on behalf of an Indigenous governing body and provided to the proponent in connection with the Project; – any study or plan prepared by an authority—or an Indigenous governing body—relating to the region where the Project is located and provided to the Project proponent; – Indigenous knowledge, community knowledge, and comments received from Indigenous groups, the public, and any other stakeholders; and – Gender-Based Analysis Plus (GBA Plus), in the context of an impact assessment, is an analytical tool and process that examines how sex and gender intersect with other identity factors to assess which individuals might be disproportionately affected by a project and how they might experience the impacts differently.	Current table of concordance

Guidelines section (2025)		Corresponding chapter or section in the EIS
	GBA Plus helps identify the experiences and needs of various population groups and guides strategies aimed at reducing barriers and promoting equitable access to the project's benefits. To facilitate the prompt resolution of issues and clarify the requirements of the guidelines, the proponent is encouraged to contact the Committee as early as possible. The Committee may establish technical advisory groups composed of Indigenous groups, federal authorities, or other entities. The proponent is also encouraged to submit draft documents for review by the Committee (e.g., proposed study plans, draft sections of the impact statement) before submitting the formal impact statement.	
1.4 Coordination of federal permits	The IAAC will coordinate federal permits, licences, or authorizations (collectively referred to as "permits") from the outset and throughout the impact assessment process to achieve the following objectives: – clarify requirements, deadlines, and permitting processes by developing a detailed permitting plan; and – ensure transparency regarding the status and progress of permits through publication of reports on the Registry. Federal authorities must wait until the impact assessment process is complete before they can issue permits, licences, and authorizations. However, the proponent is encouraged to prepare and/or submit applications for federal permits early in the impact assessment process. The requirements for public information, engagement, and consultation related to permits can be addressed at the same time as the impact statement, and in some cases, the same information can be used for both processes. Collecting and submitting information on permits during the impact assessment process can expedite subsequent federal decisions, provided the outcome of the impact assessment is positive.	N/A
2. Project description		
2.1 Project overview	The project subject to the impact assessment includes the designated specific activities and any ancillary specific activities. The proponent must describe the project by outlining its main components and related activities, the details of the timeline, the schedule for each phase, the total project duration, and other key characteristics. If the project is developed in phases, information regarding the phased and progressive development must be provided.	Chapters 2 and 5
2.2 Receiving environment	The impact statement must describe the geographic setting and context in which the Project will be carried out, so that the potential effects and impacts of the Project on the environment, health, society, and the economy can be understood. To do so, the proponent must refer to the requirements of the COMEV Directive, specifically Section 3, "Project description" and Section 4, "Description of the environment." The impact statement must also specify the location of any Crown land within the study area, as well as the distance between the project elements and the Crown land, including lands located within a reserve or to be added to a reserve, as defined in subsection 2(1) of the Indian Act.	Chapter 6

Guidelines section (2025)		Corresponding chapter or section in the EIS
2.3 Project components and activities	The impact statement must describe the Project's components and activities planned for each phase of the Project and provide sufficient detail to understand the Project's potential effects on the environment, health, society, and the economy, as well as its impacts on Indigenous peoples and their rights, as determined by the Indigenous groups. To do so, the proponent must refer to the requirements set forth in the COMEV Directive, Section 1, "Background" and Section 3, "Project description." The description must include the following activities and components:	Chapter 5
2.3.1 Project components at the mine site	– roads and culverts at the mine site to facilitate the travel of the mining equipment fleet; – the workers' camp at the mine site, for the construction and operation of the mine; – the pit and underground mining infrastructure; – storage areas for waste rock, tailings, and ore; – the dams used to isolate the pit from Lake 01; – the diversion channel; – the electrical substation and the electrical distribution network at the mine site; – the process plant; – the paste backfill plant; – the water treatment plant; – water management infrastructure (ditches, ponds, etc.); – the explosives emulsion plant and explosives storage facilities; – the garage and other auxiliary buildings; – the fuel storage area and a refuelling station; and – any other infrastructure relevant to the Project.	Chapter 5, Sections 5.1 to 5.4
2.3.2 Project activities	**2.3.2.1 Site preparation and construction** – clearing, topsoil stripping, grading, and earthworks (excavation and/or backfilling depending on the local topography); – concrete production and the cleaning of concrete mixers; – the construction of temporary or permanent infrastructure; – the construction of temporary roads and haulage roads; – the construction of mine waste management infrastructure (e.g., storage areas for waste rock, tailings, and ore); – blasting; – the transportation, storage, and management of explosives on site;	Chapter 5, Sections 5.5 to 5.8

Guidelines section (2025)		Corresponding chapter or section in the EIS
	– the drainage of part of Lake 01; – the construction of crossings (temporary or permanent) over bodies of water and watercourses; – water management, as well as sediment and erosion control during construction; – the construction of infrastructure for surface runoff management and site drainage, as well as infrastructure for the management of contact water, infiltration, mine dewatering, or treatment processes; – sewage management and treatment; – the operation and maintenance of light, heavy, and off-road mobile machinery; – the storage, management, and disposal of combustible materials and hazardous waste; and – the management and disposal of non-hazardous waste. **2.3.2.2 Operations** – the extraction, processing, and treatment of ore; – drilling and blasting; – the storage and use of explosives; – the use and maintenance of haulage roads; – the management of mine waste (including tailings, waste rock, and overburden); – wastewater management; – the storage, handling, and transport of materials on site; – the storage and handling of reagents, petroleum products, chemicals, hazardous materials, and waste materials; and – the management and recycling of waste other than mine waste (types of waste, disposal methods, quantities, disposal sites or facilities). – **2.3.2.3 Decommissioning and abandonment** – the closure, rehabilitation, and restoration of the site (the mine waste storage areas, the open-pit mine, underground infrastructure, various buildings); – – the dismantling of infrastructure; – the dismantling and removal of equipment; – the long-term maintenance, monitoring, and upkeep of site integrity, including site drainage, water and effluent management, and any remaining structures; and – the closure of temporary or permanent facilities, or the suspension of their operations.	

Guidelines section (2025)		Corresponding chapter or section in the EIS
2.4 Project purpose, need, and alternatives considered	The proponent must explain the purpose and need of the Project and analyze alternative means to carrying it out.	Chapter 2
2.4.1 Project purpose and need	To explain the purpose and need of the Project, the Project proponent must refer to the COMEV Directive in Section 1.3, "Project purpose."	Chapter 2, Section 2.1
2.4.2 Alternative means of carrying out the Project	To provide information on alternatives to the Project, the proponent must refer to the COMEV Directive, Section 2, "Selection of site and technology alternatives." In addition, when justifying its alternatives, the proponent must consider the effects and impacts on Indigenous Peoples and their rights, as well as the adverse effects on species at risk. The proponent must conduct this analysis for the main components of the Project.	Chapter 2, Section 2.4
3 Fish and fish habitat	The impact statement must assess the effects of the Project on fish and fish habitat, as defined in subsection 2(1) of the Fisheries Act, based on the pathway of probable effects. The spatial scale and pathway of effects will determine the appropriate methods for assessing fish and fish habitat, such as quantifying habitat loss and/or assessing the long-term viability of the population. Where the Project is likely to require one or more authorizations under paragraph 34.4(2)(b) or 35(2)(b) of the Fisheries Act, the proponent is encouraged to provide the information required to obtain these authorizations during the impact assessment process (Sections 3.1 to 3.4 below) to facilitate and expedite the permit approval process. Further information on authorization requirements under the Fisheries Act is available in Project planning: Apply for an authorization under the Fisheries Act and the Applicant's Guide, which supports the Authorizations Concerning Fish and Fish Habitat Protection Regulations. If a regulatory amendment is required to list waters frequented by fish in Schedule 2 of the Metal and Diamond Mine Effluent Regulations (MDMER), providing the necessary information during the impact assessment, in accordance with ECCC and DFO guidelines and policies, may help reduce the time required to amend Schedule 2 of the MDMER. For more information, the proponent should consult the Guide to the regulatory process for listing water bodies frequented by fish in Schedule 2 of the MDMER. To support the impact assessment and permitting processes, when it is not possible to eliminate, reduce, or control adverse effects on fish and fish habitat, the impact statement must describe mitigation measures—which may include the restoration of degraded fish habitat, habitat enhancement or construction, or stocking—with reference to the Policy for applying measures to offset harmful impacts to fish and fish habitat.	Chapters 6, 7, 8, and 9
3.1 Groundwater and surface water baseline conditions as a pathway of effects to fish and fish habitat	To describe the baseline conditions for groundwater and surface water, the Project proponent must refer to the requirements of the COMEV Directive in Section 4.2, "Description of the environment," as well as to the documents referenced therein. These requirements cover, among other things, the delineation and characterization of wetlands and water environments (including sediment characteristics), hydrogeological characterization, the uses of watercourses and bodies of water, aquatic and riparian vegetation, as well as several elements specific to dams and watercourse diversions.	Chapter 6, Sections 6.2.7 to 6.2.11

Guidelines section (2025)		Corresponding chapter or section in the EIS
3.2 Baseline conditions for fish and fish habitat	To describe the baseline conditions of fish and fish habitat, the Project proponent must refer to the requirements of the COMEV Directive in Section 4.2, “Description of the environment,” as well as to the documents referenced therein. These requirements include, among other things, the identification and description of the fish species present, as well as their habitats. In addition to the information required by the COMEV Directive, and more specifically, for bodies of water and watercourses (permanent and intermittent) inhabited by fish and likely to be affected by the Project, the description of fish populations must include their life cycle. Therefore, the description of potential and confirmed fish habitats must include a characterization of their function (feeding, reproduction, rearing, shelter, growth, and migration) and their quality based on the species present. For each body of water and watercourse inhabited by fish and likely to be affected by the Project, the impact statement must include maps at appropriate scales using aerial imagery overlaid with relevant descriptions, as well as summary tables of baseline conditions for fish and fish habitat. It should be noted that intermittent and ephemeral watercourses and bodies of water must be included in the statement, as they may constitute or contribute to fish habitat. The absence of fish or water at the time of the survey does not constitute evidence of the absence of fish and/or fish habitat. Lastly, beaver dams and/or accumulations of woody debris are not impassable barriers for fish and therefore cannot be used to justify the conclusion that a watercourse or body of water is not a fish habitat. The impact statement must also provide a list of aquatic species listed in Schedule 1 of the Species at Risk Act (SARA) that are likely to be present, such as the lake sturgeon, the southern Hudson Bay and James Bay population, and provide the location and description of the habitat of these species (residence and critical habitat) within or near the study areas. The proponent is also encouraged to include other species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).	Chapter 6, Section 6.3.2
3.3 Effects on groundwater and surface water as a pathway of effects on fish and fish habitat	To describe the Project’s effects on groundwater and surface water, the proponent must refer to the COMEV Directive in Section 5.1, “Identification and assessment of impacts,” as well as to the documents referenced therein. These requirements address, among other things, the Project’s effects on water quality and quantity, the water table, and wetlands, as well as the effects resulting from the construction of dams and the diversion of watercourses. The assessment of effects on water must also include a water balance (Section 3.5.1 of the COMEV Directive) and hydrogeological modelling (Directive 019). The impact statement must provide a characterization and description of the mining waste, as well as a description of how it will be managed. To achieve this, the Project proponent must refer to the requirements set forth in Section 3.4 of the COMEV Directive, “Management of tailings and waste rock,” as well as to the documents referenced therein. The characterization and description of tailings must distinguish between different types of tailings (e.g., coarse tailings and low-lithium-content tailings). In addition, since the overburden will be used as construction material, it must be characterized in accordance with the recommendations of the “Guide to the characterization of tailings and ore,” to which the COMEV Directive refers. The description of the mining waste must include a characterization of samples taken from locations near the future pit wall. In addition, the description of the chemical composition of mine materials must include all potential metals of concern.	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Sections 8.2.1.1 and 8.2.1.2 Chapter 9, Section 9.3.1 Chapter 13, Sections 13.2.2.8 and 13.2.2.10

Guidelines section (2025)		Corresponding chapter or section in the EIS
3.4 Effects on fish and fish habitat	The proponent must refer to the requirements of the COMEV Directive in Section 5.1, "Identification and assessment of impacts," as well as to the documents referenced therein, to describe the potential effects on fish and fish habitat. These requirements address, among other things, the Project's effects on fish populations and fish habitats, including fish survival and movement, as well as habitat alteration or destruction. The requirements also include several types of effects resulting from the construction of dams and the diversion of watercourses, which must be analyzed and presented in the impact statement. In addition to the information required in the COMEV Directive, the impact statement must specifically include an assessment of the potential effects on the life cycle of the fish species present. In addition, the assessment of the effects on fish and fish habitat must take into account: – changes in baseline conditions for groundwater and surface water (e.g., surface water flow, hydraulic connectivity, groundwater-surface water exchange, physicochemical parameters) – the risks associated with the introduction of invasive aquatic species; – increased fishing in the study areas; – sensitive periods for fish; – the potential effects of noise and vibration; – the likely effects on aquatic species at risk listed in Schedule 1 of the SARA, particularly the lake sturgeon population of southern Hudson Bay and James Bay, and the objectives of the associated management plans, recovery strategies, and action plans. The proponent is also encouraged to include species assessed by COSEWIC.	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Section 8.2.1.3 Chapter 9, Section 9.3.2 Chapter 13, Sections 13.2.3.2 and 13.2.3.3 Chapter 14, Sections 14.1 to 14.3
4 Migratory birds	The impact statement must describe and characterize the Project's effects on migratory birds as defined in the Migratory Birds Convention Act, 1994. From among the bird species likely to be present, the Project proponent may select birds or groups of birds to serve as indicators for assessing the effects. The proponent must select these birds or groups of birds, taking into account that different species and groups of species may be affected differently by the Project and may require different mitigation measures. The impact statement must also address each species of migratory bird listed as at risk under the SARA that is likely to be present in the Project area and affected by the Project, including: – Harlequin duck, Eastern population – Red crossbill, *percna* subspecies; – Common nighthawk; – Barrow's goldeneye, Eastern population – Bank swallow; – Olive-sided flycatcher; and – Yellow rail.	Chapters 6, 7, 8, and 9

Guidelines section (2025)		Corresponding chapter or section in the EIS
4.1 Baseline conditions	To describe the baseline conditions for migratory birds or groups of migratory birds and their habitats, the Project proponent must refer to the requirements of the COMEV Directive in Section 4.2, “Description of the environment.” These requirements primarily concern the description of the bird species present and their habitats, as well as the required mapping information. In addition to the information required in the COMEV Directive, and more specifically for the selected migratory birds, the impact statement must: – describe their population, distribution, seasonal patterns, migrations, movements, habitat use during relevant stages of their life cycle, and sensitive periods. These descriptions should include estimates of abundance or density, if available; – identify sites that are likely to be sensitive habitats for birds or environmentally significant areas (e.g., migratory bird refuges or other priority areas or refuges for birds, and national wildlife reserves); and – if it is a species at risk: • describe and locate on a map of appropriate scale the potential habitats, as well as the residences and critical habitat (if applicable), for each of them; • if inventories are conducted, mark the inventory locations and the species identified on a map; and • describe the threats and the applicable conservation or management objectives as set out in recovery strategies or management plans; In addition, the Project proponent must demonstrate whether existing data and recent studies are sufficient to assess the Project’s effects on migratory birds, taking into account the uncertainties and biases inherent in these sources. If existing data are insufficient, the proponent must conduct surveys, including: – targeted surveys to better determine the presence or location of migratory birds at risk that may require specific mitigation measures or special monitoring; – habitat characterizations to identify rare or important habitats at various stages of the bird life cycle (e.g., nesting), as well as habitats for migratory birds at risk; and – inventories when the risks or uncertainty associated with impacts on birds are moderate to high, or when the presence, population, or distribution of birds is poorly understood. These inventories would greatly facilitate the assessment of the effects.	Chapter 6, Section 6.3.4
4.2 Effects on birds	When assessing the effects on migratory birds, the Project proponent must refer to the requirements of the COMEV Directive in Section 5.1, “Identification and assessment of impacts.” These requirements primarily concern the survival and movement of birds and the destruction or alteration of their habitats, as well as species at risk and their habitats. In addition to the information required in the COMEV Directive, and more specifically for the selected migratory birds, the impact statement must describe:	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Sections 8.2.3.2 and 8.2.3.3 Chapter 9, Sections 9.3.4 and 9.3.5

Guidelines section (2025)		Corresponding chapter or section in the EIS
	– the pathways of potential effects on birds. The proponent must take into account the potential for mortality (e.g., collisions, predators, interactions with tailings ponds) and disturbance (e.g., light, noise, vibrations, air emissions, dust, and disturbance caused by the presence of workers); – the effects resulting from changes to bird habitat (e.g., degradation, destruction) and the effects on the critical habitat of at-risk migratory birds. This includes an assessment of habitat loss relative to the availability of habitat within or near the study area for each at-risk migratory bird species, as well as a map illustrating this impact and showing the footprint of the facilities.	
5 Indigenous Peoples	The impact statement must demonstrate how the impacts on Indigenous Peoples have been taken into account and measured, including: – the impacts of any environmental change on natural and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance; – any changes in the health, social, or economic conditions of Indigenous Peoples; and – the impacts on their rights. Indigenous groups are in the best position to understand how a project might affect them. The assessment of impacts on Indigenous Peoples and their rights must be conducted in collaboration with Indigenous groups, as outlined in the section titled “Description of engagement with Indigenous groups” in the Generic Requirements for Impact Statements. The proponent must work with Indigenous groups to incorporate information provided by them or concerning them into the assessment of impacts on VCs (e.g., biophysical VCs). Thus, the proponent must respect each Indigenous group’s preferences regarding impact assessments and consult with each group to determine whether it is appropriate to provide its findings regarding the impacts (residual and cumulative) on Indigenous Peoples and their rights. If an Indigenous group has provided its own conclusion, the proponent may use it in its impact statement. When the proponent’s conclusions differ from those of the Indigenous groups, they must be clearly documented and justified. The proponent is expected to engage all Indigenous groups identified in the Indigenous Engagement and Partnership Plan (IEPP) and to describe the results of this engagement in the impact statement. In addition, the results of the engagement must be analyzed and presented separately for each Indigenous group. This group-specific assessment does not need to repeat the full analysis of each VC, but should summarize and present the relevant information for each Indigenous group. Whenever possible, each group-specific assessment should be conducted in the manner that best suits that group. At the request of the Indigenous groups, all or part of the assessment of the impacts on Indigenous Peoples and their rights may be consolidated into a group-specific assessment. For example, the impacts on current use of lands and resources for traditional purposes and the impacts on hunting, fishing, and trapping rights can be assessed together. Indigenous groups can also identify holistic VCs that encompass various environmental, health, social, or economic components. Conducting these assessments jointly, when requested, will allow for consistent conclusions to be drawn. In any case, the impact statement must demonstrate that all requirements have been met.	Chapters 6, 7, 8, and 9

Guidelines section (2025)		Corresponding chapter or section in the EIS
	The proponent must pay particular attention to the pathway of effects, that is, to the changes to the environment that the Project could cause (e.g., air quality, wildlife) and the effects of these changes on Indigenous natural and cultural heritage, on structures, sites, or things of significance, on the current use of lands and resources for traditional purposes, and on the health, social, or economic conditions of Indigenous Peoples.	
5.1 Indigenous natural and cultural heritage and structures, sites, or things of significance	The impact statement must assess and clearly distinguish between the Project's impacts on natural and cultural heritage and its impacts on structures, sites, or things that are of historical, archaeological, paleontological, or architectural significance to Indigenous peoples. The proponent must follow the guidelines set forth in the Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing.	Chapter 6, Section 6.4
5.1.1 Reference conditions	The impact statement must: – describe the reference conditions associated with natural and cultural heritage, as well as with structures, sites, or things of significance to Indigenous peoples; – describe how past and current developments have affected natural and cultural heritage and the ability to pass on culture; and – indicate the locations of natural and cultural heritage elements and sites of significance on maps, provided that Indigenous groups have shared this information with the proponent and authorized its publication (if necessary, geographic data may be of lower resolution). Information regarding heritage and structures, sites, or things that are of significance to Indigenous groups—including information identified by them—may include, but is not limited to: – places of spiritual significance, including bodies of water and watercourses (particularly the La Grande River watershed), as well as navigable routes; – landscapes, places, plants, animals (including the woodland caribou, boreal population), things, people, or elements that are sacred, ceremonial, or culturally significant; and – other environmental components identified by Indigenous groups as having heritage value. The woodland caribou, boreal population, is a species of great significance to Indigenous Peoples, both in terms of cultural heritage and the ongoing use of resources for traditional purposes. To inform the impact assessment for caribou-related VCs, the impact statement must provide information on the baseline conditions for the woodland caribou, boreal population. To do so, the proponent must refer to the requirements of the COMEV Directive. The proponent must also refer to the 2020 Amended recovery strategy for the woodland caribou (Rangifer tarandus caribou), boreal population, in Canada, to complete its description of the baseline conditions specific to the woodland caribou, boreal population, in accordance with that strategy.	Chapter 6, Sections 6.4.1 to 6.4.3, and 6.4.7

Guidelines section (2025)		Corresponding chapter or section in the EIS
5.1 Impacts on Indigenous natural and cultural heritage and structures, sites, or things of significance	The impact statement must: – assess the potential impacts on natural and cultural heritage, as well as on structures, sites, or things that are of historical, archaeological, paleontological, or architectural significance to Indigenous groups, in particular: • the alteration, loss, or destruction of natural and cultural heritage, including the pathway of effects related to woodland caribou and the La Grande River watershed; • changes to access to sites related to natural and cultural heritage; • changes in cultural values, spirituality, or the importance placed on natural and cultural heritage; • changes to places, things or elements that are of sacred, ceremonial, or cultural significance, as well as languages, stories, cultural transmission, and traditions; and • changes to the visual appearance during the Project's lifespan and after the Project's closure. – assess any other impacts identified by Indigenous groups; and – provide copies of correspondence with provincial, territorial, or Indigenous authorities responsible for heritage resources, along with comments on any assessment of natural and cultural heritage resources.	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Sections 8.2.6.1 to 8.2.6.4 Chapter 9, Sections 9.3.9 to 9.3.12
5.2 Current use of lands and resources for traditional purposes	The impact assessment must assess the Project's impacts on the current use of lands and resources for traditional purposes. The analysis must follow the steps outlined in the document, Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA 2012.	Chapter 6, Section 6.4
5.2.1 Reference conditions	When information is provided and validated by Indigenous groups, the impact statement must describe the baseline conditions related to the current use of lands and resources for traditional purposes, including: – lands covered by treaties, title areas, land claims, or traditional territories (including maps); – how past and current developments have affected the current use of lands and resources; – reserves and communities; – any Indigenous protected and conservation area; – Indigenous governance systems and Indigenous laws related to the current use of lands and resources for traditional purposes; – traditional activities currently or historically practised (e.g., hunting, fishing, trapping, gathering plants or medicinal resources, access or transportation routes); – the baseline conditions for factors that may have a pathway of effects on the current use of lands and resources by Indigenous peoples, with sufficient detail to support the impact assessment, including: • the use of these species (scope, timing) and their availability as traditional foods or for other traditional purposes. Include a description of each key species, including the lake sturgeon, the woodland caribou—boreal population, the moose, the bear, the Canada goose, and the beaver, and indicate whether their consumption is culturally significant to Indigenous communities, including for medicinal purposes. To describe animal resources, excluding fish and birds, the proponent must refer to the requirements of the COMEV Directive, specifically Section 4.2, "Description of the environment";	Chapter 6, Sections 6.4.1 to 6.4.3

Guidelines section (2025)		Corresponding chapter or section in the EIS
	• for fish and birds, refer to the requirements of the section on fish and fish habitat and the section on migratory birds of the guidelines; • wherever possible, sites used in the study areas or historically important sites for the collection of country foods must be identified and mapped, such as important fishing sites; and • navigable waters and their uses, navigable waters users, and existing concerns regarding navigable water use and access; – any other current use identified by Indigenous groups.	
5.2.2 Effects on the current use of lands and resources for traditional purposes	The impact statement must assess the potential effects of the Project on the current use of lands and resources for traditional purposes, taking into account the context of historical and current cumulative effects and potential pathways of effects. This includes changes to: – the quality, perceived quality, and quantity of resources, as well as access to them; • With regard to the effects on terrestrial wildlife, including woodland caribou, which are of significance to Indigenous Peoples, the impact statement must refer to the requirements of the COMEV Directive in Section 5.1, “Identification and assessment of impacts,” to describe and assess the Project’s effects on terrestrial wildlife and wildlife habitat; • For the woodland caribou—boreal population, the analysis of the Project’s effects on the species must take into account both the current declining status and the historical status of the population. It must also explain how the Project and mitigation measures will be consistent with the 2020 Amended recovery strategy for the woodland caribou (Rangifer tarandus caribou), boreal population, in Canada. – the location, frequency, duration or timing of fishing, hunting, trapping, gathering, cultural or ceremonial activities and other traditional practices, including any avoidance of resources due to perceived quality; – the economic burden and increased time for travelling further to hunt, fish, trap and gather; – the Indigenous groups’ efforts to restore traditional practices; – the experience of being on the land (e.g., sensory and visual disturbances, the fragmentation of traditional territory, and any impact on well-being resulting from sensory changes); – the use of riverbanks, travel ways, navigable waterways and water bodies, including for social and ceremonial purposes, travel or recreation; and – any other use identified by Indigenous groups. The impact statement must also describe the effects on navigation and navigation safety arising from the following components and activities: – project components to be built in navigable waters; and – mining operations that could have an indirect effect on navigable waters.	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Sections 8.2.6.1 to 8.2.6.4 Chapter 9, Sections 9.3.9 to 9.3.12

Guidelines section (2025)		Corresponding chapter or section in the EIS
5.3 Health, social, and economic conditions of Indigenous Peoples	Baseline conditions should present health, social and economic conditions in a community-specific, disaggregated manner. Baseline conditions established for Indigenous communities must take into account Indigenous governance regimes and Indigenous laws associated with health and socio-economic conditions. The proponent should consult the following guidance documents: – Analyzing Health, Social and Economic Effects under the Impact Assessment Act; – Tools and approaches for assessing and supporting public health action on the social determinants of health and health equity; – Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls, particularly the Calls for Justice addressing the extractive and development industries (Calls for Justice 13.1 to 13.5); and – Indigenous Mental Wellness and Major Project Development - Guidance for impact assessment professionals and Indigenous communities.	Chapter 6, Section 6.4
5.3.1 Baseline health conditions	The impact assessment must describe the current state of physical, mental, and social well-being. The impact statement must: – develop community health profiles using the definitions of physical, mental, and social health and well-being specific to each Indigenous community consulted, where information is available; – describe the factors contributing to community health that are of interest to Indigenous Peoples, including factors contributing to community resilience and well-being; – identify and describe the biophysical and social determinants of health relevant to the Project and Indigenous communities. At the biophysical level, provide, in particular, the approximate location and distance of likely human receptors (including Cree campsites), including foreseeable and sensitive future receptors that could be affected by changes in air quality, water quality, country foods, and noise and light levels. At the social level, describe the access to health and social services, community support networks, as well as perceived and actual safety in and around mining operations; – describe sources of drinking water as well as the waters used for recreational or cultural purposes; – describe the level of food security and food sovereignty in Indigenous communities. For further information, please refer to the Public Health Agency of Canada's Food Security website and the First Nations Food, Nutrition, and Environment Study. – describe Indigenous Peoples' access to and consumption of country foods as a health-related behaviour (e.g., site-specific consumption studies, First Nations Food, Nutrition and Environment Study); and – provide baseline concentration of contaminants in air, drinking water, soil, and sediments (the proponent must refer to the requirements of the COMEV Directive; see Sections 4.2.1 and 4.2.2);	Chapter 6, Section 6.4.3

Guidelines section (2025)		Corresponding chapter or section in the EIS
	For country foods used and consumed by Indigenous communities, the proponent must first identify the species or resources for which there is a potential risk of increased contaminant levels, in collaboration with the Indigenous communities potentially affected. If a potential risk is identified, the proponent must assess this risk. The proponent must determine and justify whether existing baseline data can be used, or whether tissue or resource samples should be collected, and if so, determine the best sampling method in collaboration with Indigenous communities.	
5.3.2 Baseline social conditions	The impact statement must include community profiles to understand the context of each Indigenous community. These profiles must include: – a demographic profile of each Indigenous community consulted, and a list of important socio-cultural values; – a "Community Well-Being Index" profile for each Indigenous community consulted, using data publicly available on the Indigenous Services Canada website: The Community Well-Being index; – the psychosocial and sociocultural environment; – the relevant historical background of the communities; – applicable history relating to previous proponents and environmental liabilities, including hydroelectric projects (impacted water bodies, contamination thresholds, fish consumption recommendations, etc.); and – any other factors relevant to the Indigenous groups consulted. The impact statement must describe existing local and regional services and infrastructure in the study areas and their capacity, insofar as they relate to the social and health conditions of Indigenous communities.	Chapter 6, Section 6.4.3
5.3.3 Baseline economic conditions	The impact statement must describe: – the main economic activities of Indigenous Peoples in the study areas, including a description of the use of lands and watercourses for economic purposes; – an overview of Indigenous businesses that may provide supplies and services required for the Project; – information on economically active community members, including an overview of Indigenous participation in the local and regional workforce; – the availability of skilled and unskilled workers, and conditions influencing workforce availability during the Project's lifetime; – workforce development and training plans for Indigenous Peoples; – barriers to employment or participation in the labour market. – Indigenous or federal economic development plans for the study areas; and – the applicable provisions of the treaties concerning the economic activities of Indigenous Peoples.	Chapter 6, Sections 6.4.3 and 6.4.5

Guidelines section (2025)		Corresponding chapter or section in the EIS
5.4 Effects on the health, social, and economic conditions of Indigenous Peoples	The proponent must assess the effects of the Project on human health and on the social and economic conditions of potentially affected Indigenous communities. The proponent is encouraged to support the carrying out of this assessment by the affected communities. Given the holistic nature of First Nations health and well-being, all aspects outlined in the guidelines that may influence health and well-being must be taken into account in this assessment (e.g., Indigenous natural and cultural heritage; current use of lands and resources; health, social, and economic conditions). The impact statement must describe the interactions and interconnections between these effects and other VCs.	Chapters 7, 8, and 9
5.4.1 Effects on health conditions	The impact statement must: – present a health impact assessment, including biophysical and social determinants of health; – determine whether a human health risk assessment (HHRA) is required, taking into account the following elements: • current and future contaminants of potential concern (COPC); • current and future exposure pathways; and • a conceptual site model illustrating the links between COPCs, human receptors, and exposure pathways; – if an HHRA is not carried out, provide justification; and – if an HHRA is performed, assess all COPC exposure pathways and consider a multimedia HHRA for contaminants with multiple pathways. The proponent should refer to the Interim Guidance: Health Impact Assessment of Designated Projects under the Impact Assessment Act, and Health Canada's Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment	Chapter 7, Section 7.3, Table 7-1 Chapter 8, Section 8.2.5.1 Chapter 9, Section 9.3.7
5.4.1.1 Biophysical determinants of health	The impact statement must: – provide an assessment of the potential effects on the health of Indigenous communities, taking into account, in particular, potential changes to: • air quality, noise exposure and vibration effects. To describe the atmospheric environment, the proponent must refer to the requirements of the COMEV directive, specifically Section 5.1, Identification and assessment of impacts; • ambient light; • accessibility, availability, and current and future quality of country foods; • drinking water and water used for recreational and cultural purposes; and • any other effects identified by Indigenous groups, if applicable; – assess the cancer risks associated with human exposure to all the potentially carcinogenic polycyclic aromatic hydrocarbons present in diesel fuels, and characterize the carcinogenic risk of diesel engine exhaust;	Chapter 8, Section 8.2.5.1 Chapter 9, Section 9.3.7

Guidelines section (2025)		Corresponding chapter or section in the EIS
	– provide a justification if it is determined that an assessment of the potential for contamination of country foods is not necessary, or for any COPC[1] or non-negligible exposure pathways that would be excluded or eliminated from the HHRA; – document and take into account tolerance thresholds for potential adverse effects on health defined by Indigenous Peoples; and – describe any project-related changes that could have a positive impact on health (e.g., remediation projects).	
5.4.1.2 Social determinants of health	The impact statement must assess the impacts on the health of Indigenous Peoples from key social determinants of health, including those described in Sections 5.4.2 and 5.4.3 of the guidelines, as well as psychosocial factors such as: – perceived risks to human health and potential avoidance of certain places, water sources, or foods due to perceived contamination; – the resilience and well-being of Indigenous groups (e.g., due to changes in the relationship with the land, the role of stewardship, cultural continuity); – public safety concerns (e.g., risks of accidents or malfunctions related to project activities); and – the disruption of daily activities.	Chapter 8, Section 8.2.5.1 Chapter 9, Section 9.3.7
5.4.2 Effects on social conditions		Chapter 7, Section 7.3, Table 7-1 Chapter 8, Section 8.2.5.1 Chapter 9, Section 9.3.7
5.4.2.1 Effects on community well-being	The impact statement must: – assess the potential effects on community well-being taking into account: • changes to food security (including country foods), income inequity, and the cost of living; • changes resulting from population increase, particularly in terms of accessibility to housing and basic goods and services; • risks associated with the disruption of community, family, and household cohesion; and • he main sectors of the local economy, including traditional economic sectors;	Chapter 8, Section 8.2.5.1 Chapter 9, Section 9.3.7

1 COPC: Any chemical substance whose concentration in an environmental medium is likely to be elevated as a result of project activities may be considered a COPC in the first instance. However, if it is determined that the sum of modelled and background concentrations is below the guidelines, standards, or criteria—based on health protection—of the affected environment, the problem statement stage of the risk assessment may conclude that it is not necessary to treat this chemical as a COPC in a quantitative risk assessment.

Guidelines section (2025)		Corresponding chapter or section in the EIS
	– assess effects on access, ownership and use of resources (land, minerals, infrastructure, etc.); and – describe workforce interactions with Indigenous communities, including differential impacts, particularly on women and girls, in the context of the National Inquiry into Missing and Murdered Indigenous Women and Girls. The impact statement must describe the anticipated positive and adverse effects on local and regional services and infrastructure, including access to these services and infrastructure in the study areas insofar as they are related to social conditions.	
5.4.3 Effects on economic conditions	The impact statement must: – describe potential employment changes in employment for Indigenous communities, breaking down the data to provide an understanding, for each phase of the Project, of the number of available positions by type of employment (e.g., permanent or temporary; part-time or full-time; contract or employee; role and required skills); – describe potential changes in training opportunities for Indigenous communities; – estimate the capacity of the local and regional market to meet the demand for employees, and describe the potential risks of labour shortages, taking into account the different phases of the Project and other projects in the region; – indicate and describe, if applicable and if the communities concerned have agreed to share this information, any agreements on economic benefits concluded or planned with Indigenous groups; – provide an estimate of the anticipated levels of economic participation for Indigenous groups in comparison to the total Project requirements (e.g., total dollar value of contracts); – describe the situations where the Project could directly or indirectly create economic hardship or opportunities, such as job losses or the displacement of businesses to Indigenous communities near the site; and – describe any other effects identified by Indigenous groups, if applicable. The economic information provided will be made available to the public and must not contain confidential business information.	Chapter 8, Section 8.2.5.2
5.5 Rights and values of Indigenous Peoples	The *Impact Assessment Act* confirms the Government of Canada's commitment to ensure respect for the rights and treaties of the Indigenous Peoples of Canada, as recognized and affirmed by section 35 of the Constitution Act, 1982. The proponent is encouraged to refer to the following documents: Assessment of Potential Impacts on the Rights of Indigenous Peoples - Canada.ca; Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples; and the IAAC Guidelines of the Indigenous Advisory Committee: Principles to Guide the Assessment of Impacts to Indigenous Inherent and Treaty Rights. The values of Indigenous groups underpin and exemplify the exercise of these rights. These values, shaped by Indigenous knowledge, tradition, culture, and spirituality, emphasize the protection of the environment and the social fabric, the preservation of traditional ways of life, access to land, and sustainable development.	Chapter 6, Section 6.4.3

Guidelines section (2025)		Corresponding chapter or section in the EIS
5.5.1 Baseline conditions	The impact statement must: – describe the Aboriginal and treaty rights (e.g., JBNQA) of Indigenous peoples potentially affected by the Project, including the historical context, the scope of these rights, and their importance to the rights-bearing groups (e.g., practices, customs, beliefs, worldviews, and livelihoods); – document the values or concerns identified by the groups, as well as any thresholds that, if exceeded, could adversely affect their ability to exercise their rights in a meaningful way; and – document the cumulative impacts that already impede or could impede the ability to exercise rights or transmit Indigenous cultures and cultural practices. Indigenous groups must be involved in establishing baseline conditions regarding their rights.	Chapter 6, Section 6.4.3
5.5.2 Impacts on the rights and values of Indigenous peoples	The proponent must share studies and information about the Project and its potential impacts with Indigenous groups before assessing the Project's impact on their rights, and must collaborate with Indigenous groups to assess the impacts on those rights. The proponent, in collaboration with Indigenous groups, must document the potential impacts on Indigenous Peoples' rights, including the severity of the impacts the Project could have, as expressed by the potentially affected Indigenous Peoples. To do so, the proponent must take into account the following elements, where relevant: – the residual impacts on Indigenous Peoples' rights and cumulative impacts; – the effects of the Project on Indigenous cultures, traditions, laws, and governance; – the Project's impacts on planning, management, or stewardship of traditional lands and resources by Indigenous groups; – how the Project will change the ability of Indigenous groups to derive future economic benefits from, or maintain an ongoing relationship with, the land or water; – how the Project aligns with the values, political direction, and objectives of Indigenous groups in the fight against climate change; – how the Project and its impacts weaken or strengthen the authority of Indigenous groups on their territory; and – how the Project affects any other significant components identified by Indigenous groups. On treaty lands, the Cree and Inuit signatories to the JBNQA enjoy certain rights. For example, Section 24 of the JBNQA establishes a single regime for hunting, fishing, and trapping and recognizes certain rights related to these traditional activities. When preparing the impact statement, the proponent is encouraged to consider these rights, without being limited to them. When preparing the impact statement, the proponent is encouraged to consider the values of Indigenous groups, without being limited to them. For reference, the guiding principles in Section 22 of the JBNQA, paragraph 22.2.4, and the Cree Nation Mining Policy provide insights into Cree values in the context of development projects. Furthermore, the protection of traditional ways of life, access to healthy lands and wildlife resources, and the concept of "living well" in the natural environment are values of great significance to the signatories of the JBNQA.	Chapter 8, Sections 8.2.6.1 to 8.2.6.4 Chapter 9, Sections 9.3.9 to 9.3.12

Guidelines section (2025)		Corresponding chapter or section in the EIS
	The impact statement must: – describe the solutions to the concerns raised regarding the impacts on the exercise of rights, as agreed upon by Indigenous groups; – describe the methodology used and accepted by Indigenous groups to assess the impacts on their rights, and include all Indigenous-led studies that have been provided, provided that permission has been obtained from the Indigenous group for this purpose; and – provide an explanation when an Indigenous group has not communicated its views to the proponent regarding the Project's impact on its rights, or when the proponent and an Indigenous group, in consultation with the IAAC, agree that the Indigenous group will provide information on the impacts on its rights directly to the IAAC.	
6 Contributions to inform decision-making	At the decision-making phase of the IAA, should the decision maker determine that the adverse federal effects that are likely to be caused by the Project are likely to be, to some extent, significant, the decision maker must decide whether they are justified by the public interest in light of the extent to which they are significant and of the factors set out in section 63 of the IAA. The requirements in this section of the guidelines may inform the analysis of these factors.	Chapters 6, 7, 8, 9, and 11
6.1 Canada's environmental obligations and climate change commitments	The committee, with the support of federal authorities, will analyze the Project's likely effects in the context of Canada's environmental obligations that apply to the Project, and will analyze the Project's greenhouse gases (GHG) emissions in the context of Canada's emissions targets and forecasts. The information gathered during the planning phase, including information on similar development projects, suggests that the Project's effects would generally not contribute to the Government of Canada's ability to meet its environmental obligations and climate change commitments. This is due to the Project's footprint on the receiving environment (e.g., habitat loss resulting in adverse effects on biodiversity, diversion of Lake 01) and to the potential emissions caused by the Project (e.g., GHG emissions). If the proponent is of the view that the likely effects of the Project may contribute to the Government of Canada's ability to meet its environmental obligations or climate change commitments, the proponent is encouraged to substantiate this view by describing these likely effects and the extent of their contribution (e.g., net positive impacts on biodiversity through habitat recovery, net negative GHG emissions through carbon capture).	Chapter 6, Section 6.2.3 Chapter 7, Section 7.3, Table 7-1 Chapter 8, Section 8.2.7 Chapter 9, Section 9.3.13 Chapter 11 (Climate change resilience)
6.1.1 Environmental obligations	Federal environmental obligations relevant to this Project include: – Canada's Nature Strategy 2030 and other legislation that supports the implementation of Canada's biodiversity commitments, including SARA and the *Canada Wildlife Act* (1985), as well as related policies and guidance documents; – SARA recovery strategies and action plans for all species at risk potentially affected by the Project; – the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar), as implemented in part under the Federal Policy on Wetland Conservation and related guidance documents such as the North American Waterfowl Management Plan; and	Chapter 6, Sections 6.3.1 to 6.3.8 Chapter 7, Section 7.3, Table 7-1 Chapter 8, Sections 8.2.1.3, 8.2.3.2, 8.2.3.3, and 8.2.3.4

Guidelines section (2025)		Corresponding chapter or section in the EIS
	– the Convention for the Protection of Migratory Birds in the United States and Canada, as implemented in part by the Migratory Birds Convention Act (1994), and supporting guidance documents on conservation objectives derived from bird conservation regions and strategies. The impact statement must provide a list of SARA Schedule 1 species likely to occur in the study areas and identify the likely effects of the Project on these species and their critical habitat, and outline the measures that will be taken to avoid or mitigate these effects and to monitor them. The impact statement must refer to the descriptions of effects already provided for VCs in other parts of the impact statement, as appropriate. The proponent is also encouraged to refer to the most recent COSEWIC annual report, and to include other species assessed by COSEWIC as extirpated, endangered, threatened or of special concern. Where the proponent is of the view that the likely effects of the Project contribute to the Government of Canada's ability to meet its environmental obligations, the proponent is encouraged to: – describe the initiatives or actions the proponent wishes to implement and that could contribute to the environmental obligations listed above; and – with respect to biodiversity[2]: • describe and, if possible, quantify the likely changes to biodiversity resulting from the Project by referring to relevant guidelines such as the Convention on Biological Diversity's Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment; • describe whether and how, by applying the mitigation hierarchy, the Project would result in no net loss or net positive impacts on biodiversity; and • describe whether and how the likely effects of the Project will contribute to achieving the goals set out in Canada's Nature Strategy 2030.	Chapter 9, Sections 9.3.2, 9.3.4, and 9.3.5
6.1.2 Climate change commitments	Where the proponent is of the view that the likely effects of the Project contribute to the Government of Canada's ability to meet its climate change commitments, the proponent is encouraged to describe the initiatives or actions the proponent wishes to implement to contribute to the fulfilment of commitments. The proponent is also encouraged to assess the Project's GHG emissions in accordance with the Strategic Assessment of Climate Change (SACC) developed by ECCC, including the draft Technical Guidance on quantification of net GHG emissions, the impact on carbon sinks, mitigation measures, the net-zero plan, and the upstream GHG assessment. The committee invites the proponent to keep apprised of updates to the SACC and related technical guides published by ECCC. The proponent can also refer to the COMEV directive, more specifically to section 3.9, GHG emissions, climate change mitigation, and adaptation. The proponent should consider the strategies in place and the efforts made by local, regional, and national actors to fight climate change in the Eeyou Istchee region.	Chapter 6, Section 6.2.3 Chapter 7, Section 7.3, Table 7-1 Chapter 8, Section 8.2.7 Chapter 9, Section 9.3.13 Chapter 11 (Climate change resilience) Chapter 13, Section 13.2.2.2

2 The Convention on Biological Diversity defines biological diversity, or biodiversity, as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

Guidelines section (2025)		Corresponding chapter or section in the EIS
6.2 Project's contribution to sustainability	Sustainability is the ability to protect the environment, contribute to the social and economic well-being of the people of Canada, and preserve their health in a manner that benefits present and future generations. The information contained throughout these guidelines can be used to support sustainability analysis.	
6.2.1 Social and economic well-being of the communities	The developer is encouraged to refer to the requirements of the COMEV Directive in Sections 4.2.2, "Social environment" and 5.1.2, "Social environment." These requirements mainly concern the local and regional economy and land use. In addition to the information required in these sections of the COMEV Directive, the proponent is encouraged to include in its impact statement a description of: – the potential for workforce and economic development based on local and regional economic activities and workforce capacity, including the anticipated region of origin of the workforce (i.e., local, regional, out-of-province, or international employees); and – the economic benefits to Canadians, including growth in gross domestic product and tax revenues, as well as indirect benefits such as investments in the development and adoption of clean technologies and the growth of innovative businesses, clusters, and supply chains in Canada (e.g., by providing essential minerals needed for the global transition to a net-zero economy).	Chapter 6, Section 6.4.5 Chapter 8, Section 8.2.5.2 Chapter 13, Section 13.2.4
6.2.2 Extent to which the likely effects of the Project contribute to sustainability	The impact statement must provide an analysis of the extent to which the positive and adverse effects likely to result from the Project contribute to sustainability, according to the following steps: – identify the key VCs from Section 1.2, "Selection of valued components," as well as any other VC relevant to the well-being of Canadians and local communities (e.g., economic and social benefits), in order to include them in the sustainability analysis; – establish temporal boundaries, considering how effects on the identified VCs could affect future generations, including beyond the life cycle of the Project; and – provide an analysis to determine the extent to which likely positive effects and likely negative federal effects make a net positive contribution to sustainability (based on the criteria of no contribution, to low, moderate, or high contribution): • consider the interconnectedness and interdependence of human-ecological systems; • consider the well-being of present and future generations; • consider positive effects and reduce the adverse effects of the designated project; and • apply the precautionary principle, and consider the uncertainty and the risk of irreversible harm.	Chapters 4, 5, 8, 9, 13 and 14

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ABBREVIATIONS AND ACRONYMS

2ELGBTQ+	Two spirits, Lesbian, Gay, Bisexual, Transgender, queer, intersex and others
3RV	Reduction at the source, reuse, recycling, and recovery (residual materials)
AACE	Association for the Advancement of Cost Engineering
AARQ	Atlas of Amphibians and Reptiles of Quebec
AAS	Atomic Absorption Spectrometry
ABA	Static testing
AISC	*All-in Sustaining* Cost
AMCE	Other Effective Conservation Measures
AMQ	Mining Association of Quebec
AONQ	Atlas of Breeding Birds of Quebec
API	*American Petroleum Institute*
APNQL	Assembly of First Nations of Quebec and Labrador
ARBJ	James Bay Regional Administration
ARC	Canada Revenue Agency
ARIA	Accident Analysis, Research, and Information (French database)
ATI	Authorisation for impacting exploration work
ATM	Bank ATMs
ATV	All-Terrain Vehicle
BAB	Acid-base balance
BARPI	Office for the Analysis of Industrial Risks and Pollution (French Ministry of Ecology and Sustainable Development)
BBS	*Breeding Bird Survey*
BESS	*Battery Energy Storage* System
BEV	Battery-powered mining equipment

BEX	Exclusive operating leases
BV	Watersheds
CACA	Red minnow (*Catostomus catostomus*)
CACO	Black mullet (*Catostomus commersonii*)
CAEFMVQ	Advisory Committee on Threatened or Vulnerable Wildlife Species in Quebec
CAPEX	Capital Expenditures
CASP	Mullet sp. (*Catostomus sp.*)_
CBDG	*Chisasibi Business Development Group*
CBSC	*Chisasibi Business Service Center*
CCCEP	Canadian Council for the Conservation of Endangered Species
CCE	Commission for Environmental Cooperation
CCME	Canadian Council of Ministers of the Environment
CCQ	Quebec construction commission
CCSSSBJ	Cree Health and Social Services Board of James Bay
CDA	Canadian Dam Association
CDPNQ	Quebec Natural Heritage Data Centre
CEAEQ	Quebec Centre of Expertise in Environmental Analysis
CEP	Concentration likely to cause an effect
CER	Concentration causing rare effects
CERRI	Chisasibi Eeyou Research and Resource Centre
CFIA	Canadian Food Inspection Agency
CFP	Professional training center
CFTP	Surface Water Quality Criteria – Protection of Fish-Eating Terrestrial Wildlife by the MELCCFP
CIE	International Commission on Illumination
CIM / ICM	Canadian Institute of Mining
CIP	Carbon-in-pulp (process)

CLSC	Local Community Service Centre
CMEB	*Cree Mineral Exploration Board*
CMC	*Miyupimaatisiiun* community center
CNESST	Commission on Occupational Health and Safety Standards
CNG	Cree Nation Government
CNG	Compressed natural gas
CNPI	National Fire Prevention Code
Co	Hilly landscape
COCL	Whitefish (*Coregonus clupeaformis*)
COFEX	Federal Review Committee
COMEV	Committee for the Assessment of Environmental and Social Impacts
COMEX	Committee for the Review of Environmental and Social Impacts
COPC	Potentially Concerning Contaminant
COPD	Chronic obstructive pulmonary disease
COPL	Lake chub (*Couesius plumbeus*)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSP	Chub (sp.)
COT	Total Organic Carbon
CPC (EO)	Surface Water Quality Criteria – Prevention of Contamination (Water and Aquatic Organisms) by the MELCCFP
CPC (O)	Surface Water Quality Criteria – Prevention of Contamination (Aquatic Organisms Only) from MELCCFP
CPE	Early Childhood Centre
CRAIM	Council for the reduction of major industrial accidents
CRE	Regional Conference of Elected Officials
CREECO	*Cree Regional Economic Enterprises Company*
CRSP	*Coregonus sp.* (fish)
CRSSSBJ	James Bay Regional Health and Social Services Centre

CSE	Concentration threshold producing an effect
CSMO Mines	Mining Industry Labor Sector Committee
CTA	*Cree Trappers' Association*
CVAA	Acute aquatic life criteria
CVAC	MELCCFP Surface Water Quality Criteria – Protection of Aquatic Life (Chronic Effect)
CVE	Valued Components of the Environment
CYPR	*Cyprinidae* (fish)
DDT	Dichlorodiphenyltrichloroethane (insecticide)
DEE	Exclusive exploration rights
DFO	Department of Fisheries and Oceans
DHP	Diameter at breast height
DJC	Growth degree-days
DJR	Cooling degree-days
DMS	Dense-medium separation
DRA	Acid rock drainage
DRE	Explosives Regulation Division
DRL	Limited-range enumeration
ECCC	Environment and Climate Change Canada
EDF	Meltwater
EE	Environmental evaluation
EIA	Environmental Impact Assessment
ELOS	*Equivalent Linear Overbreak Slough* (dilution model)
EPC	*Eeyou Planning Commission*
ERA	Impact and Benefit Agreement
ERSH	Human Health Risk Assessment
ESEE	Environmental Effects Monitoring Study
ESLU	Northern pike (*Esox lucius*)

EVD	Endangered species
EVEE	Invasive alien plant species
FIFO	Fly-in/Fly-out
FIRFF	Forest Fire Reconstruction Initiative Fund
FISIM	Mining Industry Social Investment Fund
FLAP	*Fatal Light Awareness Program*
FOB	*Free on board* (shipping costs not included)
GC	Government of Canada
GCC	Cree Grand Council
GDP	Gross Domestic Product
GHG	Greenhouse gases
GIRT	Integrated Resource and Land Management
GJ	Gigajoule
GPS	Global Positioning System
GREIBJ	Eeyou Istchee James Bay Regional Government
HA	*Highly Annoyed* (noise criterion)
HCT	Kinetic tests
HG	High-grade ore
HIV	Human Immunodeficiency Virus
HP	Petroleum hydrocarbons
HQ	Hydro-Québec
HRT	Hydraulic retention time
IAAC	Impact Assessment Agency of Canada
IC	Total abundance index
ICM	Canadian Institute of Mining
IDF	Reference flood
IFM	Forest-Weather Index (related to wildfires)

INRP	National Pollutant Release Inventory
IPA	Point Abundance Index
ISO	International Organization for Standardization (quality)
ISQ	Quebec Institute of Statistics
JBNQA	James Bay and Northern Quebec Agreement
La	Lake landscape
LCE	Lithium carbonate equivalent
LCMVF	Act respecting the conservation and development of wildlife
LCT	Lithium, Cesium, and Tantalum
LDR	Reported Detection Limit
LEET	Trench landfills
LEI	Environmental Impact Assessment Act
LEMV	Act respecting threatened or vulnerable species
LEMVQ	List of Threatened or Vulnerable Wildlife Species in Quebec
LEP	Species at Risk Act
LG	Low-grade ore
LHD	*Load-Haul-Dump* (specialized vehicle)
LHOS	Long-Hole Open Stoping (long-hole drilling and blasting)
LiDAR	Light Detection and Ranging
LII	Lower flammability limit
LLDPE	Linear Low-Density Polyethylene Membrane
LNC	Unincorporated community
LNG	Liquefied natural gas
LOLO	Lotte (*Lota lota*)
LOM	Mine life
LOWL	Lowest water level
LPG	Liquified propane gas

LQE	Environmental Quality Act
LSB	Dam Safety Act
LSI	Upper Flammability Limit
LTE	Energy transport line
M	Threatened
MAMA	Pearl mullet (*Margariscus margarita*)
MBBR	Moving Bed Biofilm Reactor
MBR	Membrane bioreactor
MCN	Mistissini Cree Nation
MCS	Critical and strategic minerals
MDF	Dense-medium separation of fines
MDG	Dense-medium separation of coarse particles
MDMER	*Metal and diamond mining effluent regulations*
MDR	Dense medium separation of re-crushed material
MDUF	Ultra fine separation in dense medium
MELCC	Ministry of the Environment and Climate Change
MELCCFP	Ministry of the Environment, Climate Change, Wildlife, and Parks
MERN	Ministry of Energy and Natural Resources
MES	Suspended solids
MFFP	Ministry of Forests, Wildlife, and Parks
MISQ	Quebec intersectoral model
ML	Metal leachate
MM	Moving average
MMU	Mobile manufacturing units
MOWL	Highest water level
MRNF	Minister of Natural Resources and Forests
MT	Megaton

MTESS	Ministry of Employment and Social Solidarity
MTMD	Ministry of Transport and Sustainable Mobility
MTQ	Quebec Ministry of Transport
MW	Megawatt
NCC	Chisasibi Cree Nation
NCM	National Community of Managers
NCQAA	Canadian Ambient Air Quality Standards
NCQQA	Quebec Air Quality Standards and Criteria
NCW	Wemindji Cree Nation
NEP	Not at risk
NEQ	Quebec Business Number
NFPA	*National Fire Protection Association*
OER	Environmental Discharge Objectives
OPEX	Operating costs
ORP	*ORP*
OSRCPC	Cree Hunters and Trappers Income Security Office
P	Worrying
PAH	Polycyclic Aromatic Hydrocarbons
PCCN	Joint Plan for the American Wigeon
PGA	Acid Generation Potential
PHAST	*Process Hazard Analysis Software Tool*
Pl	Undulating plain landscape
PMET	PMET Resources
PMNC	Cree Nation Mining Policy
PMPA	Aboriginal Mobilization and Partnership Plan
PMT	Total Particles
PMU	Emergency Response Plan

PN	Northern Projects
PNCC	Chisasibi Cree First Nation
PNM	Mistissini Cree First Nation
PNW	Cree First Nation of Wemindji
POETS	Costs, Operations, Environment, Technical, Social
PPMU	Preliminary Emergency Response Plan
PQVMCS	Quebec Plan for the Valorization of Critical and Strategic Minerals
PRCY	Round-leaved Menominee (*Prosopium cylindraceum*)
PRP	Global warming potential
PSE	Economic Security Program
PSR	Income Security Program for Cree Hunters and Trappers
PST	Total Suspended Particles
PTRA	Gross Vehicle Weight Rating
PUE	Smallest extraction unit
RAA	Air Quality Regulation
RADF	Regulations on Sustainable Forest Management
RCM	Regional County Municipality
RCO	Bird Conservation Areas
RCQE	Canadian Environmental Quality Guidelines
RDOCECA	Regulations on the Mandatory Reporting of Certain Atmospheric Contaminant Emissions
REAFIE	Regulations on the Regulation of Activities Based on Their Environmental Impact
REMMMD	Regulation respecting effluents from metal and diamond mines
RES	Criteria for Resurgence in Surface Water
RFID	Radio Frequency Identification
RGBS	Suspended Bed Biological Reactor
RLRQ	Compilation of the Laws and Regulations of Quebec

RLRUP	*Regional Land and Resource Use Plan*
RNC	Natural Resources Canada
RNSPA	National Air Pollution Monitoring Network
ROM	Raw Ore Stockpiles
RSQAQ	Quebec Air Quality Monitoring Network
RUE	Regulation on Environmental Emergencies
SAAQ	Quebec Automobile Insurance Corporation
SADC	Community Development Assistance Corporation
SAFO	Brook trout (*Salvelinus fontinalis*)
SANA	Lake trout (*Salvelinus namaycus*)
SDBJ	James Bay Development Corporation
SDC	Cree Development Corporation
SDMV	Likely to be designated as threatened or vulnerable
SEC	Business and Community Services
SEG	Scientific, Educational, or Wildlife Management (permit)
SGSS	Health and Safety Management System
SIGEOM	Geomining Information System
SLSP	*Salvelinus sp*. (fish)
SMB	White Nose Syndrome
SME	Small and medium-sized enterprises
SMS	*Short Message Service* (text messaging)
SMVD	Likely to be designated as threatened or vulnerable
SOPFEU	Society for the Protection of Forests Against Fire
SPEDE	Cap-and-trade system
SPLP	*Synthetic Precipitation Leaching Procedure*
SPN	Northern plan Society
SRPNI	Secretariat for Relations with First Nations and Inuit

STE	Water Treatment Plant
TCLP	*Toxicity Characteristic Leaching Procedure*
TDFN	Natural background levels
TRAF	Rivière aux Feuilles herd (caribou)
TRG	George River herd (caribou)
UAF	Forest Management Units
UF	Ultrafiltration (treatment)
UGAF	Fur Animal Management Units
UNKN	Unidentified species
UTM	Universal Transverse Mercator
UV	Ultraviolet
V	Vulnerable
Va	Valley landscape
VOD	Video on Demand
WHMIS	Workplace Hazardous Materials Information System
XRD	X-ray diffraction room
YKU	Chisasibi Airport (code)
ZEL	Local study area
ZER	Regional study area

GLOSSARY

Acid-generating potential	The acid-generating potential associated with the oxidation of tailings.
Anthropogenic	Refers to phenomena that essentially result from man’s direct or indirect intervention.
Aquifer	A geological stratum or formation that is sufficiently porous and permeable to stock a significant quantity of water while being sufficiently permeable to allow water to flow freely through it.
Background concentration	The concentration of a chemical substance that corresponds to said substance’s ambient presence.
Carbon oxide equivalent (CO2 eq.)	A unit used to compare the radiative forcing of a GHG to carbon dioxide.
Criteria	Concentrations of a contaminant that, if they are exceeded, risk causing a complete or partial loss of the use for which they were established.
Deposit	A series of mineral layers in the ground. A mineralized zone that is large enough to justify its commercial development.
Dewatering	The action of evacuating infiltration water from a mine.
Effluent Discharge Objectives	The maximum concentrations and loads of different contaminants that may be released into a receiving environment while ensuring the maintenance or retrieval of their uses.
Expected detection limit	The detection limit associated with the analytical method of a given parameter specified in the list of analytical methods published by the Centre d’analyse environnementale du Québec of the MELCCFP.
Extraction	The action of removing mineral material from excavation - open pit or underground.
Filter press	An intermittently operating filter consisting of a series of flat vertical filtering surfaces into which the pulp to be filtered is injected under pressure. The pulp is released by separating the filter plates.
Final effluent	Mine wastewater that is no longer treated before being released at the discharge point into the receiving environment or a sewer system.

Flood period	A significant increase in the water flow (and consequently the level) of a watercourse, a lake or a reservoir, most often attributable to precipitations or melting snow.
Geochemistry	The study of the chemical behaviour of the elements, in particular in rocks (magmatic, metamorphic and sedimentary) as well as in water (coastal and marine) and the atmosphere.
Glaciary deposits	Continental sediments originating from matter ripped off by a glacier.
Greenhouse gas	Gaseous component in the atmosphere, both natural and artificial, that absorbs and re-radiates the infrared radiation of a specific wavelength emitted by the surface of the Earth, the atmosphere and the clouds.
Hazardous material	A material which, by reason of its properties, is a hazard to health or to the environment and which is explosive, gaseous, flammable, poisonous, radioactive, corrosive, oxidizing or leachable or is designated as a hazardous material, and any object classed by regulation as a hazardous material by virtue of the Environment Quality Act.
High water	Elevation of the water level following abundant rainfalls or melting snow or ice.
High-water mark	This line is located at the natural high-water mark, i.e., where the predominance of aquatic plants passes to a predominance of terrestrial plants or, if there are no aquatic plants, where the terrestrial plants stop towards the body of water. This mark delineates the shorelines and shores of lakes and watercourses.
Hydraulic conductivity	A property of geological materials that characterizes the ease with which they allow the movement of water.
Hydrogeological conditions	A set of elements and characteristics that define the hydrology (groundwater science) and geology of a sector. It includes, among other things, the hydrostratigraphic units, granulometry and hydraulic properties of geological materials as well as groundwater levels and characteristics.
In situ	Latin expression that means on site.
Land use	The traditional and contemporary use of resources and the full occupation of the traditional territory.
Leaching tests	These tests make it possible to establish the risks associated with the potential leaching of toxic substances into the groundwater table.

Lixiviation	A technique consisting of using a solvent, namely water flowing in the soil or a substrate containing toxic products, to extract soluble products.
Low water level	The lowest recorded level of a watercourse or any other body of water.
Low-water period	The period of the year during which the flow of a watercourse reaches its lowest level (minimum flow).
Maternity	A fauna breeding site.
Mine water	Water, not including domestic wastewater, that is pumped from a mine excavation to keep it dry during exploration and development operations.
Mining lease	A mineral title that confers on its holder, on a given public territory, the exclusive right to mine mineral substances, except for those found on the surface. Since 1966, mining leases have replaced mining claims for new applications to operate.
Mitigation measure	A measure designed to reduce or eliminate the adverse effects of a project.
Modelling	The design of a model, i.e., a diagram representing a defined system, chosen following its intended use, followed by the development of a simulator (or an analogue, digital or other simulation model) of the system.
Observation well	A well used to observe, on an episodic or regular basis, a characteristic of the groundwater that may vary: level, chemical quality, temperature, etc. More specifically, a well used to measure the hydraulic load of a water table, in general near its surface, by surveying the depth of the table, and to observe its natural or influenced variations, through periodic measurements (less rigorously than when using a piezometer).
Organic matter	A substance of biological origin that results from the decomposition of plant debris, dejections and animal carcasses.
Outflow	A watercourse that releases the water of a lake or pond.
Overburden	The unconsolidated natural layer of sediments that must be penetrated to reach the economic material, i.e., soil that does not contain any material of value to mining companies.
Pond	A wetland with a water level of less than 2 m during the low-water season. It is characterized by the presence of floating or submerged aquatic vegetation as well as emergent vegetation covering at least 25% of the environment's surface area. Temporary ponds, often called vernal or forest pools, are shallow (< 1 m), isolated and usually fed in water by precipitations, melting or the water table. Ponds retain stagnant water in the spring for a period of approximately two months and then dry out during

	the summer. Given they are not inhabited by fish, they tend to favour species that are adapted to the recurrent flood/drought cycles such as salamanders and certain frog species.
Post-rehabilitation	The period that follows the end of the rehabilitation work planned to return the receiving environment to a satisfactory state for its protection.
Receiving environment	The environment in which the project unfolds and that is likely to be affected by the completion of the project.
Recirculation	Action by which mine wastewater is retrieved to be reused in equipment and processes.
Reference state	The characteristics of an environmental component as they were before the project.
Shoreline	The part of a lake or watercourse that extends from the high-water line to the centre of the body of water.
Special status species	Special status species are plant and animal species at risk according to the MELCCFP, i.e., those that are designated as threatened or vulnerable Québec by virtue of the Act respecting threatened or vulnerable species and those that are likely to be designated as such as well as plant and animal species that are at risk in Canada by virtue of the Species at Risk Act.
Stockpile	Land where mineral substances, topsoil, concentrates or mine tailings are accumulated.
Surface mineral substances	Peat; sand including silica sand; gravel; limestone; calcite; dolomite; common clay and argillaceous rocks used in the manufacture of clay products; all types of rocks used as dimension stone, crushed stone, silica or mineral in the making of cement; and every mineral substance that is found in its natural state as a loose deposit, except the tilth, as well as inert mine tailings, where such substances and tailings are used for construction purposes, for the manufacture of construction materials, or for the improvement of soils (chapter I-1, Mining Act).
Surface or superficial deposits	Unconsolidated sediments (clay, sand, gravel, stones, etc.) of various origins, natures, morphologies and thicknesses that rest on the surface of the bedrock.

Tailings	Solid or liquid substances, with the exception of the final effluent, resulting from the extraction, preparation, enrichment and separation of an economic material, including the sludge and dust resulting from the treatment or purification of mine wastewater or air emissions. Are considered as tailings the slag and sludge, including sewage sludge, released during the treatment by pyrometallurgy, hydrometallurgy or electroextraction. Are also considered as tailings the substances released during the extraction of a marketable substance from tailings and that correspond to those already defined in the first two paragraphs. Are excluded the tailings resulting from the working of a pit within the meaning of the Regulation respecting pits and quarries (R.Q., c.Q-2, r.2).
Tallyman	A trapper in charge of supervising other trappers and whose primary responsibility is managing animal populations within the limits of the land for which he is responsible.
Topsoil	Surface soil that is composed of a mix of organic matter as well as sand, silt and clay or a combination thereof and that is conducive to vegetation growth.
Traditional practices (traditional activities)	All of the traditional hunting, fishing, gathering and general activities as well as land and resource use activities for livelihood, ritual and social purposes.
Tributary	A watercourse that flows into a larger watercourse or into a lake (affluent).
Unconsolidated deposits	Unconsolidated matter that covers a deposit or the bedrock.
Waste rock	Rocks that do not contain enough minerals to make them economically viable.
Water table	The underground water table that feeds catchment works. The water table is the first table of groundwater under the soil surface.
Watercourse	Any water mass that flows into a bed at a regular or intermittent rate, including those created or modified by human intervention as well as the St. Lawrence River and the Gulf of St. Lawrence and all seas surrounding Québec.
Watershed	A watershed is a territory, bounded by drainage divides, over which water flows to a single point called an outflow.

1 Introduction

The Shaakichiuwaanaan mining project (the "project") located in northern Quebec, within the Cree territory of Eeyou Istchee, is undergoing a detailed environmental impact assessment, which is described in this report. Further information on the project integration context, the regulatory context, and the rationale for the project is presented in Chapter 2. It should be noted from the outset that this impact assessment, while not applying a formal issues-based approach, takes into account issues that reflect the concerns of stakeholders in the project's context. This aspect will be particularly evident from chapter 7 onwards.

In addition to this introduction, the project impact assessment report consists of 15 chapters, including:

- the context and rationale for the project (Chapter 2);
- the record of communication activities and ongoing stakeholder and community relations approach (Chapter 3);
- a description of the project alternatives considered (Chapter 4);
- a description of the construction and operations of the mining project (Chapter 5);
- a description of the biophysical and socioeconomic components of the area where the project will be carried out (Chapter 6);
- a presentation of the key issues identified based on the main concerns of the project stakeholders (Chapter 7);
- the methodological approach adopted and the analysis of the impacts associated with project activities (Chapter 8);
- the assessment of the project's cumulative impacts (Chapter 9);
- the residual impacts identified in the analysis (Chapter 10);
- the assessment of the project's resilience to anticipated climate change (Chapter 11);
- the assessment of risks and hazards associated with the construction and operations phases of the mining project (Chapter 12);
- a description of the environmental monitoring and follow-up program that will be implemented (Chapter 13);
- a description of the proposed habitat compensation programs (Chapter 14);
- the references cited in this report (Chapter 15).

1.1 About the proponent

1.1.1 Proponent's experience

PMET Resources (PMET) is a mineral exploration company focused on acquiring and developing base metal and critical minerals and strategic mining projects.

In 2023, PMET created a wholly owned Quebec subsidiary, Innova Lithium Inc. (Innova), which is the registered claim owner of the Shaakichiuwaanaan project, the proponent's flagship property located in the Eeyou Istchee James Bay region of Quebec, Canada. PMET is a publicly traded company listed on the Toronto Stock Exchange (TSX: PMET, ASX: PMT, OTCQX PMETF, WB: R9GA), which was incorporated in 2007 under the British Columbia regime (*Business Corporations Act*, S.B.C. 2002, c. 57). The corporation's head office is in Montréal. PMET also has offices in Australia, Chisasibi, and at the exploration camp north of the Shaakichiuwaanaan property.

PMET, which owns 100% of the Shaakichiuwaanaan property, wishes to pursue development of the project, namely a mining complex consisting of an open pit and underground mine workings, for the purpose of extracting spodumene pegmatites containing lithium.

The planned extraction of spodumene from the property at a rate exceeding 5 kt per day is therefore subject to federal and provincial environmental and social impact assessment regimes applicable to the territory covered by the James Bay and Northern Quebec Agreement (JBNQA) (south of the 55th parallel—via the Evaluating Committee [COMEV] and the Review Committee [COMEX]), as well as to the federal impact assessment procedure provided for under the Impact Assessment Act (S.C. 2019, c. 28, s. 1).

A directive has been issued by the Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP)[1] for the project (réf. : 3214-14-072; mars 2024 [MELCCFP, 2024]). A directive was also issued by the Impact Assessment Agency of Canada on August 18, 2025 (ref.: 89271; IAAC, 2025)

The contact details of the project initiator and its representative are provided in Table 1-1.

Table 1-1 Contact details for the proponent and its representative

Name of project initiator	PMET Resources (PMET)
NEQ (Quebec Enterprise Number)	1173512535
Civic address	1801 McGill College Avenue, Suite 900 Montréal, Quebec H3A 1Z4
Name and position of representatives	Grace Barrasso, EVP Corporate Affairs **Cathryn Moffett, VP Environment and Permitting**
Phone number	438-334–4968
Email	cmoffett@pmet.ca
Website	www.pmet.ca

1 Formerly the Ministère de l'Environnement du Québec (MENV), the Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP), the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), and the Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). The acronym MELCCFP will be used to refer to this department throughout the report, regardless of when the documents are published.

1.1.2 Policies, corporate initiatives, and environmental and sustainable development agreements

As part of its activities, PMET considers social, environmental, and ethical responsibility to be of paramount importance. To ensure rigorous and transparent management of its projects, the company has adopted policies and codes of conduct that govern its practices in the following key areas: environment, community relations, health and safety, responsible procurement and supplier conduct, and cultural heritage (available on its website: Lithium Exploration | PMET RESOURCES (www.pmet.ca)). The following sections provide a summary of each policy and code of conduct.

Community Relations Policy

PMET places great importance on the quality of its relationships with the communities that host it. The company is committed to establishing open, ongoing, and respectful dialogue with all stakeholders, whether Indigenous or otherwise, to promote mutual understanding and maximize the positive impacts of its activities.

The community relations policy is designed to consult and inform communities from the earliest stages of projects, respect everyone's rights and expectations, and work together to address concerns that are raised. PMET is committed to avoiding operations on sensitive cultural sites, prioritizing local employment and procurement, and investing in sustainable initiatives that support the social and economic growth of host communities.

The company promotes diversity, equity, and inclusion, both within its teams and in its relationships with partners and communities. It establishes accessible communication mechanisms to gather feedback, handle complaints, and continuously improve its practices. Finally, the policy provides for regular assessment of commitments and results to ensure responsible and transparent management of community relations.

Environmental Policy

PMET's environmental policy applies to all its employees, partners, and sites, at every stage of the project life cycle.

The company is committed to complying with laws and consulting with stakeholders, while developing an organizational culture focused on respect for the environment. It sets clear objectives for reducing emissions and waste, protecting biodiversity, using resources efficiently, and avoiding sensitive areas. Each project undergoes a rigorous assessment of risks and impacts, and mitigation or compensation measures are systematically implemented.

Continuing education, transparent communication, and improved practices are encouraged so that everyone involved can contribute to environmental performance. Lastly, site closure and rehabilitation are carefully planned in consultation with the communities concerned to ensure responsible long-term management.

Health and Safety Policy

PMET considers health and safety top priorities, placing the well-being of its employees, partners, and host communities first. The company prioritizes prevention and is committed to creating healthy and safe work environments where everyone is encouraged to act responsibly and report any situations that pose a risk.

The policy provides for compliance with laws and the establishment of clear objectives to continuously improve health and safety performance. Risks are identified and assessed at each project stage, and mitigation measures are systematically applied. PMET ensures that all workers receive the necessary training and tools, while promoting communication and the reporting of concerns.

Lastly, the company ensures that its practices are regularly reviewed and adapted to guarantee a work environment where safety takes precedence over all other considerations.

Responsible Procurement Policy

PMET takes a responsible approach to procurement aimed at generating sustainable and positive economic benefits for host communities. The company ensures compliance with laws, labour and human rights, and its ethical commitments, while incorporating health, safety, environmental, and governance criteria into its purchasing decisions.

The policy encourages the development of strong relationships with suppliers, the promotion of local purchasing, and equitable access to opportunities for businesses owned by Indigenous people, women, or underrepresented groups. PMET ensures that its needs and requirements are clearly communicated, that risks are identified and managed, and that goods and services are obtained in a secure, ethical manner that complies with industry best practices.

The company promotes transparency, a culture of listening, and continuous improvement by providing communication channels to hear the concerns and suggestions of all stakeholders. This approach aims to maintain a culture of integrity and accountability at every stage of the supply chain.

Internal Code of Conduct

PMET's Internal Code of Conduct sets out the ethical and professional principles that all employees, officers, directors, consultants, and contractors acting on behalf of the company must follow. The code requires, among other things, compliance with internal policies, responsible performance of duties, and transparent reporting of any misconduct or observed deviations.

The document emphasizes the importance of maintaining exemplary behaviour, free from conflicts of interest, corruption, or misuse of company resources. It governs the management of confidential information, the acceptance of gifts or invitations, and the use of corporate assets. PMET also imposes requirements related to health, safety, and respect in the workplace: all forms of discrimination, harassment, or unfair treatment are prohibited, and everyone is expected to contribute actively to maintaining a safe, inclusive, and professional environment.

Supplier Code of Conduct

PMET expects its suppliers to share its ethical values, sense of accountability, and respect for the law. The Supplier Code of Conduct sets clear standards: it requires compliance with laws, integrity in business, prevention of corruption, and protection of confidential information. Suppliers must also comply with company policies, particularly those relating to ethics, health and safety, human resources, and the environment.

The code emphasizes the importance of ensuring healthy, safe, and inclusive workplaces, eliminating all forms of discrimination or harassment, and promoting diversity and equity. It prohibits forced labour and child labour, and ensures the protection of workers' fundamental rights.

Suppliers are also required to treat host communities with respect, promote local employment and responsible procurement, and collaborate with the company to improve social and environmental practices. Lastly, they must proactively manage risks, document their actions, and demonstrate transparency, or risk having their business relationship reassessed in the event of non-compliance.

1.2 Consultant mandated by the project initiator

The consultant mandated by the project initiator to coordinate and prepare the documents required for this environmental impact assessment process is WSP Canada Inc., whose information is presented in Table 1-2.

Table 1-2 Information on the mandated consultant

Name	WSP Canada Inc.
Civic address	**Head Office** 1600 René-Lévesque Boulevard West, 11th Floor Montréal, Quebec H3H 1P9 **Project Coordination Office** 1135 Lebourgneuf Boulevard Québec, Quebec G2K 0M5
Mailing address (if different from civic address)	n/a
Phone number	1-581-814-5976
Phone number (other)	n/a
Email:	marie-helene.brisson@wsp.com
Description of the mandate	Coordination and preparation of documents required as part of the environmental and social assessment process

The other consulting firms supporting WSP in its mandate are:

- **Nigaan Synergis** — Field studies: small mammals, herpetofauna, avifauna, ichthyofauna and benthos, surface water and sediments, characterization of mercury and other metals in fish flesh, and offsetting plan for loss of fish habitat.
- **BBA Inc.** — Hydrogeological studies, groundwater background levels, analysis of alternatives
- **AtkinsRéalis** — Feasibility study, geotechnical analyses, study of water quality at the mine effluent and plant, dilution study
- **G Mining Services Inc.** — Project engineering
- **Vision Geochemistry** — Geochemical characterization of mining materials
- **Emphase environnement** — Phase I Environmental Site Assessment (ESA)
- **GCM Consultants Inc.** — Rehabilitation and restoration plan
- **Archéoconsultant** — Archaeological survey
- **Mailloux Hydrogéologie Inc.** — Hydrogeological modelling of the pit and underground mine

2 Project context and rationale

2.1 Context of project integration

2.1.1 Location

The Shaakichiuwaanaan mining project (the “project”) is located in Quebec in the administrative region of Nord-du-Québec (region10), which is divided into two territories: Eeyou Istchee James Bay, where Category III lands are administered by the Eeyou Istchee James Bay Regional Government, and Nunavik, where regional services are coordinated by the Kativik Regional Government. Located north of the 49th parallel, entirely within the Canadian Shield, the region covers just over half of Quebec’s total area and is the province’s largest administrative region, covering 860,553 km² (MAMH, 2023).

More specifically, the project is located in the territory of the Eeyou Istchee James Bay Regional Government (EIJBRG), which replaced the Municipality of Baie-James in 2014. It is the only regional government in Quebec. This territory, located between the 49th and 55th parallels, corresponds to Category III lands under the James Bay and Northern Quebec Agreement (JBNQA), where the Cree have exclusive rights to trap fur-bearing animals and fish certain species. The EIJBRG exercises the powers, functions, and authorities conferred on a regional county municipality.

The project’s local study area is located 220 km east of the town of Radisson and touches on the traditional territory of three Cree communities: Chisasibi (whose village is located 330 km to the west), Wemindji (330 km to the southwest), and Mistissini (350 km to the south). The geographic coordinates at the centre of the mine site are:

- Latitude: 53° 32′00″ N
- Longitude: 73° 55′00″W

The regional study area, which is crossed by the Trans-Taiga Road and the Billy-Diamond Highway, includes, in addition to the territories mentioned above, notably the territories of the Cree communities of Eastmain, Waskaganish, Nemaska, and Waswanipi, as well as the municipality of Matagami.

2.1.2 Brief overview of the project

The project has as its goal to mine a deposit of spodumene pegmatites (lithium). In 2023, PMET Resources Inc. (PMET) created a wholly owned Quebec subsidiary, Innova Lithium Inc. (Innova), which is the registered exclusive exploration rights holder of the Shaakichiuwaanaan project, PMET’s flagship property located in the Eeyou Istchee James Bay region of Quebec, Canada.

PMET's primary objective is to mine its CV5 deposit on the Shaakichiuwaanaan property (the current project). The Shaakichiuwaanaan property hosts numerous other spodumene pegmatites, and PMET believes it has the potential to become the next lithium district in North America.

Spodumene mining at the Shaakichiuwaanaan property will be carried out using a hybrid mining method (open pit and underground mining).

The expected life of the mine is 21 years, including construction, development, the pre-production period, and the commercial production period. At full production, the underground mine is expected to reach a maximum extraction rate of 5,500 tons of ore per day.

A total of 84.3 million tons (Mt) of ore are expected to be mined over the life of the mine. The lithium concentrate produced will have a grade of 5.50% Li_2O, with a Li_2O recovery rate of 68.9%. The dense media separation (DMS) plant will have a nominal processing capacity of 5.1 million tons per year (Mtpa) at maximum throughput.

A total of 155.2 Mt of waste rock, including overburden, leachable waste rock, and low-risk waste rock (non-leachable), as well as 14.0 Mt of overburden and 3.2 Mt of organic material will be stored in the stockpiles and pit.

The storage of tailings and waste rock will mainly take place in two stockpiles. Stockpile 01, located northwest of the plant, will be used exclusively for the storage of low-risk waste rock due to its proximity to the open pit. It will hold approximately 43.5 Mt of non-leachable waste rock, while the remainder (29.6 Mt) will be deposited in the pit once extraction is complete. Stockpile 02, located northeast of the plant, will be used for the co-disposal of leachable waste rock (81.0 Mt) and tailings. It will be fully equipped with a sealed membrane to prevent any risk of contamination. Tailings will be deposited separately from waste rock storage. Lastly, overburden (14.0 Mt) and organic matter (3.2 Mt) will be stored in their respective stockpiles, notably Stockpiles 04 and 05, which will receive material from the excavation of the pit.

Spodumene concentration will be carried out at the mine site. The main treatment processes will be as follows:

- crushing circuit (primary, secondary, and tertiary crushing);
- stack storage for crushed material supply;
- dense media separation (coarse, fine, and re-crushed);
- magnetic separation and handling of the final product;
- drying of fine and intermediate particulate matter, and handling;
- tailings management.

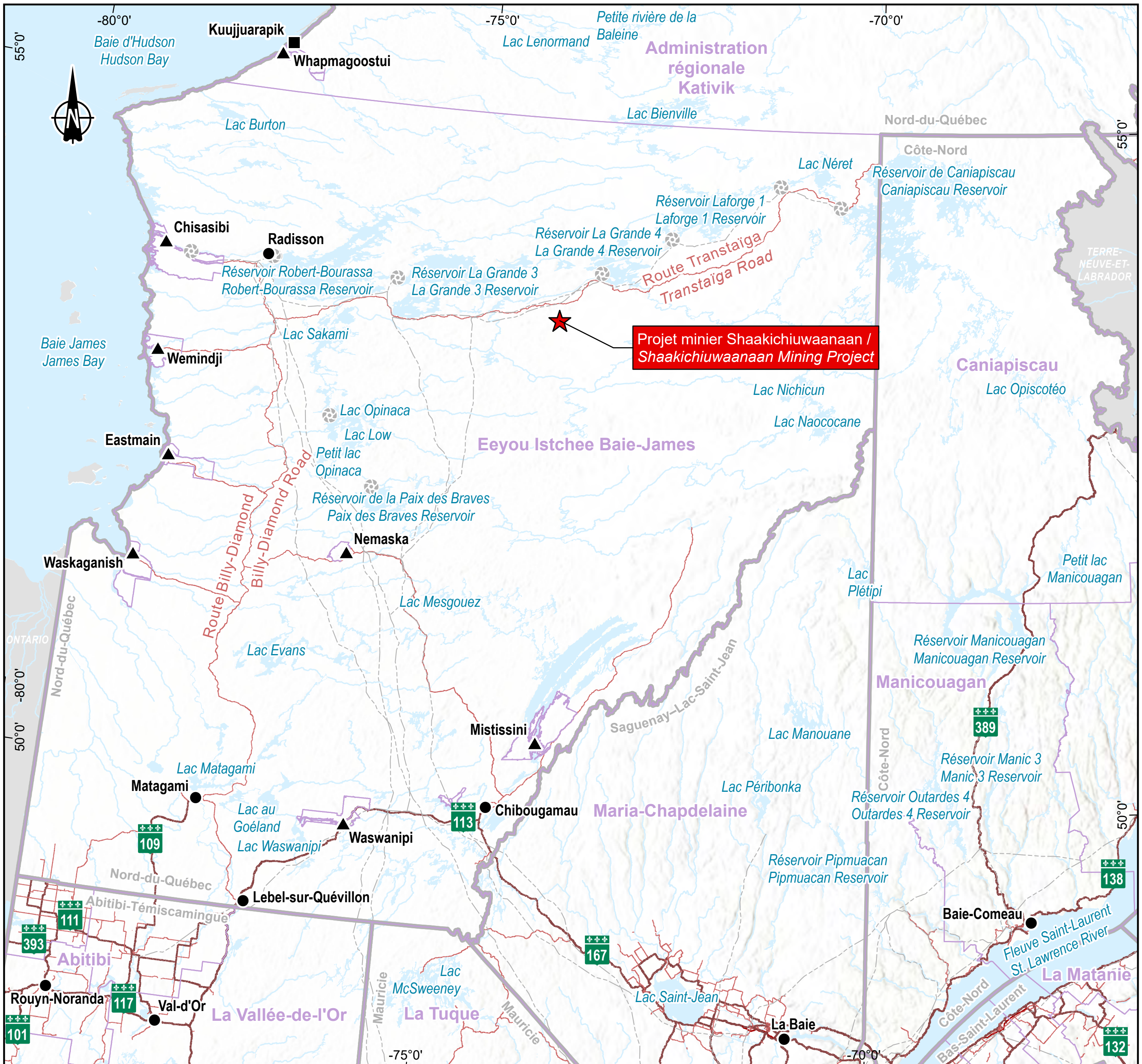
A fleet of trucks will transport the concentrate via the Trans-Taiga Road and Billy-Diamond Highway to the Matagami transshipment yard. The construction of new infrastructure by the Town of Matagami will be required to load the concentrate onto train cars. The product will then be transported by train to the port of Grande-Anse via railroad.

The mining complex will consist of various types of infrastructure (Map 2-1), including:

- an access road to the mining site from the Trans-Taiga Road (existing infrastructure);
- roads and culverts to enable the movement of mining equipment during mine operations;
- a workers' camp during the construction and operations phases of the mine;
- a pit and underground mine workings for mining the CV5 deposit;
- dikes to isolate the CV5 deposit mining pit from Lake L01, which partially covers it;

- storage areas for waste rock, tailings, overburden, and organic material;
- an ore storage area;
- a power supply line;
- an electrical substation and an electrical distribution network;
- an ore processing plant;
- a water treatment plant;
- an emulsion explosives storage area;
- a garage and other auxiliary buildings;
- a fuel storage area and a refuelling station.

After the deposit has been mined, restoration and rehabilitation measures will be implemented to restore the original ecosystem or create a new sustainable ecosystem that is as similar as possible to the original state.



Repères géographiques / *Geographical Landmarks*

- ▲ Communauté crie (zone d'étude régionale) / *Cree community (regional study area)*
- ■ Village inuit / *Inuit village*
- ● Municipalité / *Municipality*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Autoroute / *Highway*
- Route nationale ou régionale / *National or regional road*
- Autre / *Other*

Limites / *Boundaries*

- Région administrative / *Administrative Region*
- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 2-1 / *Map 2-1*
Localisation du projet minier Shaakichiuwaanaan / *Location of the Shaakichiuwaanaan Mining Project*

Sources :
SDA, 1/20 000, MRNF, 2024-02
Canvec, 1/250 000, 1/5 000 000 et 1/15 000 000, RNCan, 2019
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/5 000 000, MRNF Québec, 2010
AQréseau+, réseau routier, MERN, 2024-03-01
RNCan, Frontières géopolitiques, 2002

0 50 100 km

NAD 1983 Quebec Lambert

2026-02-05

Préparation / Preparation : M.-H. Brisson
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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CA0001724_3318_eie_c02_1_084_loc_projet_260218

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

2.1.3 History of mining and exploration activities

From 1950 to 1997, exploration work on the property focused on the search for base metals and precious metals. This work led to the discovery of several copper, gold, and silver deposits.

In 1997, Virginia Gold Mines Inc. acquired a large property that overlaps PMET's current property. Until the 2000s, it acquired various data (through geophysical and mapping surveys) and carried out prospecting. Numerous indications of base metals and precious metals were discovered during this period, including gold, copper, and zinc. From 2001 to 2013, this company carried out drilling on its property.

In 2016, PMET (then known as 92 Resources Inc.) acquired its first exclusive exploration rights in the region due to the presence of spodumene crystals in the pegmatite, which had been noted during an exploration program conducted by Virginia Gold Mines Inc. in 2006. More specifically, the description of the mineral indicated a lithium pegmatite. Since the acquisition, PMET has carried out various surface exploration programs (focused on lithium pegmatite, with secondary interest in base and precious metals) that have resulted in the discovery of multiple copper, gold, silver, lithium, tantalum, and cesium showings across the property. Drilling by PMET commenced in 2021, targeting the main lithium pegmatite showings. This work has identified significant and promising deposits of CV5 and CV13 pegmatites, thereby enabling the mine to begin operations.

2.1.4 Mining rights and land ownership

The Shaakichiuwaanaan property contains 463 exclusive exploration rights (EERs) held by PMET covering an area of approximately 23,710 ha. Most of them form an almost continuous group stretching approximately 51 km from east to west. The other EERs are located near the Trans-Taiga Road. The CV5 pegmatite deposit is located in the centre of the property, approximately 13 km south of KM 270 on the Trans-Taiga Road (Map 2-1).

PMET also holds a lease from the Ministère des Ressources Naturelles et Forêts (MRNF) on an area south of KM 270 of the Trans-Taiga Road, where its exploration camp and core library are located.

2.2 Regulatory context

The project is located within the James Bay Agreement territory and, as such, is subject to the impact assessment and review regime provided for in the JBNQA. It will also require authorizations from provincial and federal authorities, in accordance with applicable laws and regulations. The following sections provide an overview of the main legislative and regulatory frameworks applicable to the project.

2.2.1 Quebec

2.2.1.1 Environmental Quality Act (R.S.Q. c. Q-2.

In accordance with Chapter XXII of the JBNQA, incorporated into Title II of the Environment Quality Act (EQA), the procedure for assessing and reviewing environmental and social impacts applicable in the James Bay region - James region is governed by sections 133 to 167 of the EQA and regulated by the Regulation respecting environmental and social impact assessment and review in the James Bay and Northern Québec territory (Q-2, r. 25). The purpose of this regime is to minimize the adverse effects of development on the Indigenous population and wildlife resources in the territory, as provided for in paragraph 22.2.2(b) of the JBNQA.

Under Schedule A of the Environment Quality Act (EQA), any mining project — including the expansion, processing, or modification of an existing mining operation — is mandatorily subject to this impact assessment and review procedure.

The environmental and social assessment of projects under Quebec jurisdiction located in the James Bay region is the responsibility of the Environmental and Social Impact Evaluating Committee (Evaluating Committee or COMEV) and the Environmental and Social Impact Review Committee (Review Committee or COMEX). COMEV first considers the scope and obligation of a project's impact assessment. COMEX then takes over upon receipt of the impact assessment until the end of the process, including changes to the project authorized during construction or operations and follow-up reports produced by the initiators.

At the end of the COMEX assessment process, the authorization certificate provided for in section 154 of the EQA is issued by the Minister of the Environment, Climate Change, Wildlife, and Parks (MELCCFP). Any activity arising from the project is subject to ministerial authorization under section 22 of the EQA, or a declaration of compliance, or exemption, as provided for in the Regulation of activities based on their impact on the environment (Q-2, r. 17.1) (REAFIE).

2.2.1.2 Directive 019 on the Mining Industry

Directive 019 (D019) is the analytical framework used by the MELCCFP when receiving applications for ministerial authorizations of mining projects. It presents the environmental guidelines and basic requirements for the different types of mining activities so that environmental deterioration can be prevented. It also provided PMET with the information required to prepare the impact assessment. D019 is therefore a guideline that specifies MELCCFP's expectations regarding main mining activities.

Its update in 2025 aims to ensure alignment with:

- the Regulation applying to activities on the basis of their environmental impact (REAFIE), which sets out the activities requiring ministerial authorization and the information and documents required to submit such an application;
- the Ministère's expectations regarding the characterization of tailings, as defined in the *Guide de caractérisation des résidus miniers et du minerai* [Tailings and ore characterization guide];

- the Government of Canada's *Metal and Diamond Mine Effluent Regulations* (MDMER) with respect to final effluent discharge standards.

In addition, the latest version of Directive 019 clarifies elements already present in the previous version and adds or modifies certain requirements relating, in particular, to:

- factoring in the expected effects of climate change in the design of mining infrastructure;
- monitoring at the final effluent discharge point;
- groundwater protection;
- the environmental management of explosives;
- management of tailings and stability of mining infrastructure;
- technical information to be provided in an authorization request.

2.2.1.3 Mining Act (R.S.Q., c. M-13.1)

Quebec's *Mining Act* and *Mining Regulation* (CQLR, c. M-13.1, r. 2) determines how mines are to be developed, operated, and closed. They define the conditions for obtaining a mining lease issued by the Ministère des Ressources naturelles et des Forêts (MRNF)[1], which is required for the operation of a mine. This lease has an initial term of 20 years and is renewable up to three times for periods of 10 years. To obtain a mining lease, companies must develop a site restoration and redevelopment plan to be submitted to the MRNF for approval. This plan will then have to be reviewed every five years, or when there are changes in the mining activities that justify the amendment. In the two years following the approval of the site restoration plan, a financial guarantee covering all anticipated costs must be paid to the MRNF.

The *Mining Act* also provides a framework for the granting of exclusive leases for the mining of surface mineral substances (EML), which may be issued for the extraction of sand, gravel, or other surface mineral substances (peat, stone, etc.) for the operation of quarries and sandpits, as well as for the granting of mining claims for mineral exploration.

2.2.1.4 Act respecting occupational health and safety (R.S.Q., c. S-2.1)

The main health and safety legislation in Quebec is the *Act respecting occupational health and safety*, with which the Project must comply. Several regulations, such as the *Regulation respecting occupational health and safety in mines* (R.R.Q., c. S-2.1, r. 14) and the *Regulation respecting occupational health and safety* (R.R.Q., c. S-2.1, r. 13), also apply.

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1 Formerly the Ministère de l'Énergie et des Ressources naturelles (MERN) and the Ministère des Forêts, de la Faune et des Parcs (MFFP). The acronym MRNF will be used to refer to this department throughout the report, regardless of when the documents are published.

2.2.1.5 Guidelines for the management of environmental noise

These guidelines establish the requirements applicable to any person who may emit noise pollution into the environment in excess of the present criteria and who is subject to the Environmental Quality Act (EQA). They replace Instruction Note 98-01 entitled "Handling Noise Complaints and Requirements for Businesses that Generate Noise" (IN 98-01) while maintaining its objective.

2.2.1.6 Other applicable regulations

In addition, the following regulations will apply:

- *Sustainable Forest Development Act* (CQLR, c. A-18-1):
  - *Regulation respecting the sustainable development of forests in the domain of the State* (CQLR, c. A-18.1, r. 0.01);
- *Act respecting the lands in the domain of the State* (CQLR, c. T-8.1);
- *Watercourses Act* (CQLR, c. R-13):
  - *Regulation respecting the water property in the domain of the State* (CQLR, c. R-13, r. 1);
- *Dam Safety Act* (CQLR, c. S-3.1.01):
  - *Dam Safety Regulation* (CQLR, c. S-3.1.01, r. 1);
- *Act respecting threatened or vulnerable species* (CQLR. c. E-12.01):
  - *Regulation respecting threatened or vulnerable wildlife species and their habitats* (CQLR, c. E-12.01, r. 2);
  - *Regulation respecting threatened or vulnerable plant species and their habitats* (CQLR, c. E-12.01, r. 3);
- *Act respecting the conservation and development of wildlife* (CQLR, c. C-61.1):
  - *Regulation respecting wildlife habitats (*CQLR, c. C-61.1, r. 18);
- *Cultural Heritage Act* (CQLR, c. P-9.002);
- *Building Act* (CQLR, c. B-1.1):
  - *Construction Code* (CQLR, c. B-1.1, r. 2);
  - *Safety Code* (CQLR, c. B-1.1, r. 3);
- *Act respecting explosives* (CQLR, c. E-22):
  - Regulation under the *Act respecting explosives* (CQLR, c. E-22. r. 1);
- *Highway Safety Code* (CQLR, c. C-24.2):
  - *Transportation of Dangerous Substances Regulation* (CQLR, c. C-24.2, r. 43);
- Regulations under the *Environment Quality Act*:
  - *Regulation respecting activities in wetlands, bodies of water and sensitive areas* (CQLR, c. Q-2, r. 0.1);
  - *Clean Air Regulation* (CQLR, c. Q-2, r. 4.1);
  - *Regulation respecting pits and quarries* (CQLR, c. Q-2, r. 7.1);
  - *Regulation respecting compensation for adverse effects on wetlands and bodies of water* (CQLR, c. Q-2, r. 9.1);

- *Regulation respecting biomedical waste* (CQLR, c. Q-2, r. 12);
- *Regulation respecting the declaration of water withdrawals* (CQLR, c. Q-2, r. 14);
- *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere* (CQLR, Q-2, r. 15);
- *Regulation respecting the regulatory scheme applying to activities on the basis of their environmental impact* (CQLR, c. Q-2, r. 17.1);
- *Regulation respecting the burial of contaminated soil* (CQLR, c. Q-2, r. 18);
- *Regulation respecting the landfilling and incineration of residual materials* (CQLR, c. Q-2, r. 19);
- *Regulation respecting waste water disposal systems for isolated dwellings* (CQLR, c. Q-2, r. 22);
- *Regulation respecting the operation of industrial establishments* (CQLR, c.Q-2, r. 26.1);
- *Snow, road salt and abrasives management Regulation* (CQLR, c. Q-2, r. 28.2);
- *Regulation respecting halocarbons* (CQLR, c. Q-2, r. 29);
- *Regulation respecting hazardous materials* (CQLR, c. Q-2, r. 32);
- *Water Withdrawal and Protection Regulation* (CQLR, c. Q-2, r. 35.2);
- *Land Protection and Rehabilitation Regulation* (CQLR, c. Q-2, r. 37);
- *Regulation respecting the quality of the atmosphere* (CQLR, c. Q-2, r. 38);
- *Regulation respecting the quality of drinking water* (CQLR, c. Q-2, r. 40);
- *Regulation respecting the charges payable for the use of water* (CQLR, c. Q-2, r. 42.1);
- *Regulation respecting the traceability of excavated contaminated soil* (CQLR, c. Q-2, r. 47.01);

— *Lignes directrices relatives à la valorisation des résidus miniers* [Tailings reclamation guidelines] (MDDELCC, 2015);

— *Guide de préparation du plan de réaménagement et de restauration des sites miniers au Québec* [Guidelines for preparing mine closure plans in Quebec] (MRNF, 2024);

— *Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés* [Intervention guide – Soil protection and rehabilitation of contaminated sites] (MELCC, 2021);

— *Guide de caractérisation des résidus miniers et du minerai* [Tailings and ore characterization guide] (MELCC, 2020).

2.2.1.7 Procedure

As indicated in section 2.2.1.1, since the project is subject to the environmental and social impact assessment and review procedure set out in Title II of the EQA, its progress follows the steps established by this regime. The following summarizes the main steps already completed or to come for this project.

The Quebec environmental assessment procedure that applies to the project is a five-step process, some of which has already been completed, namely:

1. Project initiator's statement:
   - Notice of intent including preliminary project information submitted on November 27, 2025.

2. Evaluation:
   - COMEV forwarded its recommendation for a directive, specifying the scope of the impact assessment, to the Administrator, who then forwarded it to the initiator.
   - The directive for the PMET project (file 3214-14-072) was received in March 2024.

3. Preparation of the impact assessment by the project initiator.
4. Review:
   - Submission of the impact assessment to the Administrator, who forwards it to COMEX.
   - Indigenous governments and the public may make representations to COMEX, which may also hold public hearings or other forms of consultation.
5. Decision:
   - After considering the COMEX recommendation, the Administrator decides whether or not to authorize the project. If the Administrator cannot accept the COMEX recommendation, the Administrator must consult with COMEX before making a final decision and informing the project initiator. The final decision is also forwarded to the relevant First Nations administrations. In addition, sectoral authorizations (e.g., for quarries and sand pits, water and sewer networks, and campsites) must be issued under the various provisions of Chapter I of the EQA.
   - The EQA provides for different timeframes, ranging from 30 to 90 days, for each step of the process. However, the duration of these steps may be extended, if necessary, by the Administrator.

2.2.2 Canada

The *Impact Assessment Act* (IAA) (S.C., 2019, c. 28, s. 1) and its regulations provide the legislative basis for federal environmental assessment practice in most parts of Canada.

The IAA (2019) applies to projects designated by the *Physical Activities Regulations*. It also provides for the Minister of the Environment to designate a project when the Minister considers that its implementation could cause adverse environmental effects or give rise to public concern.

On June 20, 2024, the *Budget Implementation Act* (2024) received Royal Assent, bringing the amendments to the IAA into force. These amendments were made in response to the Supreme Court of Canada's decision on the constitutionality of the IAA. Transitional provision 305 of the Budget Implementation Act, 2024, No. 1 describes the steps by which the Impact Assessment Agency of Canada (IAAC) or the Minister will bring designated projects under the amended IAA.

According to section 18(c) of the Physical Activities Regulations, the construction and operation of a new metal mill, other than a uranium mill, with an ore input capacity of 5,000 t/day or more are subject to the federal impact assessment process.

Section 18(d) of the same regulations provides a similar provision for any new metal mine other than a rare earth element mine, placer mine or uranium mine, with an ore production capacity of 5,000 t/day or more.

The project exceeds this threshold and is therefore subject to this procedure.

On May 22, 2025, PMET received notice from the IAAC determining that an impact assessment was required for the project.

A *Fisheries Act* authorization will be required from Fisheries and Oceans Canada (DFO) for the indirect effects of the project on fish habitat.

Also, the *Canadian Navigable Waters Act* will apply as navigable water bodies within the meaning of the Act will be indirectly affected by the construction of the mining infrastructure.

Lastly, various laws and regulations may need to be applied to the project, including:

- *Canadian Environmental Protection Act* (S.C. 1999, c. 33):
  - *Environmental Emergency Regulations (*SOR/2019-51);
  - *PCB Regulations (*SOR/2008-273);
  - *Federal Halocarbon Regulations (*SOR/2022-110);
- *Species at Risk Act* (S.C. 2002, c. 29);
- *Canada Wildlife Act* (R.S.C. 1985, c. W-9);
- *Explosives Act* (R.S.C., c. E-17);
- *Hazardous Products Act* (R.S.C. 1985, c. H-3);
- *Transportation of Dangerous Goods Act, 1992* (S.C. 1992, c. 34):
  - *Transportation of Dangerous Goods Regulations (*SOR/2001-286);
- *Nuclear Safety and Control Act* (S.C. 1997, c. 9):
  - *General Nuclear Safety and Control Regulations* (SOR/2000-202);
  - *Nuclear Substances and Radiation Devices Regulations* (SOR/2000-207);
- *Metal Mining and Diamond Mining Effluent Regulations* (SOR/2002-222);
- *Migratory Birds Regulations (*SOR/2022-105).

2.2.3 James Bay and Northern Quebec Agreement

The James Bay and Northern Quebec Agreement (JBNQA), signed in 1975 between the governments of Quebec and Canada, the Grand Council of the Crees, and the Association of Inuit of New Quebec, establishes the territorial, political, and administrative framework applicable to the territory of Eeyou Istchee James Bay. It divides the territory into Category I, II, and III lands, each with specific rights regarding use, hunting, fishing, and resource management. The project is located on Category III lands, where mining rights belong to the Government of Quebec.

Chapter 22 of the JBNQA establishes the environmental and social protection regime applicable to development projects located in this territory. It provides for the creation of committees responsible for the impact assessment and review process: the Assessment Committee (COMEV), the Review Committee (COMEX) and, when federal jurisdiction is involved, the Federal Review Committee (COFEX). These bodies operate in accordance with Title II of the EQA and Regulation Q 2, r. 25.

The Eeyou Istchee James Bay Regional Government (EIJBRG) and the James Bay Development Corporation (JBDC) also play a role in land management and development, particularly with regard to the issuance of certain sectoral authorizations under the James Bay Development Act.

Table 2-1 Specific rights according to land category

Category	Specific rights
Category I lands	For Cree use only. They may be used for residential, community, commercial, industrial, or other purposes. In addition, the Cree have exclusive hunting, fishing, and trapping rights on these lands.
Category II lands	Contiguous to Category I lands. They are part of the Quebec public domain. These are lands where the Cree have exclusive hunting, fishing, and trapping rights.
Category III lands	Represent all treaty lands not included in Category I and II lands. On these lands, the Cree have exclusive rights to trap fur-bearing animals. In addition, certain wildlife species are reserved for their hunting and fishing activities. On these lands, hunting and fishing are permitted for both First Nations and non-First Nations people who may, subject to the principle of conservation, pursue their traditional activities throughout the year. On Category III lands, the mineral rights belong to the provincial government. **The Project is located north of the 49th parallel in the Nord-du-Québec administrative region, on Category III lands in the Eeyou Istchee James Bay Territory.**

2.2.4 Municipal

The project must also comply with the regulations applicable in the James Bay region, particularly the *Act respecting land use planning and development* (chapter A-19.1). On Category III lands in the Eeyou Istchee James Bay territory, the Eeyou Istchee James Bay Regional Government (EIJBRG) exercises municipal responsibilities and may adopt urban planning and nuisance regulations applicable to the project, including:

- *Zoning By-law* (No. 213);
- *Nuisance By-law* (No. 149);
- *By-law relating to peace and order in public and private places* (No. 148).

PMET will file applications for authorizations and permits for the construction and operation of the project with the Eeyou Istchee James Bay Regional Government, in accordance with applicable regional regulations.

2.2.5 Permits and authorizations

The permits and authorizations required from the Eeyou Istchee James Bay Regional Government are:

- Permit - Construction - Main building
- Permit - Construction - Additional building
- Certificate of authorization for soil excavation, cutting/filling, and topsoil removal
- Certificate of authorization for tree planting and cutting for non-commercial purposes
- Certificate of authorization for work and structures on the banks and shores of lakes and watercourses

2.3 Project rationale

2.3.1 Purpose of the project

2.3.1.1 Project objective

According to the feasibility study conducted by a team of qualified professionals and managed by G Mining, hereafter referenced as G Mining Services (2025), the project's deposit is the largest lithium pegmatite resource in the Americas and ranks among the top ten globally. Spodumene, a lithium and aluminum silicate, is the main lithium mineral found in pegmatites.

The project's objective is to mine this deposit to produce a spodumene concentrate, an essential component of lithium-ion batteries. These batteries are indispensable to the energy transition, particularly for electric vehicles (EVs) and energy storage systems, as well as for various clean technologies.

The project's probable reserves are estimated at 84.3 Mt with an average grade of 1.26% Li_2O, representing approximately 2.62 Mt of lithium carbonate equivalent. The mine will be in production for 19 years, with a estimated production rate of 5,500 tonnes per day, totalling approximately 2 Mt per year (G Mining Services, 2025).

2.3.1.2 Critical minerals and lithium market

In October 2020, the Government of Quebec launched the Quebec Plan for the Development of Critical and Strategic Minerals 2020–2025 (Government of Quebec, 2020), which stems from the government's desire to promote prosperity in Quebec's regions and the transition to a low-carbon economy. Similarly, in March 2024, Natural Resources Canada published an update to Canada's Critical Minerals List (NRCan, 2024). This list identifies 34 minerals deemed essential to the sustainable economic success of Canada and its allies—minerals that can be produced in Canada, are essential to domestic industry and security, and have the potential to support secure and resilient supply chains to meet global demand. Both lists identify lithium as essential to technologies that reduce greenhouse gas emissions.

According to G Mining Services (2025), electric vehicle production will account for nearly a quarter of total sales in 2025 and reach 42% by 2030. The market for battery energy storage systems is also growing rapidly. By 2040, global demand for lithium is expected to increase from 1.1 Mt to 5.6 Mt of lithium carbonate equivalent (LCE). Global supply is expected to keep pace with demand until 2030, but annual deficits are anticipated thereafter, leading to higher prices.

Given the size of the deposit, its high grade, and the strong demand forecast, the project is well positioned to contribute to the global market needs and become a strategic partner in the development of Quebec's battery industry.

2.3.1.3 Economic impacts

The mining industry is a major economic player in Quebec. In 2022, the mining industry accounted for 15,594 direct jobs in Quebec, according to the Quebec Mining Association (QMA). If indirect and induced jobs are included, the total reaches 51,334 jobs.

The Quebec mining ecosystem includes 3,847 supplier companies with head offices in Quebec, including several SMEs (QMA). In its 2020 update of the economic impact of the mining industry in Quebec, the QMA estimated that the turnover of Quebec mining companies totalled $12.5 billion including investments (EcoTec Consultants, 2024). The mining industry generates an estimated 55,570 person-years of employment in Canada, the vast majority of which is in Quebec (76.5%). The gross domestic product (GDP) generated in Quebec by this industry is estimated at $12 billion. More specifically in Nord-du-Québec, the $1.1 billion GDP generated by the mining industry corresponds to 18.1% of the region’s total GDP. That represents 1,287 person-years of employment in the mining industry in Nord-du-Québec in 2022. In terms of tax and quasi-tax revenues, mining companies have contributed $1.9 billion to the Government of Quebec and $735.5 million to the Government of Canada through taxes, mining duties, and quasi-taxes in 2022 alone.

According to the feasibility study conducted by G Mining Services (2025), the total capital required to construct the project is estimated at $1,978 million, operating costs total approximately $9,664 million, and reclamation and closure costs are estimated at approximately $248.4 million.

The project is part of the government’s commitment to responsibly develop Quebec’s mineral resources to stimulate employment and support economic prosperity. It will generate significant benefits for local communities, particularly in Cree and Jamesian communities, as well as for the region, by promoting job creation and economic activity. On a larger scale, the project will contribute to the sustainable development of northern Quebec and generate significant economic benefits for the entire province. The detailed economic benefits can be found in the economic impact study presented in Appendix 5-13.

During the construction and operations phases, positive impacts will be created for local communities through business opportunities and direct and indirect jobs.

Economic, technical, social, and environmental opportunities and constraints

The project benefits from a favourable economic climate, marked by strong global demand for lithium, which is essential to the energy transition and the battery industry. This situation significantly reduces the risk of the project being abandoned, as the current market offers prospects for sustained growth in the medium and long term.

From a technical standpoint, the confirmed presence of high-grade resources and the integration of combined pit and underground mining operations are major advantages. However, certain constraints remain, particularly the northern climate and the availability of skilled labour. From a social perspective, the project offers significant opportunities to the Cree and Jamesian communities, with commitments to employment and training, but it requires ongoing dialogue to address cultural and territorial concerns. Finally, from an environmental perspective, the sensitivity of ecosystems requires rigorous measures for managing water, waste rock, and tailings, which are integrated into the project design.

Compared to other lithium projects that have been approved in the region but have yet to be developed, this project stands out due to the advanced stage of its work, the well-defined geological continuity of the CV zone, and the robustness of its resources, which are characterized by several high-grade pegmatites.

In addition, PMET's ongoing engagement with the Cree Nation of Chisasibi and the Jamesian communities is a key factor in promoting social acceptability and limiting the risk of delays or interruptions, an issue that has affected other regional projects.

In summary, the combination of production volume, mineral grade, a simple DMS ore processing method, the ore's crystal size, and the support of a major financial partner gives the project a significantly higher probability of successful completion.

Events that may cause a slowdown or temporary halt in operations

External factors that could cause a slowdown or temporary halt in operations include significant decreases in the price of lithium, major technical problems, or extreme weather events. The availability of the required energy block from Hydro-Québec remains a critical factor; without the necessary power supply, the project design will need to be revised. Delays in obtaining regulatory approvals or issues related to social acceptability could also influence the work schedule, although consultation and compliance measures are planned to reduce the likelihood of this occurring.

2.3.2 Alignment with policies, government guidelines, and local agreements

2.3.2.1 Section 22 of the James Bay and Northern Quebec Agreement (JBNQA)

The James Bay and Northern Quebec Agreement (JBNQA) is an agreement signed in 1975 by the Grand Council of the Crees of Quebec, the Northern Quebec Inuit Association, the Government of Quebec, the Government of Canada, Hydro-Québec, and the James Bay Energy Corporation. Section 22 of this agreement, which applies to the Eeyou Istchee James Bay Territory south of the 55th parallel, establishes an environmental and social protection regime. It is aimed at reducing the impact of development on the territory and protects Cree hunting, fishing, and trapping rights. Among the measures introduced by the JBNQA are the division of lands into Categories I, II, and III; a hunting, fishing, and trapping regime; two separate environmental protection regimes (Cree and Inuit); a regime for the control and operation of outfitters; wildlife protection measures; measures to support traditional activities; and, economic and social development measures.

Table 2-2 shows the alignment between key subsections of Section 22 of the JBNQA and the information presented in the project's environmental impact statement.

Table 2-2 Alignment between the elements of Section 22 of the JBNQA and the environmental impact assessment

Subsections of Section 22 of the JBNQA	Corresponding chapter or section in the EIA
22.2 General Provisions	
22.2.2 a) To minimize the negative impact of development on the First Nations people and wildlife resources of the Territory.	Chapter 6 – Description of the Receiving Environment – Physical, biological, and social environments Chapter 7 – Identification of Issues – No. 1 – Preservation of aquatic habitat quality – No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora – No. 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population – No. 6 – Preservation of the traditional activities and practices of Indigenous peoples and the activities and practices of non-Indigenous peoples Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of issues 1, 4, 5, and 6 Chapter 9 – Cumulative Impact Assessment – Cumulative impact assessment Chapter 13 – Preliminary Monitoring and Follow-up Program – Environmental follow-up Chapter 14 – Preliminary Offsetting Program – Plan to offset the loss of fish habitat
22.2.2 c) A special status and involvement for the Cree people over and above that provided for in procedures involving the general public through consultation or representative mechanisms.	Chapter 3 – Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations
22.2.2 d) Protection of the rights and guarantees of the Cree people established by and in accordance with Section 24: – Hunting, fishing, and trapping – Maintaining traditional First Nations activities	Chapter 3 – Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations Chapter 6 – Description of the receiving environment – Social environment Chapter 7 – Identification of Issues – No. 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population – No. 6 – Preservation of the traditional activities and practices of Indigenous peoples and the activities and practices of non-Indigenous peoples Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of Issues 5 and 6 Chapter 9 – Cumulative Impact Assessment – Analysis of cumulative impacts Chapter 13 – Preliminary Monitoring and Follow-up Program – Environmental follow-up Chapter 14 – Preliminary Offsetting Program – Plan to offset the loss of fish habitat

<table>
<tr><th>Subsections of Section 22 of the JBNQA</th><th>Corresponding chapter or section in the EIA</th></tr>
<tr><td>22.2.2 e) The protection of the Cree people, their economies, and the wildlife resources upon which they depend.</td><td>Chapter 6 – Description of the Receiving Environment
– Biological and social environments
Chapter 7 – Identification of Issues
– No. 1 – Preservation of aquatic habitat quality
– No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora
– No. 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population
– No. 6 – Preservation of the traditional activities and practices of Indigenous peoples and the activities and practices of non-Indigenous peoples
Chapter 8 – Identification and Assessment of Impacts
– Impact assessment for the VECs of Issues 1, 3, 5, and 6
Chapter 9 – Cumulative Impact Assessment
– Analysis of cumulative impacts
Chapter 13 – Preliminary Monitoring and Follow-up Program
– Environmental follow-up
Chapter 14 – Preliminary Offsetting Program
– Plan to offset the loss of fish habitat</td></tr>
<tr><td>22.2.4 a) The protection of the hunting, fishing, and trapping rights of First Nations people in the Territory.</td><td rowspan="2">Chapter 3 - Relationships with the Community
– Cree communities of Eeyou Istchee and Indigenous organizations
Chapter 6 – Description of the Receiving Environment
– Biological and social environments
Chapter 7 – Identification of Issues
– No. 1 – Preservation of aquatic habitat quality
– No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora
– No. 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population
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Chapter 8 – Identification and Assessment of Impacts
– Impact assessment for the VECs of Issues 1, 3, 5, and 6
Chapter 9 – Cumulative Impact Assessment
– Analysis of cumulative impacts
Chapter 13 – Preliminary Monitoring and Follow-up Program
– Environmental monitoring
Chapter 14 – Preliminary Offsetting Program
– Plan to offset the loss of fish habitat</td></tr>
<tr><td>22.2.4 c) The protection of First Nations people, societies, communities, and economies with respect to developmental activity affecting the Territory.</td></tr>
<tr><td>22.2.4 d) The protection of wildlife resources, physical and biotic environment, and ecological systems in the Territory with respect to developmental activity affecting the Territory.</td><td>Chapter 6 – Description of the Receiving Environment
– Physical and biological environments
Chapter 7 – Identification of Issues
– No. 1 – Preservation of aquatic habitat quality
– No. 2 – Preservation of soil and groundwater quality</td></tr>
</table>

Subsections of Section 22 of the JBNQA	Corresponding chapter or section in the EIA
	– No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora – No. 6 – Preservation of the traditional activities and practices of Indigenous peoples and the activities and practices of non-Indigenous peoples Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of Issues 1, 2, 3, and 6 Chapter 9 – Cumulative Impact Assessment – Analysis of cumulative impacts Chapter 13 – Preliminary Monitoring and Follow-up Program – Environmental follow-up Chapter 14 – Preliminary Offsetting Program – Plan to offset the loss of fish habitat
22.5 Requirements for Impact Assessment and Review	
22.5.11 a-i) Purpose of the project.	Chapter 2 – Background and Rationale for the Project – Project rationale
22.5.11 a-ii) The nature and extent of the proposed development.	Chapter 2 – Background and Rationale for the Project – Context of project integration – Project rationale
22.5.11 a-iii) Intention to study alternative sites for development where appropriate.	Chapter 4 – Location and Technology Alternatives
22.5.11 a-iv) If applicable, the reasons why no site alternatives are possible.	Chapter 4 – Location and Technology Alternatives
22.7 Final Provisions	
22.7.1 The proponent shall, before proceeding with the work, obtain where applicable, the necessary authorization or permits from the responsible government departments and services.	Chapter 2 – Background and Rationale for the Project – Regulatory context

2.3.2.2 The Cree Nation Mining Policy

The Cree Nation Mining Policy (CNMP) establishes the guidelines for the development of natural resources, mainly mining activities, on the Eeyou Istchee territory. It aims to ensure Cree participation in the various stages of mining projects. The CNMP values the integration of sustainable development, as well as the respect of Cree rights and way of life.

In January 2023, PMET launched an information and consultation process with several regional communities and organizations, including the Cree Nation Government and the Cree Nations of Chisasibi, Wemindji, and Mistissini. The main objective of this approach was to consider traditional interests, concerns, and knowledge throughout the development of the project.

Table 2-3 shows the alignment between the major pillars of the CNMP and various aspects addressed in the project’s environmental impact assessment.

Table 2-3 Alignment between the Cree Nation Mining Policy and the environmental impact assessment

Sections of the CNMP	Corresponding chapter or section in the EIA
Pillar 1 – Promotion and Support of Mining Activities	
Cree Contribution	
Incorporation of Cree guidance based on their traditional, technical, and scientific expertise on land and mineral resources.	Chapter 3 - Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations
Consideration of the interests of all Cree people and their institutions.	
Pillar 2 – Mineral Exploration and Sustainable Practices	
Sustainable Development Policy	
Conservation of biological diversity, soils, water and watercourses, flora, fauna, scenic diversity, and recreational values.	Chapter 6 – Description of the Receiving Environment – Physical, biological, and social environments Chapter 7 – Identification of Issues – No. 1 - Preservation of aquatic habitat quality – No. 2 – Preservation of soil and groundwater quality – No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora – No. 6 – Preservation of traditional activities and practices of Indigenous peoples and activities and practices of non-Indigenous peoples Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of Issues 1, 2, 3, and 6 Chapter 9 – Cumulative Impact Assessment – Analysis of cumulative impacts Chapter 13 – Preliminary Monitoring and Follow-up Program – Environmental monitoring Chapter 14 – Preliminary Offsetting Program – Plan to offset the loss of fish habitat
Restoration of damaged ecosystems.	Chapter 7 – Identification of Issues – No. 1 – Preservation of aquatic habitat quality – No. 3 – Preservation of wetlands and habitats of interest to terrestrial fauna and flora Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of Issues 1 and 3 Chapter 9 - Cumulative Impact Assessment – Analysis of cumulative impacts Chapter 13 – Preliminary Monitoring and Follow-up Program – Environmental follow-up Chapter 14 – Preliminary Offsetting Program – Plan to offset the loss of fish habitat

Sections of the CNMP	Corresponding chapter or section in the EIA
Pillar 3 – Transparency and Collaboration	
Transparency	
Establishing direct and close relationships with Cree communities and other entities.	Chapter 3 – Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations
Collaboration	
Involvement of the Cree in the project to ensure that their rights, interests, and benefits are well protected and enhanced.	Chapter 3 – Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations
Support for the Mining Community	
Working with affected communities and local Cree families, including Cree tallymen and contractors.	Chapter 3 – Relationships with the Community – Cree communities of Eeyou Istchee and Indigenous organizations

2.3.2.3 Existing agreements in the Eeyou Istchee James Bay Territory

On July 24, 2012, the Cree of Eeyou Istchee and the Government of Quebec signed the Agreement on Governance in the Eeyou Istchee James Bay Territory (Governance Agreement). This Governance Agreement grants the Cree expanded jurisdiction over the management of natural resources and lands in the Eeyou Istchee James Bay Territory. On Category III lands, municipal land management is done in collaboration with the Jamesians. The purpose of the Governance Agreement is to pursue the development of the territory, to integrate a governance model based on sustainable development, and to take into account the traditional way of life.

The Project is part of the Governance Agreement's vision of "continuing the development of Northern Quebec." It was developed by considering the three pillars of sustainable development: environmental, social, and economic. Various project alternatives were considered in light of the environmental impacts (Chapter 2). The anticipated impacts on the physical, biological, and social environments have been assessed and mitigation measures are proposed to minimize the effects (Chapters 9 and 10).

On the other hand, the project will generate significant economic benefits for the Eeyou Istchee region. In fact, PMET is committed to ensuring meaningful participation by Cree communities, with a target of 15% of jobs during construction and 20% of jobs during operations. This commitment is part of a responsible and inclusive development approach that promotes the integration of local communities.

2.3.2.4 Strategic vision of mining development in Quebec

In 2020, Quebec adopted the Quebec Plan for the Development of Critical and Strategic Minerals (QPDCSM), which is part of the 2030 Plan for a Green Economy. This plan aims to make Quebec a leader in the production, processing, and recycling of CSM, which are essential to the energy transition and decarbonization of the economy. Critical minerals, such as lithium, graphite, nickel, and cobalt, are essential for the manufacture of batteries for electric vehicles and energy storage systems, as well as for several clean technologies. (Québec.ca)

The QPDCSM consists of four main areas of focus:

- enhance knowledge and build expertise on CSM;
- set up integrated supply chains, in partnership with the producing regions;
- contribute to the transition to a sustainable economy, in particular through the circular economy and the recycling of tailings;
- raise awareness and promote the importance of CSM for Quebec's energy future.

An update to the action plan for 2023-2025 reinforces these objectives by adding the following key measures:

- support for workforce training and the digital transformation of mines;
- optimization of environmental management and promotion of social acceptability;
- development of the battery industry, including lithium, to meet growing global demand.

The project is fully aligned with this strategic vision by contributing to the development of lithium, a critical mineral that is a priority for Quebec.

It should also be noted that demand for lithium will exceed supply in the coming years, making any mining project essential to the marketing of products using lithium.

Table 2-4 shows the alignment between the Quebec Plan for the Development of Critical and Strategic Minerals and the environmental impact assessment.

Table 2-4 Alignment between the Quebec Plan for the Development of Critical and Strategic Minerals and the project

Purpose	Corresponding chapter or section in the EIA or corresponding project element
Establishment of integrated supply chains (The QPDCSM aims to develop complete value chains for CSM, including production, processing, and recycling.)	The project contributes to the battery supply chain by providing spodumene concentrate (lithium), which is essential for lithium hydroxide conversion plants.
Support for training and employment (The plan includes measures to train the workforce and promote the integration of local and Indigenous communities.)	Targets of 15% Cree employment in construction and 20% in operations. – Section 1.2.3 – Community Relations Policy: ▪ Promote local job creation. – Section 3.11 – Employment and training: ▪ Hiring policy favouring the hiring of women, local candidates, and First Nations people.
Contribution to the energy transition (The QPDCSM aims to ensure the supply of CSM for the manufacture of batteries and clean technologies.)	The project involves the development of a lithium mine, a mineral that is critical for the battery industry and the high-tech sector.

2.3.2.5 Plan d'action nordique (Plan Nord)

The first version of the Plan Nord [Northern Action Plan] was unveiled by the Quebec government in 2011. The primary focus of the Plan Nord was the development and enhancement of resources in the north of the province. The second version of this action plan, entitled "The Plan Nord toward 2035, 2015-2020 Action Plan," was published in 2015. The three key policy directions of this action plan were to:

- "develop the diversified economic potential of northern Quebec in a responsible way and for the benefit of the population living there and Quebec as a whole";
- "support the development of all communities in the area covered by the Plan Nord, by helping them realize their full potential and enhancing their living conditions"; and,
- "protect the environment and preserve the distinctive biodiversity of northern Quebec by ensuring that mechanisms are put in place to dedicate 50% of the area covered by the Plan Nord, by 2035, to non-industrial purposes, protection of the environment, and the safeguarding of biodiversity" (Secrétariat du Plan Nord, 2015).

In 2023, the Société du Plan Nord developed "Le Plan d'action nordique 2023-2028" [The Northern Action Plan 2023-2028] which is a continuation of the Plan Nord toward 2035 and its long-term objectives (Société du Plan Nord, 2023). Four key areas of focus were adopted:

- increasing connectivity to the territory;
- capitalizing on the economic strengths of the North;
- stimulating the vitality of communities;
- preserving a unique environment.

The project is well aligned with the objectives and priorities of the Plan Nord, which aims to address economic, social, and environmental development issues while contributing to the vitality and prosperity of the host communities. Table 2-5 presents the various aspects of the project's environmental impact assessment that align with the focus areas of the Plan d'action nordique 2023-2028.

Table 2-5 Alignment between the Plan d'action nordique 2023–2028 and the environmental impact assessment

Section of the Plan d'action nordique	Corresponding chapter or section in the EIA
Focus area 2 – Capitalizing on the economic strengths of the North	
2.1.4 Supporting Indigenous entrepreneurship	Chapter 1 – Introduction – Responsible Procurement Policy
2.2.1 Supporting the implementation of projects for the training, international recruitment, retention, and qualification of the workforce	Chapter 7 – Issues – No. 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population – No. 6 – Preservation of the traditional activities and practices of Indigenous peoples and the activities and practices of non-Indigenous peoples Chapter 8 – Identification and Assessment of Impacts – Impact assessment for the VECs of Issues 5 and 6

Section of the Plan d'action nordique	Corresponding chapter or section in the EIA
	Chapter 9 – Cumulative Impact Assessment – Analysis of cumulative impacts
Focus area 4 – Preserving a unique environment	
4.3.2 Facilitate the detection and anticipation of climate change impacts on northern biodiversity	Chapter 11 – Climate Change Resilience

2.3.2.6 Integration of sustainable development principles

The concept of sustainable development was articulated in 1987 in the Report of the World Commission on Environment and Development: Our Common Future (the Brundtland Report).

According to the project directive (MELCCFP, 2025),"Sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs." The three objectives of sustainable development are maintaining the integrity and characteristics of the environment, improving social equity, and improving economic efficiency. A project designed with this in mind must aim to integrate and balance these three objectives.

The directive requires the proponent to take sustainable development objectives into account when developing its project and to determine how the actions to be implemented should be adapted to the specific environmental and social context of the James Bay region. It requires that the impact assessment summarize the sustainable development approach followed by the proponent and explain how the project design takes this into account.

The impact assessment of a project must be carried out with the participation of citizens in the planning and decision-making process. The project must be based on a rational and integrated planning approach that takes into account the links between project components and implementation choices. For the impact assessment to be an effective tool in support of sustainable development, it must integrate the social, environmental, and economic dimensions in a way that meets the needs of the local population (in the vicinity of the work) and those who will be served by the project. Table 2-6 shows how PMET takes the principles into account through its actions, commitments, and the way it has adapted its project.

Table 2-6 Sustainable development principles integrated into the project

Sustainable development principles	Examples of implementation in the project
1–Health and quality of life	PMET's commitment to creating and maintaining a safe and healthy work environment. – Existing policies to meet these health and quality of life commitments. – System in place to report incidents and implement corrective actions or follow-ups to improve practices. – Nursing services are available on site; employees are offered prevention and follow-up care to better guide them in matters of health and quality of life. – Human resources team members on site at the camp. – Strict water management, dust and emissions control, and measures to protect aquatic and terrestrial environments.
2–Social equity and solidarity	– Contribution to economic prosperity during the exploration phase and even more so during the operations phase by promoting the hiring of personnel from Indigenous communities.

Sustainable development principles	Examples of implementation in the project
3–Environmental protection	– Employee training and procedures in place in the event of accidental spills. – Mitigation measures implemented to minimize the project’s impact on various environmental components. – Monitoring and follow-up program implemented during the project.
4–Economic efficiency	– Contribution to economic prosperity during the exploration phase and even more so during the operations phase through the hiring of several employees. – Lithium production for the battery industry, contributing to energy transition and decarbonization
5–Participation and engagement	– PMET held numerous meetings with various stakeholders during the project preparation phase so that it could share all information about its project with the host communities and gather comments, concerns, and suggestions. – PMET’s willingness to sign agreements with non-Indigenous and Indigenous stakeholders.
6–Access to knowledge	– Involvement of Cree community members in inventories to obtain opinions on land use (fishing, hunting, gathering, or other activities) and on the wildlife species found in the study area (Chapters 3 and 6).
7–Subsidiarity	Not applicable.
8–International partnerships and cooperation	– Alignment with the QPDCSM and the Plan d’action nordique 2023-2028.
9–Prevention	– Incident procedures in place and used by employees. – Spill kits and first aid kits available on site. – On-site emergency response plan. – Continuous environmental monitoring.
10–Precautions	
11–Protection of cultural heritage	– Keeping mining infrastructure concentrated within a certain area to limit how much it encroaches on the tallyman’s land and to protect the landscapes and sensitive areas for the tallyman and other users as much as possible. Change made: combination of pit and underground mine, rather than exclusively open-pit mining, to reduce the footprint and visual impact. – Maintaining respectful and ongoing dialogue with host communities and local authorities through documenting and sharing information, mutual understanding, and collaboration to address concerns, particularly those related to cultural aspects. – Archaeological excavations carried out around the camp area on sites of medium potential identified by a specialized archaeological consultant. – Inclusion of traditional knowledge in the EIA through interviews with land users and the participation of many members of the Chisasibi community in field surveys.
12–Biodiversity preservation	– Project design developed to reduce encroachment or negative impacts on various components of the environment; incorporation of mitigation measures.
13–Respect for ecosystem support capacity	
14–Responsible production and consumption	Ongoing optimization of the mine will be carried out to reduce environmental impacts.
15–Polluter pays	Budget dedicated to the environmental management of the project from construction to closure.
16–Internalization of costs	– Guaranteed amount for site restoration following the end of operations.

2.3.3 Constraints and issues identified

Based on the information available regarding the project, its receiving environment, and the comments and concerns raised by government authorities, stakeholders, and Indigenous groups, the main issues identified for the project are:

- increased risk of accidents, wildlife collisions, and wildlife disturbance on the Trans-Taiga Road and the Billy-Diamond Highway due to increased heavy vehicle traffic transporting concentrate;
- increased traffic on the Billy-Diamond Highway due to the project and numerous other potential projects in the area (cumulative effects);
- project encroachment on fish habitat;
- protection of water quality and fish resources;
- potential disruption to the traditional activities of land users;
- protection of the well-being and quality of life of local communities.

PMET wishes to address these issues with the relevant authorities, stakeholders, and Indigenous groups to develop strategies aimed at mitigating the project's potential impacts and increasing its social acceptability among users.

2.4 Analysis of project alternatives

2.4.1 Consequences of non-completion or postponement of the project

If the project is not carried out, Quebec will miss out on a strategic opportunity to develop the critical and strategic minerals sector, particularly lithium, which is essential to the energy transition and to achieving the objectives of the 2030 Plan for a Green Economy. It would limit the province's ability to meet growing demand for battery materials, thereby reducing its role in the North American and global value chain. Postponing the project would have similar effects, delaying the market entry of spodumene and compromising Quebec's competitiveness relative to other jurisdictions that are accelerating their mining projects to meet the needs of battery manufacturers and automakers.

2.4.2 Solutions proposed during consultations

The consultations identified concerns related to the ecological footprint and environmental impacts of exclusively open-pit mining. In response, PMET modified the initial design to adopt a hybrid approach combining open pit and underground mining, thereby reducing the disturbed area and impacts on the landscape. This solution is in addition to other planned measures, such as the creation of a waste rock stockpile equipped with a sealed membrane for PAG waste rock, and the safe co-disposal of tailings and waste rock.

2.4.3 Line of reasoning and criteria leading to the decision

The decision to carry out the project was based on several criteria:

- Strategic relevance: alignment with Quebec's critical and strategic minerals policy and direct contribution to the establishment of a robust Quebec-based battery industry.
- Characteristics of the deposit: high spodumene content and sufficient volumes to support long-term production at a competitive global price.
- Economic context: strong global demand for lithium, expected to grow significantly by 2040, with risks of shortages after 2030.
- Socioeconomic benefits: job creation, contribution to regional and provincial GDP, and substantial tax revenues for the governments.
- Social acceptability: incorporation of recommendations from consultations, particularly the reduction of territorial impacts through the adoption of a hybrid mine.

2.5 Similar projects

In the study area and more broadly in Quebec, several mining projects focused on critical and strategic minerals are currently being evaluated or implemented and are likely to influence the design or impacts of the proposed project. Major projects include:

- Rose Lithium-Tantalum Mining Project (Critical Elements Lithium Corporation) in Eeyou Istchee James Bay, currently in the permit and authorization phase.
- Moblan Project (Sayona Nord Inc.), feasibility study for a lithium mine in Nord-du-Québec.
- James Bay Lithium Mine Project (Galaxy Lithium Canada Inc.), in the authorization phase.
- Whabouchi Mining Project (Nemaska Lithium), commissioning suspended.

These projects, combined with existing infrastructure (roads, power lines, treatment facilities), may influence the planning and design of the proposed project, particularly in terms of logistics, access, and environmental impact management.

PMET also plans to conduct bulk sampling as part of the project, which is a preliminary step before production begins.

The presence of several mining projects in the region raises the issue of cumulative effects on the environment and communities. These effects may include:

- increased pressure on natural environments (habitat fragmentation, wildlife disturbance);
- increased air emissions and noise from mining activities and transportation;
- socioeconomic impacts (employment, infrastructure, coexistence with traditional activities).

3 Community Relations

PMET is committed to building and maintaining positive, mutually beneficial relationships with local stakeholders[1] and communities affected by its activities.

Since the beginning of the Shaakichiuwaanaan Project exploration phase in 2017, PMET has worked to identify, inform, and, where appropriate, consult local stakeholders and communities affected by its activities on the Shaakichiuwaanaan property, in a structured and culturally respectful manner.

This section addresses the requirements set out in the Tailored Impact Statement Guidelines issued by the Impact Assessment Agency of Canada (IAAC), as well as those outlined in the Directive of the Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP). Although PMET's engagement activities began during the exploration phase, this chapter focuses primarily on engagement carried out during the environmental impact assessment phase, specifically following the filing of the project notice to the MELCCFP in November 2023.

Engagement with the Cree communities of Eeyou Istchee James Bay, the Inuit living in Chisasibi and Indigenous organizations is presented in a separate section from engagement with non-Indigenous stakeholders and government authorities. Each section summarizes the key comments, perspectives, and concerns raised during consultations, and explains how this input has informed the development of the Shaakichiuwaanaan Project.

Engagement activities with both Indigenous and non-Indigenous stakeholders were led by PMET, with support from WSP. Recognizing that meaningful engagement is an ongoing process, PMET will continue consultation and dialogue following submission of the EIA.

3.1 Engagement Process

In addition to the government requirements outlined above, PMET's engagement process, as described in the company's Stakeholder Engagement Protocol, is guided by the ECOLOGO® UL 2723 Certification for Mineral Exploration companies. This certification, which involves a formal audit of the certified exploration company and its suppliers, is designed to ensure the application of best economic, environmental, and social practices in mineral exploration.

3.1.1 Approach

The approach set out in PMET's Stakeholder Engagement Protocol is structured around six key steps:

- identifying project parameters and the company's responsibilities with respect to its duty to inform;

1 According to the MELCCFP, the term *stakeholders* refers to "individuals, groups, organizations, or local or Indigenous communities that are directly affected (or likely to be affected) by a given project and its impacts (both positive and negative), but may also include stakeholders (at the local, regional, or provincial level) who are interested in the project without being directly affected by its potential benefits and impacts" (MELCCFP, 2023. p. 3 [translated from the French original]). In keeping with this definition, the term *non-Indigenous stakeholders* is used in this chapter.

- identifying stakeholders and assessing the social environment;
- planning and initiating contact with key stakeholders;
- reporting;
- information sharing.

Through this approach, PMET ensures that it:

- engages local stakeholders and communities early in order to gather concerns in a timely manner;
- includes all stakeholders potentially affected by the project;
- promotes participation by providing advance notice of upcoming consultation activities;
- adapts engagement activities to the local culture by:
  - taking into account other traditional events or activities;
  - presenting meaningful and accessible information (e.g., in the local language);
  - using culturally appropriate consultation methods implemented with respect for local customs and traditions;
- encourages feedback to support ongoing dialogue with stakeholders;
- properly documents engagement activities; and
- maintains communication channels throughout the project lifecycle.

3.1.2 Objectives

PMET's engagement process with local stakeholders and communities aims to achieve the following objectives:

- Promote transparent dialogue and proactive, effective communication between PMET, host communities, and stakeholders involved in the company's activities and the Shaakichiuwaanaan Mining Project.
- Enhance the dissemination of information regarding the company's activities and the Shaakichiuwaanaan Project to ensure accountability.
- Gather information on land use, as well as the culture and traditions of Indigenous and local communities affected by the company's activities.
- Gather stakeholder concerns and identify potential challenges associated with the implementation of the Shaakichiuwaanaan Project and the company's other activities.
- Address concerns raised, correct misperceptions where appropriate, and make the necessary commitments to respond to questions, comments, and issues raised.
- Develop and maintain a lasting relationship of trust with stakeholders affected by the Shaakichiuwaanaan Project and the company's activities.

Through this process, PMET ensures that stakeholders and local communities affected by its activities are provided with meaningful opportunities to participate proactively in project planning and design.

3.1.3 Engagement tools

Certain tools have been designed specifically for Indigenous communities to support their engagement. PMET places particular importance on its relationships with Cree communities that may be affected by the project, especially the Cree Nation of Chisasibi. In July 2024, PMET renamed the Corvette Project following a recommendation from Chisasibi elders and the family of the tallyman responsible for trapline CH39. Shaakichiuwaanaan refers to the four Shaakichiuwaanaan hills located near the CV5 pegmatite. A new logo was also designed in collaboration with the family of the tallyman responsible for trapline CH39. It incorporates several Cree symbols, including a goose, a teepee, syllabic script, mountains, elements representing team spirit, and Lake Shaakichiuwaanaan. This name change reflects PMET's commitment to the Cree Nation of Chisasibi and its respect for traditional Cree land. Integrating the Cree language into the project name also helps promote and share Cree culture with all stakeholders.

PMET has developed various tools as part of its engagement process. These are presented below.

3.1.3.1 Communications log

As early as the exploration phase, PMET maintained a communications log to identify local stakeholders and other project participants, document the engagement activities in which they participated, and record their concerns. The log also enables the company to track commitments made to interested parties and local stakeholders.

The communications log serves as a stakeholder register and includes the following information: the name and contact details of the person met, the organization represented, their role, the engagement activities in which they participated (where applicable), their level of interest in and influence with regard to the project, archived emails, and follow-up actions required by PMET in relation to that stakeholder.

The communications register also serves as a tool for monitoring engagement activities and records: the type of activity carried out, the stakeholder consulted, the date of the activity, the names of participants, the materials used, the purpose of the activity, a summary of discussions, actions to be undertaken by the company following the activity, and the associated timelines.

Comments are categorized by theme to facilitate the identification of key concerns raised by local stakeholders and communities.

3.1.3.2 Community liaison office in Chisasibi

In 2024, PMET hired a community liaison coordinator and opened a liaison office in the Chisasibi shopping centre. The community liaison coordinator enables PMET to maintain ongoing relationships with various local stakeholders (elected officials, tallymen, community organizations, entrepreneurs, and community members). This role informs these stakeholders about activities conducted by PMET on the Shaakichiuwaanaan property and serves as an interpreter when the Cree language is required to adequately address community concerns. The coordinator also contributes to the development of PMET’s engagement strategy, supports awareness and understanding of exploration and mining activities, and coordinates information sessions, site visits, and public events.

3.1.3.3 Regional Working Group on the Transportation of Spodumene Concentrate

PMET established a working group on the transportation of spodumene concentrate (hereafter referred to as the "working group"). Representatives from the Cree Nations of Chisasibi and Wemindji, the City of Matagami, the Town of Radisson, and the Eeyou Istchee James Bay Regional Government participated in the working group's first meeting on January 17, 2025. At this initial meeting, PMET presented the purpose of the working group, namely to integrate the perspectives of local stakeholders into the development of a transportation plan for spodumene concentrate from the Shaakichiuwaanaan mine site. Participants were invited to share their experiences with other mining projects, particularly lithium projects, as well as their perspectives on the transportation of raw materials in the region. Participants also had the opportunity to express their comments and concerns regarding traffic on the Transtaïga Road and Billy-Diamond Highway. The meeting concluded with clarification of the working group's operating procedures, including the agenda and frequency of meetings, document sharing, and preparation of meeting minutes.

3.1.3.4 Communication Tools

To engage local stakeholders and communities affected by the project, PMET deployed a range of communication tools. As noted above, some of these tools were developed in collaboration with local communities, particularly the community of Chisasibi, in order to culturally tailor the company's communications and reach as many stakeholders as possible. These tools were used to inform local populations about the Shaakichiuwaanaan Project and to promote the information and consultation activities carried out by PMET. The following communication tools were used:

- meetings and interviews (in person or virtual);
- public presentations and events;
- phone calls and emails;
- community newsletters, fact sheets, *project update bulletins*, letters;
- company website and social media;
- informational videos;
- radio broadcasts;
- digital billboards.

3.2 Regional Context

The Crown has a legal duty to consult Indigenous Peoples and, where appropriate, accommodate them when considering actions that may adversely affect an established or potential Indigenous or treaty right.

The Shaakichiuwaanaan Project is located within the territory of the Eeyou Istchee James Bay Regional Government (EIJBRG), which replaced the municipality of James Bay in 2014. This territory, situated between the 49th and 55th parallels, corresponds to Category III lands under the James Bay and Northern Quebec Agreement (JBNQA), where the Cree hold exclusive rights to trap fur-bearing animals and fish certain species. The environmental protection regime established under the JBNQA guarantees the Cree a distinct and meaningful role in the environmental assessment process. This participation is carried out through consultation and representation mechanisms in which the Cree play a central role.

3.3 Cree Communities of Eeyou Istchee and Indigenous Organizations

The Crown has delegated certain procedural aspects of its legal duty to consult Indigenous peoples and, where appropriate, accommodate them in relation to the Shaakichiuwaanaan Project to PMET, through the requirements set out in the Tailored Impact Statement Guidelines.

3.3.1 Eeyou Istchee Cree communities and engaged Indigenous organizations

To carry out the impact assessment process, the IAAC and the Cree Nation Government (CNG) signed, in 2025, the Agreement concerning the Shaakichiuwaanaan External Federal Assessment Process Under the James Bay and Northern Quebec Agreement (JBNQA) and the *Impact Assessment Act* (IAA). The agreement delegates to a Joint Assessment Committee, composed of representatives appointed by the CNG and the IAAC, the responsibility for carrying out the activities required under the Act, including the implementation of an Indigenous Engagement and Partnership Plan (IEPP). This document is intended to ensure that meaningful consultations are conducted with Indigenous Peoples who may be affected by the Shaakichiuwaanaan Project.

As part of the IEPP, the Joint Assessment Committee established a list of Indigenous groups that could be affected by the project and must, therefore, be consulted and informed during the impact assessment. This list includes Indigenous groups potentially subject to adverse project impacts, particularly with respect to the exercise of their Aboriginal rights, whether recognized, asserted, or treaty-based. It also includes Indigenous groups whose Aboriginal rights are recognized and affirmed under section 35 of the *Constitution Act, 1982*, as well as Indigenous Peoples with asserted rights requiring an assessment of factors pursuant to section 22 of the IAA. The First Nations and Cree and Inuit organizations identified for engagement are as follows:

- Cree Nation of Chisasibi
- Cree Nation of Wemindji
- Cree Nation of Mistissini
- Makivik Corporation
- Cree Nation Government

PMET quickly identified the Cree Nation of Chisasibi as a priority stakeholder, given that the project is located on trapline CH39, which is associated with its traditional land. The company met with Chisasibi’s elected officials to determine the concerned trapline tallyman and to agree on appropriate communication protocols.

Given the project's proximity to the Mistissini (M02A) and Wemindji (VC26) traplines, PMET also contacted elected officials from those communities to inform them of the project's key milestones, even though no drilling activities are planned within their respective territories.

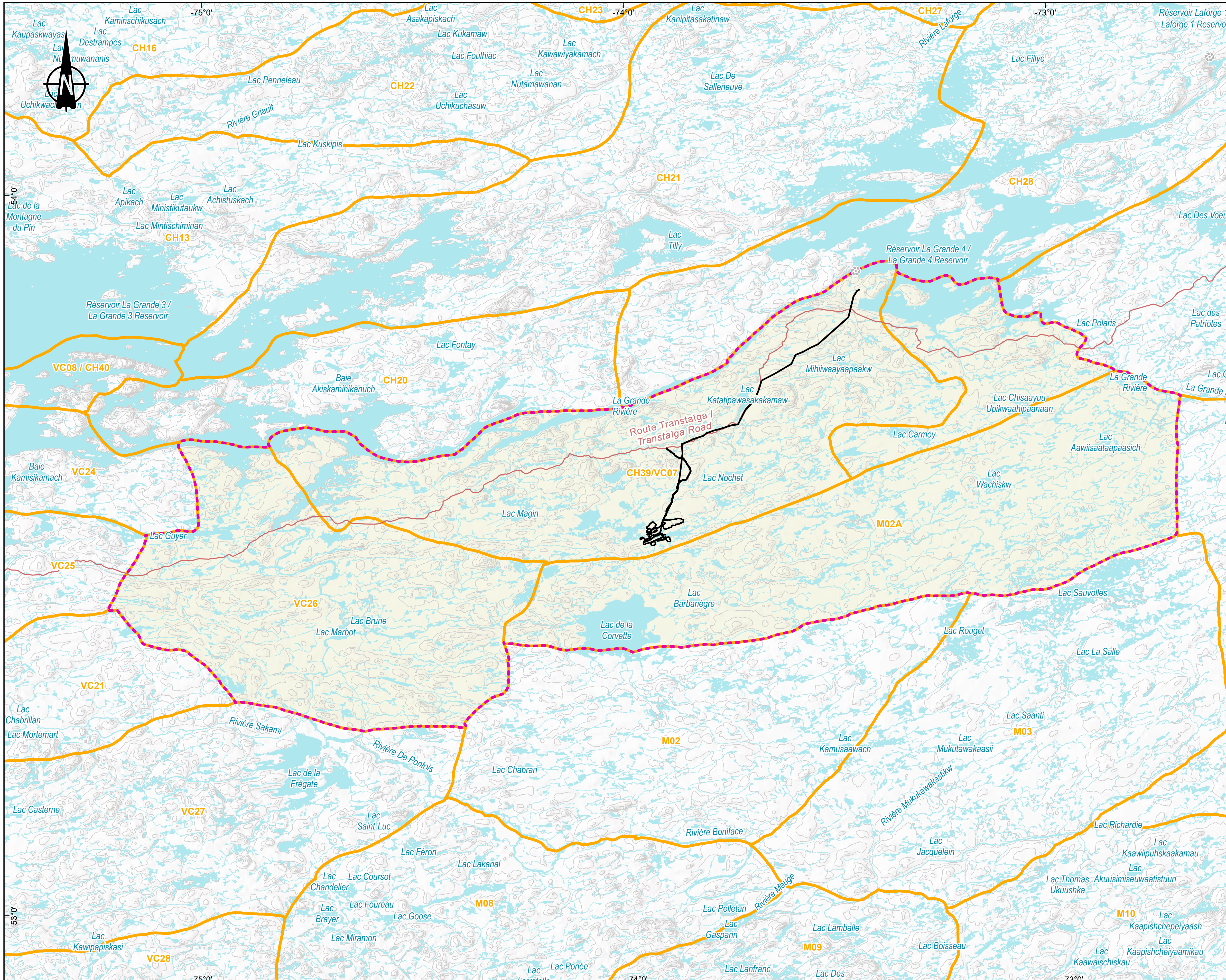
PMET attempted to contact the Makivik Corporation but did not receive a response[2]. In addition, given the role of the Cree Nation Government in the environmental and social impact assessment process established under Section 22 of the JBNQA, PMET ensured that it was included in its information-sharing and engagement activities.

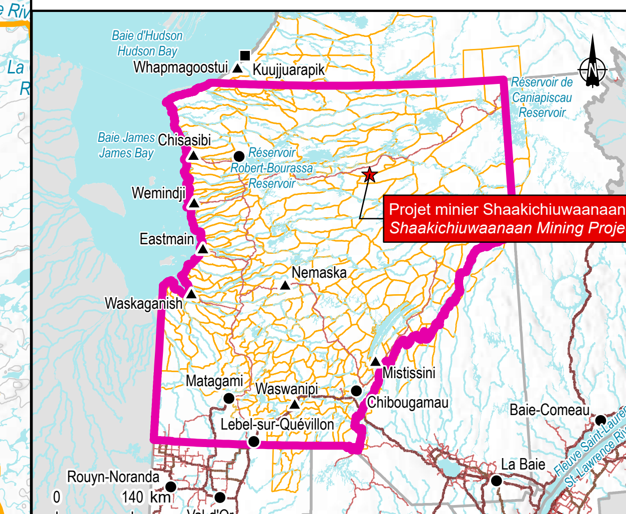
Engagement efforts are therefore focused on the Cree communities of Eeyou Istchee and the Indigenous organizations listed in Table 3-1. These efforts include outreach to local stakeholders, the respective community governments, as well as the tallymen and primary users of the traplines affected by the project. Businesses and organizations within the Cree Nation of Chisasibi were also specifically targeted. Map 3-1 illustrates the traplines and Cree communities in the region.

Table 3-1 List of Indigenous stakeholders

Category	Stakeholders engaged
Regional Indigenous government	Cree Nation Government
Indigenous communities	Cree Nation of Chisasibi (CNC)
	Cree Nation of Wemindji (CNW)
	Cree Nation of Mistissini (CNM)
Land users	Tallyman and land users (CH39 – Chisasibi)
	Tallyman and land users (M02A – Mistissini)
	Tallymen and land users (VC26 – Wemindji)
Entrepreneurs and organizations of the Cree Nation of Chisasibi	Cree Trappers' Association (CTA – Chisasibi)
	Chisasibi Business Development Group (CBDG)
	Chisasibi Business Service Centre (CBSC)
	Saskounan Construction (construction company)
	Niigaan (environmental consultant)
	Chisasibi Eeyou Resource and Research Institute
	Cree Board of Health
	Cree School Board
	Youth Council
	Chisasibi Cree Women Association
	Chisasibi Cree Men's Association
Inuit organizations	Makivvik Corporation
	Kigaluk Landholding Corporation
	Anguvigaq of Chisasibi

[2] Members of the Makivik Corporation were contacted on three occasions by PMET via email (between September 2025 and February 2026) to invite them to various information and public consultation sessions, as well as to virtual or in-person meetings.





Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Occupation du territoire cri / *Cree Territory*

- Terrain de trappage / *Trapline*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 3-1/ *Map 3-1*
Terrains de trappe et communautés cries de la région / *Traplines And Cree Communities in the Region*

Sources / Sources

SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
AQréseau+, réseau routier, MERN, 2024-03-01
Cree Trappers Association, 2018 / Le Groupe Nippour, 2013-05

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3.3.2 Engagement Activities During the Exploration Phase

PMET initiated an information and consultation process prior to EIA. Initial discussions with the Cree Nation of Chisasibi began in 2017 during the preliminary exploration phase. In June 2022, PMET met with Chisasibi's elected officials for the first time to introduce the company and present its ongoing exploration activities. Throughout 2022, PMET representatives met on several occasions with elected officials and Band Council staff, while continuing to communicate by letter, email, and telephone.

In 2018, PMET notified the Cree Mineral Exploration Board (CMEB) by mail of its intention to carry out exploration activities at the Shaakichiuwaanaan site.

The tallyman of trapline CH39 and members of his family were first met in September 2022 at the Mirage site, a lithium exploration project led by Brunswick Exploration. They were given a tour of the core shack, which allowed them to familiarize themselves with the exploration activities conducted by PMET.

PMET first contacted the Cree Nation of Mistissini in 2019 to inform the community of the company's intentions regarding the Shaakichiuwaanaan property. In 2022, PMET provided information, by both email and mail, to the tallyman of trapline M02A as well as to community elected officials about the various exploration and construction activities underway on the Shaakichiuwaanaan property.

In December 2022, in accordance with the company's established process, PMET contacted the Chief of the Cree Nation of Wemindji and the tallyman of trapline VC29 by mail to inform them of the exploration activities being carried out on the Shaakichiuwaanaan property.

In February 2023, PMET, the Council of the Cree Nation of Chisasibi, and the Cree Nation Government jointly began developing a communication protocol specific to the exploration activities associated with the Shaakichiuwaanaan Project. This protocol establishes the framework for collaboration and defines the relationship between the company and its Cree partners. It includes mutual commitments regarding communication, environmental monitoring, employment and training, negotiation of impact and benefit agreements, and business opportunities. Discussions with Chisasibi concerning the communication protocol continued during the environmental impact assessment phase.

3.3.3 Engagement Activities During the Environmental Impact Assessment Phase

Since November 2023, when the project's impact assessment process began, PMET has organized more than 85 in-person and virtual working meetings with various stakeholders from the Cree community of Chisasibi. These meetings were held primarily with elected officials of the Chisasibi Band Council, the tallyman of trapline CH39, and members of his family. In addition, several dozen emails, letters, and phone calls were exchanged with various members of the First Nation.

In addition to these working meetings, PMET has visited the community of Chisasibi approximately every six weeks since January 2023 to hold engagement activities with community members. These activities included community information sessions, site visits, and Shaakichiuwaanaan Day. This annual cultural event took place at the exploration camp in June 2024 and again in September 2025.

Elected officials and tallymen from the Mistissini and Wemindji traplines, located near the project, have been met with five and three times, respectively, since November 2023.

Finally, PMET met with Cree stakeholders working in the health and education sectors, as well as in the private sector, in order to better understand the host community and its various social and economic issues, and to discuss potential business opportunities.

3.3.3.1 Meetings with Band Councils and representatives of the Cree Nation Government

Between November 2023 and décembre 2025, PMET met 32 times with elected officials of the Cree Nation of Chisasibi. The meetings referenced in this section were held exclusively with elected representatives, including the Chief, Deputy Chief, Councillors, and Band Council staff, notably the Executive Director, Acting Economic Development Officer and Tourism Coordinator, Natural Resources Relations Officer and the Finance Coordinator of the community. Some of these meetings were also attended by representatives of the Cree Nation Government.

These working meetings addressed, among other matters, project updates, the development of a communications protocol, the planning of community engagement activities, and the consultation and impact assessment process. PMET also maintained regular communication with elected officials by telephone, videoconference, text message, and email.

All interviews and other communications held in person or by videoconference since November 2023 are compiled in Table 3-2.

Table 3-2 Meetings with elected officials from the Chisasibi Band Council and representatives of the Cree Nation Government

Date	Participants[3]	Topics discussed
November 14, 2023	– CNC Chief – CNC Deputy Chief – Representatives of the Cree Nation Government	– Description of the project and ongoing activities – Strategies to attract Cree workers – Development of a communication protocol – Name of camp
December 8, 2023		

3 It should be noted that the participants mentioned did not attend all the meetings.

Date	Participants[3]	Topics discussed
January 19, 2024 February 8 and 23, 2024 March 8, 18, 27, 2024 April 8, 2024 May 31, 2024 June 13, 2024 July 29, 2024 August 27, 2024 October 3, 10, 17, 25, 2024 November 1, 6, 21, 2024	– CNC Chief – CNC Deputy Chief – Representatives of the Cree Nation Government	– Recent project developments – Planning of engagement activities – Development of a communication protocol – Planning of Shaakichiuwaanaan Day (2024) – Meeting with Wemindji elected officials and the concerned tallyman – Planning of field visits – Review of community information sessions – Exploration program – EIA process
January 22, 2025 March 10, 2025 April 29, 2025 May 28, 2025 June 17, 2025 July 7, 2025 July 14, 2025 August 14, 2025 September 8, 2025 September 9, 2025 October 22, 2025 November 12, 2025	– CNC Deputy Chief – CNC Chief – CNC Councillors – Executive Director – Representative of the Cree Nation Government	– Review of 2024 achievements – Development of a communication protocol – Visit to the Eleonore mine – Recent developments in project design – Relations with Hydro-Québec – Band Council election – Regional group on the transportation of spodumene concentrate – Boat washing station – Issues related to traplines – Infrastructure for training in the community – Chisasibi Business Development Group (CBDG) – Shaakichiuwaanaan Day (2025) – Follow-up on the meeting with the CH39 tallyman's family – Compensation projects for fish habitat and fishing – Community relations and consultation as part of the EIA – Mineral Resource Estimates update – Bulk sampling – Government relations

Meetings were held during the EIA phase with the Deputy Chief, the Regional Development Officer, and the Environmental Administrator of the Cree community of Mistissini to present the Shaakichiuwaanaan Project and outline the consultation and collaboration approach planned for the environmental and social impact assessment (EIA) process.

An initial virtual meeting with the Chief and Deputy Chief of Wemindji was held in 2024. The purpose of this meeting was to present the Shaakichiuwaanaan Project, provide information on the EIA process, and invite them to participate in the regional group on the transportation of spodumene concentrate.

All of these meetings are listed in Table 3-3. PMET also met with staff from various Band Councils, including the Regional Development Officer for Mistissini. In addition, elected officials were kept informed of project developments by email and telephone.

Table 3-3 Meetings with elected officials of the Mistissini and Wemindji Band Councils

Date and location	Participants	Topics discussed
June 26, 2024 Online (Mistissini)	– CNM Regional Development Officer – CNM Environmental Administrator	– Presentation of project background and preliminary project fact sheet
December 11, 2024 Online (Wemindji)	– CNW Chief – CNW Deputy Chief	– Presentation of the Shaakichiuwaanaan Project – Regional group on the transportation of spodumene concentrate
December 12, 2024 Online (Mistissini)	– CNM Deputy Chief – CNM Environmental Administrator	– Presentation of the Shaakichiuwaanaan Project – Consultation and collaboration approach

The Cree Nation Government plays an important role in the project impact assessment process, given its status as a member of COMEX/COMEV and pursuant to the agreement established with the IAAC. It is therefore directly involved in the project authorization process. In 2024, the Cree Nation Government organized a training workshop to help PMET managers and executives better understand the cultural, political, and economic context of the Cree Nation. It also met with PMET to discuss the EIA process and Indigenous consultation expectations specific to the treaty territory.

Table 3-4 Meetings with representatives of the Cree Nation Government

<table>
<tr><th>Date</th><th>Participants[4]</th><th>Topics discussed</th></tr>
<tr><td>November 22, 2023</td><td>– 2 representatives of the Cree Nation Government</td><td rowspan="4">– Introduction to and overview of the Shaakichiuwaanaan Project
– Cumulative effects related to traffic on Billy-Diamond Highway
– JBNQA
– Mining activities in Eeyou Istchee
– COMEX Process
– Consultation framework in Eeyou Istchee
– Permitting schedule and federal review process
– Bulk sampling
– Development of a communication protocol
– Community relations
– Preliminary economic assessment
– Working group on the transportation of spodumene concentrate</td></tr>
<tr><td>February 20, 2024</td><td>– 1 representative of the Cree Nation Government</td></tr>
<tr><td>October 1, 2024</td><td>– 1 representative of the Cree Nation Government</td></tr>
<tr><td>March 10, 2025</td><td>– 1 representative of the Cree Nation Government</td></tr>
</table>

4 It should be noted that the participants mentioned did not attend all the meetings.

3.3.3.2 Meetings with tallymen and their families

Between November 2023 and December 2025, 27 meetings were held with the tallyman of trapline CH39 and members of his family. Most of these meetings took place in Chisasibi. Up to 17 family members attended certain meetings. Approximately ten of the meetings were also held in the presence of elected officials from the Band Council or representatives of community businesses.

These meetings provided an opportunity to better understand the family's use of the land and to gather their questions and concerns regarding the Shaakichiuwaanaan Project. PMET ensured that it met with the family of the tallyman responsible for trapline CH39 prior to holding public information sessions, in order to share information specific to their family trapline in advance. All meetings and the main topics discussed are listed in Table 3-5. Only in-person and virtual meetings have been included.

Table 3-5 Meetings with the tallyman of trapline CH39 from Chisasibi and his family

Date	Participants[5]	Topics discussed
January 17, 2024 (2 meetings)	– Tallyman – 28 family members in total	– Presentation of the project – New authorization process for impact-causing exploration work (ATI) – Project benefits and opportunities – Planning of Shaakichiuwaanaan Day (2024) – Development of a communication protocol – Preliminary economic assessment – Update on mineral resource estimates – Baseline data collection for natural and human environments – Land use – Study on the mining potential of the Shaakichiuwaanaan property – Field studies for the impact assessment – 2024 year-end review
March 12, 2024	– Tallyman – 10 family members	
March 25, 2024	– Tallyman – 16 family members	
March 27, 2024	– Tallyman – 4 family members	
May 1, 2024	– Tallyman – 4 family members	
May 21, 2024	– Tallyman – 4 family members	
July 19, 2024	– Tallyman – 2 family members	
July 30, 2024	– Tallyman – 10 family members	
August 13, 2024	– Tallyman – 12 family members	
September 9, 2024	– Tallyman – 17 family members	
November 18, 2024	– Tallyman – 2 family members	
December 10, 2024	– Tallyman – 12 family members	
January 21, 2025	– 9 family members	

5 Some of these meetings were also attended by elected officials or Band Council staff such as the Chief, Deputy Chief, Youth Council Chief, councillors, Acting Chief Executive Officer, Corporate Secretary, Treasurer, the Finance Coordinator, the Executive Assistant, the Natural Resources Relations Officer, the Acting Economic Development Officer and Tourism Coordinator, and a representative of the Cree Nation Government.

Date	Participants[5]	Topics discussed
March 17, 2025	– Tallyman – 6 family members	– Transportation of spodumene concentrate – Employment and business opportunities – Tour of the Eleonore mine – Study of fish and fish habitat compensation program – Land use – Field surveys (archeology, water and sediment, fish habitat compensation, vegetation, wetlands) – Preliminary closure plan – Shaakichiuwaanaan Day (2025) – Communication protocol – Mineral resource estimate and new minerals of interest (cesium, tantalum) – Bulk sampling – Environmental impact assessment process (methodology, validation of valued components) – Archaeological study – Caribou study – Vegetation and wetland study – Bird, amphibian and reptile study – Update on exploration activities – Year-end celebrations
March 27, 2025	– Tallyman	
April 28, 2025	– Tallyman – 10 family members	
May 26, 2025	– Tallyman – 6 family members	
July 3, 2025	– Tallyman	
July 7, 2025	– Tallyman – 10 family members	
July 14, 2025	– Tallyman – 1 family member	
August 11, 2025	– Tallyman – 1 family member	
September 2, 2025	– Tallyman – 1 family member	
September 9, 2025	– Tallyman – 10 family members	
September 11, 2025	– Tallyman – 1 family member	
October 23, 2025	– Tallyman – 1 family member	
November 12, 2025	– Tallyman – 1 family member	
December 1, 2025	– Tallyman – 1 family member	

An interview was conducted in February 2025 in Nemaska with the tallyman responsible for trapline M02A and four members of his family. The purpose of this meeting was to document the use of trapline M02A and to gather comments, concerns, and suggestions from the tallyman and his family members. A virtual meeting was subsequently held with elected officials of the Mistissini Band Council and other members of the tallymen's families to inform them of the concerns raised during the meeting.

PMET also met with the two tallymen of trapline VC26 to better understand how they use their trapline. This meeting also provided an opportunity to gather their concerns, comments, and suggestions.

Table 3-6 Meetings with the tallymen of Mistissini and Wemindji and their families

Date and location	Participants	Topics discussed
February 19, 2025 Nemaska	– Tallyman of trapline M02A – 4 family members	– Presentation of the project – Data collection on land use
February 20, 2025 Wemindji	– Two tallymen of trapline VC26	– Presentation of the project – Data collection on land use
March 13, 2025 Online	– 3 users of the trapline M02A – CNM Deputy Chief – CNM Environmental Administrator – CNM Regional Development Officer	– Follow-up on the meeting with the tallyman of trapline M02A

3.3.3.3 Community information sessions

PMET organized seven community information sessions in Chisasibi between October 2023 and September 2025. These sessions addressed a range of topics. Up to 78 community members participated, including elected officials and members of the family of the tallyman responsible for trapline CH39. The sessions provided an opportunity to share information about the project, respond to questions, and gather concerns from the community. At the suggestion of the Community Chief, three of the sessions were held in a World Café format, allowing participants to discuss the topics presented by PMET in small groups and in plenary sessions.

Invitations to participate in the public sessions were shared through community radio, social media, and email. Some sessions were also broadcast on community radio, enabling outreach to a broader audience. Simultaneous interpretation into Cree was provided to ensure accessibility for the entire population. The following topics were discussed during the public information sessions:

- the mining industry and mineral exploration;
- ongoing activities on the Shaakichiuwaanaan property;
- the implementation of a communication protocol;
- environmental baseline data collection and the impact assessment process;
- impacts on fish habitat and fish habitat compensation projects;
- land use;
- the project schedule;
- employment, training, and business opportunities;
- mitigation and compensation measures; and closure planning.

Three exhibitions featuring 22 informational posters were also organized by PMET in various public locations in Chisasibi (April and July 2025). Approximately 80 visitors attended the July and September 2025 exhibition. Public information and engagement sessions held in Chisasibi are detailed in Table 3-7.

Table 3-7 Public information and engagement sessions in Chisasibi

Date and location	Activities	Participants	Topics discussed
October 11, 2023 Chisasibi	World Café	– Tallyman of trapline CH39 – 7 family members of trapline CH39 – 12 community members – CNC Finance Coordinator	– Recent project developments – Survey of winter birds and large wildlife – Employment, training, and business opportunities
January 16, 2024 Chisasibi	Information session	– CNC Chief – Representative of the Cree Nation Government – CNC Natural Resources Liaison Officer – CNC Acting Economic Development Officer and Tourism Coordinator – Administrator, CTA – 46 community members – Family members of trapline CH39	– EIA process – Project schedule – Relationship with tallyman of trapline CH39
March 26, 2024 Chisasibi	Information session	– 78 community members	– Communication protocol
April 15, 2024 Chisasibi	World Café	– 30 community members	– Presentation of the project (video screening) – Recent developments
August 12, 2024 Chisasibi	Information session	– 46 community members	– Communication protocol – Consultation schedule
September 10, 2024 Chisasibi	World Café	– Tallyman of trapline CH39 – 10 family members of trapline CH39 – 3 community members	– Recent project developments – Community liaison coordinator – Shaskichiuwaanaan Day – Site infrastructure – Muskw (partnership) – Update on mineral resource estimates – Preliminary economic assessment
January 22, 2025 Chisasibi	Information session	– Tallyman of trapline CH39 – 7 family members of trapline CH39 – 2 community members – CNC Natural Resources Relations Officer	– Recent project developments – Project schedule – Environmental impact assessment – Presentation by the tallyman of trapline CH39

3.3.3.4 Targeted meetings with other Cree authorities

Between April 2024 and December 2025, eight meetings were conducted with various Cree organizations in Chisasibi to gain a better understanding of community dynamics. These meetings also provided an opportunity to document participants' concerns and to gather their comments and suggestions related to the project. Stakeholders from the following organizations were consulted:

- Cree School Board – Adult Education Services;

- Cree Trappers' Association;
- Cree Board of Health and Social Services of James Bay;
- Chisasibi Eeyou Resource and Research Institute (CERRI);
- Niskamoon Corporation.

In March 2025, additional discussions were held with members of CERRI and Niskamoon Corporation regarding fish habitat compensation measures. Similar discussions were also held multiple times with members of the family of the tallyman responsible for trapline CH39 as well as with land users of the Cree Nation of Wemindji in October 2025.

Representatives of the Chisasibi Business Development Group (CBDG), as well as several local businesses, including Saskounan Construction, Niigaan, Cree Construction and Development Company and Kuikuhaacheu, were also invited to meet with PMET to learn more about the project and the related business opportunities.

During the period, meetings were also held with various organizations in the community to inform them about the Project and discuss potential joint initiatives related to education and training, including the Chisasibi secondary and vocational schools, as well as the Eeyou Istchee College of Science and Technology.

PMET intends to continue engaging with these authorities to support ongoing project planning. Activities carried out to date are presented in Table 3-8.

Table 3-8 Meetings with other Cree authorities

Date and location	Participants	Topics discussed
April 15, 2024 Chisasibi	– 2 representatives from CERRI	– Presentation of the project – Fish habitat compensation program – Exploration program – EIA process – Worker' training – Community and workers' health
May 31, 2024 Chisasibi	– 1 representative from CERRI	
January 22, 2025 Chisasibi	– 1 representative from CERRI	
January 23, 2025 Online	– 1 representative from the Cree School Board	
January 23, 2025 Online	– 1 local representative from the Cree Trappers' Association	
February 4, 2025 Online	– 1 representative from the Cree Health Board	
March 17, 2025 Chisasibi	– 1 representative from CERRI	
March 17, 2025 Chisasibi	– 1 representative from the CNC Niskamoon Corporation	
April 1, 2025 Online	– 2 representatives from the Cree Health Board	

Date and location	Participants	Topics discussed
July 8, 2025 Chisasibi	– 1 representative from the CNC Niskamoon Corporation	
October 23, 2025 Chisasibi	– 1 representative from CERRI	

3.3.3.5 Other outreach activities

Public events and community cultural activities organized by PMET or in which it participated are listed in Table 3-9.

Cree cultural events

On June 1, 2024, PMET organized the first Shaakichiuwaanaan Day, bringing together members of the Cree community of Chisasibi, workers from the mine site, and members of PMET's management team. The purpose of the event was to build relationships with the community and celebrate Cree culture. For the occasion, a *sabtuan* (tent) was erected, and participants shared traditional foods. A tour of the workers' camp was also organized for community members. Some participants also travelled to the CV5 extraction site and to the core shack at the Mirage Lodge site, a lithium exploration project led by Brunswick Exploration. PMET intends to make this an annual event. The second edition of Shaakichiuwaanaan Day was held on September 7, 2025.

The company also marked National Truth and Reconciliation Day and Orange Shirt Day in 2023, 2024, and 2025. In 2024, to mark this commemorative day in honour of survivors of residential schools, a camp was set up on trapline CH39 together with the tallyman and his family.

Site Visits

In February 2025, at the request of the tallyman of trapline CH39, he and his family, along with the Deputy Chief of Chisasibi, visited the surface facilities of the Eleonore Mine, an operating gold mine located on the territory of the Cree community of Wemindji. In August 2025, PMET also organized a visit to the Whabouchi Mine, owned by Nemaska Lithium. The tallyman of trapline CH39, five members of his family, the Deputy Chief of Chisasibi, and a council employee toured various mine facilities, including the camp, the open pit, the ponds, and the ore processing plant.

Table 3-9 Other engagement activities (cultural events, site visits, etc.)

Date and location	Activity	Participants
June 1, 2024 Shaakichiuwaanaan Property	Public Event – Shaakichiuwaanaan Day	– 34 members of the Cree community of Chisasibi
February 22, 2025 Eeyou Istchee James Bay	Site visit – Eleéonore Mine	– Tallyman of trapline CH39 – 8 family members of trapline CH39 – CNC Assistant Chief – CNC Natural Resources Relations Officer
August 2, 2025 Eeyou Istchee James Bay	Site visit – Whabouchi Mine	– Tallyman of trapline CH39 – 5 family members of trapline CH39 – CNC Assistant Chief – CNC Natural Resources Relations Officer
September 7, 2025 Shaakichiuwaanaan Property	Public Event – Shaakichiuwaanaan Day	– 61 members of the Cree community of Chisasibi

3.3.4 Results of engagement activities and PMET responses

The main comments raised by Indigenous stakeholders are presented in this section. These comments have been compiled into three separate tables: one for Chisasibi, one for Mistissini and Wemindji, and one for the Cree Nation Government and other Cree stakeholders. The tables below summarize the concerns, questions, and suggestions expressed by stakeholders. These are organized by issue and linked to the relevant valued ecosystem component (VEC). Comments that do not relate directly to the VECs identified in the EIA have also been included, such as concerns or questions regarding the assessment or consultation process.

The comments are drawn from PMET's communications log (see Section 3.1.3) and from selected meeting transcripts. The "Reference in the EIA" column identifies certain commitments, measures, or approaches considered by PMET and refers to the sections of the impact assessment that address the concern.

A summary of the key concerns is presented following the tables in Section 3.3.4.4.

3.3.4.1 Chisasibi

Table 3-10 Concerns identified during engagement activities with the Cree Nation of Chisasibi

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
Preservation of health, safety, and socioeconomic conditions of the regional population		
Physical, psychological, and social health	Cultural safety – Ensure a culturally safe environment on site and at the workers' camp (e.g., cultural safety program)	PMET works closely with the community liaison coordinator to develop a cultural safety program for its Indigenous employees. PMET has a workplace harassment policy and a process for handling harassment complaints.
	Workers' lifestyles – Concerns regarding nutrition, substance use, and physical exercise at the workers' camp	PMET plans to develop a workers' camp designed to provide a restful and healthy environment. The camp will include: – a gym; – an indoor and outdoor common areas for resting; – a cafeteria offering healthy meal options. All concerns regarding health impacts and proposed mitigation measures are addressed in the health sectoral report (Appendix 6-24).
	Physical health of workers – Concerns regarding the impacts of working on-site (e.g., exposure to contaminants or dust)	PMET has implemented an occupational health and safety prevention program. Health risks were evaluated as part of the human health risk assessment (HHRA) (Appendix 6-24). The anticipated impacts and proposed control measures for air emissions are described in section 8.2.4 of Chapter 8. Ambient air quality monitoring will be initiated at the start of construction (section 13.2.2 of Chapter 13).
	Mental health of workers – Concerns regarding the impact of work schedules and commuting on workers' mental health and work-life balance	PMET plans to offer 7/7 and 14/14 work rotations. PMET also intends to implement workplace support measures to help mitigate the potential negative effects of fly-in/fly-out (FIFO) arrangements, including: – Training mental health leaders; – Providing access to consultations with a mental health professional; – Providing access to a 24/7 telephone hotline or chat service.

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
	Social cohesion – Concerns regarding the project's impact on community relations (e.g., equitable sharing of benefits)	PMET recognizes that the project may exacerbate tensions within families and the community and is committed to considering all concerns and to delivering meaningful benefits to the community as a whole.
	Vulnerable populations – Concerns regarding the health and safety of vulnerable populations (e.g., individuals with chronic illnesses, women, etc.)	The health and safety of vulnerable populations are addressed in section 8.2.5 of Chapter 8 and in Appendix 6-24. PMET remains open to discussions regarding additional measures that could be implemented to ensure their health and safety.
	Spiritual well-being – Concerns regarding the project's impact on the spiritual well-being of local stakeholders	Concerns regarding spiritual well-being are addressed in the chapter about health (Appendix 6-24).
	Access to health services – Concerns regarding pressure on health services if mine employees use them	24-hour on-site nursing services will be available. If necessary, workers will be airlifted (Appendix 8-2).
Economic activities	Employment opportunities – Expectations regarding competitive employment opportunities for members of Cree communities	PMET plans to develop and implement a local workforce recruitment and training strategy (see sections 5.10 of Chapter 5, Appendix 5-12 and section 8.2.5.2 of Chapter 8). A full-time community liaison coordinator was hired in January 2024, and an office was opened in Chisasibi in August 2024 (see section 3.1.1.3). The coordinator supports PMET's communications regarding employment opportunities and facilitates connections between community businesses and project-related business opportunities. Employment-related matters are addressed in section 8.2.5 of Chapter 8.
	Economic benefits and business opportunities – Expectations regarding economic benefits and business opportunities for Cree businesses	Since 2023, discussions have been held with Chisasibi regarding partnerships and business opportunities (section 3.3.3.1, Table 3.2). An Impact and Benefit Agreement (IBA) will be discussed with Chisasibi and the Cree Nation Government. A monitoring committee will be established to ensure that the agreement's objectives are achieved throughout the life of the project (section 3.3.6.1).
	Training – Provision of training tailored to members of Cree communities to support employment at the mine	PMET is committed to working with the Cree School Board and the community of Chisasibi to implement tailored training programs to ensure that the local labour force can access available positions (Appendix 8-2). A prior learning assessment and recognition program may also be implemented, as needed.

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
Road safety	Traffic – Concerns regarding increased traffic attributable to the project, particularly the transport of concentrate and workers	PMET is committed to identifying opportunities to reduce traffic-related impacts. To this end, the company has established a working group on the transportation of spodumene concentrate to optimize transport between the Shaakichiuwaanaan site and the transshipment centre in Matagami (see Section 3.1.1.3). Measures to ensure road safety are also in place, including radio communications, mandatory training, and escort vehicles for oversized loads (Appendix 8-2).
Preservation of traditional and non-Indigenous activities and land uses		
Well-being on the land	Preservation of the Cree way of life – Concerns regarding the project's impact on ecosystems necessary to sustain the Cree way of life on the land	PMET recognizes that time spent on the land is integral to many aspects of Cree culture and well-being, including the transmission of Cree values and language, mental health, healing, and collective memory. The company is aware that cumulative impacts on the land may affect the preservation of the Cree way of life. Actions implemented by PMET to celebrate and support Cree culture are presented in section 3.3.3.5.
	Cumulative impacts – Concerns regarding cumulative impacts attributable to mining, hydroelectric, and infrastructure projects on access to the land and climate-related hazards	Cumulative impacts on Cree culture are addressed in Chapter 10. This analysis considers, in particular, hydroelectric projects, forest fires, and climate change (Section 9.3 of Chapter 9).
	Practising activities on the land – Implement measures to promote activities on the land, including: ▪ halting work during the hunting season ▪ programs to encourage youth participation in traditional activities ▪ providing space at the workers' camp for preparing traditional foods ▪ participation in the CTA fund	An IBA will be discussed with Chisasibi and the Cree Nation Government. A fund for land use and the preservation of the Cree Way of Life will be discussed as part of this agreement.
	Preservation of sites valued for traditional activities – Concerns regarding the protection of sites valued for traditional activities	PMET maintains regular communication with the primary users of the trapline. Interviews were conducted with land users to ensure that valued locations and sites would not be affected by the project (Section 3.3.3.2 of Chapter 3, Table 3-5 and 3-6).

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
Hunting and trapping of terrestrial wildlife and waterfowl	Maintenance of large wildlife – Conduct inventories and monitoring of large wildlife species populations	A large wildlife inventory was conducted in January 2023. A very low moose density (0.2 moose/10 km²) was recorded in the local assessment area. The results of this inventory are presented in Section 6.3.5. The company is working with the tallyman of trapline CH39 on wildlife habitat improvement. Monitoring of large wildlife will be defined in collaboration with the tallyman. It is anticipated that the tallyman and his family will be able to harvest large wildlife species on the Shaakichiuwaanaan property.
Harvesting of valuable plant species	Plant species – Concerns regarding the project's impact on plant species	Discussions with the main users of trapline CH39 identified certain species for analysis, including blueberries and Labrador tea. PMET presented the results of the ecotoxicological studies in Chisasibi at a public meeting.
Fishing	Fish habitat: – Concerns regarding anticipated impacts on fish habitat and efforts to avoid or minimize impacts on fish habitat and promote fishing practices.	Certain species were identified with the assistance of the tallyman of trapline CH39, and these species were the subject of an ecotoxicological study. The planned fish monitoring program is presented in Section 13.2.3 and 13.2.4 of Chapter 13. PMET is developing a compensation plan for the loss of wetlands or water bodies, as well as for the loss of fish habitat (Section 14.3 of Chapter 14 and Appendix 14-3). Measures will be implemented to avoid, minimize and, where necessary, compensate for the loss of fish habitat. The development of a fishing program for Cree youth is under discussion with the tallyman of trapline CH39.
Preservation of aquatic habitat quality		
Hydrodynamic and hydro-sedimentary conditions	Water balance – Concerns regarding lake drainage and water flow from the site within the watershed and toward valued locations	Following comments and concerns raised by members of the Chisasibi community, PMET revised its plans by opting for a hybrid operation (underground and open pit), thereby reducing the area of affected lakes from 173 ha to 67 ha. The water balance is presented in Section 5.4.1 and in Appendix 5-10, and the description of the dikes and watercourse diversion in Section 5.4.3. Effluent dilution modelling was carried out to determine how far downstream from the discharge point concentrations of metals or other potential contaminants could be detected. The results of this modelling will be verified through monitoring of surface water and sediment quality downstream of the discharge point. A water treatment plant will be constructed to ensure that mine effluent discharge complies with applicable standards and regulatory requirements. Monitoring of mine effluent includes effluent characterization and toxicity testing using collected samples (Section 13.2.2 of Chapter 13). The scenarios analyzed for water management are presented in Section 4.1.3. The northern option is preferred in order to remain within the same watershed. The diverted water will flow into Lake Shaakichiuwaanaan (L27) within the same watershed.

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
Surface water quality	Surface water use – Concerns regarding the project's impact on the water quality of lakes and waterways, particularly drinking water quality and its effects on traditional foods, human health, and wildlife	The impact on surface water quality is analyzed in Section 8.2.1 of Chapter 8. An HHRA was conducted as part of the project (Appendix 6-24). Various water monitoring programs are planned (sections 13.2.2 of Chapter 13), and the analyses take into account all metals that could potentially be deposited in surface water as a result of airborne dust dispersion.
Preservation of soil and groundwater quality		
Soil quality	Spill management – Concerns regarding spill management	The communication framework and procedures to be followed in the event of spills in terrestrial or aquatic environments are set out in the Emergency Response Plan (ERP). The importance of considering freeze/thaw periods has been incorporated into the ERP (Chapter 12, Appendix 12-3).
	Waste management – Concerns regarding waste management at the site and at the workers' camp	The technical aspects of waste management and the 3R-V approach (reduce, reuse, recycle and recovery) are presented in Section 5.6 of Chapter 5. An environmental officer will ensure compliance with the hazardous materials management plan. Monitoring of waste and hazardous materials will be carried out, along with follow-up with employees, to ensure that sorting and recovery practices are properly implemented (Section 13.2.1 of Chapter 13).
Groundwater quality	Water management – Concerns regarding water management at the mining site	Impacts on water quality are addressed in Section 8.2.1 of Chapter 8 Monitoring of surface water and groundwater is described in Section 13.2.2 of Chapter 13. Compliance of sanitary wastewater will also be monitored (Section 13.2.2), as will the biological environment (fish, benthos and sediments) (Section 13.2.3 and 13.2.4).
Preservation of wetlands and habitats of interest to terrestrial fauna and flora		
Terrestrial fauna (large wildlife, small wildlife, avifauna, herpetofauna)	Caribou migration routes – Concerns regarding the project's impacts on caribou migration routes	Impacts on caribou are addressed in Section 8.2.3 of Chapter 8.
	Moose habitat – Concerns regarding the project's impacts on moose habitat, particularly disturbances related to traffic, drilling, and helicopter flights	Impacts on moose are addressed in Section 8.2.3 of Chapter 8.

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
	Bird and small wildlife habitats – Concerns regarding the project's impacts on bird and small wildlife habitats	The impact on geese and their migration route is addressed in Section 8.2.3 of Chapter 8.
Preserving the quality of life of the local population		
Air quality	Air emissions – Concerns regarding the project's impact on air quality and the health of workers and land users	Impacts on air quality and the planned air emission control measures are described in Section 8.2.4 of Chapter 8. Ambient air quality monitoring will be implemented at the start of the project construction phase (Section 13.2.2 of Chapter 13). Health risks were assessed as part of the HHRA (Appendix 6-24). PMET remains in regular contact with families in the area to address their concerns (Section 3.3.3.2).
Noise and vibration	Monitoring of noise and vibration levels – Questions regarding the location of sound measurement stations and the noise level associated with blasting	Seven sound measurement stations have been established, including three at camps located less than 15 km from the project site. Appendix 6-2 presents the results of the noise modelling. A noise and vibration monitoring program will be implemented during the project construction phase (Section 13.2.2).
Landscape	Landscape – Concerns regarding the potential impacts of infrastructure on the natural landscape	Two visual observation points were suggested by stakeholders from the Chisasibi community and were incorporated into the landscape impact assessment (Appendix 6-28). Visual simulations were presented to the Chisasibi community during a community information session. To the extent possible, PMET will preserve important viewpoints that serve as landmarks within the territory. Spoil piles and the pit will be shaped to reflect the surrounding relief in order to integrate them into the local topography. PMET will restore and revegetate the various site components at the end of operations. Restoration activities will be subject to a monitoring and follow-up program (Section 13.1 and 13.2)
Social acceptability, consultation process, and impact assessment process		
Social acceptability	Questions and comments regarding the negotiation of an IBA	An IBA will be negotiated between Chisasibi, the Cree Nation Government, and PMET when the stakeholders deem it appropriate.
	Concerns regarding limited knowledge of the project and its impacts	Several consultation and information activities (including presentations of the project, studies and results) were carried out within the community (Section 3.3.3 of Chapter 3).
	Comments and concerns regarding the importance of consent and building trusting relationships with various Cree stakeholders	PMET's regular presence in Chisasibi and the employment of a local coordinator are intended to foster open and trusting dialogue among community members, PMET and companies involved in the project. PMET maintains regular communication with trapline users who wish to discuss the project, as well as their concerns and suggestions (Sections 3.3.3 and 3.3.6 of Chapter 3).

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures or related documents)
	Change of the project name to the Cree name of "Shaakichiuwaanaan"	In July 2024, at the suggestion of certain members of the Chisasibi community, PMET renamed the Corvette Project, which is now called Shaakichiuwaanaan (Section 3.1.3).
	Questions regarding the schedule and technical aspects (including drilling, the workers' camp, road construction, market conditions, and the use and transportation of lithium) as well as site closure	PMET answered technical questions during consultation activities when the relevant information was available. The technical aspects of construction and operation are presented in Chapter 5. Certain elements of the project schedule are described in Sections 5.5 and 5.9. The rehabilitation and closure plan will be developed in partnership with the tallyman to ensure that future land use is respected (Appendix 8-2). Restoration activities will be subject to a monitoring and follow-up program (Sections 13.1 and 13.2 of Chapter 13).
Consultation process	Questions and concerns regarding the participation of the CH39 tallyman's family and project benefits for the community	Since 2022, discussions have taken place between PMET and the Chisasibi First Nation regarding consultation, opportunities for collaboration and potential business opportunities (Sections 3.3.2 and 3.3.3 of Chapter 3). PMET's regular presence in Chisasibi, as well as the employment of a local coordinator, is intended to promote open and trusting dialogue with community members. An IBA will be negotiated between Chisasibi, the Cree Nation Government, and PMET when the stakeholders deem it appropriate.
	Suggestions regarding preferred means of communication and best practices	Various communication tools were developed based on recommendations from Cree stakeholders (see Section 3.1.3). PMET also developed a communication protocol in collaboration Chisasibi (Section 3.3.2 of Chapter 3).
	Concerns regarding community participation and requests for additional information and consultation activities	Various communication and engagement measures were implemented in collaboration with the local coordinator and in accordance with the communication protocol established with Chisasibi and the Cree Nation Government (Section 3.1.3 of Chapter 3). Seven community information sessions were held in Chisasibi between October 2023 and December 2025, including three conducted in a World Café format as well as three informational poster displays at various locations within the community (Section 3.3.3.3 of Chapter 3). Site visits to operating mines were organized in 2025 with elected officials and family members of trapline CH39 (Section 3.1.1.5 of Chapter 3).
Impact assessment process	Questions about the impact assessment process (schedules, environmental studies, required authorizations)	Various questions were raised and PMET responded to these questions during meetings when the relevant information was available. The regulatory context and authorizations required for the project are described in Section 2.2. With respect to environmental studies, members of the Chisasibi Cree participated in the studies conducted by Niigaan for the project (Section 3.3.5 of Chapter 3).

3.3.4.2 Mistissini and Wemindji

Table 3-11 Main results of engagement activities with the Cree Nations of Mistissini and Wemindji

Valued ecosystem components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures, or related documents)
Preservation of the health, safety, and socioeconomic conditions of the regional population		
Economic activities	Jobs and business opportunities – Provide business opportunities for Mistissini companies and hire workers from the community	Beginning in 2023, discussions were initiated between PMET and the Cree Nations of Mistissini and Wemindji regarding consultation and collaboration with these communities (Section 3.3.3.1 of Chapter 3).
Preservation of aquatic habitat quality		
Hydrodynamic and hydro-sedimentary conditions	Hydrology – Concerns regarding impacts on hydrology, particularly on trapline M02A	The impact on hydrology is addressed in Section 8.2.1. No impact is anticipated on the hydrology of trapline M02A.

3.3.4.3 Cree Nation Government and Cree organizations

Table 3-12 Key results of engagement activities with regional Indigenous stakeholders (Cree Nation Government, CHB, CSB)

Valued components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures, or related documents)
Preservation of the health, safety, and socioeconomic conditions of the regional population		
Physical, psychological, and social health	Workers' lifestyles – Concerns regarding diet, drug use, and physical activity at the workers' camp	PMET intends to develop a workers' camp that offers a healthy and restful environment. For example, the camp will include: – a gym; – indoor and outdoor common areas for resting; – a cafeteria offering healthy meal options. All concerns regarding health impacts and proposed mitigation measures are addressed in the health sectoral report (Appendix 6-24).
	Workers' mental health – Concerns regarding the impacts of work schedules and commuting on workers' mental health and work-life balance	PMET plans to offer 7/7 and 14/14 work rotations. PMET intends to implement workplace support measures to help mitigate the potential negative effects of FIFO arrangements, including: – Training mental health leaders; – Providing access to consultations with a mental health professional; – Providing access to a 24/7 telephone hotline or chat service.
	Vulnerable populations – Concerns regarding the health and safety of vulnerable populations (e.g., individuals with chronic illnesses, women, etc.)	The health and safety of vulnerable populations are addressed in Section 8.2.5 of Chapter 8. PMET remains open to discussions regarding additional measures that could be implemented to ensure their health and safety.
	Access to health services – Establishment of a Medevac system	24-hour on-site nursing services will be available. If necessary, workers will be airlifted (Appendix 8-2).
	Emergency Disaster Relief Department – Request for donations to fund the Emergency Disaster Relief Department, which aims to manage crisis situations locally	Discussions will continue with the community to identify potential partnerships that respond to its needs.

Valued components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures, or related documents)
Economic activities	Training – Provide training tailored to members of Cree communities to support employment at the mine.	PMET is committed to working with the Cree School Board and the community of Chisasibi to implement tailored training programs to ensure that the local labour force can access available positions (Appendix 8-2). The programs will be offered in the community whenever possible.
	Recruitment – Suggestions on ways to communicate with and recruit Cree workers (e.g., internships, job fairs, benefits related to proximity to the territory)	A full-time community liaison coordinator was hired in January 2024 and a liaison office opened in Chisasibi in August 2024 (Section 3.1.3.2 of Chapter 3). The liaison coordinator supports PMET's communications regarding employment opportunities and facilitates connections between community businesses and various business opportunities. As part of the feasibility study, a list of mining sector positions was developed, including the associated training requirements for each position. PMET plans to organize a day dedicated to employment and training in Chisasibi.
Preservation of traditional Indigenous activities and non-Indigenous land uses		
Well-being on the land	Practice of traditional activities – Implement measures to facilitate the practice of activities on the land, including traditional activities and healing workshops at the site.	Discussions will be planned regarding an IBA with Chisasibi and the Cree Nation Government. A land use and Cree Way of Life preservation fund will be discussed as part of this agreement. Compensation measures have been established in partnership with the CH39 tallyman's family. Details are presented in section 3.3.5.3. A *cultural site* to be installed near the workers' camp would enable Cree community members to prepare traditional foods and participate in cultural renewal activities.
	Cumulative impacts – Concerns regarding cumulative impacts on the land and climate-related hazards	The cumulative impacts on Cree culture are addressed in Chapter 10. The assessment considers, among other factors, forest fires and climate change (see Section 10.2). Climate change resilience is addressed in Chapter 12.
Hunting and trapping of terrestrial wildlife and waterfowl	Trapping – Concerns regarding impacts on traplines near the project	PMET maintains regular communication with the tallyman of trapline CH39 and his family in order to avoid, mitigate, or compensate for potential impacts of the project on their activities. Discussions have also taken place with tallymen and other users of adjacent lands (VC26 and M02A) (Section 3.3.3.2, Section 8.2.6 of Chapter 8 and Appendix 8-2).

Valued components	Concerns, suggestions, requests, questions	Reference in the EIA (chapters, sections, mitigation measures, or related documents)
Preservation of soil and groundwater quality		
Soil quality	Waste management – Concerns regarding waste management at the site	The technical aspects of waste management and the 3R-V approach are presented in Section 5.6. An environmental officer will ensure compliance with the hazardous materials management plan. Monitoring of waste and hazardous materials will be carried out, along with follow-up with employees, to ensure that sorting and recovery practices are properly implemented (Section 13.2.1.4). PMET is committed to leaving no waste behind where work has been carried out.
Preservation of wetlands and habitats of interest to terrestrial fauna and flora		
Wetlands and water environments	Aquatic environments – Concerns regarding potential impacts of the project on nearby lakes and watercourses, particularly with respect to health risks associated with water consumption	Potential impacts on surface water quality is analyzed in Section 8.2.2 of Chapter 8. Various water monitoring measures are planned (Sections 13.2.2 of Chapter 13). The analyses consider all metals that could potentially be deposited in water bodies as a result of airborne dust dispersion.
Terrestrial fauna (large wildlife, small wildlife, avifauna, herpetofauna)	Terrestrial fauna – Concerns regarding the project's impacts on terrestrial fauna	Potential impacts on terrestrial fauna and wetlands are addressed in Section 8.2.3 of Chapter 8.

3.3.5 Contributions and participation of the Cree

Reflecting the Cree people's unique understanding of the land, the data collected from PMET's Cree partners has enhanced the company's understanding of both the biophysical and human environment.

3.3.5.1 Design and monitoring of the Shaakichiuwaanaan Project

Between November 1, 2023, and December 2025, PMET carried out close to 290 engagement activities. Of these, more than 200 were conducted with the Cree communities of Eeyou Istchee James Bay, including the Cree community of Chisasibi, as well as various Indigenous organizations. Based on the concerns and comments raised during these activities, PMET revised the design of the Shaakichiuwaanaan Project and selected a hybrid operating scenario, thereby reducing the area of impacted lakes from 173 ha to 67 ha. The rehabilitation and closure plan is being developed in partnership with the tallyman of trapline CH39 in order to promote the future use of the site.

Environmental data collection at the Shaakichiuwaanaan Project site is being carried out by WSP and Niigaan (a Cree joint venture). Members of the Cree community of Chisasibi, including the primary users of trapline CH39, are assisting the biologists working on site. Through this collaboration, several valued plant species, including blueberries and Labrador tea, were identified. These species have undergone ecotoxicological analysis and will be monitored during subsequent phases of the project. The same approach applies to fish species. Certain species identified with the assistance of the tallyman of trapline CH39 have undergone ecotoxicological studies and will be subject to ongoing monitoring. Large wildlife species will also be monitored in collaboration with the tallyman of trapline CH39. PMET is also working with the tallyman of trapline CH39 to implement a wildlife habitat enhancement program, as well as the rehabilitation and closure plan, in order to support the future use of the site.

3.3.5.2 Employment and business opportunities

As noted previously, PMET values the economic success of local communities and is committed to ensuring that its activities and value chain generate mutual and sustainable benefits. Accordingly, the company prioritizes business relationships with contractors that employ and procure locally, particularly within the community of Chisasibi. Between January 2023 and September 2025, PMET spent more than $55 million with Indigenous businesses or joint ventures.

In 2023, 48 Indigenous workers were employed on the Shaakichiuwaanaan property, representing a total of 2,650 workdays. Between January 1, 2024, and March 31, 2025, the number of Indigenous workers increased to 123. The majority were from the CNC, and they worked more than 8,416 days on site. During this period, Indigenous employees represented an average of 16% of the on-site workforce. Between April and December 2025, the average was established at 23%. Indigenous workers contributed to core logging work led by Dahrouge Geological Consulting, heavy equipment operations required for the construction and maintenance of the multi-user road, carried out by Saskounan Construction, drilling operations led by Forage Fusion, environmental surveys conducted by Niigaan (Desfor/Synergis Group), and camp operations in collaboration with Domco/Meeyobin Iywaashtin Savard. Saskounan and Niigaan are Cree companies based in Chisasibi. In 2024, Forage Fusion and Saskounan Construction formed a joint venture called Muskw, registered with CNC. Muskw provides construction and drilling support services.

PMET is committed to working with the Cree School Board and the community of Chisasibi to develop and implement tailored programs and training initiatives to ensure that community members have access to employment opportunities available at the site.

3.3.5.3 Cultural integration and capacity building

Since 2023, PMET has contributed more than $170 000 in donations and sponsorships, including $136 000 within Eeyou Istchee James Bay. PMET contributed to the 2023 Reconstruction Initiative Forest Fires Fund (RIFFF), which aims to rebuild Cree trapper camps damaged by forest fires, as well as to the Fonds Restor-Action Cri, which supports the cleanup of abandoned mineral exploration sites on the land in Eeyou Istchee.

PMET has supported various initiatives within the community of Chisasibi. Donations and sponsorships have contributed to the construction of a sweat lodge; the organization of the 36th Chisasibi Community Gathering, led by the Mamouweedow Minshtuk Committee; the hosting of the first symposium on economic and mining development; and end-of-year community celebrations as well as supporting different cultural and sporting events.

PMET is committed to collaborating with the tallyman of trapline CH39 to develop a fishing program for Cree youth.

3.3.6 Upcoming information and consultation activities

The Company intends to maintain ongoing and transparent communication with stakeholders and communities potentially affected by the Project throughout key stages of project development, including the release of the feasibility study and the present environmental impact assessment.

Once the impact assessment has been submitted, PMET will continue its information and consultation activities with local and regional Indigenous entities. The approach adopted by PMET will remain consistent with that described above, namely to:

– continue to visit the community of Chisasibi on a regular basis;

– maintain the Chisasibi liaison office operated by the Community Liaison Officer;

– engage with community representatives at each key stage of the Project;

– continue the work of the Spodumene Concentrate Transportation Working Group;

– publish community newsletters on a quarterly basis;

– distribute plain-language documentation to inform the community of recent developments;

– regularly issue press releases; and frequently update the content of the Company’s website.

The Company also intends to engage with the newly elected Chief and Council of Chisasibi and to co-develop with them various working committees—such as education and training, environment, business opportunities, social and cultural matters, and transportation, among others. PMET also plans to organize discussion groups with Elders, women, and youth, and to collaborate with the schools of Chisasibi. The Company will regularly organize information and consultation activities on the various topics addressed in this impact assessment. Additional engagement initiatives may be implemented based on the needs expressed by Indigenous stakeholders.

3.3.6.1 Impact and Benefit Agreement

An Impact and Benefit Agreement (IBA) is expected to be negotiated between Chisasibi, the Cree Nation Government, and PMET prior to the commencement of construction work on the project. Once the IBA is signed, the company will adapt its engagement approach in accordance with the provisions of the agreement.

3.4 Non-Indigenous Stakeholders and Government Authorities

3.4.1 Identified non-Indigenous stakeholders and government authorities

PMET has conducted a preliminary identification of stakeholders in the territory who are affected or potentially affected by the Shaakichiuwaanaan Mining Project. This analysis, based on publicly available information, focused on various government authorities as well as citizen, community, economic, social, and tourism organizations in the James Bay region. The preliminary list was expanded following receipt of the provincial Impact Assessment directive and was further refined throughout the development of the mining project, particularly as exploration activities progressed and the project design became more defined. The non-Indigenous stakeholders and government authorities presented in Table 3-13 were identified as part of the consultation process.

Table 3-13 Identified non-Indigenous stakeholders and government authorities

Category	Consulted stakeholders
Federal government	Impact Assessment Agency of Canada (IAAC)
	Fisheries and Oceans Canada
	Transport Canada
	Health Canada
	Natural Resources Canada
	Environment and Climate Change Canada
	Indigenous Services Canada

Category	Consulted stakeholders
Provincial government / Crown Corporations	Ministère des Ressources naturelles et des Forêts (MRNF)
	Ministère de l'Économie, de l'Innovation et de l'Énergie (MELCCFP)
	Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs
	Environmental and Social Impact Evaluating Committee (COMEV) / Environmental and Social Impact Review Committee (COMEX)
	Hydro-Québec
	Société du Plan Nord (SPN)
	Société de développement de la Baie-James (SDBJ)
Regional and municipal governments	Eeyou Istchee James Bay Regional Government (EIJBRG)
	Administration régionale Baie-James (ARBJ)
	Town of Radisson
	City of Matagami
Regional economic organizations	Attraction Nord (James Bay)
	Northern Entrepreneurship Centre
	Centre d'études collégiales à Chibougamau – Business and Community Services (BCS)
	Matagami Community Futures Development Corporation (CFDC)
Citizen and community organizations	Sûreté du Québec
	Jamésie Youth Employment Centre
	Uni-Vers-Elles Women's Center
	Centre d'études collégiales à Chibougamau
	Centraide Abitibi-Témiscamingue and Nord-du-Québec
	James Bay Vocational Training Centre
	James Bay Regional Health and Social Services Centre
	Radisson Health Centre
	Solidarité alimentaire Matagami
Recreational and tourism activities	Radisson Campground
	Mirage Adventure
	Vacation and basic shelter leaseholders
	Radisson Snowmobile Club
	James Bay Tourism

The local stakeholders and interested parties involved were listed and detailed in the communications register developed by PMET as part of the consultation process.

3.4.2 Engagement Activities

3.4.2.1 Federal and provincial governments

In early 2023, PMET initiated communications with government departments and Crown corporations to inform them of the planned exploration activities on the Shaakichiuwaanaan property and to discuss the development of the project.

Since the launch of the EIA phase, discussions have focused primarily on establishing the timeline for the EIA process and ensuring that the content of the EIA enables analysts from the various ministries, within their respective areas of expertise, to conduct a comprehensive assessment of the Shaakichiuwaanaan Mining Project. In this regard, at both the provincial and federal levels, the company is collaborating with an interdepartmental working group responsible for overseeing the EIA process for the Shaakichiuwaanaan Mining Project.

The main engagement activities conducted with federal and provincial government authorities are outlined below.

Table 3-14 Main engagement activities conducted with federal and provincial government authorities

Date Activity	Participants	Topics discussed
November 21, 2023 *Meeting with MRNF*	– Minister of Natural Resources and Forestry – Associate Deputy Minister of Mines	– Presentation of the Shaakichiuwaanaan Mining Project – Access to the land (roads) – Establishment of an interdepartmental working group regarding the authorization process for the Shaakichiuwaanaan Project
November 21, 2023 *Meeting with SPN*	– President and CEO	– Cumulative effects related to transportation on the Billy-Diamond Highway
November 21, 2023 *Meeting with SDBJ*	– President and CEO	– Use of LG-4 airport for fly-in/fly-out service for workers
February 27, 2024 *Meeting with Secrétariat aux relations avec les Premières Nations et les Inuit (SRPNI)*	– Director, Negotiations and Consultation Branch – Team lead, Centre of Expertise on Northern Governance – Indigenous affairs advisor, Centre of Expertise on Northern Governance	– Relations with the Cree Nation Government and the Cree Nations of Chisasibi, Wemindji, and Mistissini – Development of essential transportation infrastructure in Eeyou Istchee (La Grande Alliance initiative)
May 14, 2024 *Meeting with SPN*	– Economic impact maximization coordinator, Marketing office – Economic advisor – Stakeholder, Mining Policy Branch – Mining tax advisor – Engineer, Mining Industry Development Branch	– Tax measures and financial assistance programs available to the mining sector – Action 2.2.2 of the Quebec Plan for the Development of Critical and Strategic Minerals 2020-2025
May 22, 2024 *Meeting with MRNF*	– Regional director, Nord-du-Québec Regional Office – Territorial affairs advisor (Geomatics) – Territorial affairs advisor (Environment)	– Planned decontamination work at km 277 of the Transtaïga Road – Establishment of an interdepartmental working group regarding the authorization process for the Shaakichiuwaanaan Project
June 4, 2024 *Meeting with MELCCFP*	– Coordinator/Acting team lead, Mining Projects – Project Manager, Mining Projects	– Mining strategy and planning – Data collection required to describe the receiving (biophysical) environment – Studies required as part of the EIA – Hydrological studies (methods, baseline conditions, modelling)

Date Activity	Participants	Topics discussed
June 18, 2024 *Meeting with IAAC*	– Team lead – Senior Indigenous consultation analyst	– Mining planning – EIA Process – Data collection required to describe the receiving environment
July 11, 2024 *Interdepartmental working group meeting*	– Various representatives from MRNF and MELCCFP	– Data collection required to describe the receiving environment – Timeline for obtaining the necessary authorizations
August 27, 2024 *Meeting with MELCCFP*	– Coordinator/Acting team lead, Mining Projects – Project Manager, Mining Projects – Analyst, Impact Studies and Wildlife Habitats	– Baseline conditions for fish habitat (preliminary results, methodologies) – Proposed compensation projects
September 3, 2024 *Meeting with MELCCFP*	– Coordinator/Acting team lead, Mining Projects – Project Manager, Mining Projects – Engineer, Atmospheric remediation – Analyst, Climatology	– Characterization and assessment of the atmospheric environment (methodology, baseline conditions, modelling scenarios)
September 10, 2024 Meeting with various ministerial representatives	– Coordinator for Maximizing Economic Benefits, Marketing Office (SPN) – Economic Advisor (SPN) – Speaker, Mining Policy Branch (MRNF) – Advisor, Mining Taxation (MRNF) – Engineer, Mining Industry Development Branch (MRNF) – Representative, Corporate Tax Policy Branch (Ministry of Finance of Quebec) – Representative, Services Québec Branch, Nord-du-Québec (Ministry of Employment and Social Solidarity of Quebec)	– Tax measures and financial support programs in place for the mining sector
September 20, 2024 *Meeting with SPN*	– Economic impact Maximization Coordinator, Marketing Office (SPN)	– Transportation of spodumene concentrate – Extension of Route 167 North planned under the La Grande Alliance initiative

Date Activity	Participants	Topics discussed
September 25 *Provincial interdepartmental working group meeting*	– MRNF ▪ Territorial Affairs Advisor, Head of Geomatics ▪ Representative, Mining Project Development and Oversight – MELCCFP ▪ Municipal Coordinator, Water and Natural Environment ▪ Analyst, Impact Studies and Wildlife Habitats ▪ Analyst, Industrial Infrastructure ▪ Analyst, Hydrology and Wetlands	– Timeline for obtaining the necessary authorizations
November 13, 2024 *Meeting with SPN*	– Director, Infrastructure Projects Division – Infrastructure Advisor, Infrastructure Projects Department – Investment Advisor	– Infrastructure projects planned under the La Grande Alliance initiative ▪ Route 167 North extension project ▪ Railway along Billy-Diamond Highway ▪ Deepwater port ▪ Use of LG-4 airport
November 14, 2024 *Meeting with IAAC*	– Project manager (interim), Quebec Regional Office – Team lead – Indigenous consultation analysts – Impact assessment officer	– EIA Process ▪ Memorandum of Understanding with the Cree Nation ▪ Timeline ▪ Project proponent portal ▪ Submission of Initial Project Description ▪ Geospatial data ▪ Preliminary consultations ▪ Engagement of Indigenous communities
November 26, 2024 *First meeting of the Federal Interdepartmental Committee*	– Various representatives from IAAC, Environment Canada, Fisheries and Oceans Canada, Natural Resources Canada, Health Canada, Indigenous Services Canada, Transport Canada, Women and Gender Equality Canada, and the Cree Nation Government	– Timelines for the EIA process – Consultations planned as part of the EIA process – Collaboration with the Cree Nation Government
December 9, 2024 *Meeting with SRPNI*	– Director, Negotiations and Consultation Branch – Aboriginal Affairs Advisor, Centre of Expertise on Northern Governance	– Relationship with the Cree Nation Government and the Cree nations of Chisasibi, Wemindji, and Mistissini

Date Activity	Participants	Topics discussed
January 16, 2025 Meeting with Fisheries and Oceans Canada	– Various representatives from Fisheries and Oceans Canada	– Fish inventories – Compensation projects to be implemented
January 31, 2025 *Meeting with IAAC*	– Various representatives from IAAC	– Submission of Initial Project Description
February 12, 2025 *Meeting with SPN*	– Economic Impact Maximization Coordinator, Marketing Office (SPN) – Engineer, Mining Industry Development Branch (MRNF) – Director, Marketing Office (SPN)	– Battery component supply chain
February 12, 2025 *Meeting with Hydro-Québec*	– Large-Power sales representative	– Project energy requirements – Technical requirements
February 26–27, 2025 Online consultation activities organized by IAAC	– IAAC – MRNF – Cree Nation Government – Cree Nation of Chisasibi – Cree Nation of Mistissini – Mining Working Group of the James Bay region – Town of Radisson – EIJBRG – SPN – Mining Watch Canada	– EIA Process – Participation mechanisms available to the public
February 27, 2025 *Meeting with SDBJ*	– Director, Airport Services Department	– Participation in the working group on the transportation of spodumene concentrate – Baseline scenario for traffic on the Billy-Diamond Highway and Transtaïga Road – Use of LG-4 airport for fly-in/fly-out service for workers

Date Activity	Participants	Topics discussed
March 20, 2025 *Public event (Oujé-Bougoumou) organized by SPN*	– Various representatives of the Quebec government and SPN – Local and regional entrepreneurs	– Business meetings with local and regional entrepreneurs – Panel discussions *Eeyou Istchee James Bay, a land of opportunity: strategic preparation to leverage internal policies, best practices, and major projects*
March 27, 2025 Meeting with IAAC	– Various representatives from IAAC	– Summary of questions regarding the Initial Project Description
April 7, 2025 *Meeting with SDBJ*	– Project director – Director of Airport Services and Acting Director of Road Maintenance Services	– Feasibility study – Available traffic data for the Billy-Diamond Highway and Transtaïga Road – Preliminary parameters for spodumene concentrate transport
April 11, 2025 Meeting with Fisheries and Oceans Canada	– Various representatives from Fisheries and Oceans Canada	– Inventories – Results of fish habitat characterization – Fish habitat compensation plan
April 15, 2025 *Meeting with MELCCFP*	– Coordinator/Acting team leader, Mining Projects – Project Manager, Mining Projects	– Impact assessment approach – Community consultations – Geochemistry
May 23, 2025 *Meeting with MRNF*	– Head of the Abandoned Mine Site Restoration Department, Mining Legacy Liabilities Team (state-owned mine sites)	– Compensation projects and orphaned mining sites
June 11, 2025 *Meeting with IAAC and Environment Canada*	– Various representatives from IAAC and Environment Canada	– Project schedule – Authorizations required from Environment Canada – Species at risk within the study area – Analysis of alternatives for mining waste storage – Baseline conditions for fish habitat – Infrastructure plan
June 18, 2025 Meeting with SPN and MRNF	– Economic Impact Maximization Coordinator, Marketing Office (SPN) – Executive Assistant/Acting Director General, Mining Industry Development Branch (MRNF) – Mining Policy Development Advisor(MRNF)	– Quebec Government Financing and R&D plans and programs – Calcination project – Rules governing bulk sampling

Date Activity	Participants	Topics discussed
July 8, 2025 *Meeting with IAAC*	– Project Manager – Senior Consultation Analyst	– Planification des consultations publiques
July 16, 2025 Meeting with IAAC, Environment Canada, and Fisheries and Oceans Canada	– Various representatives from IAAC, Transport Canada, Environment Canada, and Fisheries and Oceans Canada	– Permitting plan – Navigation – Fish habitat compensation projects – Mining waste management
July 18, 2025 *Meeting with MELCCFP at their office in Québec City*	– Acting Director, Industrial and Mining Projects Environmental Assessment Department	– Impact assessment process – Key project issues
July 23, 2025 *Meeting with IAAC and CNG*	– Director, Quebec Region (IAAC) – Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Associate Director (IAAC) – Environmental Analyst (CNG)	– Publication of the impact assessment guidelines – Permitting plan and impact assessment proces
August 28, 2025 *Meeting with MRNF*	– Economic Impact Maximization Coordinator, Marketing Office	– Northern Business Network – Extension of Route 167 North planned under the La Grande Alliance initiative – Calcination project – Mining Working Group of the James Bay region – Use of LG-4 airport for fly-in/fly-out service for workers
September 9, 2025 *Meeting with IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Project update – Planning of public consultations
October 14, 2025 *Meeting with IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Preliminary review of report

Date Activity	Participants	Topics discussed
October 28, 2025 *Meeting with IAAC and CNG*	– Director General, Regional Operations (East) (IAAC) – Director, Quebec Region (IAAC) – Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Schedule for obtaining the required authorizations
October 28, 2025 *Meeting with DFO, IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Senior Biologist, Fish and Fish Habitat Protection, Regulatory Reviews (DFO) – Environmental Analyst (CNG)	– Permitting plan – Fish and fish habitat compensation projectst
November 6, 2025 *Meeting with IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Planning of public consultations and approach regarding key community concerns
November 18, 2025 *Meeting with MELCCFP*	– Acting Director – Project Officer – Industrial and Mining Projects Environmental Assessment Department	– Project update – Air dispersion modelling – Preliminary assessment of socioeconomic impacts
November 27, 2025 *Meeting with Transport Canada*	– Officer, Navigation Protection Program (Transport Canada) – Project Manager, Permitting Coordination (IAAC)	– Project update – Navigation – Schedule for obtaining the required authorizations
December 11, 2025 *Meeting with DFO, IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Senior Biologist, Fish and Fish Habitat Protection, Regulatory Reviews (DFO) – Environmental Analyst (CNG)	– Preliminary review and comments on the fish and fish habitat compensation plan
January 21, 2026 *Meeting with MELCCFP at their office in Québec City*	– Acting Director – Project Officer – Industrial and Mining Projects Environmental Assessment Department	– Air dispersion modelling – Schedule for obtaining the required authorizations

Date Activity	Participants	Topics discussed
January 22, 2026 *Meeting with IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG) – Environmental Analyst (CNG)	– Impact assessment process
January 29, 2026 Provincial interdepartmental working group meeting MRNF, MELCCFP, SPN, Economy; approx. 17 analysts in person in Chibougamau and via Teams	– Regional Director, Nord-du-Québec and Environmental Liabilities Expertise Hub, Public Lands Branch, MRNF – Land Affairs Advisor – Geomatics Lead, MRNF – Officer – Mining Project Development and Oversight, MRNF – Active Sites Restoration Coordinator, Mining Sites Restoration Branch, MRNF – Project Officer, Industrial and Mining Projects Environmental Assessment Department, MELCCFP – Analyst, Regional Directorate of Analysis and Expertise for Abitibi-Témiscamingue and Nord-du-Québec, MELCCFP – Municipal Coordinator – Water and Natural Environments, MELCCFP – Analyst – Impact Assessments and Wildlife Habitats, MELCCFP – Analyst – Industrial Infrastructure, MELCCFP – Analyst – Hydrology and Wetlands, MELCCFP – Coordinator, Maximizing Economic Benefits, SPN – Advisor, Maximizing Economic Benefits, SPN	– Schedule for obtaining the required authorizations
February 25, 2026 *Meeting with ECCC, IAAC and GNC*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Caribou – Sectoral report
February 27, 2026 *Meeting with IAAC and CNG*	– Project Manager (IAAC) – Senior Consultation Analyst (IAAC) – Environmental Analyst (CNG)	– Consultations regarding human health
March 4, 2026 *Meeting with IAAC*	– Director General, Regional Operations (East) – Director, Quebec Region	– Échéancier pour l'obtention des autorisations nécessaires

3.4.2.2 Local and regional government authorities and stakeholders in the territory

Since 2017, PMET has kept the Eeyou Istchee James Bay Regional Government (EIJBRG) informed by email of developments related to exploration activities on the Shaakichiuwaanaan property. Each year, the company submits its exploration plan for the Shaakichiuwaanaan property to the EIJBRG.

During the exploration phase, PMET met in person with senior officials from the Town of Radisson and the City of Matagami, as well as representatives of the EIJBRG. The purpose of these meetings was to introduce PMET, present the Shaakichiuwaanaan Mining Project, and initiate dialogue among the parties. Subsequent meetings were held to present the project's Preliminary Economic Assessment and to invite Radisson and Matagami to be part of the regional working group on the transportation of spodumene concentrate.

As part of the EIA process, targeted meetings were conducted with representatives of the Town of Radisson and the City of Matagami. Additional targeted interviews were also carried out with representatives of the James Bay Regional Administration, as well as stakeholders from citizens, community, and tourism organizations in the region. These meetings, held by videoconference, took the form of structured interviews aimed at gaining a better understanding of the organization or entity represented, documenting the observed effects of other mining projects in Eeyou Istchee James Bay, and considering the potential positive and negative impacts of the Shaakichiuwaanaan Project. These meetings also helped identify cumulative effects to be considered and gather mitigation measures proposed by stakeholders.

The following table presents the various engagement activities conducted with communities of the James Bay region, as well as other regional authorities.

Table 3-15 Main engagement activities carried out with communities of the James Bay region and other regional authorities

<table>
<tr><th>Date –
Activity</th><th>Participants</th><th>Topics covered</th></tr>
<tr><td>December 10, 2023
Introductory meeting with the Town of Radisson</td><td>– Mayor, Town of Radisson
– Councilor, Town of Radisson
– Director General, Town of Radisson
– Public Works Foreman</td><td rowspan="3">– Introduction of PMET
– Presentation of the Shaakichiuwaanaan Mining Project
– Local perspectives on project development
– Planned exploration activities and drilling work</td></tr>
<tr><td>March 13, 2024
Introductory meeting with EIJBRG</td><td>– Director of Natural Resources and Territory, EIJBRG</td></tr>
<tr><td>June 13, 2024
Introductory meeting with the City of Matagami</td><td>– Director General, City of Matagami</td></tr>
<tr><td>December 5, 2024
Follow-up meeting with the City of Matagami</td><td>– Director General, City of Matagami</td><td rowspan="2">– Preliminary economic assessment of the project
– Regional working group on the transportation of spodumene concentrate
– EIA process</td></tr>
<tr><td>December 10, 2024
Follow-up meeting with the Town of Radisson</td><td>– Mayor, Town of Radisson
– Director General, Town of Radisson</td></tr>
<tr><td>January 17, 2025
First meeting of the regional working group on the transportation of spodumene concentrate</td><td>– Representatives from the Cree Nations of Chisasibi and Wemindji, the City of Matagami, the Town of Radisson, and the EIJBRG</td><td>– Experience with other mining projects
– Traffic on the Transtaïga Road and Billy Diamond Highway (comments and concerns)</td></tr>
<tr><td>February 13, 2025
Targeted meeting</td><td>– Director General, City of Matagami</td><td rowspan="2">– Land use, planning, and development
– Economy and services
– Social fabric and health
– Land use</td></tr>
<tr><td>March 4, 2025
Targeted meeting</td><td>– Director of Development and Partnerships, Centraide Abitibi-Témiscamingue and Nord-du-Québec</td></tr>
</table>

Date – Activity	Participants	Topics covered
March 19, 2025 *Targeted meeting*	– Assistant to the President and Director General, Media Relations, Communications, and Legal Affairs, James Bay Regional Health and Social Services Centre (CRSSSBJ) – Program Manager and Site Manager, Radisson Health Centre	– Issues identified – Mitigation measures – Other activities and cumulative effects
April 17, 2025 *Targeted meeting*	– Executive Director, James Bay Regional Administration	
April 17, 2025 *Targeted meeting*	– Director General, Town of Radisson – Coordinator of Sports, Recreation, Culture, Tourism, and Community Life – Director of Fire Safety Services	
April 22, 2025 *Targeted meeting*	– Executive Director, James Bay Tourism	
April 22,2025 *Targeted meeting*	– Programming, Planning, and Research Officer, CRSSSBJ – Public Health Department	
June 26, 2025 *Meeting with a recreational leaseholder*	– Owner of a recreational lease on the shores of Corvette Lake	– History and use of the recreational lease – Use of the multi-user road – Activities carried out by PMET on Shaakichiuwaanaan property – Environmental assessment process
July 2, 2025 *Follow-up meeting with EIJBRG*	– Land use planning coordinator, EIJBRG – Partnerships and Major Projects Coordinator	– ATI request for a bulk sample of erratic blocks
July 17, 2025 *Targeted meeting*	– Owner of a recreational lease on the shores of Corvette Lake	– Land use – Issues identified – Mitigation measures – Other activities and cumulative effects
December 17, 2025 Meeting with EIJBRG	– Partnerships and Major Projects Coordinator – Land Use Planning Coordinator	– Feasibility study of the project

3.4.3 Results of Engagement Activities and PMET Responses

This section summarizes the main comments expressed by non-Indigenous stakeholders and various government authorities. Organized by stakeholders, these comments address anticipated impacts, key issues and concerns raised, as well as suggestions and expectations. The comments are drawn from PMET's communications log (Section 3.1.1.3) and from selected meeting summaries. The company's responses, along with the measures and approaches it is considering, are also presented.

Table 3-16 Key results of engagement activities with of the James Bay region and municipalities and other regional authorities

Topics	Requests, concerns, questions, and suggestions	Responses, commitments, and actions
Preservation of aquatic habitat quality		
Surface water quality	Water management – Question regarding the location of the mine effluent discharge	The water management scenarios analyzed are presented in Section 4.1.3. The northern option is preferred in order to remain within the same watershed. Diverted water will flow into Lake Shaakichiuwaanaan (L27) within that same watershed. A water treatment plant will be constructed to ensure that mine effluent discharges comply with applicable standards and regulatory requirements. Effluent dilution modelling was conducted to determine how far downstream of the discharge point concentrations of metals or other potential contaminants could occur. The results of this modelling will be verified through monitoring of surface water and sediment quality downstream of the discharge point (Section 13.2.2 of Chapter 13).
Aquatic fauna and habitats	Fish habitat: – Questions regarding anticipated impacts on Corvette Lake and efforts to avoid or minimize impacts on the lake and fish habitat	Water from the mine site will not discharge into the Corvette Lake watershed. Measures to avoid or minimize impacts on fish habitat are discussed in section 8.2.1 of Chapter 8.
Preservation of wetlands and habitats of interest to terrestrial fauna and flora		
Wetlands and water environments	Wetlands and biodiversity: – Concerns regarding potential impacts on wetlands and biodiversity Compensation: – Questions regarding the proposed compensation projects, given the large number of wetlands in the region	PMET will ensure that a 10- to 15-metre riparian buffer strip is maintained around wetlands, watercourses, and water bodies, depending on slope conditions. Issues related to wetlands and biodiversity are addressed in Section 8.2.3 of Chapter 8. PMET is developing a compensation plan for the loss of wetlands and other water environments, as well as for the loss of fish habitat (Section 14.3 of Chapter 14).
Preserving the quality of life of the local population		
Air quality	Ambient air quality: – Concerns regarding potential impacts on air quality	PMET will implement an ambient air quality monitoring program during the construction and operation phases of the project (Section 13.2.2 of Chapter 13).

Topics	Requests, concerns, questions, and suggestions	Responses, commitments, and actions
Preservation of the health, safety, and socioeconomic conditions of the regional population		
Physical, psychological, and social health	Fly-in/fly-out service: – Questions regarding the use of fly-in/fly-out service during the operational phase, including the choice of airport for worker transit – Concerns regarding the use of fly-in/fly-out service, particularly its impacts on the vitality of communities of the James Bay region, community health, and the maintenance of regional services – Expectations and interests from communities of the James Bay region regarding fly-in/fly-out service Community health and social services: – Contact the Public Health Department in the event of health issues at the mining site that may require care by regional health centres Substance use issues: – Concern that the Town of Radisson will become a place of substance use for workers at the mine site – Concerns regarding violence against women at the mine site Housing: – Concerns regarding access to housing Accommodation capacity: – Concerns regarding the capacity of the James Bay region to accommodate workers who choose to settle in the region – Collaborate with communities of the James Bay region to develop structuring projects aimed at strengthening their capacity to accommodate new residents Social investment: – Establish structuring projects, in conjunction with local partners, rather than providing donations and sponsorships Social restoration: – Develop a social restoration plan for when the mine closes to provide psychological support and employment assistance to Jamésie residents who need it	PMET plans to use fly-in/fly-out service for workers during the operational phase of the Shaakichiuwaanaan Project. Workers will transit through LG4 airport. PMET is committed to seeking opportunities to generate or enhance positive impacts, such as contributing to the social and economic growth of communities by prioritizing local and regional procurement and employment, and by investing in sustainable community and educational initiatives (Appendix 8-2). PMET has an occupational health and safety prevention program that includes coordination with the emergency infrastructure of the Jamesian communities concerned (Appendix 8-2). The sectoral report on health determinants takes into account social and well-being issues affecting workers' families. Issues related to substance use and health are addressed in Section 8.2.5 of Chapter 8. PMET develops and implements measures to encourage and increase women's participation in the mining industry, including workplace policies to prevent sexual harassment and violence. PMET will communicate with local and municipal authorities, as well as regional housing organizations, to inform them of anticipated workforce needs for each phase of the project in order to better anticipate potential housing requirements (Appendix 8-2). PMET will communicate and collaborate with local and municipal authorities to coordinate and promote the permanent settlement of newcomers in alignment with local strategies and planned residential development projects (Appendix 8-2). PMET is committed to implementing an employee assistance program to support employees during the transition to the end of operations.

Topics	Requests, concerns, questions, and suggestions	Responses, commitments, and actions
Economic activities	Socioeconomic benefits for local communities: – Concerns regarding economic benefits at the local and municipal levels in the region – Concerns regarding economic benefits at the level of cities and towns in the region – Hope that the Shaakichiuwaanaan Project will contribute to the socioeconomic development of communities of the James Bay region – Adapt tendering processes to the capacity of regional businesses, particularly to meet the project's transportation needs Employment, training, and economic development: – Question regarding the number of employees and subcontractors working on the Shaakichiuwaanaan property during the exploration phase – Question regarding the company's business model – Provide training opportunities for residents of the James Bay region seeking employment at the mine – Concern regarding the hiring of the required number of drivers – Concern regarding the potential impacts on the job market in Matagami – Interest in establishing local businesses that meet the needs of the project	PMET places importance on the economic success of local communities and is committed to ensuring that its activities and value chain generate sustainable and mutually beneficial outcomes. To this end, PMET relies on a local and regional procurement strategy (Section 5.10 of Chapter 5, Appendix 5-12 and Section 8.2.5 of Chapter 8). The number of employees and subcontractors in the exploration phase is specified in Section 5.10 of Chapter 5. PMET's presentation, project justification, and analysis of alternatives are discussed in Sections 1.1, 2.3, and 2.4, respectively. PMET plans to develop and implement a strategy for recruiting and training local and regional workers (see section 5.10 of Chapter 5).
Road safety	Impact of heavy traffic on Billy-Diamond Highway and Transtaïga Road: – Concerns regarding increased traffic on the Billy-Diamond Highway and Transtaïga Road, including negative effects on road safety (increased risk of collisions, run-off-road accidents, etc.). Ore transportation: – Question regarding the methods of transporting spodumene concentrate, including the extension of Highway 167 as a scenario under consideration – Contribute to initiatives aimed at ensuring the safety of users of the Billy-Diamond Highway and Transtaïga Road	PMET is committed to identifying opportunities to reduce the impact on traffic. To achieve this, PMET has set up a working group on the transportation of spodumene concentrate to optimize transportation between the Shaakichiuwaanaan site and the transshipment centre in Matagami (see section 3.1.1.3 of Chapter 3). PMET has conducted a pre-feasibility study on transportation to determine potential transportation routes. It is planned that spodumene concentrate will be transported via the Transtaïga Road and Billy-Diamond Highway to the transshipment centre in Matagami (Section 5.2.4 of Chapter 5). Transportation arrangements will be discussed within the working group on the transportation of spodumene concentrate. PMET is committed to collaborating on initiatives to ensure the safety of users of the Billy-Diamond Highway and Transtaïga Road.

Topics	Requests, concerns, questions, and suggestions	Responses, commitments, and actions
Preservation of traditional Indigenous activities and uses and non-Indigenous activities and uses		
Hunting and trapping of terrestrial wildlife and waterfowl	Poaching and non-compliance with quotas: – Concerns regarding an increase in poaching, particularly of moose populations frequenting the territories along the Transtaïga Road	Measures will be put in place to prohibit hunting and trapping activities by workers.
Fishing	Poaching and non-compliance with quotas: – Concerns regarding excessive fishing by mine employees	Measures will be put in place to prohibit hunting and trapping activities by workers.
Well-being on the land	Land use: – Plan land use based on anticipated impacts in order to avoid cumulative effects between the project and other projects already operating on the land. Landscape: – Concerns regarding potential impacts of infrastructure on the natural landscape. Soundscape: – Concerns regarding potential impacts on the soundscape – Use of the multi-use road – Request regarding the use of the multi-use trail connecting to the Shaakichiuwaanaan property from the Transtaïga Road	Consultations were carried out in 2024–2025 as part of this project to document land use (see Section 3.4.2.2, Table 3-15). PMET plans to implement a complaint management mechanism at the start of construction in order to anticipate potential conflicts related to interactions between project activities and those of third parties. The cumulative effects analysis is presented in Section 9.3 of Chapter 9. PMET will, to the extent possible, maintain important viewpoints that serve as landmarks in the area and will model the shape of the waste rock piles and pit to follow the surrounding terrain in order to integrate them into the local topography. PMET will restore and revegetate the various facilities at the end of operations. Impacts on the landscape are discussed in Appendix 6-28. Various mitigation measures will be implemented, and motorized equipment (trucks, loaders, bulldozers, backhoes, etc.) will be equipped with high-performance mufflers in good condition (Appendix 8-2). PMET will implement a program to monitor ground vibration velocities and air overpressure near permanent camps during the construction and operation phases of the mine (Section 13.2.2 of Chapter 13). Under certain conditions, it is possible to use the multi-user road.
Consideration of climate change		
Climate change mitigation (GHG emissions)	Energy: – Question regarding the project's anticipated energy needs	PMET conducted an energy options study to detail its electricity requirements and evaluate potential transmission line routes. A transmission line connecting Hydro-Québec’s Tilly Substation to the Shaakichiuwaanaan property is planned (Section 5.3.2 of Chapter 5).

3.4.4 Upcoming Engagement Activities

Once the impact study has been submitted, PMET will continue its information and consultation activities with various government authorities, as well as with towns and municipalities in the James Bay region and other regional organizations. PMET's approach will remain consistent with that described above, namely:

- engaging with representatives of the federal, provincial, regional, and municipal governments at each key stage of the project;
- continuing the work of the working group on the transportation of spodumene concentrate;
- regularly issuing press releases; and
- frequently updating the content of the company's website.

Additional engagement initiatives may be implemented based on the needs expressed by the non-Indigenous community and government authorities.

4 Site location and technology alternatives

The following section provides an overview of technology and site location alternatives that were considered during the project planning process. Alternatives were considered with consideration for economic, social, technological and social criteria. The result of the alternatives assessment is a proposed project that reduces environmental impacts and maximizes benefits while accomplishing its objective.

4.1 Technology alternatives

4.1.1 Ore processing

Primero (2025) analyzed three main options for processing the raw ore generated by the Shaakichiuwaanaan mining project (the "project") on behalf of PMET (Appendix 4-1). These options include the basic treatment already considered, namely dense media separation (DMS), and two hybrid plant options including a flotation process to intercept what the DMS process has not retained (fines and ultrafines).

The DMS process involves crushing the ore to a size of less than 10 mm to enable gravity separation. In more detail, the steps include:

- Crushing aimed at generating three groups of particle size fractions: -9.5 mm to 3.3 mm, -3.3 mm to 1.5 mm, and -1.5 mm to 0.65 mm.
- The crushed material is introduced into a suspension of water mixed with ferrosilicon or magnetite (called a dense medium), which is adjusted to achieve a density of 2.6 g/cm^3 to 2.8 g/cm^3.
- The result is fed into a DMS cyclone, which separates the heavy particles containing the concentrated spodumene, which sink to the bottom of the cyclone, from the light particles of gangue, which float to the surface and are discharged (reject).
- The recovered concentrate is washed to remove the dense suspension and then dried for transport to a lithium transformation plant. The dense medium can be recovered by magnetic separation and reused in the process.

This process is primarily physical and avoids the introduction of chemical reagents. It has proven to be very effective for coarse fractions, enabling pre-concentration prior to flotation of up to 70%. However, the fine and ultrafine fractions of the ore, as well as the residues from re-crushing, must be treated by flotation.

Two hybrid plant options which add a flotation treatment section to the DMS process were considered to:

- intercept particles not intercepted by the DMS process (Option 1);
- intercept these same particles, as well as the re-crushing residues and the fine and ultrafine particles generated at various stages of the DMS process (Option 2).

In general, the flotation process works based on the difference in hydrophobic properties between mineral surfaces. Spodumene ore is rendered hydrophobic by adding reagents to an aqueous solution, while the gangue remains hydrophilic. The separation then takes place in a flotation cell where air bubbles capture the hydrophobic particles, which rise to the surface as froth. This froth is collected by skimming, dehydrated by filtration, and drying to recover the concentrate. Highly effective for fine particles, it is normally used in conjunction with a coarse particle treatment process such as the DMS process described above. However, it requires large quantities of chemical reagents and more complex water and sludge management. Furthermore, if this process were to be used to treat all the ore, it would have to be reduced to fine dust (<0.85 mm), which would require greater energy consumption.

The DMS process was ultimately chosen for the following reasons:

- The process is less sensitive to variations in ore quality and allows for good ore recovery (up to 70%).
- The process has little environmental impact (moderate water consumption for recycling the dense medium and discharge of generally inert solid matter).
- Consultations with Cree communities indicated that there would be greater resistance to the choice of a flotation process due to the higher risk of introducing chemical contaminants into the environment.
- The favorable geology of the deposit makes it possible to obtain a satisfactory concentrate quality without resorting to the flotation process, which has a greater environmental impact.
- Finally, considering the current price of spodumene, the recovery gains offered by the two hybrid plant options do not justify the required additional investment, since a return on this investment would only be achieved after 13.3 years (hybrid option 1) or 9 years (hybrid option 2), respectively.

4.1.2 Tailings and waste rock management

The management options considered for tailings and waste rock differ and are therefore presented separately. However, it should be noted that some of the waste rock will be managed at the same site as the tailings, as it is metal leaching, under certain conditions.

4.1.2.1 Tailings

Some of the tailings will be stored in an outdoor stockpile, while others will be used to make paste backfill for sections of the underground mine where operations have ended. The options under consideration mainly relate to the form in which the tailings will be stored in the stockpile. Three main alternatives were considered, namely:

- Pumping them, in the form of sludge, directly from the stockpile. This option eliminates the need to set up a process at the concentration plant to dry the tailings and limits the number of truck trips between the plant and the stockpile. However, this approach requires special modifications to the stockpile to ensure that the water contained in this sludge is recovered. This alternative will also direct an additional volume of water to be treated by the industrial water treatment plant. Lastly, this approach would require the establishment of a unique stockpile for tailings, as the sludge would make it difficult to manage on the same site as the metal leaching waste rock.
- Transforming them into thickened tailings, which generates a viscous material that can be pumped to the designated storage area. This option presents the same issues as the sludge management option, although the water content is lower.

- Dewatering the tailings at the concentration plant using DMS process units and transporting them by truck to the stockpile. This option allows surplus water to be recovered at the concentration plant and thus be reused in during the concentration process, reducing the volume of water to be treated at the industrial water treatment plant. In addition, their low water content allows them to be managed as solids, simplifying the design of the stockpile and allowing the creation of a joint space for dewatered tailings and waste rock that is metal leaching. However, this approach will require many truck trips to transport the tailings to the stockpile, as well as machinery for consolidation of the tailings in the stockpile. This issue can be mitigated by positioning the stockpile as close as possible to the plant, which was in fact one of the selection criteria for the installation of all storage sites. The advantage of this option also lies in the geotechnical stability of the structure (no liquefaction potential).

The option chosen is dewatering the tailings at the concentration plant and storing them in dewatered form at the stockpile that will be provided for this purpose. It should be noted that some of the tailings will be used to produce a paste for backfilling sections of the underground mine where operations have been completed.

4.1.2.2 Waste rock

There will be two main types of waste rock: those that are metal leaching and those that are considered low-risk. The alternative approaches considered for their storage mainly involve either placing them all in a single stockpile or separating them into separate stockpiles.

The option of storing them in a single stockpile avoids the creation of multiple stockpiles, but will result in significant volumes of water having to be treated due to the potential of a portion of the stored materials to be metal leaching. However, separating the two types of waste rock reduces the volume of water that needs to be treated, while also requiring the creation of two separate stockpiles. It should be noted that it is possible to mitigate the effects of an additional stockpile by combining the tailings discussed in the previous section with the metal leaching waste rock stockpile.

The option of separating the two types of waste rock into individual stockpiles was chosen, in combination with storing metal leaching waste rock with tailings in the same stockpile. Additional geochemical testing in the laboratory and in the field will be conducted to confirm the leachability of waste rock, as outlined in Chapter 5.

4.1.3 Water treatment

The water to be treated comes from various sources related to the project, including:

- sanitary facilities throughout the mine site;
- industrial water from the concentration plant and other activities related to mine operations;
- dewatering of the open pit and the underground galleries of the mine;
- rainwater from the site in general, but more specifically from various storage sites for tailings, waste rock, and organic soils.

The various water sources are managed using techniques specific to the anticipated contaminants. Each of the techniques selected is the result of a comparison between various alternatives, which are presented below.

4.1.3.1 Sewage water treatment

The process selected is a modular biological treatment plant combining a screen, an equalization tank, MBBR (Moving bed biofilm reactor) biological treatment, and a dissolved air flotation system. A phosphorus removal stage is also implemented to limit eutrophication of the effluent water.

A membrane bioreactor (MBR) biological treatment process was evaluated for water treatment. However, this option was rejected due to the operational constraints associated with this technology, particularly those related to membrane cleaning.

Furthermore, given the available space and the fact that sanitary effluent is then pumped to the polishing basin, the organic load from sewage becomes negligible. This limits the relevance of using an MBR, whose main advantage lies in its ability to achieve superior processing performance for TSS.

4.1.3.2 Contact water treatment

Two types of contact water must be managed separately: contaminated and non-contaminated contact water. The options considered for these are presented below.

Uncontaminated contact water

The uncontaminated contact water comes from waste rock stockpile 01 and runoff from the industrial area. This water contains only suspended solids as contaminants. Sedimentation ponds, as well as a polishing pond, have been designed to remove suspended solids before discharge into the environment.

The only option under consideration is a physico-chemical treatment system that has been proposed to remove total suspended solids. However, this option requires the addition of chemicals and additional operations. In addition to the capital and operating costs associated with a treatment plant, this approach also introduces increased operational risk.

Decantation was therefore preferred. However, since all effluent is pumped, it remains possible, in the event of exceedances of TSS criteria or the presence of another contaminant, to install a specific water treatment plant in the space already reserved for the contingency treatment system.

Contaminated contact water

The contaminated contact water includes runoff from stockpile 02, which contains both mine tailings and waste rock that may leach metals. In addition, the water from the concentrator is also included.

The treatment process for this water is based on physico-chemical principles, in particular successive precipitation. The formation of goethite, achieved by adjusting the pH and using coagulants, generates stable precipitates that are large enough to be effectively separated. The use of chelating agents promotes the complexing of certain metals. The sludge recirculation system facilitates the return of goethite to the process, which improves metal complexing and, consequently, treatment efficiency.

Alternatives to the overall water treatment process and its components that have been considered include:

- The use of sulphur-based chelating agents for the treatment of dissolved metals:

  This option was ruled out because the sludge produced is less stable, which complicates its disposal on site. In addition, the particles produced are generally finer, making them more difficult to manage and separate.

- The integration of ultrafiltration (UF) treatment:

  Although this technology offers high performance, it generates a significant amount of brine, which is complex to manage. Furthermore, its implementation is economically difficult to justify when the targeted contaminants or discharge requirements do not require the performance offered by UF.

4.1.3.3 Dewatering water treatment

Two options for managing dewatering water from the open pit mine were considered. They are related to the anticipated quality of this water. The first option consists of direct pumping into the natural environment, provided that the quality of this water met the discharge criteria of the MELCCFP and Directive 019. The second option involves pumping the water into a sedimentation pond before redirecting it to the mine site's polishing pond, where some of it can be reused in processes and some discharged into the environment (Watercourse CE11).

Given the presence of an underground mine, it is anticipated that the dewatering water will contain a significant amount of TSS. In addition, certain metals and ammonia, resulting from the use of explosives, can contribute to environmental contamination. For these reasons, the option chosen is to direct this water to the sedimentation pond, then to the mine's main pond.

This path not only guarantees the treatment of TSS, but also allows existing infrastructure to be used to redirect water to an active treatment system if necessary. In fact, depending on the quality of the dewatering water, additional treatment may be necessary.

To respond to this possibility, a treatment system has been designed based on the principles of coagulation and flocculation, and space has been reserved for its potential installation if the situation requires it.

4.1.3.4 Rainwater management and treatment

Rainwater management and treatment apply to the mining site in general (production and concentration facilities), waste rock stockpile 01, waste rock and tailings stockpile 02, overburden stockpiles 04 and 05, and organic soil deposits. The options for managing overburden and organic soils, which are not potential sources of contaminants other than suspended solids, were considered together when choosing the treatment option.

Rainwater treatment at the mining site

This refers to rainwater collected around ore production and concentration facilities, as well as around facilities related to maintenance and staff presence on site (camp). Only TSS is expected to be present in these waters. No alternatives were considered, as they will be captured by the system of ditches surrounding the facilities and directed to the polishing pond, where part of it can be reused in the processes and part discharged into the environment (watercourse CE11).

Treatment of rainwater from overburden stockpiles and organic soil deposits

Three options were considered for managing rainwater that had come into contact with these piles of materials, namely:

- Option 1: The installation of peripheral ditches around each pile that would drain into a collection pond, with the effluent directed to the mining site's sedimentation pond.
- Option 2: The installation of peripheral ditches as mentioned above, but with a discharge point into the open pit of the mine for management of this water together with the dewatering water.
- Option 3: Installation of catchment paddocks around the edges of the piles of materials. These plots, surrounded by dikes, would retain runoff water and allow sedimentation of suspended matter as the water percolates into the underlying soil.

Option 3, installation of peripheral catchment paddocks, was ultimately chosen. In fact, for option 1, the costs of providing an electrical connection to the overburden stockpiles located more than 2 km from the sedimentation ponds and the energy required to pump the collected water are significantly high. A similar problem leads to the rejection of option 2, since the water from the two overburden stockpiles cannot be directed by gravity toward the pit due to the local topography.

The option chosen is a passive system that requires little maintenance and no pumping of water.

Treatment of rainwater from waste rock stockpile 01

Due to the absence of acid leaching potential, but considering the presence of TSS associated with the presence of fine particles in the tailings, the water does not need to be treated, but the system must allow for sedimentation time. Thus, no alternative was considered, and this water will be intercepted by ditches that will direct it to two unlined ponds (001 and 001a), and their effluents will be discharged into the polishing pond at the mine site, where part of it can be reused in the processes and part discharged into the environment (watercourse CE11).

Treatment of rainwater from waste rock and tailings stockpile 02

The potential for metal leaching from the materials stored in this stockpile requires that rainwater percolating through it be treated at the industrial wastewater treatment plant. No alternatives were considered for this treatment, and the water is therefore captured by ditches and directed to two lined ponds (002 and 003), which direct the accumulated water to the industrial wastewater treatment plant. See Section 4.1.3.2 for the options considered for this treatment plant.

4.1.4 Mode of transport for the spodumene concentrate

Transporting the spodumene concentrate is a strategic element of the project, both in terms of economic performance and reducing environmental and social impacts. The chosen solution must enable the transport of an annual volume of approximately 800,000 tonnes of spodumene (or 2,300 tonnes per day including an additional 5% margin to account for weather conditions and other contingencies) from the mine site in northern Quebec to processing or shipping points, while complying with the logistical and regulatory constraints specific to the North. This section is based on the memo from G Mining Services (2025) *Note on transporting spodumene concentrate*, provided in Appendix 4-2 of this assessment.

4.1.4.1 Approach and analysis criteria

The assessment of transport alternatives is based on several criteria: user and worker safety, logistical reliability, investment and operating costs, reduction of GHG emissions, and social and environmental impacts. Significant distances, harsh climatic conditions, and limited infrastructure require rigorous planning and robust solutions. Three main scenarios were considered:

- **Scenario 1:** Transport by truck to Matagami, then by rail to an industrial facility in Bécancour, without handling by ship.
- **Scenario 2:** Transport by truck to Matagami, then by rail to the Port of Quebec (Beauport sector), including port operations.
- **Scenario 3:** Transport by truck to Matagami, then by rail to the port of Grande-Anse, with port handling prior to maritime shipment.

These scenarios are based on a combined road-rail network, limiting long-distance trucking and its impacts. The road section covers approximately 844 km (Billy-Diamond Highway and Trans-Taiga Road) to Matagami, where the rail transfer takes place. Loads per truck are estimated at 45–47 net tonnes (AGVW 68,750 kg), which can be optimized to 75 tonnes subject to specific permits.

4.1.4.2 Results of the economic analysis

Table 4-1 presents the breakdown of unit costs ($/t) and annual costs ($/year) for each scenario, based on a volume of 800,000 t/year and excluding fuel surcharges (not specified in the available data).

Table 4-1 Costs per segment and annual totals (Millette road transport company)

Transport segment	Bécancour (facility) $/t	Annual $	Grande-Anse (POL) $/t	Annual $	Québec-Beauport (POL) $/t	Annual $
Truck – Site → Matagami	95.00	76,000,000	95.00	76,000,000	95.00	76,000,000
Yard (sorting) – Matagami	2.00	1,600,000	2.00	1,600,000	2.00	1,600,000
Transshipment + storage	15.00	12,000,000	15.00	12,000,000	15.00	12,000,000
Rail – Wagon rental	11.30	9,040,000	11.30	9,040,000	12.56	10,048,000
Rail – Transportation	55.83	44,664,000	53.35	42,680,000	63.82	51,056,000
Subtotal delivered	179.13	143,304,000	176.65	141,320,000	188.38	150,704,000
POL Operations – Stacking	—	—	26.00	20,800,000	15.95	12,760,000
POL Operations – Ship loading	—	—	5.50	4,400,000	11.70	9,360,000
Total	**179.13**	**143,304,000**	**208.15**	**166,520,000**	**216.03**	**172,824,000**

These results show that the Bécancour alternative has the lowest unit cost ($179.13/t), followed by Grande-Anse ($208.15/t) and Québec-Beauport ($216.03/t). The differences are mainly due to port charges and rail distances.

4.1.4.3 Costs per transport company for each destination

Table 4-2 shows the variation in total costs according to the road transport company selected for each destination.

Table 4-2 Costs per tonne and annual costs based on destination and transport company

Destination	Road transport company	Costs/tonne ($/t)	Annual costs ($)
Bécancour	Transporter A	179.13	143,304,000
	Transporter B	229.46	183,568,000
	Transporter C	313.46	250,768,000
Québec–Beauport	Transporter A	216.03	172,824,000
	Transporter B	266.36	213,088,000
	Transporter C	350.36	280,288,000
Grande-Anse	Transporter A	208.15	166,520,000
	Transporter B	258.15	206,520,000
	Transporter C	342.48	273,984,000

These differences confirm the importance of the choice of transport company in the overall cost structure.

4.1.4.4 Preferred alternatives

The three options studied meet the project's logistical and environmental requirements. However, the combined road + rail solution is emerging as the best practice for reducing long-distance trucking and its impacts. Scenario 1 (Matagami–Bécancour) offers the most competitive cost and significant flexibility for land deliveries, while scenario 3 (Matagami–Grande-Anse) is the preferred solution for marine shipments, in line with the recommendations of the logistics memo (G Mining Services, 2025). The project favors Scenario 3, as the availability of an industrial processing facility in Bécancour cannot be guaranteed at that time.

4.1.5 Energy supply sources

4.1.5.1 Background and energy needs

The project is located in a remote area in the heart of the James Bay region, where climatic conditions are particularly harsh and winters are long. This reality imposes significant and continuous energy requirements, particularly for heating buildings, maintaining critical infrastructure, and ventilating underground tunnels. Heating requirements are particularly high during the winter months, with peaks in consumption to heat buildings and mining facilities. Energy supply must therefore meet several requirements: ensuring reliability and continuity of service, limiting investment and operating costs, reducing greenhouse gas (GHG) emissions, and minimizing the environmental and social footprint of the facilities.

Two technical and economic analyses were carried out (Appendices 4-3 and 4-4) to identify the most suitable energy solutions, both for the site's general energy supply and more specifically for heating, taking into account the following criteria:

- Reliability and continuity of supply in an isolated location.
- Capital expenditures (CAPEX) and operating expenditures (OPEX) over the project life cycle.
- Reduction of greenhouse gas (GHG) emissions.
- Potential integration of renewable energies.
- Logistical complexity and environmental footprint.

These criteria guided the assessment of various energy options, taking into account the logistical constraints specific to a remote site and the economic and environmental performance objectives.

4.1.5.2 Comparative analysis of electrical power supply options for the mining site

The mining site is expected to require, excluding heating, an average load of 34.55 MW per year during regular operations, from 2032 to 2048. To meet these electricity needs, a total of seven different scenarios were evaluated according to technical and economic criteria. They are briefly presented in Table 4-3.

Table 4-3 Description of the scenarios considered

Scenario	Description
1	Connection to Hydro-Québec's (HQ) grid: interconnection to HQ's grid from the Tilly substation, near the LG-4 hydroelectric power plant, via a 53-km, 120 kV line
2A	Stand-alone diesel power plant
2B	Hybrid diesel-powered stand-alone power plant integrated with renewable energy and a battery energy storage system (BESS)
3A	Stand-alone LNG power plant
3B	Stand-alone hybrid LNG power plant integrated with renewable energy and BESS
4A	Stand-alone CNG power plant
4B	Stand-alone hybrid CNG power plant integrated with renewable energy and BESS

Scenario 1 – Connection with Hydro-Québec

This scenario involves connecting to the Tilly substation located near the LG-4 power plant. This connection begins with the construction of a new 315-120 kV substation located near the Tilly substation and connected to it by a maximum 2 km 315 kV line. A 120 kV power line must then be built over a distance of 53 km between the new 315-120 kV substation and another substation installed at the mine site, which would operate at 120-13.8 kV.

GHG emissions associated with this scenario represent an annual maximum of 200 T CO_2eq per year, or 3,800 tons over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $195,000,000, while the projected operating costs (i.e., the cost of purchasing electricity) amount to $8,834,000 per year, for a total over the life of the mine of $203,176,000 per year, or $0.153/kWh.

Scenario 2A– Stand-alone diesel power plant

The aim here is to generate all of the mine site's electricity needs using stand-alone power plant consisting of diesel-fuelled generators.

GHG emissions associated with this scenario represent an annual maximum of 181,000 T CO_2eq per year, or 3,692,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $174,315,000, while the projected operating costs (i.e., the cost of electricity production) amount to $38,367,000 per year, for a total over the life of the mine of $882,448,000 per year, or $0.405/kWh.

It should be noted that this scenario would allow the heat generated by the plant to be recovered and used to heat process and auxiliary buildings, thereby reducing the gas requirements currently planned for their heating (see Section 4.1.5.3).

Scenario 2B – Stand-alone diesel power plant integrated with renewable energies

The plan is to install the same diesel power plant as in scenario 2A, combining it with four wind turbines of 6,200 kW each (total 24,800 kW) and a 12,400 kW BESS with one hour of spinning reserve. The objective is to reduce diesel fuel consumption, in addition to saving on gas for heating process and auxiliary buildings.

GHG emissions associated with this scenario represent an annual maximum of 136,200 T CO_2eq per year, or 2,703,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $269,322,000, while the projected operating costs (i.e., the cost of electricity production) amount to $27,638,000 per year, for a total over the life of the mine of $635,668,000 per year, or $0.347/kWh.

Scenario 3A – Stand-alone liquefied natural gas power plant

This scenario proposes the construction of a stand-alone power plant whose generators would run entirely on natural gas, which would be transported to the site in liquefied form. This power plant would also bring about savings in heating costs, as presented in Section 4.1.5.3.

GHG emissions associated with this scenario represent an annual maximum of 128,000 T CO_2eq per year, or 2,594,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $196,683,000, while the projected operating costs (i.e., the cost of electricity production) amount to $27,620,000 per year, for a total over the life of the mine of $635,253,000 per year, or $0.319/kWh.

Scenario 3B – Stand-alone liquefied natural gas power plant integrated with renewable energies

The plan is to install the same liquefied gas power plant as in scenario 3A, combining it with four wind turbines of 6,200 kW each (total 24,800 kW) and a 12,400 kW BESS with one hour of spinning reserve.

GHG emissions associated with this scenario represent an annual maximum of 95,000 T CO_2eq per year, or 1,886,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $291,690,000, while the projected operating costs (i.e., the cost of electricity production) amount to $19,625,000 per year, for a total over the life of the mine of $451,381,000 per year, or $0.285/kWh.

Scenario 4A – Stand-alone compressed natural gas power plant

This involves installing a power plant that produces all the electricity needed for the mine site using generators powered by compressed natural gas.

GHG emissions associated with this scenario represent an annual maximum of 128,000 T CO_2eq per year, or 2,592,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $175,575,000, while the projected operating costs (i.e., the cost of electricity production) amount to $38,349,000 per year, for a total over the life of the mine of $882,022,000 per year, or $0.406/kWh.

Scenario 4B – Stand-alone compressed natural gas power plant integrated with renewable energies

The plan is to install the same compressed natural gas power plant as in scenario 4A, combining it with four wind turbines of 6,200 kW each (total 24,800 kW) and a 12,400 kW BESS with one hour of spinning reserve.

GHG emissions associated with this scenario represent an annual maximum of 96,200 T CO_2eq per year, or 1,880,000 over the 23 years of operations considered in the comparative study.

The anticipated capital expenditures for this scenario are $270,581,000, while the projected operating costs (i.e., the cost of electricity production) amount to $27,270,000 per year, for a total over the life of the mine of $627,208,000 per year, or $0.344/kWh.

Selected scenario

The scenarios were analyzed based on a weighting that compared economic, environmental, social, and technical criteria. This analysis showed a clear advantage for the scenario of connecting to Hydro-Québec's grid, with a marked advantage in terms of economic and social criteria, a median score for environmental criteria (mainly due to its footprint on the land, water bodies, and wetlands), and a high score similar to two other scenarios (2A and 3A). The total score for this scenario was 80, while the next two closest options had a score of 62 (scenarios 2A and 4A).

The scenario of connecting to Hydro-Québec's grid was therefore selected and will be implemented.

4.1.5.3 Comparative analysis of options to heat the facilities

The analysis focused on three main scenarios: liquefied natural gas (LNG), liquefied propane gas (LPG), and compressed natural gas (CNG).

Scenario 1 – Liquefied natural gas (LNG)

LNG is a commonly adopted solution in remote industrial projects due to its high energy density and relatively low carbon footprint compared to other fossil fuels. It is obtained by cooling natural gas to -162 °C, which allows it to be transported in bulk by cryogenic tank trucks. Once delivered to the site, it must be regasified before being distributed to the facilities.

From an environmental standpoint, LNG offers a significant advantage as it generates fewer GHGs than propane, making it an option that aligns with emission reduction goals. From a technical standpoint, it provides a stable power supply and enables heat recovery for building heating, which improves overall energy efficiency. However, this solution requires significant initial investments. The installation of cryogenic tanks, regasification systems, and an internal distribution network represents an estimated CAPEX of $17.9 million for the first two years. On the other hand, the unit cost of LNG is the most competitive among the three scenarios, at $14.29/GJ, which reduces long-term operating expenses. This combination of high investment but low energy costs makes LNG an attractive option for the mature phase of the project, but less suitable for the start-up phase, when financial flexibility is crucial.

Scenario 2 – Liquefied propane gas (LPG)

LPG is a proven solution for remote sites, particularly due to its logistical simplicity. Unlike LNG, it does not require cryogenic storage, which reduces the complexity of facilities and commissioning times. Pressurized tanks used for LPG are easy to deploy and widely available in Quebec, ensuring a reliable supply.

However, LPG has two major drawbacks. From an environmental perspective, it has a higher carbon intensity than LNG, which increases the project’s climate footprint. From an economic standpoint, its unit cost is significantly higher, at $33.77/GJ, which translates into significant operating expenses. Initial CAPEX, estimated at $4.0 million, remains lower than that of LNG, but this initial saving is quickly offset by higher operating costs.

In summary, LPG may be a fallback solution in the event of technical or logistical constraints, but it does not optimally meet the project’s economic and environmental performance objectives.

Scenario 3 – Compressed natural gas (CNG)

CNG stands out for its delivery method. It is transported in compressed form at high pressure (250 to 300 bar) in specialized trailers, eliminating the need for cryogenic infrastructure. This feature gives CNG a strategic advantage in the initial phase of the project, as it significantly reduces the required investment. The required CAPEX is estimated at only $34,000, which is negligible compared to the other scenarios.

This solution also offers great logistical flexibility, thanks to a modular system that can be adapted to changing needs. However, this simplicity comes at a cost—CNG is the most expensive option when it comes to operating costs, with a unit price of $38.17/GJ and requiring frequent deliveries (10 to 15 trucks per week). From an environmental perspective, its emissions profile is comparable to that of LNG, but without any significant advantages.

Consequently, CNG appears to be an ideal transitional solution for the start-up phase of the project, preserving financial liquidity and allowing operations to begin quickly, while awaiting the implementation of a more sustainable infrastructure such as LNG.

Comparative analysis of scenarios

The comparative study quantified the differences between the three scenarios in terms of capital expenditures, unit costs, and cumulative expenditures over 20 years. These results are presented in Table 4-4.

Table 4-4 Comparison of energy supply scenarios

Option	CAPEX (CAD)	Unit cost ($/GJ)	Annual OPEX (CAD)	Total cost over 20 years (CAD)
LNG	17,911,572	14.29	4,970,720	117,325,972
CNG	34,000	38.17	7,099,620	142,026,400
LPG	4,011,334	33.77	7,832,595	160,663,234

Preferred alternative

Based on the assessment, CNG is selected for the initial phase of the project due to its low initial investment and rapid implementation, despite higher operating costs.

4.2 Site location alternatives

The site location alternatives for the main infrastructure were analyzed as part of the project's EIA. In accordance with the requirements of *Directive 019 on the Mining Industry* (MELCCFP, 2025) and the guides on the management of tailings and waste rock (MELCC, 2020; MRNF, 2024), the analysis focuses on describing the proposed sites, their geographic location, and comparing their biophysical, social, technical, and economic advantages and disadvantages. The goal is to demonstrate that the project takes into account local constraints, reduces its environmental footprint, and incorporates concerns expressed during consultations with stakeholders, particularly Cree communities and land users.

The alternatives presented consider the needs to be met, sustainable development objectives, greenhouse gas emission potential, and anticipated impacts of climate change. Where relevant, Cree place names are specified for the locations or bodies of water concerned. Finally, the justification for the final site selection is based on a multicriteria analysis that incorporates land-use planning criteria, biological and physical constraints, environmental vulnerability, and technical, operational, financial, and social considerations.

It should be noted that the site location scenarios analyzed in this section are based on technical studies conducted specifically for the project, including BBA's technical report entitled *Site Selection Alternatives for Storage of Mine Waste* (BBA, 2025a), which presents the preselection process, conceptual modelling, and multicriteria assessment of potential sites for tailings and waste rock stockpiles (Appendix 4-5). This assessment was conducted in accordance with the requirements of Section 20 of National Instrument 43-101, which includes the development of a preliminary project design and layout to assess the potential location of the project's main components. The criteria and results of this analysis, validated during workshops with stakeholders, form the basis for comparing the alternatives selected in this chapter.

4.2.1 Alternative locations for main infrastructure

4.2.1.1 Open pit versus underground mining

Various operations scenarios were analyzed to identify the most appropriate option for extracting the main spodumene deposit. The scenarios assessed include open pit mining only, underground mining only, and a hybrid alternative combining both methods. The hybrid alternative is the scenario chosen for the location of the mine's main infrastructure.

Scenario 1 – Open pit mining only

In this scenario, the entire deposit would be mined using a single open pit. This option maximizes ore accessibility and simplifies the organization of mining operations, particularly with regard to planning, extraction, and internal logistics. Solely using a pit also allows for more direct management of the mining sequence and optimization of extraction equipment. Furthermore, even when considering the need for fish habitat compensation, this alternative is the least expensive of the options assessed, due to the simpler design of the associated hydraulic works. It is also the least expensive because the unit operating costs (per tonne mined) are much lower in open pit mining than in underground mining.

However, it requires a large footprint, produces large amounts of waste rock and tailings, and has a significant impact on water and terrestrial environments. In terms of water management, the creation of the pit would require the installation of water control infrastructure, including cut-off dikes to maintain the natural levels of neighbouring lakes, as well as diversion channels to divert runoff away from the excavation area. These measures aim to limit the impact on local water systems, but involve a significant change to the natural flow regime.

Scenario 2 – Underground mining only

This scenario involves mining the deposit solely through underground tunnels. It reduces the footprint, limits waste rock production, and better preserves sensitive natural environments. However, it involves technical challenges related to ore access, ventilation, safety, and tailings management. Some of the processing by-products can be used as backfill in the tunnels, which contributes to the stability of the structures and reduces the volumes to be managed on the surface. Furthermore, among the alternatives assessed, this is the most expensive scenario, mainly due to the technical and operational requirements associated with fully underground operations. This scenario also results in a significant loss of resource in the surface pillar.

Scenario 3 – Hybrid alternative

The hybrid option combines open-pit mining with underground mining. This scenario was selected following multicriteria analysis, as it optimizes resource recovery while limiting environmental and social impacts. Open pit mining is planned in two phases: the first (2030–2047) for initial extraction, the second (2031–2049) for pit expansion. Underground mining will begin in 2032 and continue until 2048. The hybrid alternative offers several advantages:

- reduced footprint and volumes of waste rock generated;
- greater operational flexibility and better control over the plant feed grade. This helps reduce the need for storage areas for feed management, thereby lowering the costs and GHG emissions associated with ore re-handling, as well as the surface footprint of stockpiles.
- use of tailings as underground backfill (approximately 32.5 Mt), contributing to stability and sustainable waste management;
- adaptation of water and waste management infrastructure according to the phases of operation;
- compliance with regulatory requirements and industry best practices.

The hybrid scenario chosen for the project involves close interaction with several bodies of water, mainly Lakes L01 to L05. Lake L01, located at the centre of the project, is directly affected by the development of the open pit mine. To enable ore extraction while maintaining the lake's water level, cut-off dikes will be constructed in two successive phases. These dikes isolate the excavation area and control water infiltration into the pit. To maintain natural water flow and protect the surrounding lakes (i.e., Lakes L02, L03, and L04), a diversion channel will be constructed to divert water from Lake L01 to Lake L05, bypassing the open pit (see Section 4.2.1.3).

Reasons for the choice

The proposed mining method has been updated to address Cree concerns about the project's impact on fish and water. The integration of an underground mining method combined with an open-pit method has significantly reduced direct impacts on fish while still allowing access to the ore.

The hybrid scenario is a reasonable approach that meets the project objectives while respecting the environmental concerns raised by stakeholders. The hybrid scenario is preferable to the underground-only option for resource recovery.

The hybrid scenario also reduces the surface footprint required for waste rock and tailings management compared to the open-pit-only scenario. This approach is further supported by the results of consultation workshops and technical assessments, which highlighted the flexibility and robustness of the hybrid option given the site constraints and stakeholder expectations.

4.2.1.2 Dikes

As part of the project's development, the construction of dikes is an essential component of water management and water environment protection. Dikes are mainly required to:

- isolate the open pit of Lake L01 and maintain the water level of this body of water in its current conditions during the operations phases;
- control runoff and infiltration into the pit to limit the risk of flooding and contamination;
- ensure water diversion to downstream lakes (Lake L07), preserving the hydraulic and ecological connectivity of the watershed.

Various scenarios for the location and design of the dikes were analyzed to meet the technical, environmental, and regulatory constraints of the site. Some scenarios proposed the construction of a single large dike that would isolate the western end of Lake L01 from the main body of water from the outset, replacing the lake's natural outlet with a channel built east of the original location. Other scenarios suggested a more gradual approach, with the successive installation of dikes aligned with the development of the pit, allowing for more flexible water management and a reduction in environmental impacts.

The precise location of the dikes, their dimensions, the nature of the materials used, and the protective measures against erosion and infiltration were analyzed in detail. Hydrological and seismic safety criteria, as well as regulatory requirements, guided these choices throughout the process. Following this analysis, the chosen solution was to build **two dikes in Lake L01**, each corresponding to a phase of expansion of the open pit. The first dike would be constructed before excavation work begins, isolating the western portion of the lake and maintaining its water level east of the dike. The second dike, built during the expansion of the pit, would complete the isolation and adapts water management to the new operating conditions.

These levees are designed with a minimum crest width of 6.0 m and slopes of 3H:1V, and include 6 m wide berm upstream and downstream to account for local geotechnical conditions. Erosion protection measures consisting of riprap laid on geotextile, and seepage management systems, such as sheet piles and geomembranes, are integrated into the structure of the work. These structures have been classified as "Extreme" in accordance with Quebec regulations and the guidelines of the Canadian Dam Association (CDA), which impose very high safety requirements, particularly with regard to earthquakes and extreme flooding.

This choice makes it possible to combine technical robustness, adaptation to the evolving needs of the project, and respect for the natural environment. It also meets the requirements of *Directive 019 on the mining industry*, the *Dam Safety Act* (chapter S-3.1.01) and the *Dam Safety Regulation* (chapter S-3.1.01, r. 1), while drawing on recognized best practices in the mining sector.

4.2.1.3 Water diversion

Water diversion, a practice that involves deliberately redirecting water flow to specially designed channels, is an essential measure in the development of the open pit mine while preserving the water balance of water bodies located near the project. Before excavation work begins, a diversion channel will be constructed to redirect water from Lake L01 to Lake L05, bypassing the pit and maintaining the water level of Lake L01 at its natural elevation.

Five scenarios for the route and design of the diversion channel were analyzed, as presented in Table 4-5, Map 4-1, and Appendix 4-6. The alternatives assessed differ in terms of their length (from 726 m to 793 m), side slopes (from 2.5H:1V to 1H:1V), and compliance with safety distances from bodies of water and the pit (buffer zones of 10 to 60 m). The options were compared based on their hydraulic capacity, ease of construction, impact on water environments, and ability to limit intrusions into Lakes L02, L03, L04, and L05.

Table 4-5 Water diversion scenarios considered for the project

Scenario	Channel length (m)	Side slope	Main impacts	Advantages	Disadvantages
A	793	2.5H:1V	Intrusion into buffer zones, proximity to Lake L04	Good hydraulic capacity	Intrusion into water environments, not selected
B	738	2.5H:1V	Impact on the natural channel of Lake L02, intrusion into buffer zones	Shorter channel	Impacts on water environments, not selected
C1	726	2.5H:1V	Minor intrusion into buffer zones, impact on Lake L04	Shorter channel, good hydraulic capacity	Construction difficulty in Lake L04
C2	726	1.5H:1V	Steeper slopes, impact on Lake L04	Less excavation	Slopes too steep for the soils, reduced hydraulic capacity
D1	774	2.5H:1V	Minor intrusion into buffer zones, preservation of natural waterways	Good hydraulic capacity, environmentally friendly	Longer ditch, some minor intrusions
D2	774	1H:1V	Slopes very steep, no intrusion into lakes	Less excavation, total respect for the environment	Slopes too steep, reduced hydraulic capacity

Following a multicriteria analysis, the chosen solution corresponds to an alternative to scenarios D1 and D2, which complies with the safety distances from the pit wall (45 m) and surrounding lakes, while minimizing the impact on water environments. The side slope of the solution selected for the diversion channel is mainly 2.5H:1V (option D1), with possible adjustments to 1.5H:1V or 1H:1V in certain sections where the depth of the cover material allows, to ensure slope stability and comply with local geotechnical constraints.

This channel is designed to preserve ecological connectivity between bodies of water, in particular through the installation of drops and boulders that replicate hydraulic conditions favourable to fish migration. The channel will be built in two phases, in line with the gradual development of the open pit. In addition, the design of the diversion channel takes into account current regulatory requirements, including D019 and hydrological and environmental safety standards. The diversion work will thus help maintain the quality and quantity of surface water, protect aquatic habitats, and limit the risks of contamination associated with mining activities.

Zone d'étude / *Study Area*

Projet / *Project*

Composante du projet / *Project Component*

Projetée / *Projected*

Canal de dérivation / *Diversion Channel*

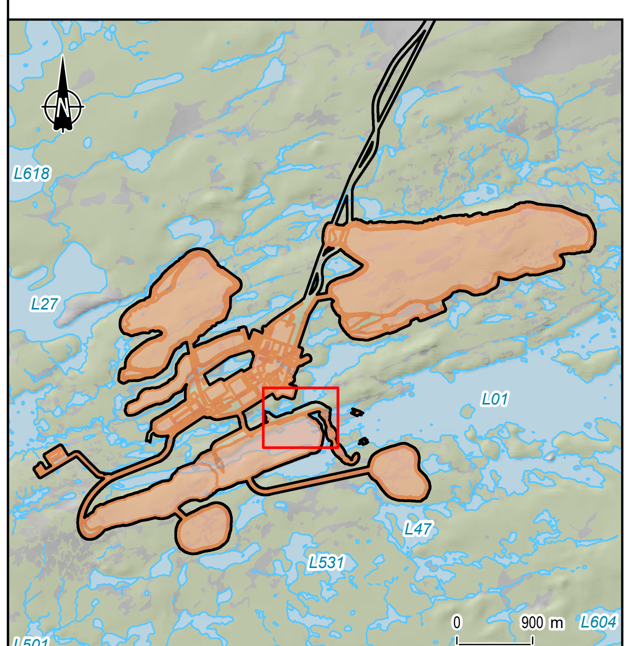
- Option A
- Option B
- Option C
- Option D
- Option choisie / *Selected option*

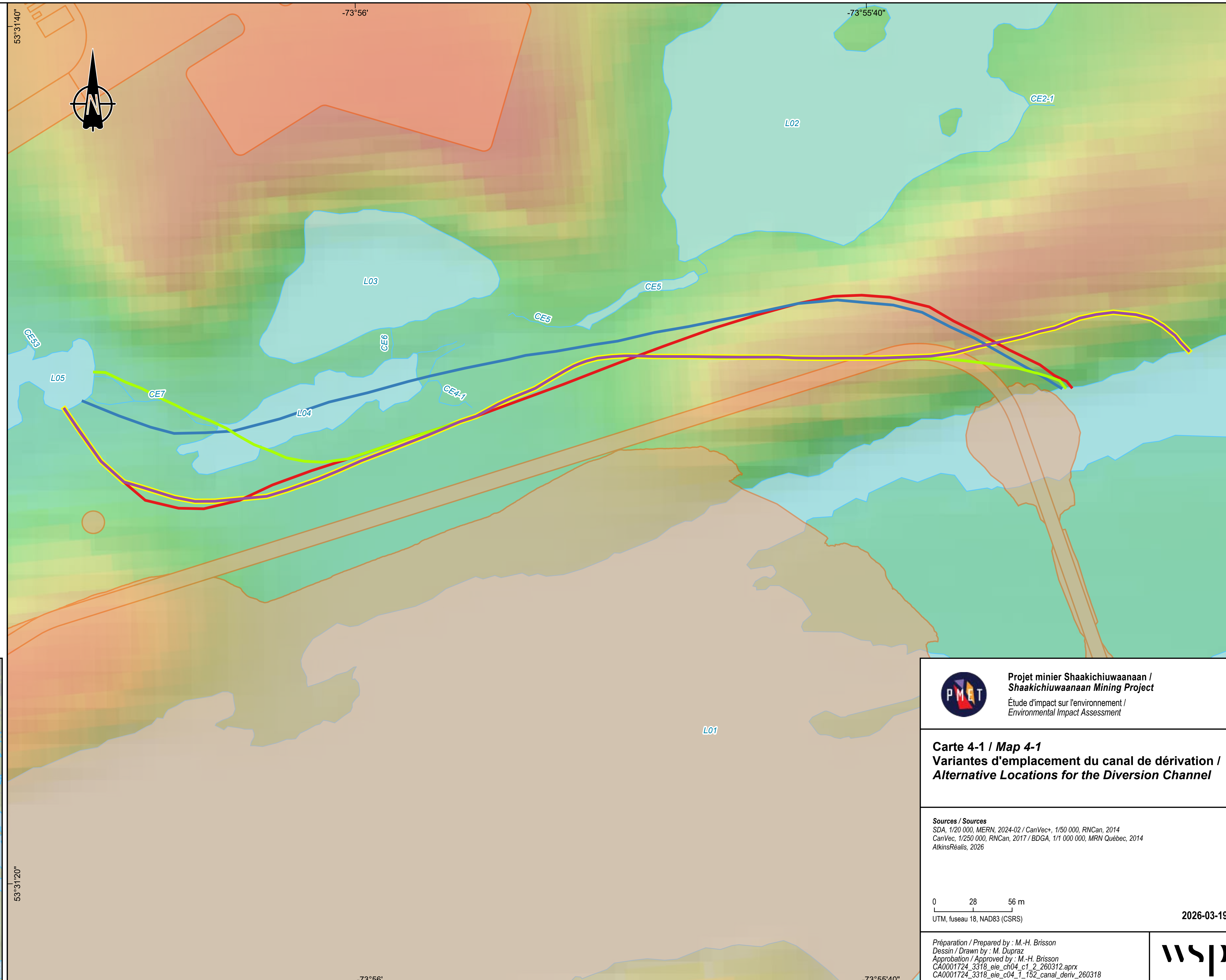
Hydrologie / *Hydrology*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourse*

Permanent / *Permanent*





Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 4-1 / *Map 4-1*
Variantes d'emplacement du canal de dérivation / *Alternative Locations for the Diversion Channel*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
AtkinsRéalis, 2026

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UTM, fuseau 18, NAD83 (CSRS)

2026-03-19

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4.2.1.4 Waste rock and tailings storage and management areas

As with any mining project, waste rock and tailings storage facilities will be required as part of the project's development. According to recent technical data, the project will generate approximately 155.2 million tonnes (Mt) of waste rock (including 81 Mt of metal leaching waste rock and 74.2 Mt of low-risk material) and 71.1 Mt of tailings, in addition to 14 Mt of overburden. These volumes correspond to a total estimate of approximately 145 million cubic metres to be managed on the surface, excluding underground backfill.

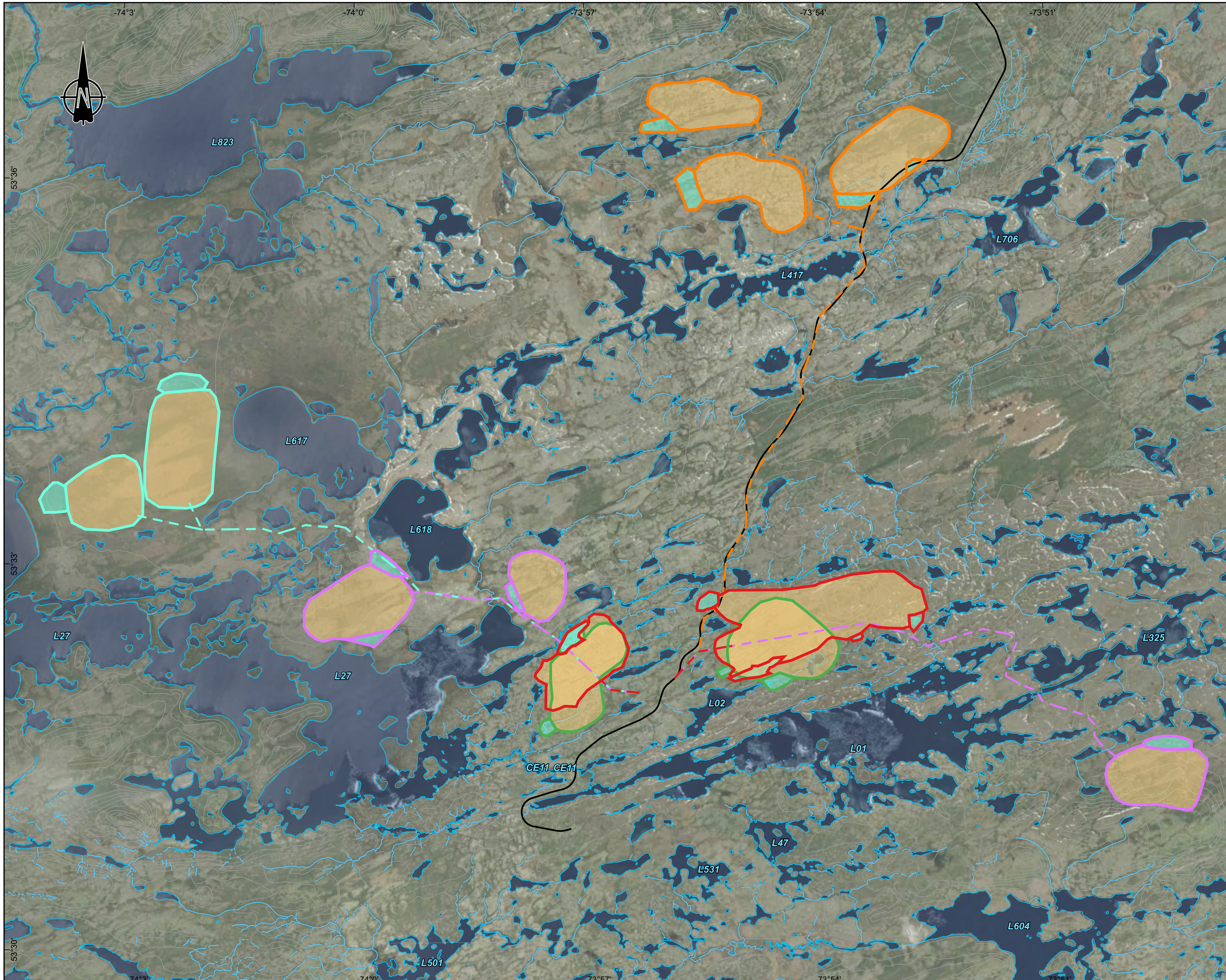
Site selection process for accumulation area

An initial survey of 31 potential sites, located within a 10 km radius of the open pit mine, was conducted based on photo interpretation and constraint analysis. Several criteria guided the preselection process: the absence of bodies of water and watercourses frequented by fish, the search for relatively flat areas to facilitate construction and stability of the structures, proximity to the pit, and the planned access road route (north side of the pit, connecting to the Trans-Taiga Road), as well as the exclusion of areas with mineral potential, protected areas, and land outside the claims held by the proponent. The aim of this approach was to limit the impact on sensitive environments, reduce transport distances, and optimize the integration of infrastructure into the main logistics corridor.

At the end of this stage, five implementation scenarios were selected for in-depth comparative analysis (Map 4-2 and Appendix 4-5). Each scenario proposes a different configuration of the accumulation areas, depending on their location, capacity, accessibility, and integration with other site infrastructure.

Comparative assessment of scenarios and surface areas covered

The comparative assessment of the scenarios was carried out using a multicriteria matrix (POETS), incorporating environmental, technical, social, economic, and operational criteria. To ensure consistency and traceability in the environmental assessment, the criteria used in the multicriteria analysis of accumulation area scenarios were defined to overlap with the project's main environmental and social risk areas. The criteria analyzed include the area of wetlands affected, distance from water bodies, geotechnical stability, contact water management, proximity to sensitive receptors, capacity for expansion, and capital and operating expenditures.



Variantes proposées / *Proposed Variants*

Infrastructures proposées / *Proposed Infrastructure*

- Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*
- Bassin / *Basin*

Variantes d'emplacement / *Alternatives Location*

- Scénario 1 / *Scenario 1*
- Scénario 2 / *Scenario 2*
- Scénario 3 / *Scenario 3*
- Scénario 4 / *Scenario 4*
- Scénario 5 / *Scenario 5*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*

Infrastructure / *Infrastructure*

- Chemin d'accès / *Access road*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 4-2 / *Map 4-2*
Variantes d'emplacement des aires d'entreposage et de gestion des stériles et des résidus miniers / *Alternative Locations for Waste Rock and Mine Tailings Storage and Management Areas*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
AtkinsRéalis, 2026

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2026-03-27

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Table 4-6 shows the correspondence between the risk assessment criteria selected for the comparative analysis and the POETS matrix criteria used in the multicriteria analysis.

Table 4-6 Correspondence between risk assessment criteria and POETS matrix criteria

POETS criterion	Corresponding risk assessment criteria	Examples of sub-criteria or indicators used
P (Project costs)	Not applicable (economic criterion, non-environmental or social)	Capital expenditures, operating expenditures, phasing, habitat compensation
O (Operational)	GHG emissions, logistics optimization, operational safety	Transport distances, GHG emissions, operational safety
E (Environmental)	Preservation of sensitive environments and biodiversity, water management, GHG emissions	Impact on wetlands, proximity to habitats, water management, containment measures, GHG emissions
T (Technical)	Stability and safety of structures, water management	Geotechnical stability, pile height, seismic risk management, technical measures for water management
S (Social)	Land use and social acceptability, preservation of traditional practices, limiting negative impacts on communities	Proximity to sensitive receptors, impacts on traditional uses, hunting/fishing areas, social acceptability

To illustrate the challenges and trade-offs associated with each option, the following sections describe the scenarios analyzed, specifying their layout, total surface area, and advantages and disadvantages in relation to the multi-criteria selected[1].

Scenario 1 – Base

This scenario proposes storage facilities located close to the plant, minimizing transport distances and, consequently, the associated greenhouse gas emissions. The total surface area occupied by waste rock and tailings stockpiles in this scenario is approximately 289 hectares (ha) (176 ha for the low-risk waste rock stockpile, 109 ha for the metal leaching waste rock stockpile, and 85 ha for the tailings stockpile). However, this layout requires encroachment on some wetlands and a high tailings stockpile (up to 95 m).

Scenario 2 – Avoidance of water environments

This scenario seeks to avoid wetlands and water environments, but requires a much larger storage area, namely 256 ha (97 ha for the metal leaching waste rock stockpile and 159 ha for the combined tailings and low-risk waste rock stockpile). This option increases development costs and footprint, but reduces certain environmental risks.

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[1] The BBA report presenting site selection alternatives for storage of mine waste was prepared in June 2025. At that time, the available data on the geochemistry of tailings and waste rock preliminarily identified several lithologies as potentially acid-generating. A validation and update of the interpretation of the geochemical data were carried out in March 2026 based on additional data collected. In light of this update, all mining materials in the project are now considered non-acidogenic. The description of the scenarios in Section 4.2.1.4 reflects this update, namely that the waste rock identified as potentially acid-generating in the BBA report is considered herein as metal leaching waste rock. Further details on this matter are provided in Section 5.2.5 of the environmental impact assessment report.

Scenario 3 – Storage cost optimization

The expansion of the base sites optimizes storage costs, but the height of the stockpile can reach 125 m. The total area occupied is approximately 252 ha (110 ha for the low-risk waste rock stockpile and 142 ha for the combined tailings and metal leaching waste rock stockpile).

Scenario 4 – Alternative sites E, O, J

This scenario proposes remoter areas, limiting certain environmental impacts but increasing transport distances and costs. The total surface area occupied is approximately 290 ha (120 ha for the low-risk waste rock stockpile, 107 ha for the metal leaching waste rock stockpile, and 63 ha for the tailings stockpile).

Scenario 5 – Alternative sites U, V, W

Lastly, this scenario covers the largest area, namely 330 ha (128 ha for the low-risk waste rock stockpile, 114 ha for the metal leaching waste rock stockpile, and 88 ha for the tailings stockpile). It presents major challenges in terms of costs, wear and tear on road infrastructure, and social acceptability.

Table 4-7 presents a summary of the various scenarios evaluated.

Table 4-7 Scenarios for waste rock and tailings storage areas

Scenario	Summary description	Total area occupied (ha)	Main advantages	Main disadvantages
1	Areas near the plant (base)	289	Minimal transport distances, optimized logistics	Impact on wetlands, high pile height
2	Avoidance of water environments, combined area	256	Reduction of impacts on water environments	Large surface area, higher development costs
3	Expansion of base sites, cost optimization	252	Reduced surface area, optimized costs	Pile height up to 125 m
4	More distant alternative sites (E, O, J)	290	Reduction of some environmental impacts	Increased transport distances, logistics costs
5	More spread out alternative sites (U, V, W)	330	Less impact on some sensitive environments	Maximum surface area, lower costs and social acceptability

Environmental risk and impact assessment

For each scenario, a detailed assessment of the risks and environmental impacts was carried out according to the following criteria:

- **Preservation of sensitive environments and biodiversity**: The scenarios nearest to the plant (1 and 3) minimize transport distances and the project’s carbon footprint, but they result in a greater impact on wetlands and some natural habitats. Conversely, the most distant scenarios (4 and 5) reduce the direct impact on sensitive environments and contribute to the preservation of local biodiversity, but they increase the amount of land cleared and the impacts associated with internal transport.

- **Water management:** All scenarios include water management measures such as perimeter ditches, collection ponds and, for hazardous materials, lined membranes and containment systems. The design aims to limit the risk of contamination of water environments, in particular by maintaining a minimum distance of 60 m from water bodies, managing runoff water, and having retention ponds.
- **Stability and safety of structures**: The stability of the piles is ensured by geotechnical analysis that complies with current standards, including consideration of seismic risks. The maximum heights vary depending on the scenario, reaching up to 125 m for scenario 3.
- **Land use and social acceptability:** The assessment of the scenarios also focused on limiting impacts on wildlife habitats, hunting and fishing areas, and traditional land uses. Where possible, distances to sensitive receptors were maximized to reduce potential nuisance to local communities.
- **Greenhouse gas (GHG) emissions:** The most compact scenarios (1 and 3) generate fewer GHG emissions due to internal transportation, while the more expansive scenarios increase the project's energy consumption and carbon footprint.

The main issues identified relate to land use, the preservation of wetlands and water environments, runoff and contact water management, and the long-term stability of structures. Scenarios favouring a compact, centralized storage area help to limit the project's carbon footprint.

Multicriteria analysis and selected scenario

A multicriteria analysis was used to assess the relative performance of each scenario for the site selection of the waste rock and tailings storage facilities according to all of the criteria assessed. The results of the multicriteria analysis of the scenarios assessed are presented in Table 4-8.

Table 4-8 Relative performance of scenarios for the location of waste rock and tailings storage facilities

Scenario	Overall score (%)[1]	Project cost (P)	Operations (O)	Environment (E)	Technical (T)	Social (S)
1	61	62	65	54	63	65
2	44	20	20	52	80	60
3	68	84	71	56	51	65
4	53	38	29	70	65	60
5	49	27	20	52	58	80

Note: 1 The higher the score, the more favourable the scenario is considered to be according to all the criteria selected.

The multicriteria analysis shows that scenario 3 achieves the best overall score, mainly due to its economic and operational advantages, while maintaining environmental impacts that are considered acceptable. Scenario 1 comes in second place, with a balance between the criteria, but a more limited capacity for expansion. Scenarios 4 and 5, although effective in terms of certain environmental criteria, are less competitive due to costs, distances, and technical constraints.

Scenario 3 was recommended following the multicriteria analysis, as it offers the best balance between economic, operational, environmental, technical, and social criteria. This scenario consists of a storage area located near the process plant, optimizing internal logistics, reducing GHG emissions, and facilitating environmental monitoring.

4.2.1.5 Industrial area

An industrial area of approximately 40 hectares will be required to accommodate the following infrastructure:

- concentration plant;
- ore storage area;
- maintenance workshop and warehouse;
- fuel storage facilities;
- workers' camp;
- administrative and operations buildings.

The main criteria for the industrial area's location depend on the position and dimensions of the open pit. In fact, the industrial area must be close enough to the pit to reduce travel distances, but sufficiently far away not to interfere with any unexpected expansion of the pit. Three pit sizing scenarios were considered (see Section 4.2.1.1), each associated with a different layout of the industrial area.

Pit sizing scenario 1 is relatively limited around lake L01, allowing the industrial area to be positioned between water bodies L02 to L08 to the south and lake L12 to the north. The industrial area would occupy most of the land between these water bodies.

Pit sizing scenario 2, still centred on the same portion of lake L01, also includes, to the north, part of lake L02 and water bodies L03 to L08. The industrial area would still be located in the same place as in the previous scenario, but with slightly different dimensions (narrower but longer).

Pit sizing scenario 3 covers a much larger area encompassing most of the land previously proposed for the industrial area. The industrial area is therefore repositioned north of lake L12, south of lake L15, and west of lakes L61 and L62.

Lastly, as pit sizing scenario 1 was selected, the associated positioning of the industrial area was chosen.

4.2.1.6 Main access road to the Trans-Taiga Road

A main access road connecting the project site to the Trans-Taiga Road was built during the summer of 2024. To avoid additional encroachment caused by the development of new roads, it was decided to retain the current road, making modifications to ensure that spodumene could be transported by trucks carrying two bins totalling 75 tonnes. These modifications mainly include smoothing out some curves and improving the road foundation so that it can withstand repeated heavy truck traffic.

4.2.1.7 Secondary access roads

A road network will be required to connect the open pit mine to the industrial area and the waste rock and tailings storage facilities. Two main options were considered for the development of these local roads: a single network for all light and heavy vehicles, or separate networks for light and heavy vehicles. For safety and efficiency reasons, the option of separate networks was selected.

The routes for these networks were largely determined by two main criteria: reducing transport distances for heavy vehicles and minimizing the number of watercourse crossings.

4.2.2 *Other infrastructure*

4.2.2.1 Transmission line

The power supply for the Shaakichiuwaanaan project requires the construction of a new 120 kV transmission line to connect the mine site to Hydro-Québec's grid. A pre-feasibility study identified, analyzed, and compared two line routing options, taking into account the technical, environmental, and social constraints of the land. The *Technical Report – 120 kV Transmission Line Study* (BBA, 2025b), on which this section is based, is provided in Appendix 4-7.

Scenario 1 – Route along the Trans-Taiga Road

This routing scenario favours running along the Trans-Taiga Road and existing mining access roads for nearly 70% of its length. This route minimizes the construction of new access roads, which will facilitate logistics during construction and maintenance work. It has a total length of 52.9 km and is divided into three sections:

- **Section 1**: The route runs alongside the existing 735 kV lines for approximately 3.5 km to the Trans-Taiga Road. It then crosses a natural area, consisting of forests, hills, and wetlands, for approximately 18 km.
- **Section 2**: The route runs alongside the Trans-Taiga Road for approximately 17 km.
- **Section 3**: This section of the route runs alongside existing mine access roads for approximately 18 km to the projected substation located near the mine.

The main challenges identified for this routing option are:

- the construction of access roads (section 1) involving impacts on the natural environment and additional construction work;
- the crossing of natural environments, including wetlands and water environments, and soils that are unfavourable for the construction of the line's infrastructure;
- the proximity of LG-4 Airport (approximately 1.2 km away) and the hydroplane base (300 m away) in section 1;
- the proximity (300 m) of sensitive sites such as cabins, old cemeteries, and other places of cultural significance to the tallyman's family.

However, this routing option has the advantage of limiting the length of access roads to be built and reducing the impact on sensitive environments and wildlife.

Scenario 2 – Direct route connecting the existing substation to the mine

The second scenario proposes a shorter route, with a total length of 50.5 km, between a starting point (near Hydro-Québec's Tilly substation, which has yet to be named) and the planned substation (yet to be named) located near the mine. This scenario involves a greater distance from the Trans-Taiga Road, which means building additional access roads and crossing a larger area of wetlands and water environments, old-growth forests, and soil that is unsuitable for building infrastructure for the line. The route is also divided into three sections:

- **Section 1:** With an initial transmission line route very similar to that of scenario 1, the route of scenario 2 diverges from it approximately 11.5 km after the road crossing, then rejoins it approximately 13.5 km further on, near the Trans-Taiga Road.

- **Section 2**: Running alongside the Trans-Taiga Road for 2.5 km, the line then heads toward the mine for approximately 12 km, crossing natural areas with no roads or access paths.
- **Section 3**: The line follows existing mine access roads for approximately 7 km to the planned substation located near the mine.

The main challenges identified for this routing option are:

- the construction of access roads (sections 1 and 2) involving impacts on the natural environment and additional construction work;
- the crossing of natural environments, including wetlands and water environments, and unfavourable soils (organic soils associated with wetlands) for the construction of the proposed line;
- the proximity (200 m) of sensitive sites such as cabins, old cemeteries, and other places of cultural significance to the tallyman's family.

Comparative analysis of options

The comparative analysis of the options took into account the main environmental constraints of the land, including the presence of wetlands, old-growth forests, and sites with wildlife or archaeological potential (Table 4-9). The alternatives were compared taking into account the minimization of impacts on these environments, in accordance with MELCCFP requirements. The assessment criteria also include the total length of the routes, access road requirements, the presence of unfavourable soils, the presence of old-growth forests, proximity to sensitive sites, and technical and logistical feasibility.

Table 4-9 Comparative analysis of two routing options for the proposed 120 kV line

Criteria	Option 1	Option 2
Total length	52.9 km	50.5 km
Access road construction	Less	More
Bodies of water crossed	Comparable (no major crossings)	
Wetlands crossed	Comparable	
Unfavourable soils	32% of the route	29% of the route
Length of old-growth forest area crossed	8.9 km	11.6 km
Proximity to sensitive sites	≥ 300 m	≥ 200 m
Proximity to LG-4 Airport	1.2 km	
Proximity to the hydroplane base	300 m	
Technical and logistical feasibility	Favourable	Less favourable

Selected option

Following the comparative analysis, scenario 1 was selected to continue data acquisition and project planning. This route was chosen for the following reasons:

- reduction of the access constraints thanks to the proximity of the Trans-Taiga Road and mine access roads;
- reduction of impacts on sensitive environments;
- better technical and logistical feasibility;
- increased flexibility for potential adjustments in later phases.

It should be noted that the selected scenario will be subject to further field studies and stakeholder consultations to adjust the final route based on the results of ecological surveys, concerns raised, and regulatory requirements.

4.2.2.2 Runway

A runway may be necessary to support the work team rotation schedule and supplies by air. The length of the runway may vary depending on the size of the aircraft expected, which will also depend on the size of the crew and the transport of supplies. In addition, the location of the runway will depend on prevailing winds and terrain and should be close to the main access road and the mine site to minimize transport time. A weather station has been in operation approximately 31 km northeast of the project site at the La Grande 4 dam since 1985. The data collected at this station includes wind speed and direction and may be useful in determining the choice of the future runway site. Other technical considerations may be necessary, such as vegetation cover (the presence of rock outcrops may require blasting).

It should also be noted that discussions are underway with the SDBJ and Hydro-Québec regarding the possibility of opening LG4 Airport to the public, which could call into question the nature of the runway required and even its necessity. As for the Mirage site runway (southeast of LG4), it can only accommodate aircraft of limited size (no Boeing 737s) and would not be able to handle the number of flights required for PMET activities.

No additional heliports, apart from the one already existing at the exploration camp, are planned for the mine site. In the event that a helicopter needs to land there, the heavy vehicle parking area is to be used.

4.2.2.3 Borrow pits and quarries

The project will also require construction materials to build mine roads, industrial areas, etc. This infrastructure may require a significant volume of construction materials. Therefore, the extraction of materials located close to the mine site would be ideal.

Options for granular material supply include:

- use only excavated material from the pit;
- use only materials sourced from a quarry (for coarser granular materials) and from borrow pits (for potential unconsolidated deposits located on either side of the site access road);
- use materials from these potential quarries and borrow pits until the pit is able to generate sufficient granular materials to meet construction needs.

The option of relying exclusively on materials generated from the pit is not feasible, as various site developments must be completed before excavation activities can begin in the pit. Conversely, the option of relying solely on potential quarries and borrow pits is technically feasible; however, their distance from the mine site would result in higher transportation costs, making this option less advantageous once usable materials begin to be generated from the pit. For this reason, the preferred option consists of opening quarries and borrow pits and using them on a temporary basis until materials from the pit become available. Quarries and borrow pits may subsequently serve as an alternative source of materials for the mine site, particularly for works to be carried out in close proximity to these areas (road segments, base camp located near the Trans-Taiga Road, etc.).

With respect to quarries more specifically, a study conducted by BBA in March 2026 identified 14 potential sites (Map 4-3). An analysis of the available material volumes and their anticipated geochemical characteristics led to the selection of five sites considered suitable to meet material requirements for construction activities, up to the commencement of pit operations. These quarries are located on either side of the mine access road between kilometre markers 13 and 16.

For borrow pits, the areas of interest are more limited and are all located between kilometre markers 8.5 and 9.5. A total of six sites were identified (Map 4-3).

4.2.2.4 Overburden stockpiles

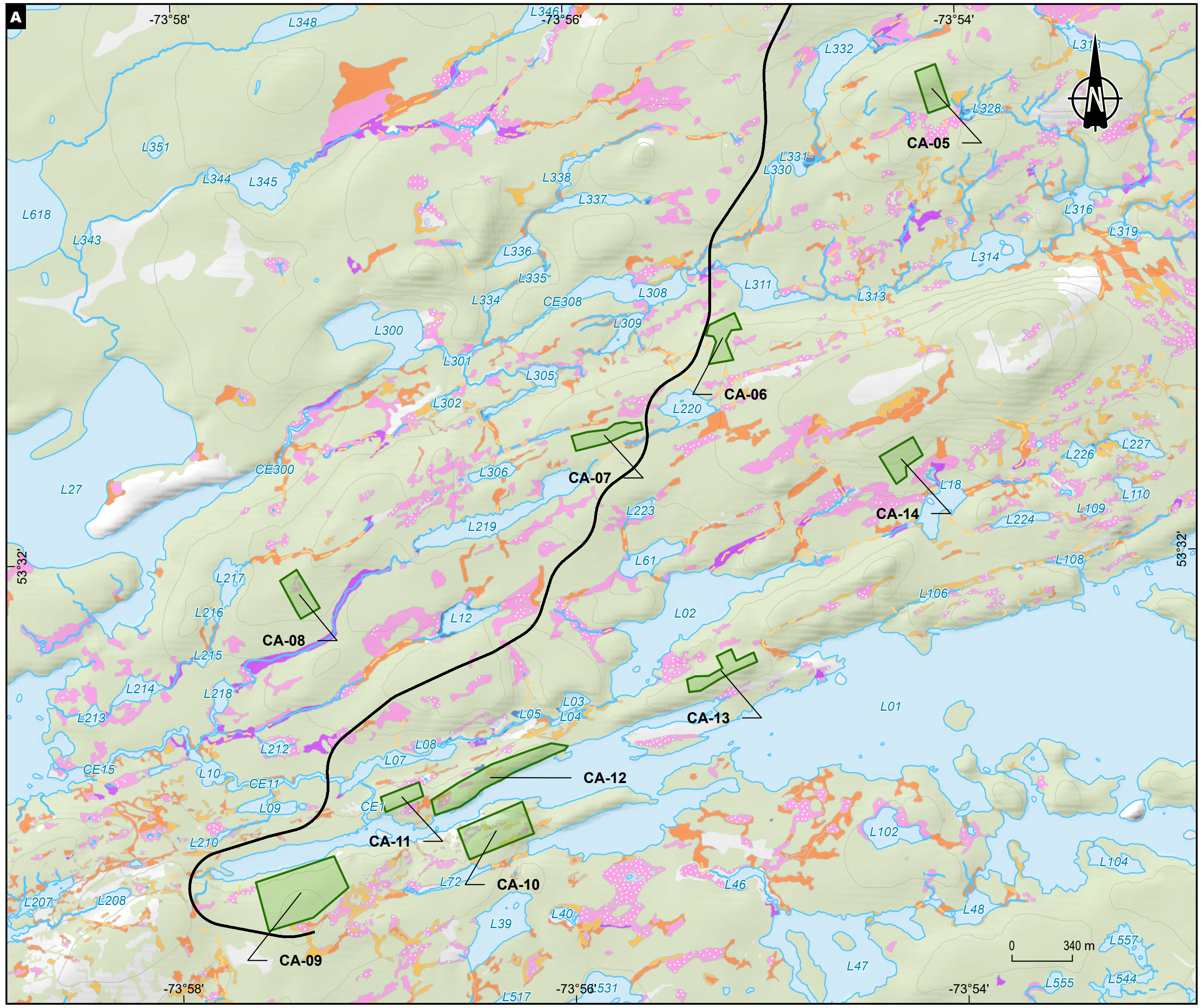
Overburden, including topsoil, sand, gravel, and other unconsolidated materials, will be removed during the stripping of the various project development areas, including the open pit and main infrastructure. These materials will be removed in two phases corresponding to the opening of the two sections (west and east) of the open pit.

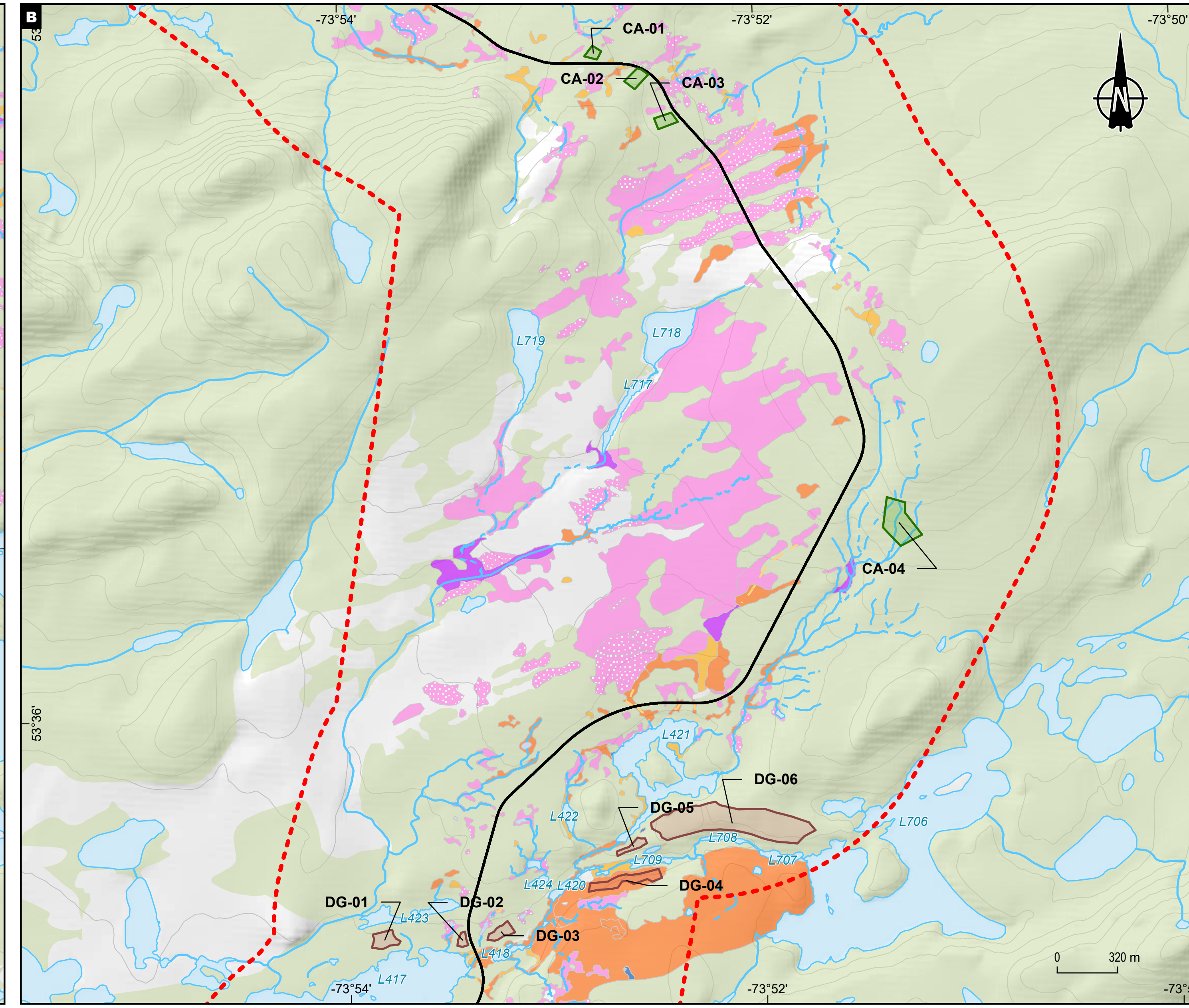
The only alternatives for managing these materials were to create a single stockpile where everything could be stored, or two stockpiles to distribute the overburden, in line with the two removal phases and so as not to interfere with the mine’s activities. The main disadvantage of the single stockpile option was finding a site that offers sufficient space, has little impact on wetlands and the water system, and is located close to the areas where the materials originate.

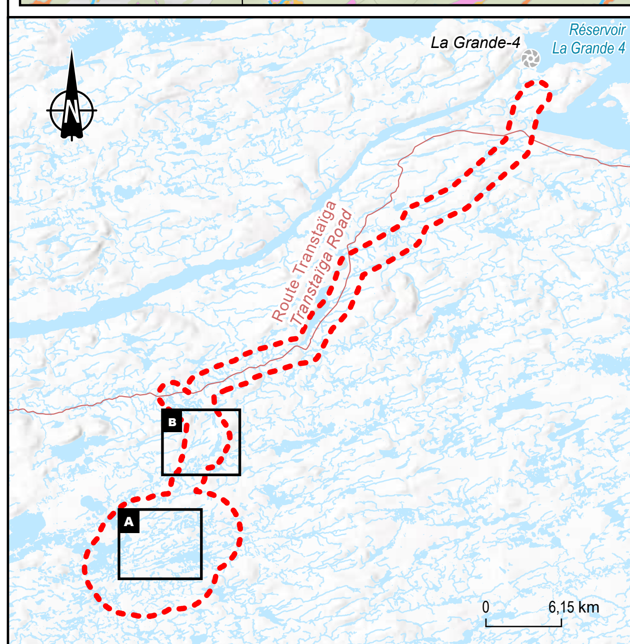
It was therefore decided to plan the development of two smaller stockpiles, which would be much easier to integrate near the site while minimizing environmental impact and transportation distances.

4.2.2.5 Organics stockpiles

The alternatives considered for the management of organics are similar to those for overburden, i.e., the installation of one or two temporary stockpiles. The chosen solution is to set up two stockpiles to facilitate placing them near the surfaces to be stripped and to avoid/minimize encroachment on sensitive natural components.







Zone d'étude / *Study Area*

Locale - Biophysique / *Local - Biophysical*

Bancs d'emprunt / *Borrow Pits*

Carrières potentielles / *Potential quarries*

Dépôts meubles potentiels / *Potential unconsolidated deposits*

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*

Marécage arborescent / *Treed swamp*

Marécage arbustif / *Shrubby swamp*

Tourbière minérotrophe boisée / *Treed fen*

Tourbière ombrotrophe boisée / *Treed bog*

Tourbière ombrotrophe ouverte / *Open bog*

Marais / *Marsh*

Eau peu profonde / *Shallow water*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Souterrain / *Underground*

Infrastructure / *Infrastructure*

Chemin d'accès / *Acces Road*

Réseau routier / *Road Network*

Route d'accès aux ressources / *Resource access route*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 4-3 / *Map 4-3*

Options de carrières et de bancs d'emprunt pour construction des infrastructures /
Quarry and Borrow Pit Options for Infrastructure Construction

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01

0 340 680 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : M-H. Brisson
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CA0001724_3318_eie_c04_c3_155_bancs_emprunt_260326

La précision des limites et des mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

4.3 Cost-benefit analysis

Lithium is recognized by the Government of Québec as a critical and strategic mineral due to its economic importance, its role in several technological and energy-related sectors, and the high level of risk associated with its global supply. In this context, lithium mining projects located in Québec contribute to strengthening the security of supply for this resource by reducing reliance on imports and supporting the resilience of North American supply chains. This contribution aligns with government orientations aimed at ensuring stable and predictable access to the minerals required for Québec's economic and technological development. [quebec.ca], [gq.mines.gouv.qc.ca]

Lithium is an essential input in the manufacture of lithium-ion batteries, which are used notably in electric and plug-in hybrid vehicles, energy storage systems associated with renewable energy sources, and various technological applications. As such, lithium supply is closely linked to the energy transition and economic decarbonization objectives pursued by the Government of Québec. Lithium mining projects therefore support the deployment of technologies related to electrification and energy storage by providing a raw material recognized as necessary for these uses, in accordance with provincial strategies related to critical and strategic minerals.

A cost-benefit analysis was undertaken for the Project to compare the advantages of the status quo with the advantages of developing the project. The analysis was undertaken following key potential benefits by theme as outlined in the table below.

Table 4-10 Cost-benefit analysis

Themes	Benefits if the project goes ahead	Benefits if the project does not go ahead (status quo)
Socio-economic benefits	• Creation of local and Indigenous jobs • Strengthening skills and training for Indigenous communities • Economic revitalisation of a northern region • Development of a strategic sector for the energy transition • Increased tax revenue and infrastructure investment	• Preservation of the current local way of life • Preservation of traditional activities without industrial pressure • No influx of workers and no pressure on local services and infrastructure
Technical and operational choices	• Optimisation of mineral resource recovery from the territory • Reduced impacts of hybrid mining compared to 100% open-pit mining	• No need to build mining infrastructure • Full preservation of the landscape, soil and local water bodies
Environmental impacts and planned mitigation measures	• Enhanced environmental oversight through monitoring measures • Potential to restore and compensate for certain habitats • Application of strict standards to minimise long-term effects	• Full preservation of ecological and hydrological functions • No disturbance to wildlife, flora and sensitive habitats
Social issues and consultation	• Incorporation of community concerns • Development of collaborative relationships and community opportunities	• Full preservation of current land uses (trapping, hunting, Cree culture) • Lack of industrial pressure

The project involves the development of a lithium deposit that is considered strategic in light of the energy transition. It is therefore likely to generate positive socioeconomic benefits, particularly through the creation of direct and indirect jobs, the development of specialized expertise, and its contribution to regional and provincial economic activity. These benefits are particularly significant in a northern context where opportunities for structural economic development remain limited.

From a technical and operational standpoint, the choices made for mining operations, tailings and waste rock management, transport of concentrate, and energy supply are designed to ensure the project's feasibility while limiting the constraints associated with the site's isolation and climatic conditions. The hybrid mining option, combining open pit and underground mining, optimizes resource recovery while reducing the footprint and certain impacts associated with exclusively open pit mining or exclusively underground operation. Similarly, the preferred infrastructure solutions were selected to facilitate gradual implementation that could be adapted to the different phases of the project.

However, the project will impose constraints and generate impacts on the biophysical and social environment, particularly in terms of land cover, local changes to hydrology, temporary disturbances to wetlands and aquatic environments, and land use. These effects were taken into account when selecting site location and technology options, with a view to reducing the project's footprint. Mitigation, compensation, and monitoring measures are planned to limit these impacts and ensure their long-term management, as presented in the subsequent chapters of this assessment.

Social issues and land use were also taken into consideration. Consultations with Cree communities and land users have helped to incorporate some concerns into the project design, particularly with regard to the location of infrastructure and the protection of sensitive sites. These elements help to improve the integration of the project into its host environment and reduce the risk of conflicts of use. In fact, consultations with land users led to the decision to adopt a hybrid extraction method, as this approach reduces the environmental impact compared to using only open pit mining.

The "do nothing" approach, i.e., not carrying out the project, would avoid the impacts associated with mining activities, but would also mean missing out on the socioeconomic and strategic benefits associated with developing the deposit. In light of the information presented, the project, as designed and with the planned mitigation and monitoring measures, presents an acceptable balance between the expected benefits and the identified constraints.

5 Project description

5.1 Project summary

The Shaakichiuwaanaan (CV5 Pegmatite) mining project (hereinafter the “project”) is aimed at developing a large LCT pegmatite (lithium-cesium-tantalum) spodumene deposit located in the James Bay region of northern Quebec. The project is being developed by PMET Resources (PMET) through its subsidiary Lithium Innova Inc., which holds all 463 Exclusive Exploration Rights (“EERs”) – formerly referred to as ‘CDC claims’ – totalling 23,710 ha.

The objective is to extract and process the ore to produce a spodumene concentrate (“SC”) grading 5.5% Li_2O, destined for the international lithium market. The project is adopting a hybrid mining approach combining open pit and underground extraction to reduce the land footprint and visual impacts, in line with the concerns expressed during consultations. It is fully aligned with the *Quebec Strategy for the Development of Critical and Strategic Minerals* and the *2030 Plan for a Green Economy*, contributing to the creation of an integrated battery industry in Quebec and to the provincial and federal energy transition. This project is part of global efforts aimed at decarbonizing the economy.It responds to the growing global demand for lithium, which is expected to increase fivefold by 2040, and is a major driver for regional economic development.

The project includes:

- open pit mining of the CV5 pegmatite (Phase 1), followed by underground expansion (Phase 2);
- a two-stage process plant with a maximum nominal processing rate of 5.1 million tonnes of ore per year, producing approximately 800,000 tonnes of SC 5.5% Li_2O concentrate;
- storage areas for waste rock and tailings, designed to allow for gradual rehabilitation;
- an internal road network, an electrical connection to the Hydro-Québec grid, and support infrastructure (camp, mechanical workshop, administrative buildings, water management ponds, treatment plant, and fuel depot).

The total lifespan of the project is estimated at approximately 19 years of mining operations (2030 to 2049), excluding the construction phase (2028 to 2030) and gradual closure. According to the economic impact analysis (Appendix 5-13), project expenditures are expected to support an average of approximately 3,200 direct, indirect, and induced jobs per year during construction and approximately 3,500 during operation (jobs expressed in person-years; direct, indirect, and induced effects).

The main phases of the project are as follows:

1. Construction phase: development of roads, platforms, and main infrastructure.
2. Mining and transportation phase: extraction, crushing and concentration, road transport to a regional transshipment centre.
3. Closure and rehabilitation: dismantling of facilities, revegetation, and post-closure environmental monitoring.

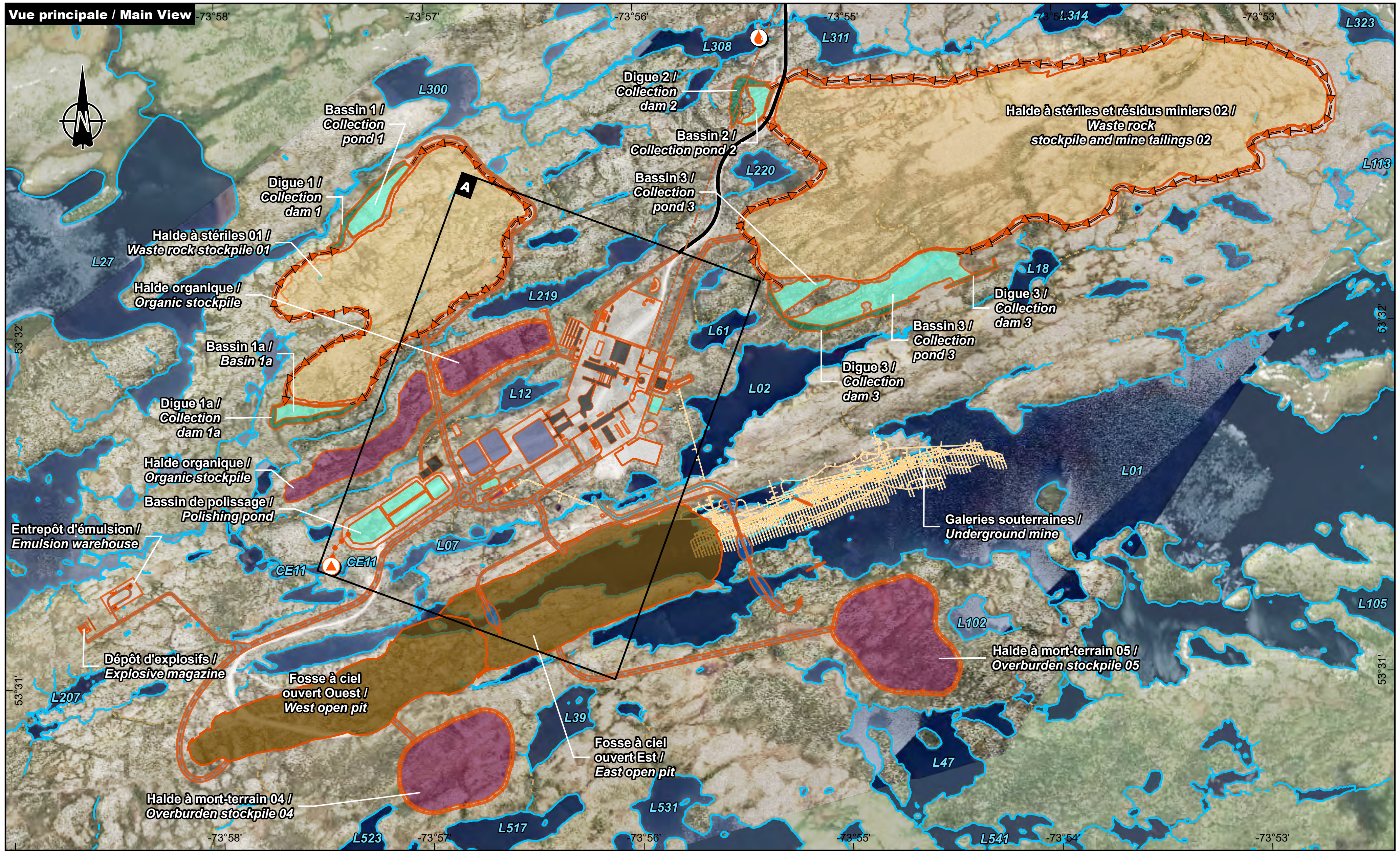
5.2 Description of the mine and operations

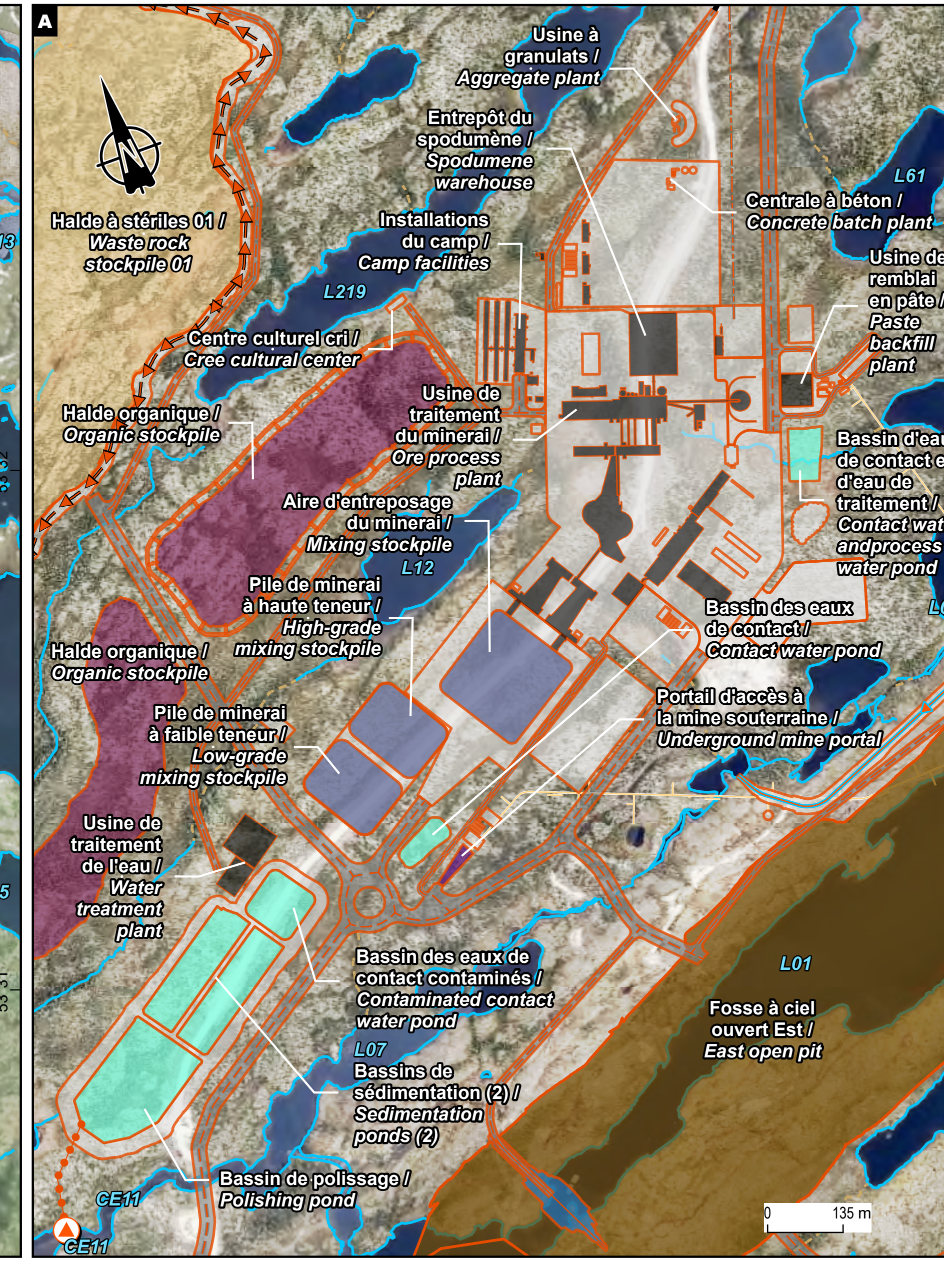
The mining complex will consist of various facilities described in more detail in the following subsections, including:

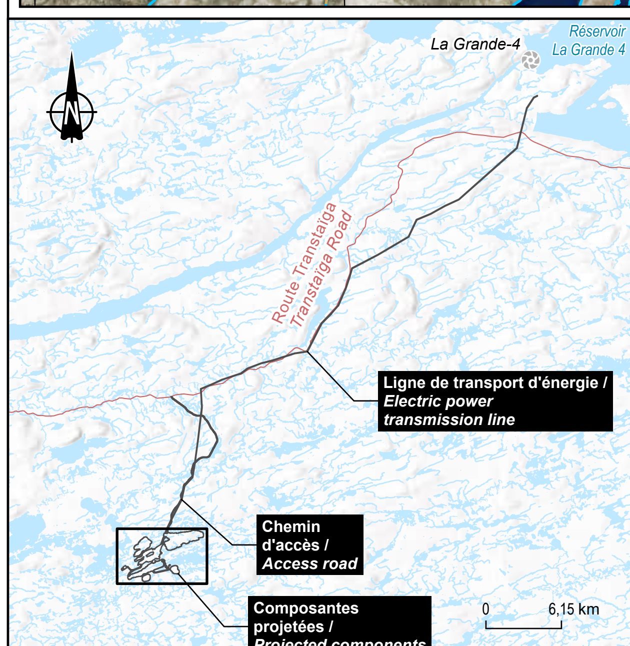
- an access road to the mine site from the Trans-Taiga Road;
- roads and culverts to enable the movement of mining equipment during mine operations;
- a workers' camp during the construction and operations phases of the mine;
- a hybrid mine for mining the CV5[1] deposit (partly open pit and partly underground);
- storage areas for waste rock and tailings;
- an ore storage area;
- dikes to isolate the CV5 deposit mining pit from Lake L01, which partially covers it;
- a power supply line;
- an electrical substation and an electrical distribution network;
- an ore processing plant;
- a paste backfill plant;
- a water treatment plant;
- an emulsion explosives storage area;
- a garage and other auxiliary buildings;
- a fuel storage area and a refuelling station.

Several components of the project are illustrated in Map 5-1.

1 Other spodumene pegmatite clusters show potential for additional resources, notably CV13 and CV9, located west of CV5, respectively.







Zone d'étude / *Study Area*

Projet / *Project*

Composantes du projet / *Project Components*

Existante / *Existing*

Chemin d'accès / *Access road*

Projetées / *Projected*

Effluent minier / *Mining effluent*

Prise d'eau / *Water intake*

Barrage / *Dam*

Canal / *Channel*

Canal de dérivation / *Diversion Channel*

Chemin secondaire / *Secondary road*

Fossé / *Ditch*

Galerie souterraine / *Underground mine*

Ligne de transport d'énergie / *Power transmission line*

Aire d'entreposage du minerai mixte / *Mixed ore stockpile*

Autre / *Other*

Bâtiment ou équipement / *Building or equipment*

Digue / *Dam*

Bassin / *Basin*

Digue des bassins / *Basins dam*

Fosse / *Pit*

Halde à mort-terrain et organique / *Overburden stockpile*

Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*

Portail d'accès à la mine souterraine / *Underground mine portal*

Voie de circulation / *Roadway*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Souterrain / *Underground*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-1 / *Map 5-1*
Composantes du projet minier / *Mining Project Components*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025

0 260 520 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / Prepared by : M-H. Brisson
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Approbation / Approved by : M-H. Brisson
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5.2.1 Mineral deposits, resources, and reserves

The main deposit of the project is the CV5 Pegmatite, a near-vertical body of the LCT pegmatite type, located within the La Grande Greenstone Belt, an Archean geological sequence composed of metasedimentary and volcanic rocks.

At the time of inclusion into the 2025 Feasibility Study (includes drilling through 2024), the CV5 Pegmatite had been delineated to approximately 4.6 km in length (has since been extended to approximately 5.0 km at the end of 2025) and remains open laterally and at depth (Figure 5-1). Diamond drilling at the Property carried out between 2021 and 2024 totals approximately 235,000 m, spread over approximately 800 holes, with the vast majority focused on delineation and development of the CV5 Pegmatite.

The Mineral Resource Estimate for the CV5 pegmatite, prepared in accordance with NI 43-101, totals 101.8 Mt at 1.38% Li_2O, 0.09% Cs_2O, 164 ppm Ta_2O_5, and 66 ppm Ga (Indicated), and 13.9 Mt at 1.21% Li_2O, 0.08% Cs_2O, 147 ppm Ta_2O_5, and 60 ppm Ga (Inferred). The cut-off grade is 0.40% Li_2O (open-pit) and 0.60% Li_2O (underground), with an Effective Date of June 20, 2025 (through drill hole CV24-787). Mineral resources are not mineral reserves as they have not demonstrated economic viability. Mineral resources include mineral reserves. The Mineral Reserve Estimate for the CV5 Pegmatite, prepared in accordance with NI 43-101, totals 84.3 Mt at 1.26% Li_2O (Probable). The cut-off grade is 0.40% Li_2O (open-pit) and 0.70% Li_2O (underground), with an Effective Date of September 11, 2025.

The Shaakichiuwaanaan Property is situated within the Archean Superior Province of the Canadian Shield, which extends from Manitoba to Quebec and covers approximately 750,000 km^2 of Quebec. Within the region, the Superior Province is divided into four distinct sub-provinces based on their lithological, metamorphic, geophysical, and structural characteristics: Opatica, Nemiscau, Opinaca, and La Grande (Map 5-2). The Property is situated within the central portions of the volcano-plutonic, La Grande sub-province, proximal to the Opinaca sub-province to the south. The region is considered to have strong exploration potential for a variety of commodities, including base and precious metals, and lithium (LCT pegmatite).

The Property covers part of the Lac Guyer Greenstone Belt, considered part of the larger La Grande River Greenstone Belt. The Property is dominated by volcanic and sedimentary rocks metamorphosed up to amphibolite facies. The Property’s principal claim group is dominantly host to rocks of the Guyer Group (amphibolite, iron formation, intermediate to mafic volcanics, peridotite, pyroxenite, komatiite, as well as felsic volcanic tuffs). The amphibolite and metasedimentary rocks that trend east-west through this region are bordered to the north by the Magin Formation and to the south by an assemblage of tonalite, granodiorite, and diorite, in addition to metasediments of the Marbot Group (conglomerate, wacke). Several regional-scale Proterozoic gabbroic dykes also cut through portions of the Property (Lac Spirt Dykes, Senneterre Dykes). The KCG claim block, located to the north of the principal claim group, is situated within the Bezier Suite (monzodiorite and granodiorite), and outside the Guyer Group.

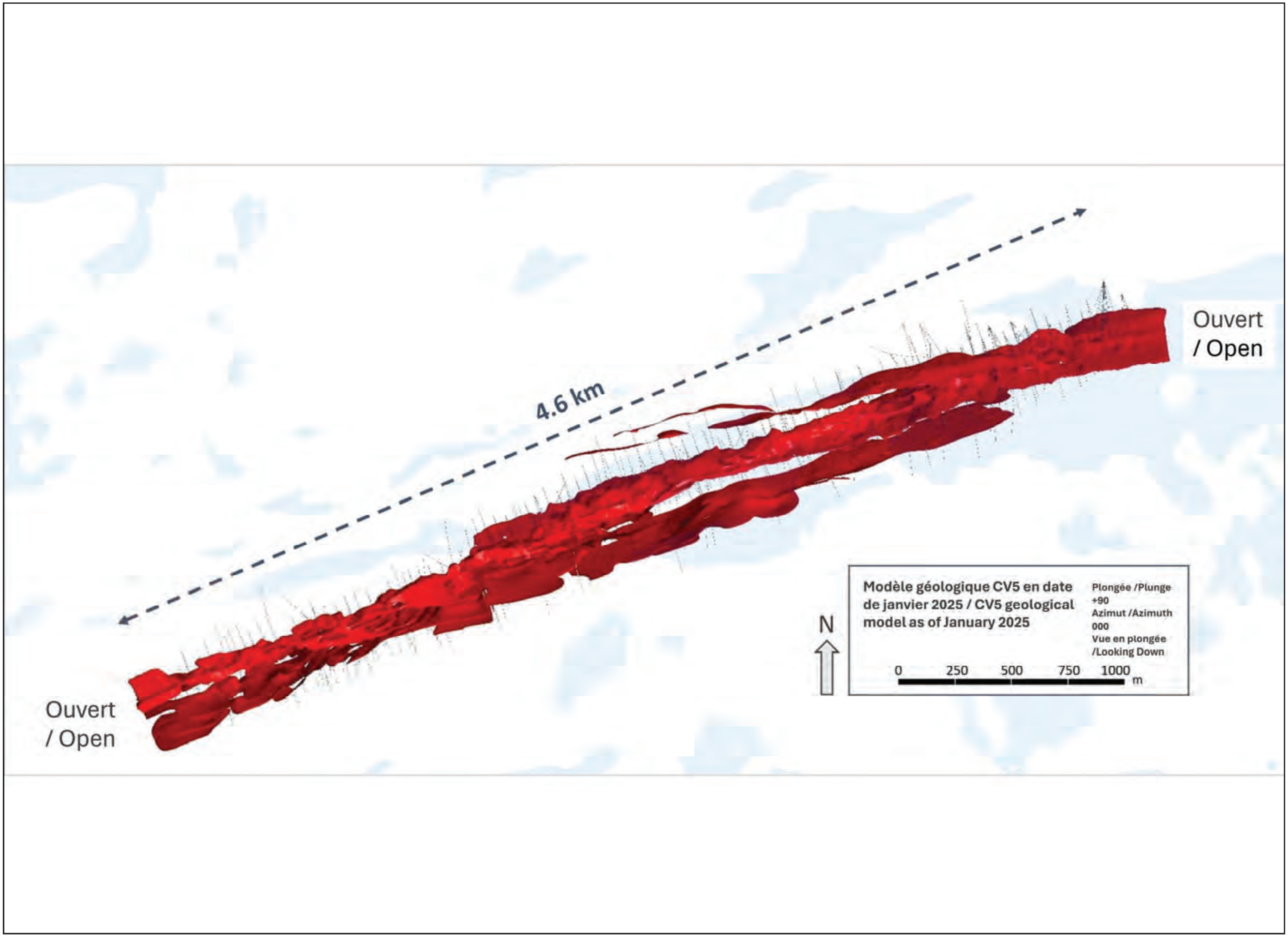

Figure 5-1 **Vue du modèle de blocs pour la fosse à ciel ouvert et la mine souterraine /** *View of the block model for the open pit and the underground mine*

Zones d'étude / *Study Areas*

- Locale - Biophysique / *Local - Biophysical*
- Régionale - Biophysique / *Regional - Biophysical*

Repères géographiques / *Geographical Landmarks*

- Communauté crie (zone d'étude régionale) / *Cree community (regional study area)*
- Municipalité / *Municipality*

Limites / *Boundaries*

- Région administrative / *Administrative Region*
- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*

Réseau routier / *Road Network*

- Route nationale ou régionale / *National or regional road*
- Autre / *Other*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*

Géologie / *Geology*

- Sous-province ou sous-division géologique / *Geological subprovince or subdivision*

Géologie générale du socle / *General Bedrock Geology*

- Roches intrusives de l'Archéen / *Archean intrusive rocks*
- Roches intrusives de l'Archéen-Paléoprotérozoïque / *Archean-Paleoproterozoic intrusive rocks*
- Roches intrusives du Paléoprotérozoïque-Mésoprotérozoïque / *Paleoproterozoic-Mesoproterozoic intrusive rocks*
- Roches métamorphiques de l'Archéen / *Archean metamorphic rocks*
- Roches métamorphiques du Paléoprotérozoïque / *Paleoproterozoic metamorphic rocks*
- Roches métamorphiques du Paléoprotérozoïque-Mésoprotérozoïque / *Paleoproterozoic-Mesoproterozoic metamorphic rocks*
- Roches sédimentaires de l'Archéen / *Archean sedimentary rocks*
- Roches sédimentaires de l'Archéen-Protérozoïque / *Archean-Proterozoic sedimentary rocks*
- Roches sédimentaires du Paléoprotérozoïque / *Paleoproterozoic sedimentary rocks*
- Roches sédimentaires du Paléozoïque / *Paleozoic sedimentary rocks*
- Roches sédimentaires et roches volcaniques de l'Archéen / *Archean sedimentary and volcanic rocks*
- Roches sédimentaires et roches volcaniques du Paléoprotérozoïque / *Paleoproterozoic sedimentary and volcanic rocks*
- Roches volcaniques de l'Archéen / *Archean volcanic rocks*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / Environmental Impact Assessment

Carte 5-2 / *Map 5-2*
Contexte géologique /
Geological Context

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
SIGEOM, Divisions géologiques, 2025
Ressources naturelles Canada, Géologie du socle rocheux, 2025

0 20 40 km
UTM, fuseau 18, NAD83 (CSRS)

2026-03-20

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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The lithium pegmatites on the Property, including those at CV5, are hosted predominantly within amphibolites, metasediments, and minor ultramafic rocks of the Guyer Group within the principal claim group.

The geological setting is primarily prospective for gold, silver, base metals, platinum group elements, and lithium, over several different deposit styles including orogenic gold (Au), volcanogenic massive sulphide (Cu, Au, Ag), komatiite-ultramafic (Au, Ag, PGE, Ni, Cu, Co), and Li-Cs-Ta (LCT) pegmatite.

Exploration of the Property has outlined three (3) primary mineral exploration trends (Figure 5-2), crossing dominantly east-west over large portions of the Property's principal claim group – Golden Trend (gold), Maven Trend (copper, gold, silver), and CV Trend (Li-Cs-Ta Pegmatite). The Golden Trend is focused on the northern areas of the Property, the Maven Trend in the southern areas, and the CV Trend "sandwiched" between. Historically, the Golden Trend has received the exploration focus followed by the Maven Trend. However, the identification of the CV Trend and the numerous lithium-tantalum pegmatites discovered to date represents a previously unknown lithium pegmatite district that was first recognized in 2016/2017 by Dahrouge Geological Consulting Ltd. and PMET.

The CV LCT Pegmatite Trend is currently recognized as an approximate 1-km wide and 25+ km long corridor, which is host to numerous distinct LCT pegmatite occurrences, and extends in a general east-west direction across the west-central portions of the Property. The trend is interpreted to extend across the majority of the principal claim group of the Property (~50 km); however, large areas remain to be explored for lithium pegmatite. The LCT pegmatites along this trend may outcrop as isolated high-relief "whale-back" landforms or relatively low-relief to flat landforms (Figure 5-2).

To date, nine distinct lithium pegmatite clusters have been discovered along this trend at the Property: CV4, CV5, CV8, CV9, CV10, CV12, CV13, CV14 and CV15. Each of these clusters includes multiple lithium pegmatite outcrops in close proximity and oriented along the same local trend.

To date, the lithium mineralization discovered on the Property has been confined to the CV Trend. The principal area of the trend includes the CV5 spodumene pegmatite with a strike length at the end of 2025 of approximately 5.0 km and the CV13 spodumene pegmatite with a strike length of approximately 3.2 km, as defined by drilling.

5.2.2 Ore extraction

The project will involve a hybrid mining method that combines open-pit and underground extraction. Mineral reserves extracted over the life of the mine (19 years) will total 84.3 Mt. To access the mineralization, 155.2 Mt of waste rock, 14 Mt of overburden and et 3.2 Mt of organic materials. will need to be excavated.

The following sections provide more information on the specific extraction methods used in both types of mines.

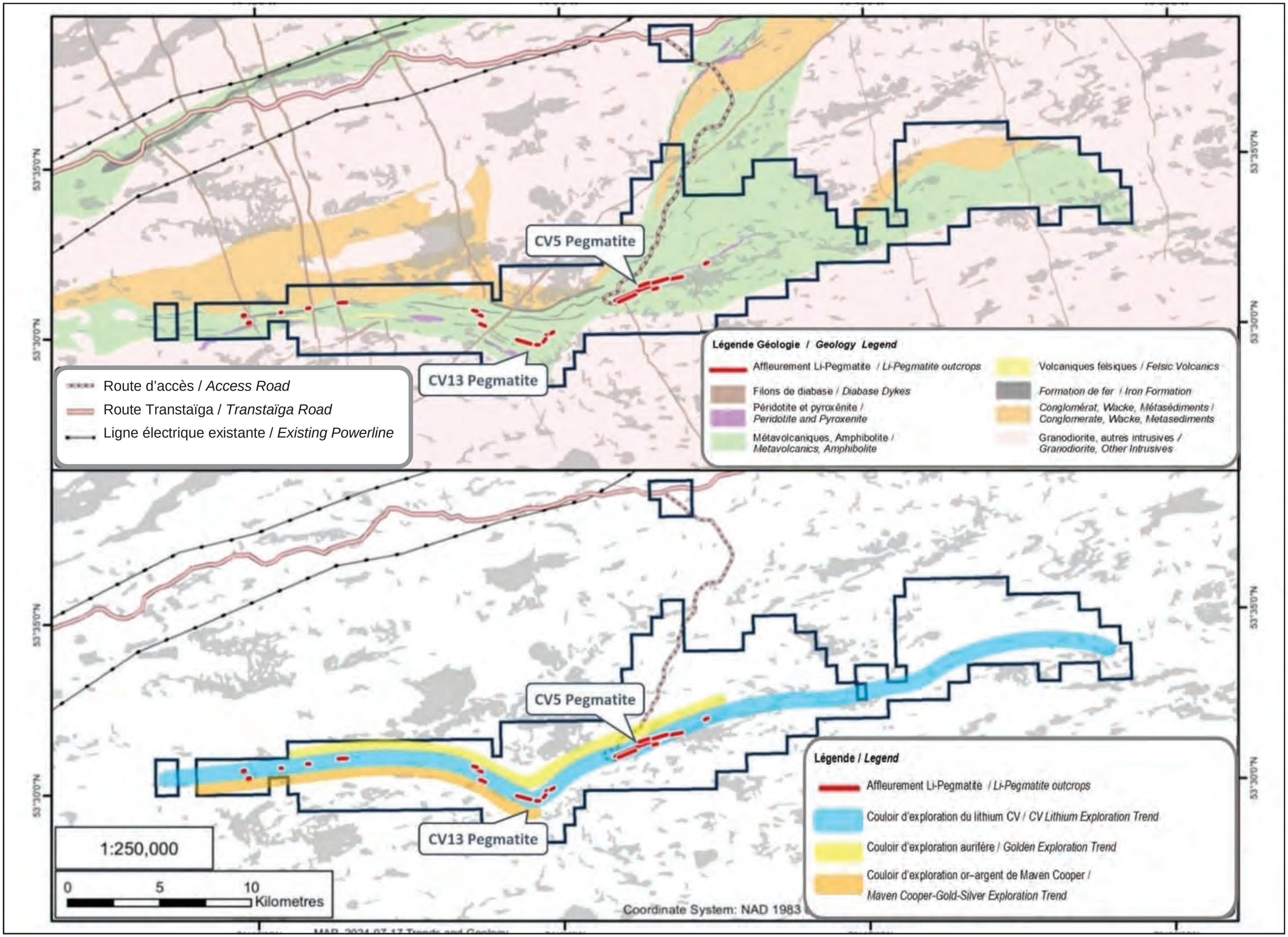


Figure 5-2 **Géologie de la propriété et tendances en matière d'exploration /** *Property Geology and Exploration Trends*

5.2.2.1 Open pit

Surface mining will be carried out using conventional production and pre-split drilling methods, as well as blasting, followed by loading and transport of ore and waste rock.

The design of the open pit takes into account the physical constraints of the site, in particular the location of the dikes. A long-term stability study of the final walls of the pit is presented in Appendix 5-1. It proposes a single pit divided into two main phases, each mined using sub pits, for a total of six sub pits (Figure 5-3):

- West Pit: Prioritizing the mining of the West Pit allows early access to ore content while limiting the impact on the adjacent body of water (Lake L01) by postponing certain operations.
- East Pit: The East Pit, which represents the second phase of open-pit mining, is also physically constrained by the dam located northeast of the ultimate pit shell. This sequence aims to optimize resource recovery while respecting the site's water and geotechnical constraints.

The planned peak mining rate is 23 Mt per year with a life-of-mine of 19 years, including a two-year pre-production period. A total of 49.2 Mt at 1.12% Li_2O of ore will come from the open pit. All operations will require the movement of approximately 216.7 Mt of material, including ore, waste rock, and overburden.

The equipment will include drills, hydraulic excavators, wheel loaders, and 140-tonnes haul trucks, operating on successive steps for the pit. The list of main equipment is presented in Table 5-1.

Table 5-1 Main equipment planned for open pit mining operations

Main equipment	Number
Production Drill (4.5″-8)	3
Auxiliary Pre-split Drill (4.5″-8)	1
Diesel Hydraulic Shovel (15 m^3)	2
Wheel Loader (23 m^3)	2
Mining Haul Truck (140 t)	13
Track Dozer (600 HP)	3
Motor Grader (18 ft)	2
Water Truck	1
Wheel Dozer (530 hp)	1

5.2.2.2 Underground mine

The underground mine will provide access to the CV5 Deposit located beneath Lake L01. Underground mining will use the long-hole open stoping (LHOS) method, mainly in a transverse configuration.

The underground mine will enable the extraction of 40.3 Mt of material, including 35.1 Mt of ore grading 1.45% Li_2O, and will reach a maximum production rate after an estimated development period of two years. A stability study of surface pillars is presented in Appendix 5-1.

Underground operations will be carried out using battery-electric mining equipment (BEV), including 50-tonnes trucks to transport ore to the surface, with a view to reducing emissions and improving environmental performance. The list of main equipment is presented in Table 5-2

Table 5-2 Main equipment planned for underground mining operations

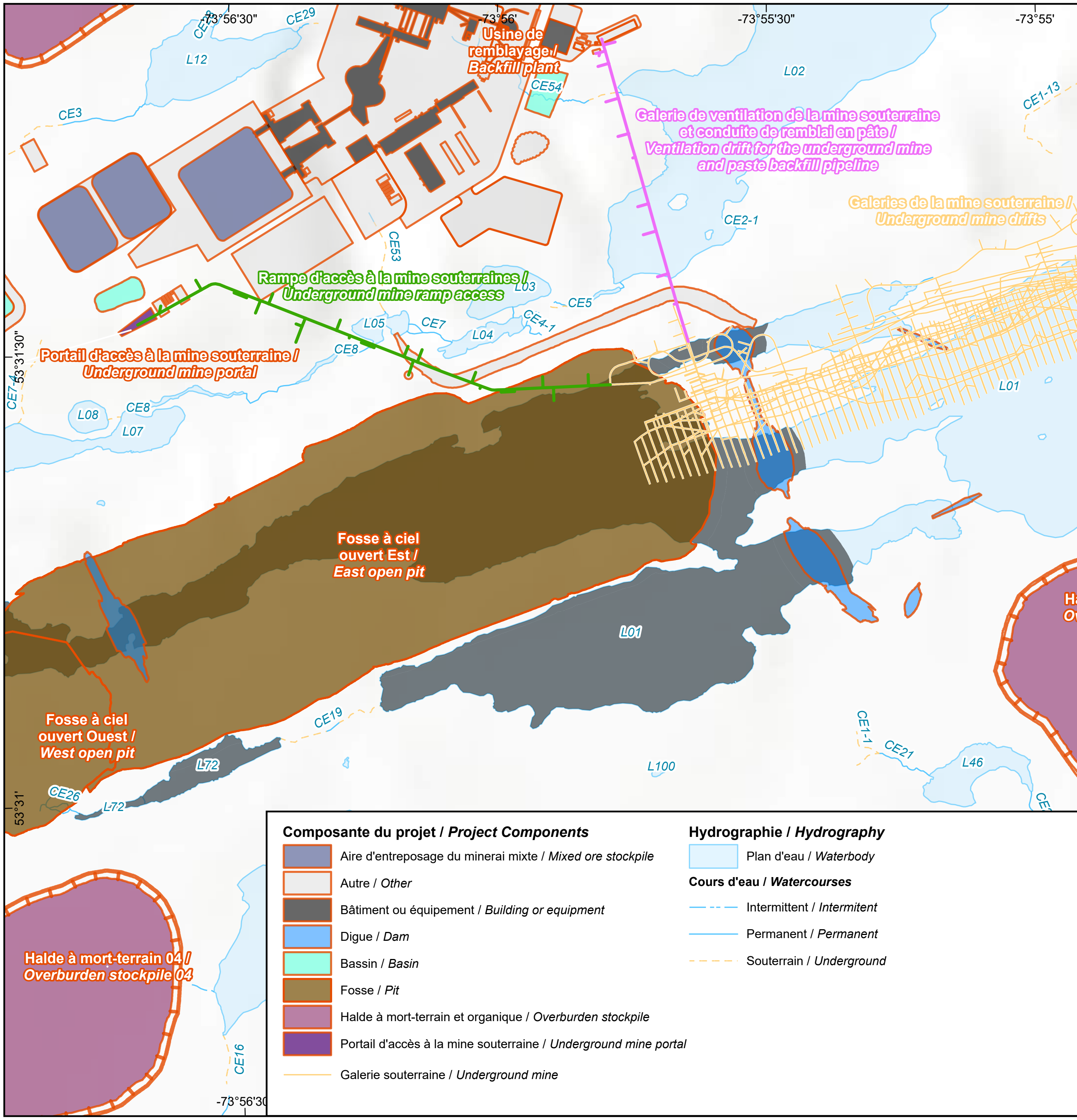
Main equipment	Number	Main equipment	Number
Jumbo – 2 Boom	2	Water Truck	1
Bolter	6	Block Holer	1
Production Drill	4	Grader	1
Cable Bolter	1	Light Vehicle	23
Front-end loader– 18 T BEV	5	Tractor – Electricians	2
Front-end loader – 10 T	2	Telehandler	2
Truck – 50 T BEV	9	Mobile Air Compressor	1
Explosive Truck	3	Backhoe Loader	2
Scissor Lift	5	Raise Bore (include head 1.2 m head reamer)	1
Truck Crane	2	Giant Bolter	1
Fuel & Lube Truck	1		

5.2.3 Ore processing

Spodumene will be concentrated at the mine site, where an ore processing plant will be built north of the CV5 pit and will be continuously fed by trucks from the open pit and underground mines (Map 5-1). The average lithium recovery rate is estimated at 69%, with an annual production of approximately 800,000 tons of dry SC grading 5.5% Li_2O. The concentrate generated will be stored under cover prior to shipment. The concentrate will be transported by 75-tonnes truck to the Matagami rail transfer point, for onward shipment to a deep-water port and international markets.

The following sections describe the main components of the processing plant site, the process used, and the main products used in the process.

Figure 5-3 ***Schéma conceptuel de la fosse par phase*** / *Conceptual diagram of the Open–pit by phase*



Composante du projet / *Project Components*

- Aire d'entreposage du minerai mixte / *Mixed ore stockpile*
- Autre / *Other*
- Bâtiment ou équipement / *Building or equipment*
- Digue / *Dam*
- Bassin / *Basin*
- Fosse / *Pit*
- Halde à mort-terrain et organique / *Overburden stockpile*
- Portail d'accès à la mine souterraine / *Underground mine portal*
- Galerie souterraine / *Underground mine*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermittent*
- Permanent / *Permanent*
- Souterrain / *Underground*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-3 / *Map 5-3*
Schéma conceptuel de la mine souterraine / *Conceptual Schematic of the Underground Mine*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025

0 120 240 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

Préparation / Prepared by : M-H. Brisson
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Approbation / Approved by : M-H. Brisson
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CA0001724_3318_eie_c05_03_104_galeries_260326

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5.2.3.1 Infrastructure

The processing plant will include areas dedicated to ore storage, crushing and grinding, concentration, drying, and loading for shipment.

The main components and activities at the processing plant site include:

- run-of-mine (ROM) stockpiles;
- crushing circuit (with primary, secondary, and tertiary crushing);
- crushed feed stockpile;
- coarse dense media separation (DMS) circuit;
- fine DMS circuit;
- ultrafine DMS circuit;
- recrush DMS circuit;
- magnetic separation and final product handling;
- dewatering and management of fines and middlings;
- tailings management.

5.2.3.2 Process

The concentration process at the processing plant is designed to produce spodumene concentrate that meets quality specifications from the raw ore extracted from the mine. This process will be based on a gravity circuit using a three-stage DMS and a crushing circuit, applicable to coarse and fine fractions. The facility will be equipped with two parallel processing lines, capable of operating independently, each representing 50% of the crushing, concentration, and dewatering capacity.

The main processing steps, also shown in Figure 5-4, will be as follows:

- crushing circuit (primary, secondary, and tertiary crushing);
- silo storage for crushed material supply;
- dense media separation (coarse, fine, and re-crushed);
- magnetic separation and handling of the final product;
- fines bypass, middling dewatering, and handling.
- final waste handling (tailings).

The raw ore from the pit and underground mine (mixed raw material) will be transported by mining trucks to the processing plant. At the site, trucks will either dump the raw ore directly into the dump pocket of the primary crusher (known as a jaw crusher) or direct it to a nearby temporary storage area where wheel loaders can continue to feed the primary crusher dump pocket.

The crushed ore will then be transported to be crushing screen. At this stage, coarse ore will be sent to the secondary crusher, while sufficiently fine ore will be sent directly to the final screen before being stored for processing via the DMS process. Any material that does not pass through the final screen is sent to a tertiary crusher, while materials that meet the desired particle size are transported to a silo to feed the DMS system, thus serving as a buffer between the crushing circuit and the processing plant. Subsequently, two apron feeders located in a reclaim tunnel beneath the silo will reclaim the crushed material and move it to a conveyor that will transport it to the processing plant.

At this stage of separation, there are three DMS circuits:

- Coarse DMS (CDM);
- Fine DMS (FDM);
- Ultrafine DMS (UFDM);
- Recrush DMS (RDM).

The dense medium separation process is essentially a gravity separation process in which crushed ore is introduced into a solution of water densified with added ferrosilicon (called dense medium) that is adjusted to achieve a density of 2.6 g/cm³ to 2.8 g/cm³. The ore particles, which are denser than the medium, report to the cyclone underflow, while the lighter gangue materials (quartz, feldspar, etc.) report to the overflow.

Following the dense medium separation circuits, the magnetic separation circuit will be fed by a fraction of the products from the FDM, UF-DMS separation circuit and part of the products from the RDM separation circuit. These materials will be exposed to a high-intensity magnetic field that will separate materials with higher proportions of iron in their mineral composition from the concentrate (final product). This magnetic circuit ensures that the final concentrate specification does not exceed the final iron impurity. The magnetic fraction will be sent to the processing plant's rejects (tailings). The non-magnetic fraction will be combined with part of the products from the CDM separation circuit to obtain a final concentrate, which will be loaded by a front-end loader into trucks for transporting the spodumene concentrate.

Residual fractions that are too fine will be directed to the fines bypass and middling dewatering circuit, where they will be conveyed to dewatering cyclones whose underflow will go to a thickener, and whose overflow will join the process water. The rest of the material from the dewatering cyclones as well as the thickener will be transported by conveyor to the dense medium separation middling stockpile. This product will then be transported by a wheel loader to a mining truck, which will store it in a designated location.

The final rejects of the process (tailings) come from the CDM, FDM, UF-DMS and RDM separation circuits, as well as the magnetic separation circuit. These rejects are accumulated on a stockpile and then transported by truck to the tailings storage facility.

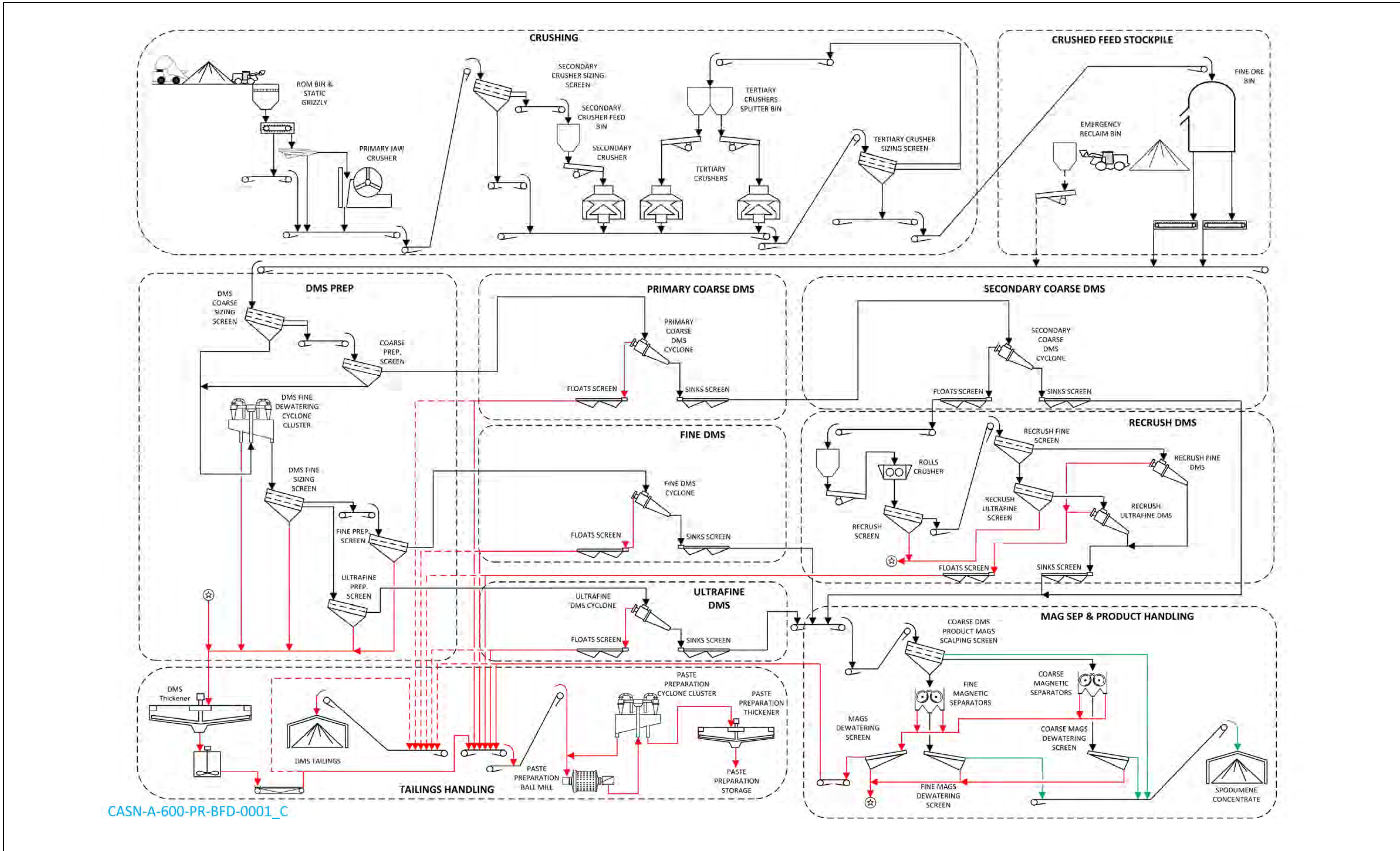


Figure 5-4 Mineral Processing Facility Simplified Process Flow Diagram

5.2.3.3 Reagents used in the process

The processing plant will mainly use two types of reagents:

- Ferrosilicon (FeSi) for dense media separation (DMS), delivered in bulk bags and prepared in a mixing tank before being pumped to the DMS circuits.
- Anionic flocculant (Magnafloc 10) for thickening and dewatering waste, delivered in 25 kg bags and diluted with raw and process water.

The mixing of reagents will be carried out in dedicated areas within the plant, with spill recovery systems.

5.2.4 Shipping of spodumene concentrate

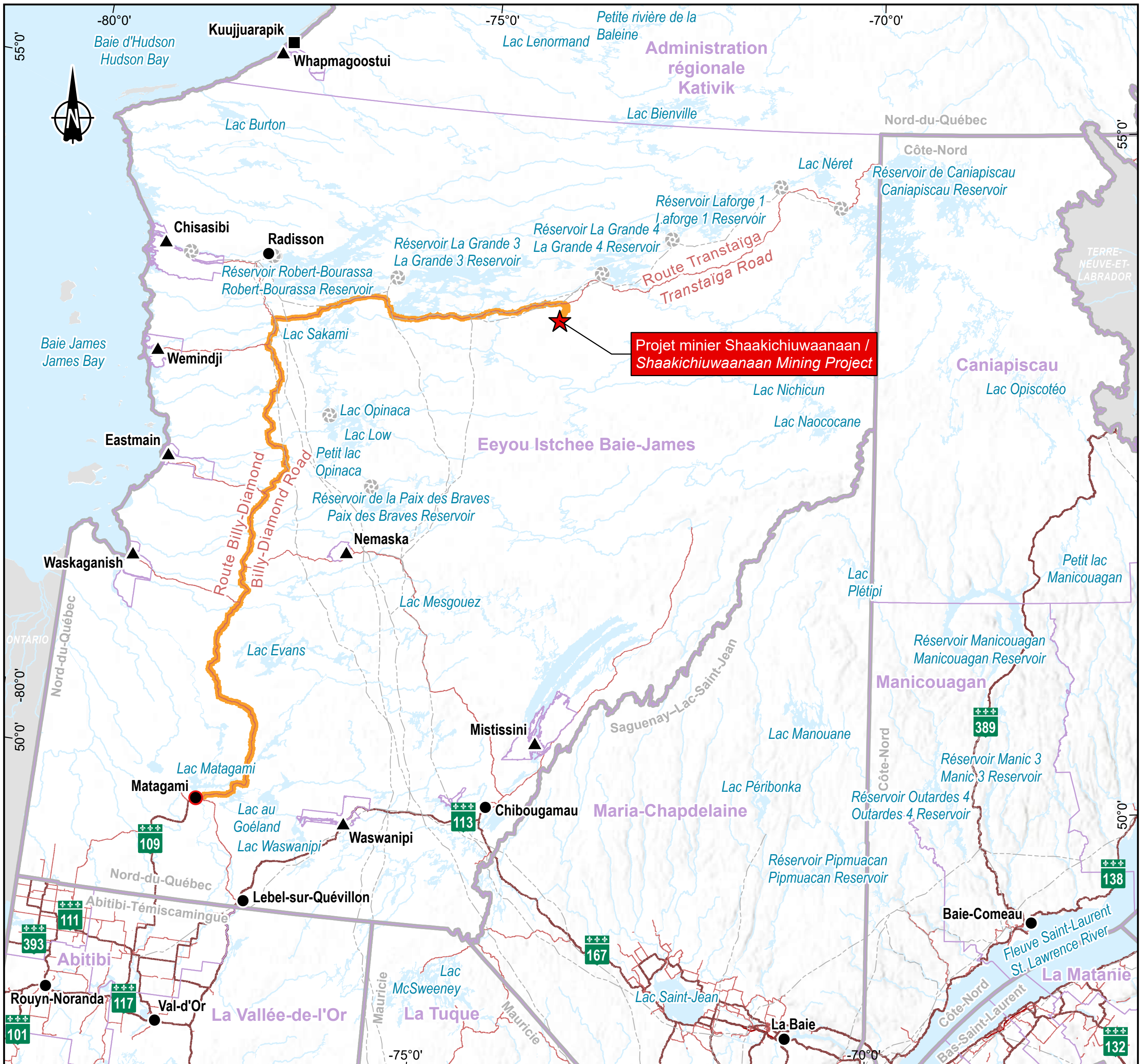
The project will produce an average of 800,000 tonnes of spodumene concentrate per year. A fleet of trucks will transport the concentrate from the mine site to the Matagami railway station, where a transshipment yard will be built (Map 5-4). The concentrate will be transported by trucks carrying two bins in a road train totalling 75 tonnes. The total road distance between the mine and Matagami will be over 800 km.

Upon arrival at the Matagami transfer yard, the trucks will be unloaded into a building that will protect the concentrate from the elements. From this point, the concentrate will be shipped by rail to the Grande-Anse/La Baie port, where it will be transported to conversion facilities located outside Quebec. Should a local market develop, conversion of the concentrate inside Quebec will be prioritized (at equal costs).

5.2.5 Geochemistry of tailings and waste rock

The geochemical studies conducted for the project include acid-base accounting (ABA), kinetic tests (HCT and columns), and predictive modelling by Vision Geochemistry (Appendix 5-4-1).

Atkins-Realis conducted a review of the available geochemical data (Appendix 5-4-2) to update the classification of the mining materials that will be produced during the operation of the Shaakichiuwaanaan project, in accordance with the criteria set forth in the Quebec Guide to the Characterization of Mine Tailings and Ore. The data examined include results from static tests conducted on 350 samples of waste rock, ore, and mine tailings, as well as results from kinetic tests in wet cells and columns. Some of these results were previously presented in the Vision Geochemistry report (2025). This report aims to validate and update the interpretation presented in the 2025 report based on the additional data collected.



Repères géographiques / *Geographical Landmarks*

- Communauté crie (zone d'étude régionale) / *Cree community (regional study area)*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Transport du minerai / *Ore Transportation*

- Route pour le transport du spodumène / *Spodumene transportation route*

Réseau routier / *Road Network*

- Autoroute / *Highway*
- Route nationale ou régionale / *National or regional road*
- Autre / *Other*

Limites / *Boundaries*

- Région administrative / *Administrative Region*
- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 5-4 / *Map 5-4*
Gestion du transport routier en dehors du site /
Off-site Road Transportation Management

Sources :
SDA, 1/20 000, MRNF, 2024-02
Canvec, 1/250 000, 1/5 000 000 et 1/15 000 000, RNCan, 2019
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/5 000 000, MRNF Québec, 2010
AQréseau+, réseau routier, MERN, 2024-03-01
RNCan, Frontières géopolitiques, 2002

0 50 100 km

NAD 1983 Quebec Lambert

2026-03-25

Préparation / Preparation : M.-H. Brisson
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Table 5-3 presents a summary of the classification of the various lithologies evaluated as part of this review. This overview forms the basis for the interpretation of risks associated with the geochemical behavior of the project's materials and will be used to develop the mine waste management program for the site. The classification is based on information available as of the date of this review, assuming that the properties of the samples analyzed for a given lithology are representative of the properties of that lithology as a whole. Laboratory tests will begin in March 2026 to apply these segregation criteria to the various mining materials in the project and to verify the feasibility of producing low-risk material based on these criteria.

Table 5-3 Summary of geochemical classification of mine lithologies

Lithology	Acid generating	Metal leaching	High risk	Radioactivity (preliminary evaluation)
Amphibolite	No	Leachable (**As, Cd, Sb**)	No	No
Metasediment	No	Leachable (As)	No	No
Ultramafic	No	Leachable (**As, Cd**)	No	No
Sterile pegmatite	No	Leachable (As, Cd, Cu)	No	No
Spodumene Pegmatite	No	Potentially leachable (As, Li),	No	No
Tailings	No	Leachable (**As**, Li, U)	No	No

Note: Elements shown **in bold** are more likely to be leached over the long term, based on the results of column testing. Some materials from each lithology may be considered non-leachable when segregated according to their arsenic content and sulfide content.

It should be noted that in the Vision Geochemistry report (2025), several lithologies were preliminarily identified as potentially acid-generating. In light of the additional information reviewed in this study, this potential has not been confirmed. All mining materials in the project are therefore considered non-acidogenic. However, it is recommended that testing continue under conditions more representative of actual mining conditions to validate this information.

Although all lithologies have been classified as non-acidogenic, the metasedimentary lithology is likely to be the most sensitive to heterogeneity in the distribution of sulfides or neutralizing minerals. Indeed, this unit has the highest sulfur grades and some of the lowest carbonate grades. The environmental risk that this unit could pose must be assessed in greater detail.

No mining material from the project was classified as "high-risk" in this review. However, column tests on ultramafic rock show leached concentrations of over 5 mg/L for arsenic. Larger-scale tests must be conducted to verify leached concentrations under field conditions.

Based on available analysis results, all mining materials exhibit some potential for leaching in the short term (metasediments, pegmatite) or in the longer term (amphibolite, ultramafic rock, and mine tailings). Vision Geochemistry (2025) proposes implementing a segregation process to separate the waste rock into two groups: one consisting of low-risk material, and the other comprising leachable material. As previously mentioned, laboratory tests will begin in March 2026 to apply these segregation criteria to the various mining materials in the project and to verify the feasibility of producing low-risk material based on these criteria.

The project calls for segregation of potentially metal leaching materials, specifically the complete separation of ultramafic lithology and the removal of all materials with arsenic concentrations greater than 30 ppm. This method should prevent arsenic leaching at Stockpile 01, thereby maintaining arsenic concentrations below the CVAA and REMMMD/D019 criteria.

Conversely, leaching conditions were identified in Stockpile 02, with arsenic concentrations that could exceed REMMMD/D019 criteria by up to two orders of magnitude, mainly due to the presence of tailings. Similarly, antimony and, to a lesser extent, lithium could be leached from Stockpile 02.

Among the measures planned to limit environmental impacts, the project includes the installation of a geomembrane-lined foundation beneath Stockpile 02, as well as a drainage system and collection ponds to intercept contact water. This water will be sent to a treatment plant to remove contaminants before being discharged into the natural environment.

A geochemical monitoring program will be implemented during operations to track the evolution of oxidation conditions and to confirm that metal leaching rates—expected to be higher during the initial exposure of materials and to decrease over time as a result of a natural wash-off process—remain consistent with predictions. This program will allow, if necessary, for adjustments to be made to the management of waste rock piles and retention ponds.

5.2.6 Stockpile management

The stockpile management areas relate to five major groups of materials: tailings, waste rock, overburden, organics, and ore. The project design includes the development of two waste rock stockpiles, two overburden storage facilities, and two organics storage facilities. The condemnation report for mineral resources under stockpiles is provided in Appendix 5-6. The construction and gradual elevation of these stockpiles will take place continuously throughout the mine's lifetime.

Materials stored in waste rock stockpiles and organics piles will be reused, where appropriate, during the site closure phase, particularly for covering and restoring mining components. The following sections describe how these different types of materials are managed.

5.2.6.1 Waste rock and tailings management

Project operations will produce 155.2 Mt of waste rock, including 74.2 Mt of low-risk waste rock and 81 Mt of waste rock that can potentially leach metals. Low-risk waste rock will be stored in Stockpile 01 (Map 5-1) located north of the mining facilities and covering a ground area of approximately 802,400 m^2. As for potentially metal-leaching waste rock, it will be stored on part of Stockpile 02 located east of the mining facilities (Map 5-1), covering an estimated area of approximately 1,296,000 m^2.

A total of 71.1 Mt of tailings will be generated. A portion of these tailings (54 Mt), containing low levels of lithium and tantalum, will be stored in a separate section of Stockpile 02 with the potentially metal leaching waste rock, covering an area estimated at approximately 1,022,000 m^2. The remaining 17.1 Mt of tailings will be used to produce paste backfill, which will be deposited in underground stopes where extraction has been completed.

As for Stockpiles 01 and 02 mentioned above, they will have a footprint of 80 ha and 218 ha, respectively, and will reach heights of 95 m and 120 m. For Stockpile 02, 92 ha are earmarked for tailings and 126 ha for potentially metal leaching waste rock. These stockpiles will comply with the minimum setback of 60 m from water bodies and identified fish habitats. In accordance with the requirements of Directive 019 on the mining industry, the footprint of Stockpile 02 will be lined with an impermeable geomembrane (Figure 5-5).

All tailings destined for surface storage will be transported by truck, then spread by a dozer and compacted using a vibratory soil compactor to ensure the stability of the deposits. The stockpiles were designed in such a way as to ensure long-term geotechnical stability of the deposits by ensuring a stepped elevation with final slopes ranging from 26 to 30 degrees (Figure 5-6). The report on the geotechnical laboratory analysis of tailings and the technical analysis of the stability of Stockpiles 01 and 02 are presented in Appendices 5-7 and 5-8, respectively.

5.2.6.2 Overburden and organics management

A total of 14 Mt of overburden will be moved as part of the mining operations and stored on two separate stockpiles, namely Stockpiles 04 and 05, located south and southeast of the open pit, respectively. A surface area of approximately 225,000 m² (Stockpile 04) and 271,000 m² (Stockpile 05) is planned for these two stockpiles.

A total of 3.2 Mt of organics will be removed from the mining facility operating area and stored in two storage areas located between Stockpile 01 and the mining facilities. These storage areas will have a footprint of approximately 98,400 m² and 134,200 m² respectively.

These two types of materials will be temporarily stored, as they will eventually be reused in the site closure works.

5.2.6.3 Ore management

The ore extracted from CV5 and transported out of the pit by truck will be stored in ore stockpiles adjacent to the process plant. As for the ROM pad, its storage capacity covers the 1 Mt required for the entire life of the mine (LOM). These storage areas are temporary and designed to receive ore before it is transferred to the processing plant. These areas will have a total footprint of approximately 65,000 m², about half of which is planned for the ROM pad. Geochemical characterization of the ore is underway and will help identify risks of leaching and acid generation. Depending on the results obtained, the design of the ore stockpile foundation and the ROM pad will take into account the sealing measures to be applied for groundwater protection as presented in D019.

5.3 Planned infrastructure and related developments

The project will include a coherent set of infrastructure facilities designed to support the project’s extraction, processing, and environmental management operations. This infrastructure will be designed in accordance with Quebec standards for safety, environmental performance, and integration into the local landscape. The site infrastructure plan is shown on Map 5-1.

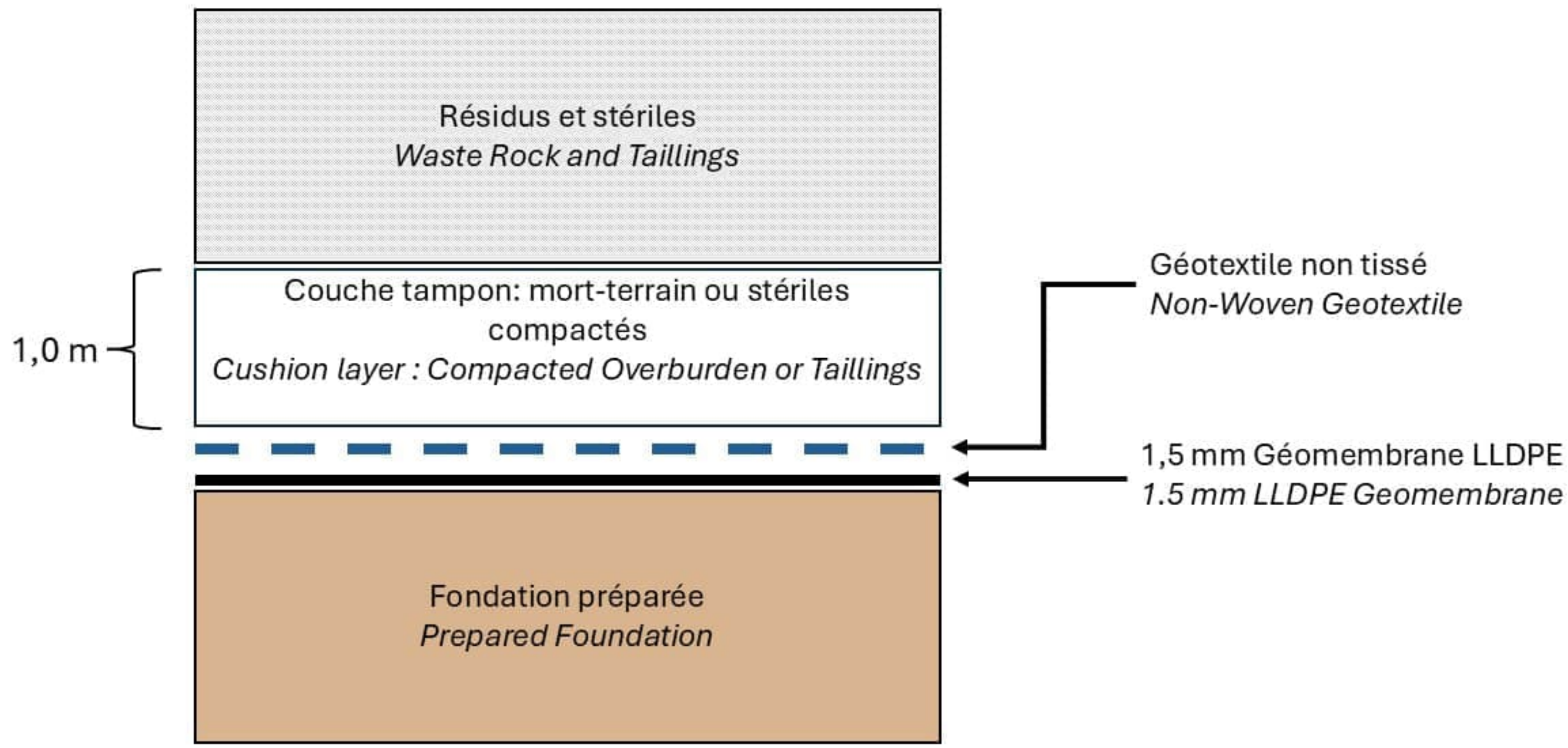


Figure 5-5 **Schéma conceptuel d'une fondation muni d'une membrane pour la halde 02 /** Conceptual diagram of a foundation equipped with a membrane for Stockpile 02

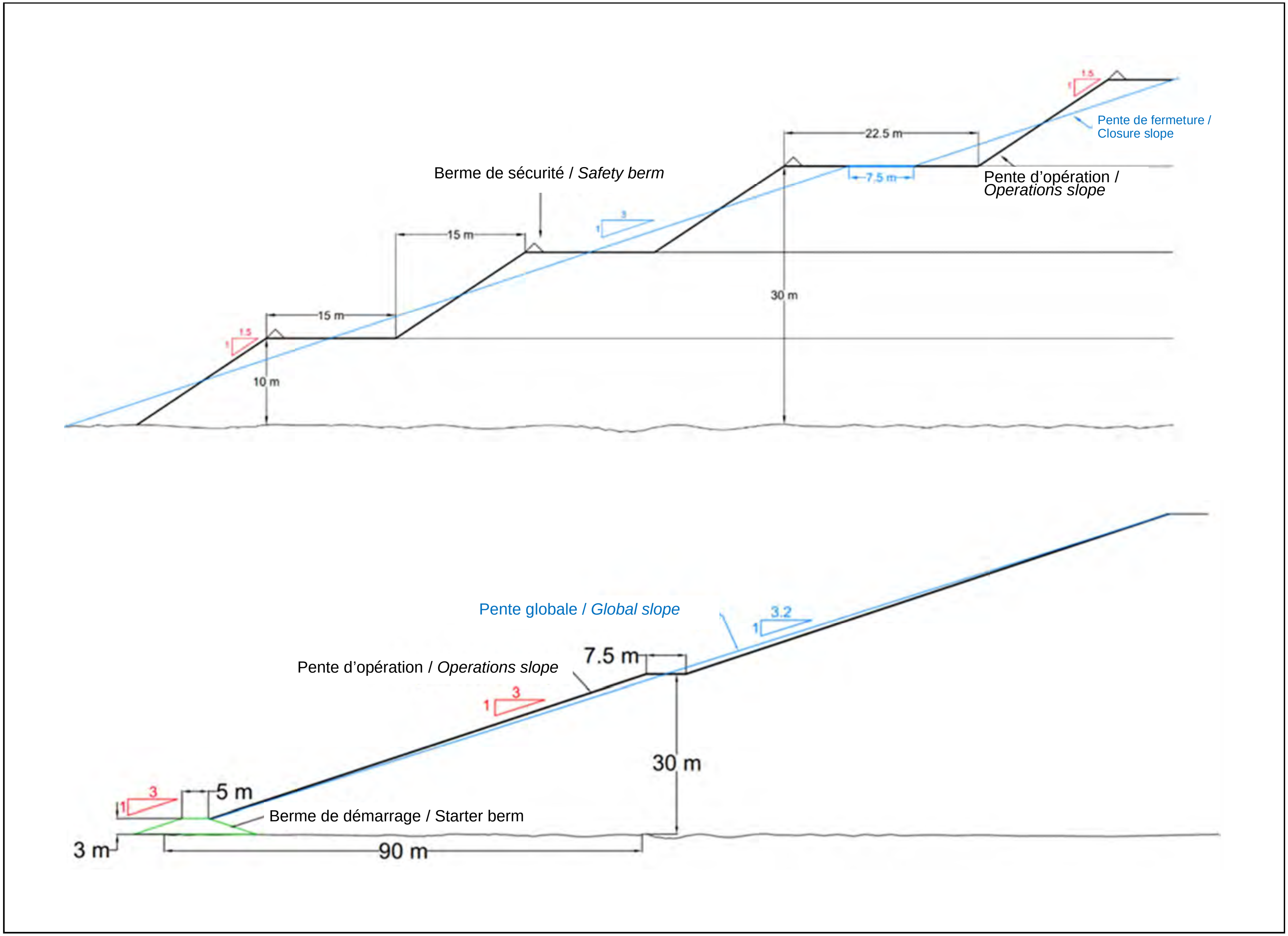


Figure 5-6 **Schéma conceptuel des pentes proposées pour les diverses zones d'empilement /**
Conceptual diagram of the proposed slopes for the various stacking areas.

Some infrastructure has been developed, and other infrastructure is planned to be developed before the work and activities described in this document are carried out. These facilities and their construction have been or will be subject to prior authorizations and are necessary for the development of the project, but are not part of the scope of its environmental impact assessment. This infrastructure includes:

- the construction of an exploration camp at kilometre 270 of the Trans-Taiga Road;
- the construction of an all-season road from the Trans-Taiga Road to the project site.

5.3.1 Road access to the mine site and internal road network

The main access to the site will be via an existing all-season road approximately 20 km long connecting the Trans-Taiga Road (km 270) to the project's industrial zone (Map 5-5). This road will allow heavy and light vehicle traffic, with an average right-of-way of 30 m. Note that the Trans-Taiga Road, which runs east-west, connects to the Billy-Diamond Highway, which links Matagami to the south, the final destination for road transport of the concentrate (Map 5-5).

Within the boundaries of the mine site, a planned network of approximately 17 km of gravel roads will be constructed to allow the movement of light vehicles and heavy mobile equipment (Map 5-1). These internal roads will connect the main surface infrastructure, including the processing plant, workshops, fuel storage areas, material storage areas, explosives facilities, and waste rock management areas. Some of these routes will be dedicated to heavy trucks to facilitate the transport of ore and minimize interactions between these trucks and light vehicles.

Haul roads will be designed to accommodate 140-tonnes rigid-frame trucks, ensuring the movement of ore and waste rock between open pit mining areas and key surface infrastructure (primary crusher, maintenance workshop, refuelling station, tailings management facility, waste rock and overburden storage areas).

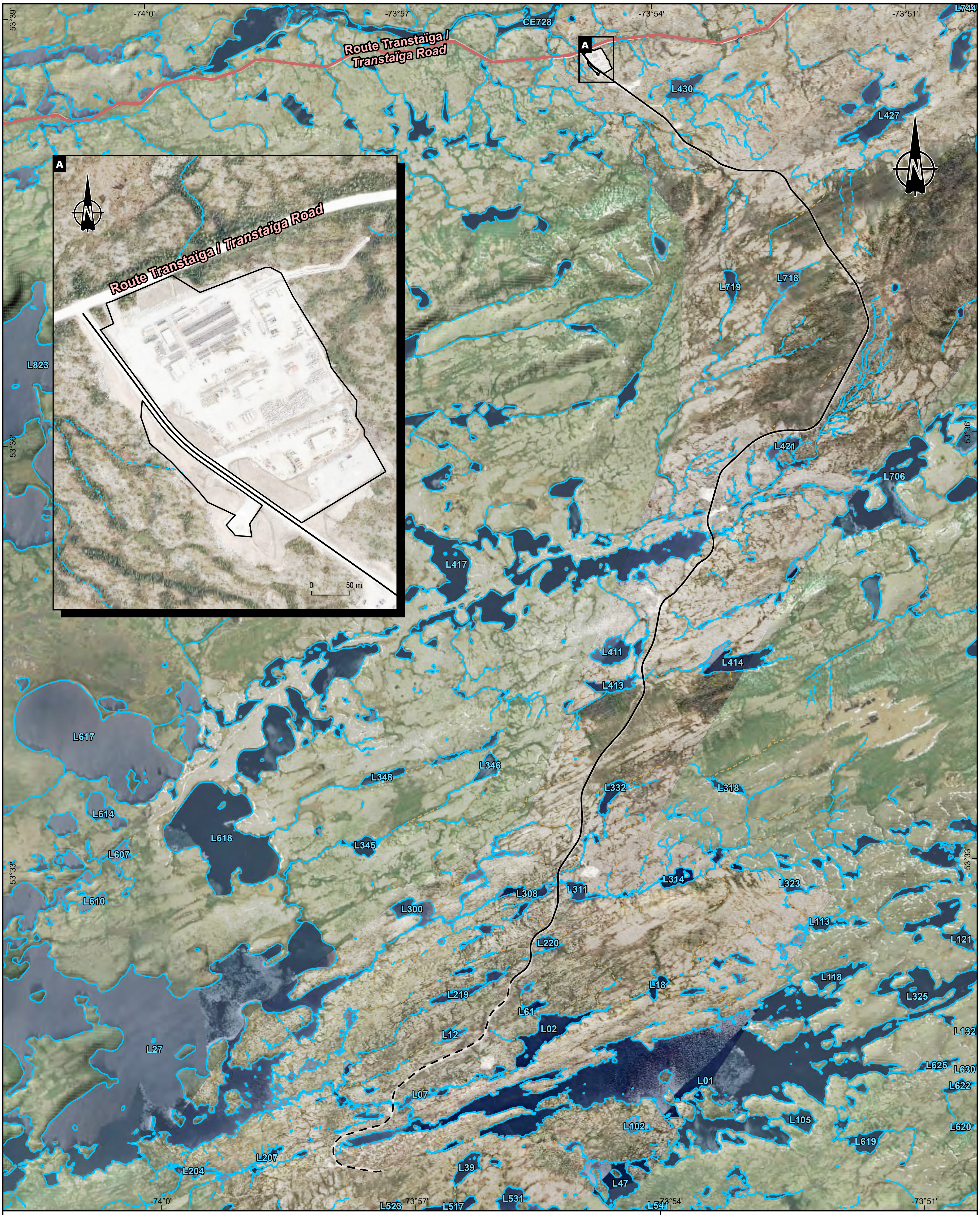
The entire road network includes ditch systems as well as culverts and bridges where necessary to ensure the free flow of surface water.

5.3.2 Power supply

Electricity will be supplied via a connection to the Hydro-Québec grid from the existing 315 kV Tilly substation located near the La Grande-4 complex. A dedicated transformer station (315 kV/120 kV) will be built near the Tilly substation to step down to the required power level of 120 kV. At the mine site, another step-down transformer is needed to reduce the voltage to a distribution level (Map 5-6).

The total power requirement is estimated at 35 MW for the combined operations of the open pit mine, underground mine, processing plant, and various on-site facilities. Hydroelectric power will ensure a favourable carbon footprint and limit the use of fossil fuels.

In the event of a grid power failure, a load-shedding scheme will be implemented to maintain power to essential systems. These critical loads will be supplied by two standby diesel generators rated at 2 MW each, operating at 13.8 kV. To further improve reliability, a third 2 MW backup generator will also be installed, providing additional redundancy. This standby generation system ensures that all essential systems remain energized during an outage.



Composantes du projet / *Project Components*

Existante / *Existing*

- Campement d'exploration / *Exploration camp*
- Chemin d'accès / *Access road*
- Chemin d'accès à démanteler / *Access road to be dismantled*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Souterrain / *Underground*

Infrastructures / *Infrastructure*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 5-5 / *Map 5-5*
Composantes existantes du projet /
Existing Project Components

Sources / Sources
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes actuelles, CASN-A-001-GE-GA-0002-CAD_RevB5, 2025
MERN, Ombrage MNT 50k, 2023
ESRI, World Imagery

0 0,5 1 km
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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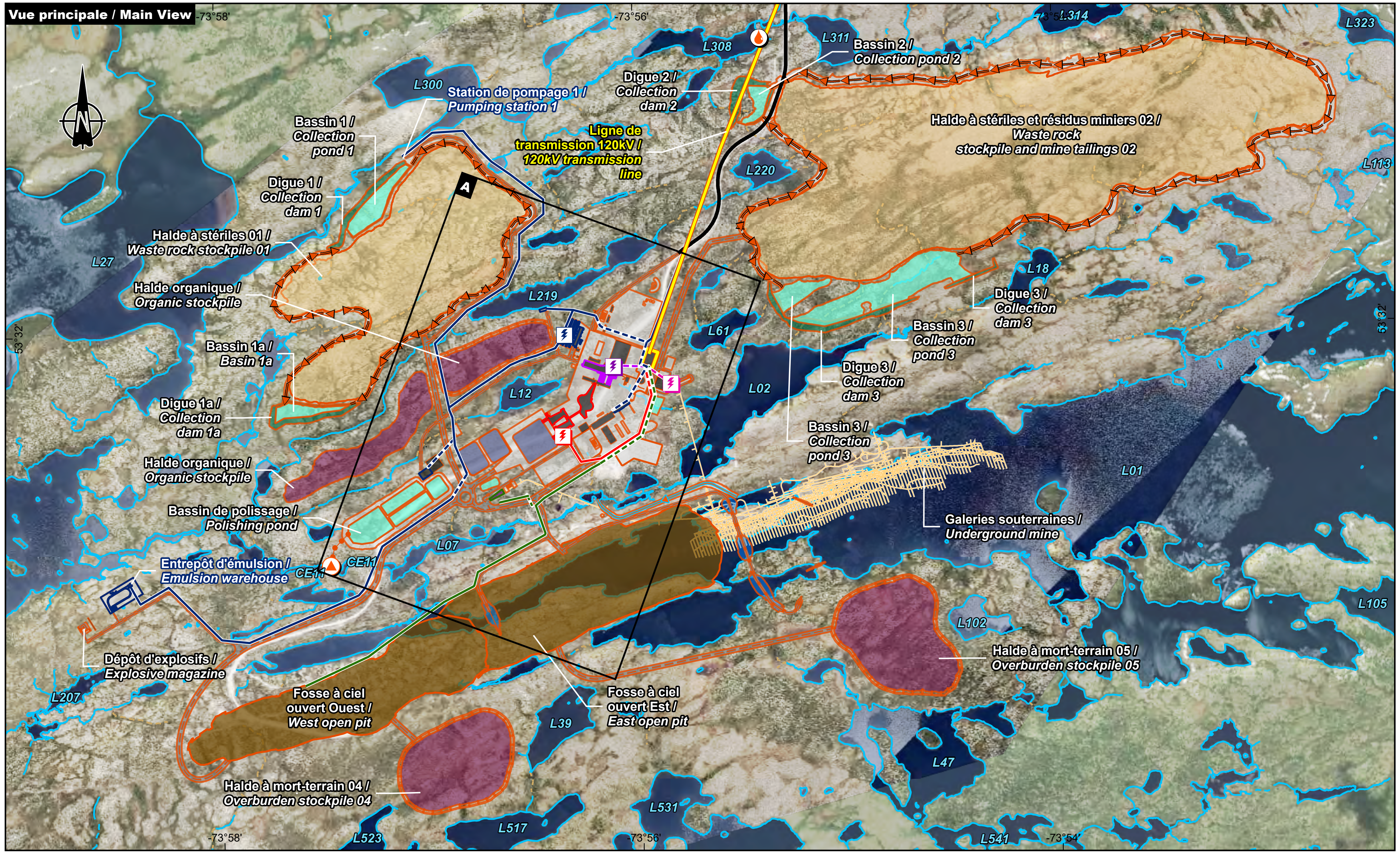

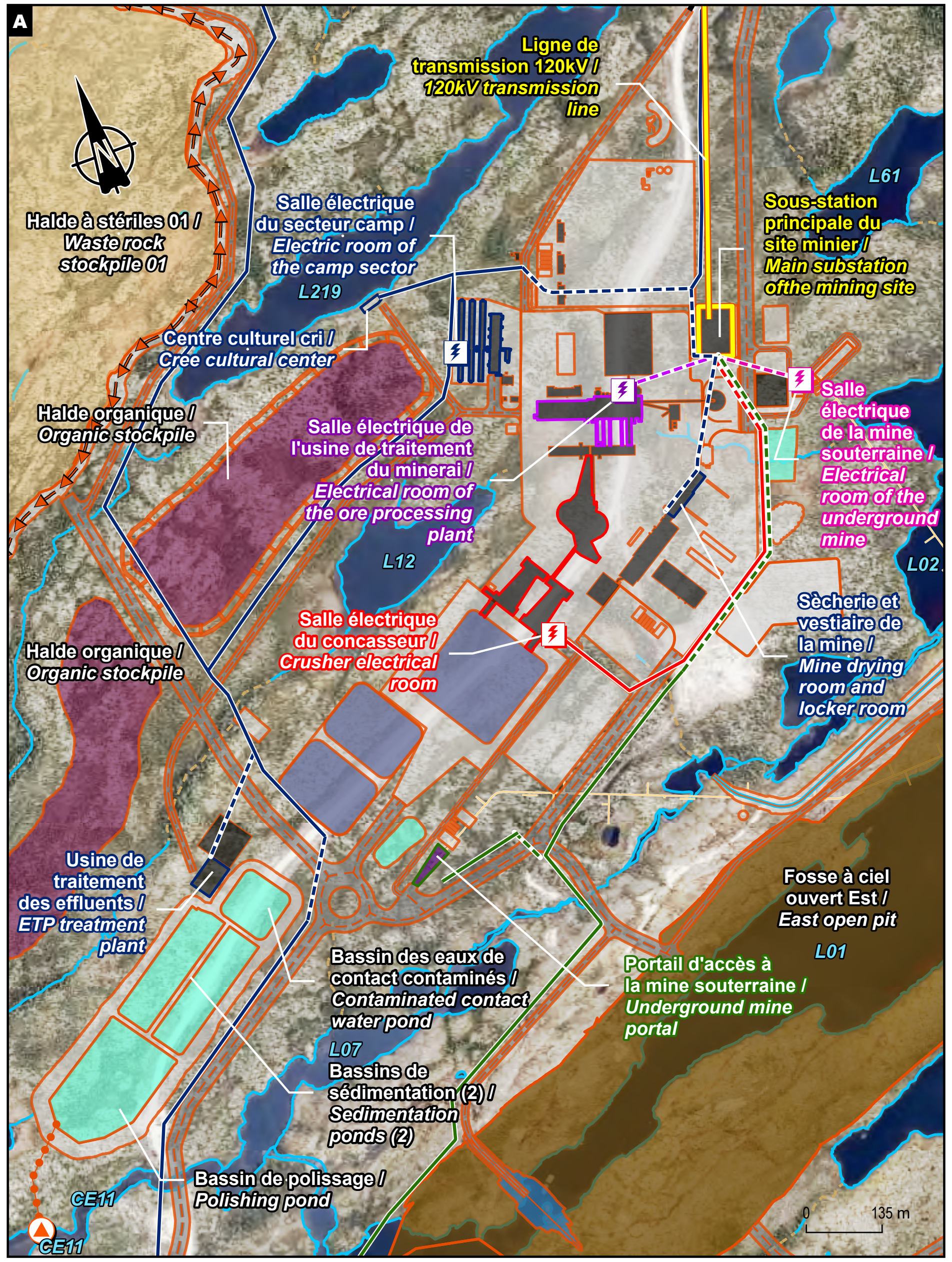

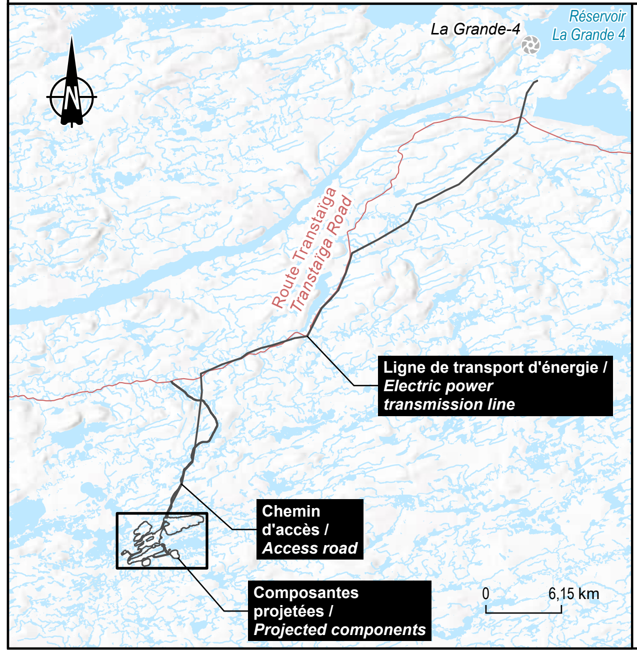

Composantes du projet / *Project Components*

Existante / *Existing*
- Chemin d'accès / *Access road*

Projetées / *Projected*
- Effluent minier / *Mining effluent*
- Prise d'eau / *Water intake*
- Barrage / *Dam*
- Canal / *Channel*
- Canal de dérivation / *Diversion Channel*
- Chemin secondaire / *Secondary road*
- Fossé / *Ditch*
- Aire d'entreposage du minerai mixte / *Mixed ore stockpile*
- Autre / *Other*
- Bâtiment ou équipement / *Building or equipment*
- Digue / *Dam*
- Bassin / *Basin*
- Digue des bassins / *Basins dam*
- Fosse / *Pit*
- Halde à mort-terrain et organique / *Overburden stockpile*
- Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*
- Portail d'accès à la mine souterraine / *Underground mine portal*
- Voie de circulation / *Roadway*

Réseau électrique projetée / *Projected Electric Network*
- Ligne de transmission 120kV / *120kV transmission line*
- Ligne électrique aérienne (couleur) / *Overhead power line (color)*
- Ligne de distribution souterraine (couleur) / *Underground distribution line (color)*
- Salle électrique (couleur) / *Electrical room (color)*

Subdivision du réseau électrique sur le site minier (couleur) / *Subdivision of the Electric Network on the Mining Site (Color)*
- Concasseur / *Crusher*
- Mine à ciel ouvert / *Open-pit mine*
- Infrastructures / *Infrastructure*
- Mine souterraine / *Underground mine*
- Usine de traitement du minerai / *Ore processing plant*

Hydrographie / *Hydrography*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*
- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Souterrain / *Underground*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*
Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-6 / *Map 5-6*
Localisation des postes, de la ligne de transmission projetée et des connexion électrique sur le site minier / *Location of the Stations, of the Projected Transmission Line, and of the Electrical Connection on the Mining Site*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014 / CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014 / BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025

0 260 520 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / Prepared by : M-H. Brisson
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Approbation / Approved by : M-H. Brisson
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5.3.3 Surface buildings and infrastructure

The industrial area will include:

- the ore processing plant, including crushing and screening circuits, crushed ore silos, DMS circuits, magnetic separation, and a loading area for concentrate and tailings;
- administrative buildings: offices, control centre, clinic, changing rooms, and other small auxiliary buildings for the concentrator and mine areas;
- a permanent camp with 672 beds for operational personnel, designed in accordance with CNESST standards;
- mechanical workshops and warehouses for equipment maintenance;
- a fuel depot (capacity of 320,000 litres) for vehicles and generators, equipped with a refuelling station;
- a secure storage area for hazardous materials (oils, solvents, batteries, reagents);
- an emulsion storage facility and explosive storage magazines;
- a First Nations cultural centre;
- storage areas, particularly for mining equipment.

Map 5-1 shows all planned infrastructure, and Figure 5-7 shows a 3D model of the main planned surface infrastructure.

All buildings will be thermally insulated and connected to a compressed natural gas (CNG) central heating system. Domestic wastewater will be treated on site by a modular system that complies with the *Wastewater Systems Effluent Regulations* (Section 5.4.7). The following sections provide more detailed information about some of these buildings.

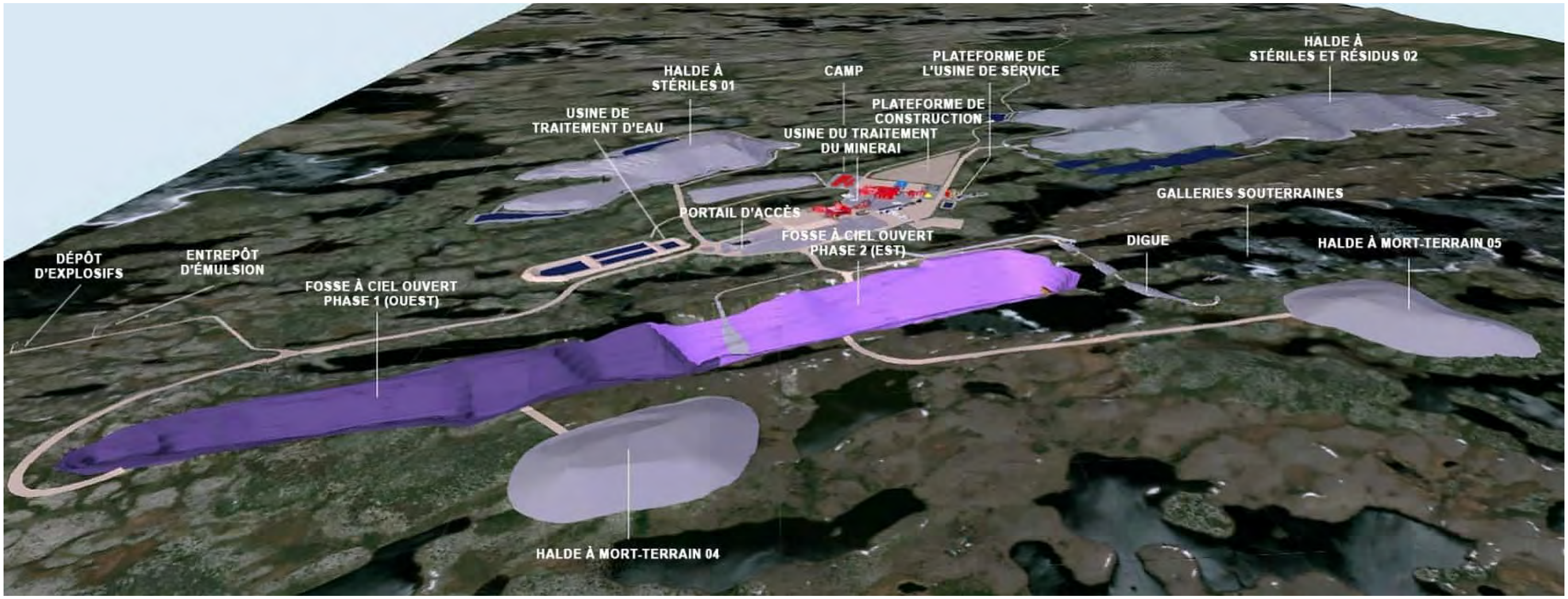


Figure 5-7 **Infrastructure principale du site – Vue en perspective**

5.3.3.1 Administrative and laboratory building

The administrative and laboratory building will be designed to combine office, meeting, and technical analysis functions under one roof. The administrative section will include ten closed offices, a work area with 30 workstations, two meeting rooms, a dining room, and support areas (printing, storage).

The laboratory section will be equipped for a range of analytical and preparation activities, including a wet laboratory, a sample preparation room, a chiller room, a press room, storage for instrumentation and chemicals, and a dedicated acid cabinet. In addition to these components, the laboratory will include equipment such as a jaw crusher, a rotary splitter, multi-head pulverizers, a sample drying oven, fume hoods, dust collectors, and other analytical apparatus.

Support areas will include a mechanical room, a chemist’s office, and a training room. Acoustic insulation measures will be incorporated in certain spaces to enhance safety and comfort.

5.3.3.2 Process buildings

The secondary and tertiary crushing, screening, DMS sizing, and DMS buildings will be constructed with a concrete structure, insulated, and heated to prevent freezing. Most of the process plant equipment will be installed indoors with the exception of large water storage tanks and thickeners, which will be located outdoors but equipped for winter conditions. The primary crusher will remain outdoors without heating.

Crushed ore will be stored in an insulated silo capped with an insulated concrete dome. It will be erected on site with a steel frame and shotcrete construction. A reclaim tunnel will be built underneath the silo, with one doorway allowing access for a front-end loader in case of emergency.

All conveyors downstream of the DMS sizing building will be enclosed, insulated, made of structural steel, and heated to prevent freezing. For Phase 2, the secondary and tertiary crushing, screening, and crushed ore storage buildings will be duplicated, while the DMS buildings will be extended to accommodate the additional equipment.

5.3.3.3 Staff administrative building

The building will be multifunctional and will occupy an area of approximately 750 m^2. It will combine staff preparation areas and administrative spaces to optimize safety and operational efficiency.

It will include, in particular:

- men’s and women’s changing rooms with lockers, washing areas, and sanitary facilities;
- a boot washing area near the entrances to maintain cleanliness;
- administrative areas including offices for supervisors, meeting room, server room, truck dispatch area, and office for remote operations;
- additional amenities: cafeteria, electrical room, and laundry room for work clothes.

The layout will facilitate traffic flow during shift changes and will be located near the truck workshop, ensuring separate traffic flows for safety reasons.

5.3.3.4 Permanent campsites and related buildings

The permanent camp will be designed to accommodate up to 480 workers on site during Phase 1. In Phase 2, 192 additional beds will be added to meet the anticipated increase in workforce needs. In addition, the existing 150-bed camp located along the Trans-Taiga Road can be used during the construction phase when the total workforce exceeds the capacity of the operating camp.

Workers will be accommodated in Type B buildings, which are collective accommodation units spread over two levels. Each Type B dormitory is designed to accommodate up to 96 beds and includes rooms arranged along corridors, with shared sanitary facilities at a ratio of one bathroom for every two rooms, as well as technical and maintenance rooms.

The kitchen and lunchroom facilities will be designed to accommodate approximately 150 individuals at a time. They will include cooking zones, serving areas, and hygienic processing sections that comply with health standards, as well as storage spaces and cold rooms to ensure food safety.

The office is a single-story structure with an approximate area of 750 m², situated adjacent to the laundry facility and the recreational room.

5.3.3.5 First Nations Cultural Centre

The First Nations Cultural Centre will be in front of Lake L219, with spaces reserved for meetings and areas for traditional activities. This facility includes restrooms, a cold kitchen and wood stove, and a library.

Installed adjacent to this building, a traditional house will be positioned, covered in a waterproof canvas, with a combination of traditional and modern materials.

5.3.3.6 Temporary truck shop

A temporary shop will be installed to support mining activities during the construction phase. It will include multiple service bays for light vehicle maintenance, supported by specialized work areas such as a welding bay, tire shop, oil room, and battery storage. A wash bay will be integrated with appropriate drainage and water management systems. The facility will also include three heavy-duty vehicle bays and two tracked equipment bays.

The structure will consist of an insulated dome and will incorporate safety features such as eye wash stations, hose reels, and water gun stations.

5.3.3.7 Warehouse

The warehouse will be a thermally insulated steel structure, with thermoacoustic panel cladding and a fibre-insulated dome, covering an area of approximately 1,390 m². It will be designed for storage, reception, and distribution operations, with an internal layout that promotes smooth movement and safety.

5.3.3.8 Explosives storage facility

This infrastructure will be designed to meet all blasting requirements during operations.

Two mobile manufacturing units (MMUs) will be dedicated to the site, with the second being added as a backup unit for maintenance and contingencies. The explosive requirement will be 63,000 kg of 100% emulsion per week. The bulk depot will include two 25-ton ANE iso-containers, a garage/wash bay for one MMU, and containers for mixing gasser products, a water evaporator for contaminated water treatment, and other supplies.

Moreover, a 12 m explosives magazine and a 3.6 m detonator magazine will be included. The bulk depot sizing will provide 5.5 days of capacity without delivery. No additional infrastructure will be required for the underground operations, other than underground magazines. Emulsion will be delivered in 1,500 kg bins from the emulsion plant, and 65 bins total may be required cumulatively for the initial underground development work planned at the start of the production phase. This estimate represents a total volume over a limited period and does not correspond to a quantity stored simultaneously in underground magazines. The explosive storage area will be enclosed within a secured and fenced perimeter, with controlled access gates and regular security patrols.

5.3.4 Communication and security systems

The site will be equipped with a fibre-optic and satellite telecommunications network enabling real-time monitoring of operations and security systems.

The security measures will include the following:

- 24-hour surveillance system at strategic checkpoints;
- computerized access control;
- emergency plan and corrective measures integrated into the project’s Health and Safety Management System (HSMS).

Joint emergency exercises will be conducted periodically with local services and the Cree authorities concerned.

5.3.5 Fuel storage and distribution

The fuel depot will include two separate sections (Map 5-1): one for light-duty vehicles and one for heavy-duty vehicles, with separate circulation paths to ensure safety and efficiency. It will be equipped with:

- three (3) horizontal steel diesel tanks, each with a capacity of 50,000 litres, as well as a 20,000-litre tank for clear diesel for Phase 1;
- an additional three (3) tanks of 50,000 litres to be added in Year 3 of operations.

This storage is designed to ensure five days of autonomy at peak consumption without requiring delivery.

The work will also include safety access walkways, grounding systems for lightning protection, and perimeter fencing for access control. The fuel distribution network will consist of two independent circuits:

- heavy vehicles: complete piping network with high-flow pumps and dispensing nozzles;
- light vehicles: similar, lower-flow network, compatible with both gasoline and clear diesel.

A dedicated loading/unloading area will be set up with:

- a heated 20-ft insulated container for transfer equipment;
- safety mechanisms such as emergency shut-off, spill protection, and overfill alarms.

A hydrocarbon separator unit will be installed downstream to treat accidental spills before discharge into the drainage system. The management system will include radio frequency identification (RFID) card access, real-time tracking, and a leak detection unit with automatic shutdown in the event of an incident.

5.3.6 Compressed natural gas (CNG)

The heating of the plant, underground mine, and auxiliary buildings will use 100% compressed natural gas (CNG). This will be delivered by a supplier via a high-pressure (up to 4,300 psi) trailer system, serving as both delivery and mobile storage units. The system will be designed with enough capacity to ensure four days of peak heating autonomy, with trailer rotation managed by the supplier to ensure continuous supply.

5.3.7 Quarries and borrow pits for construction

A report detailing the locations of quarries and borrow pits, as well as their capacities, is provided in Appendix 5-9. According to this report completed by BBA in March 2026, the material requirements (all particle sizes combined) for the construction of the entire mining site amount to 1.3 Mm^3. These requirements will be met by the opening of quarries and borrow pits, as well as by materials extracted from the pit once its excavation begins. Quarries and borrow pits will remain active after the pit is opened to meet the needs of work to be carried out in their vicinity (repair of the access road, in the exploration camp area, etc.).

A total of fourteen potential quarry sites (CA-1 to CA-14) have been identified on both sides of the access road to the mining site (Map 5-7). Of these, nine (CA-1 to CA-4 and CA-9 to CA-13) were excluded due to limited volumes of available material, unfavorable locations (conflict with project infrastructure), and the risk that a portion of the estimated volumes may be unusable due to the risk of leaching of metals, including arsenic. Priority for exploitation was therefore given to quarries CA-5 through CA-8 and CA-14, which are located between km 13 and 16 of the access road to the mining site. Table 5-4 presents the estimated potential volumes for the selected quarries.

Table 5-4 Estimated maximum volume for the selected quarries

Quarry	Estimated volume (000 m^3)
CA-5	800 to 1000
CA-6	200
CA-7	125
CA-8	4509
CA-14	750
Total	**2 325 to 2 525**

Source : Poly-Géo, 2026

Regarding borrow pits, the six identified sites (DG-01 to DG-06) are all located between km 8.5 and 9.5 of the access road to the mining site. The estimated potential volumes are presented in Table 5-5.

Table 5-5 Estimated maximum volume from borrow pits

Sand/gravel deposit	Estimated volume (000 m^3)
DG-01	15
DG-02	5
DG-03	8
DG-04	20
DG-05	10
DG-06	500
Total	**558**

Source : Poly-Géo, 2026

Note that geochemical characterizations for these various borrow pits and quarries are currently underway to confirm all construction material will be low risk.

5.4 Water management

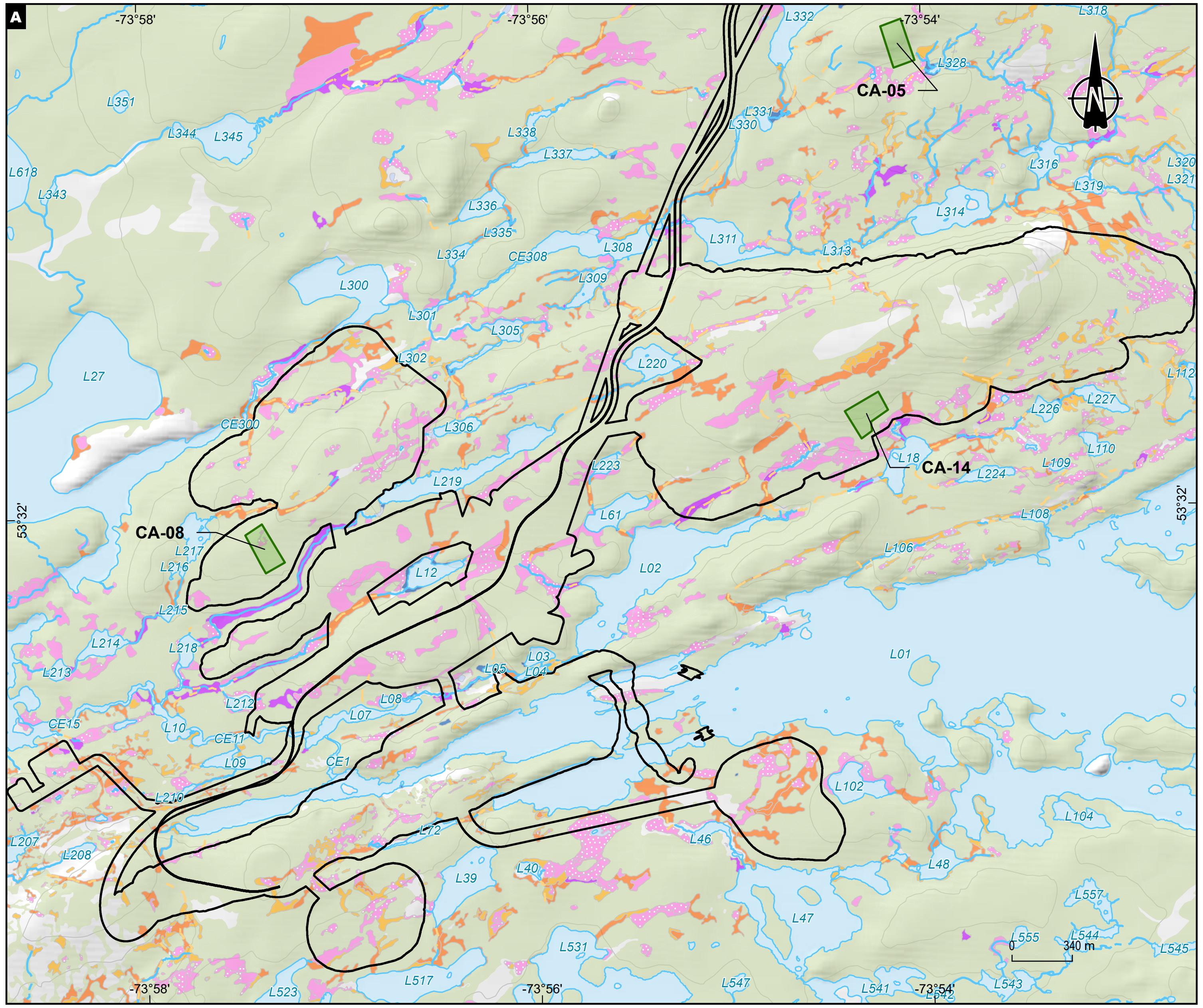
The project's water management aims to prevent any contamination of the water environment, optimize the reuse of process water, and ensure regulatory compliance of discharges. The system is designed according to an integrated water balance approach, combining collection, storage, treatment, and recirculation.

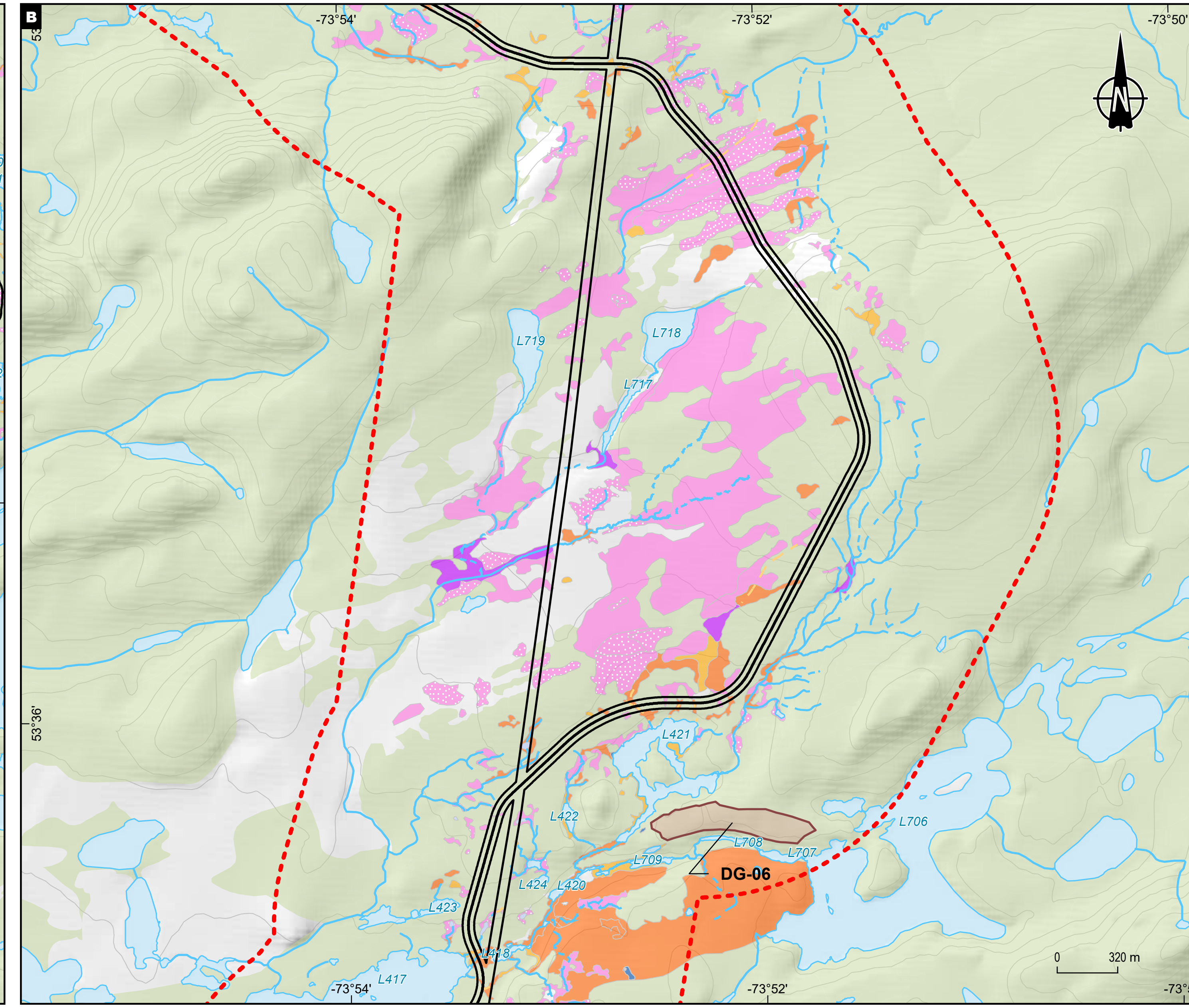
5.4.1 Water balance

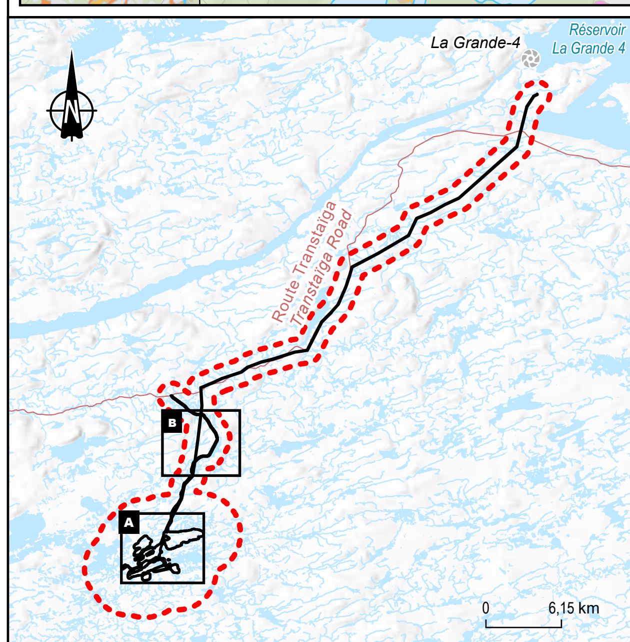
A water balance model was developed for the entire mining complex to assess inflows and outflows (Appendix 5-10): precipitation, runoff, infiltration, pumping, process consumption, and evaporation.

The main inflows considered are:

- runoff from the pit, stockpiles, and pads;
- dewatering water from the underground mine;
- process water from ore processing;
- mine drainage water (during operations);
- natural inputs (precipitation) and losses through evaporation.







Zone d'étude / *Study Area*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Bancs d'emprunt / *Borrow Pits*

- Carrières potentielles / *Potential quarries*
- Dépôts meubles potentiels / *Potential unconsolidated deposits*

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*

- Marécage arborescent / *Treed swamp*
- Marécage arbustif / *Shrubby swamp*
- Tourbière minérotrophe boisée / *Treed fen*
- Tourbière ombrotrophe boisée / *Treed bog*
- Tourbière ombrotrophe ouverte / *Open bog*
- Marais / *Marsh*
- Eau peu profonde / *Shallow water*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermittent*
- Permanent / *Permanent*
- Souterrain / *Underground*

Infrastructure / *Infrastructure*

- Chemin d'accès / *Acces Road*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

PMET

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 5-7 / *Map 5-7*
Carrières et bancs d'emprunt sélectionnés pour la construction des infrastructures / *Selected Quarries and Borrow Pits for Infrastructure Construction*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025

0 340 680 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : M-H. Brisson
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CA0001724_3318_eie_c05_c7_156_bancs_emprunt_choisis_260326

wsp

Key findings from the water balance analysis include:

- The fresh water supply varies from 4,424 m^3/month to 4,898 m^3/month.
- Under average conditions, when the mine is fully developed, the volume of excess water discharged to the environment ranges from 286,000 m^3 (February) to 989,000 m^3 (May) per month.
- On an annual basis, the volume of excess water discharged to the environment is estimated at 4,950,000 m^3 in dry conditions, 7,030,000 m^3 in average conditions, and 8,410,000 m^3 in wet conditions.
- The treated water stored in the polishing pond will be sufficient to supply the processing plant and meet other operational needs throughout the life of the mine, under various climate scenarios.
- The runoff ponds located at the base of the stockpiles will be adequately sized to manage the meltwater.
- The pumping stations, designed to handle the Directive 019 snowmelt event, ensure efficient and reliable transfer of water to both passive and active treatment systems.
- The hydraulic retention time (HRT) in the passive treatment infrastructures consistently remains high enough to allow for effective particle settling.
- Under normal conditions, the ponds operate between the lowest operating water level (LOWL) and maximum operating water level (MOWL), utilizing only 40% of the pump capacity.

The model provides for internal recirculation of more than 75%, thereby minimizing fresh water requirements and discharge volumes. Excess volumes will be treated before their final discharge into the receiving environment. Figure 5-8 shows the flow diagram for mine site water management.

5.4.2 Contact water management infrastructure

The water management plan was designed to effectively separate contact water from uncontaminated water, in accordance with the requirements of Directive 019 on the mining industry. The main water management infrastructure is presented in the following subsections (Map 5-8). It will all be designed to withstand at least a 100-year rainfall event and equipped with automated control devices (see section 5.4.2.2).

5.4.2.1 Contact water collection ditches and pipelines

Ditches will be constructed to collect runoff from Stockpiles 01 and 02 and direct it to the contact water collection ponds (Map 5-8). All ditches will be constructed to allow for the installation of an adjacent service road, and those located around Stockpile 02 will be lined with a geomembrane, as shown in Figures 5-9 and 5-10. Pipes for drinking water, sewage water, and industrial water will also be installed on the site (Map 5-9).

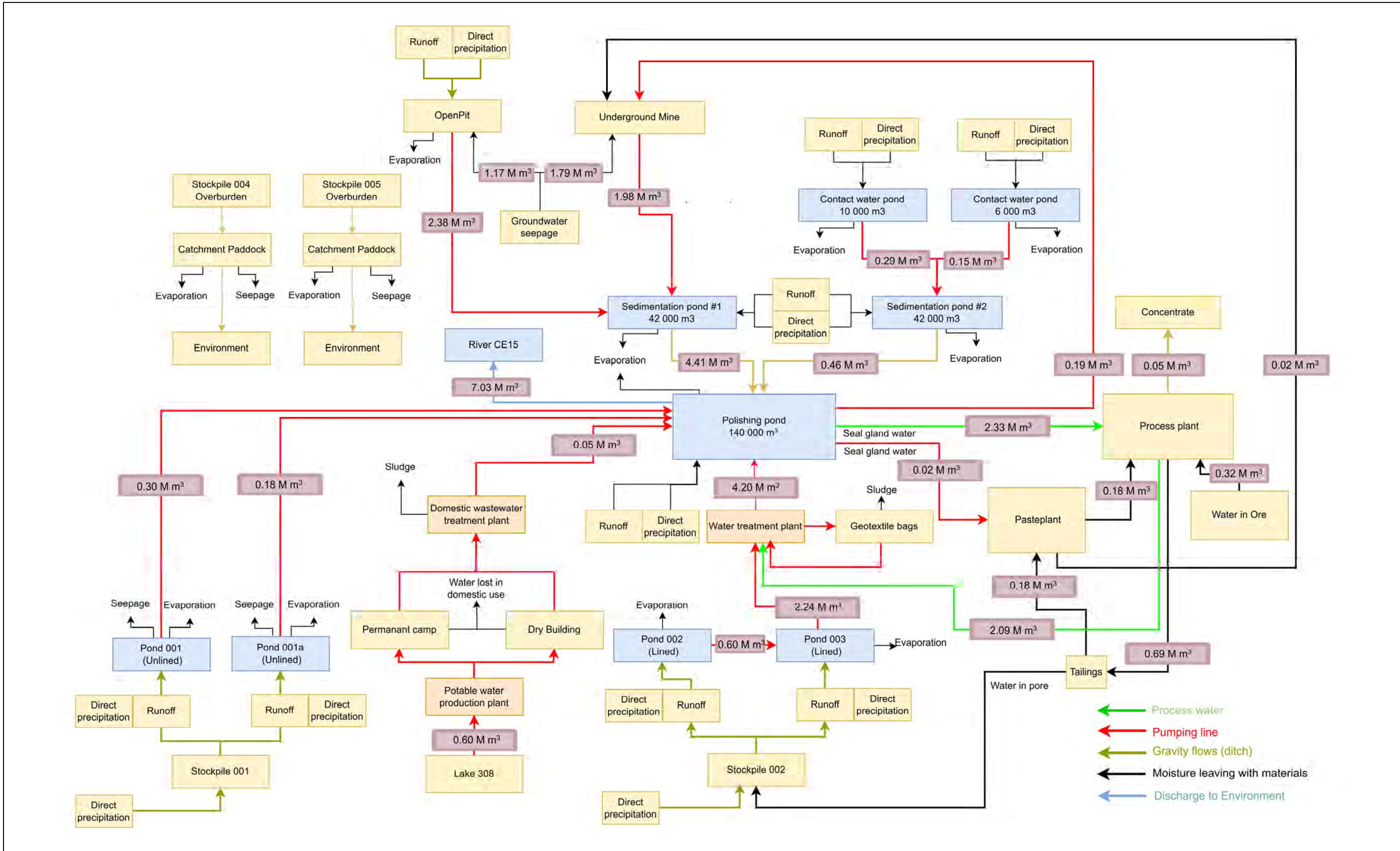


Figure 5-8 Mine site water balance

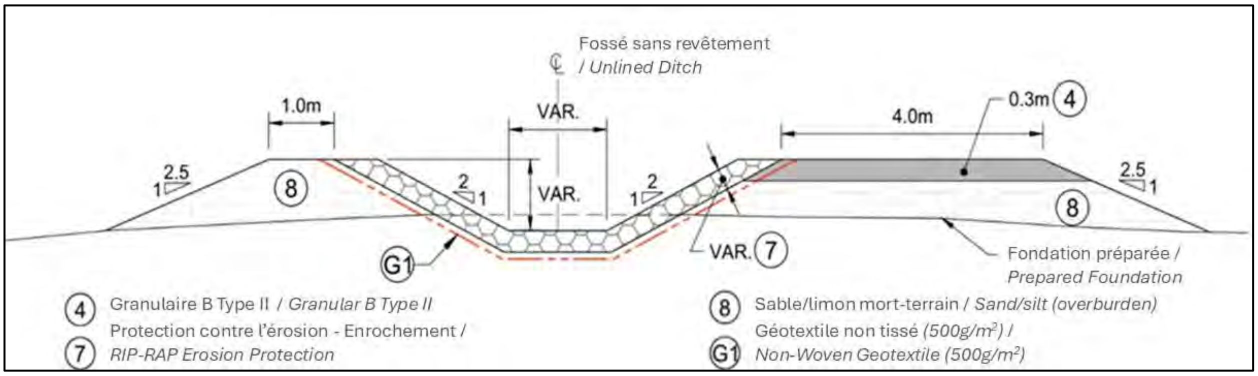


Figure 5-9 Typical section for Stockpile 01 water collection ditch

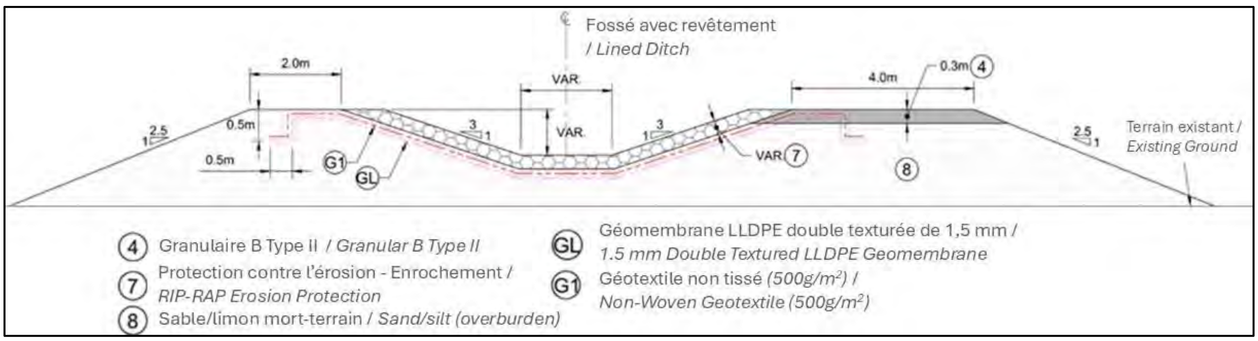


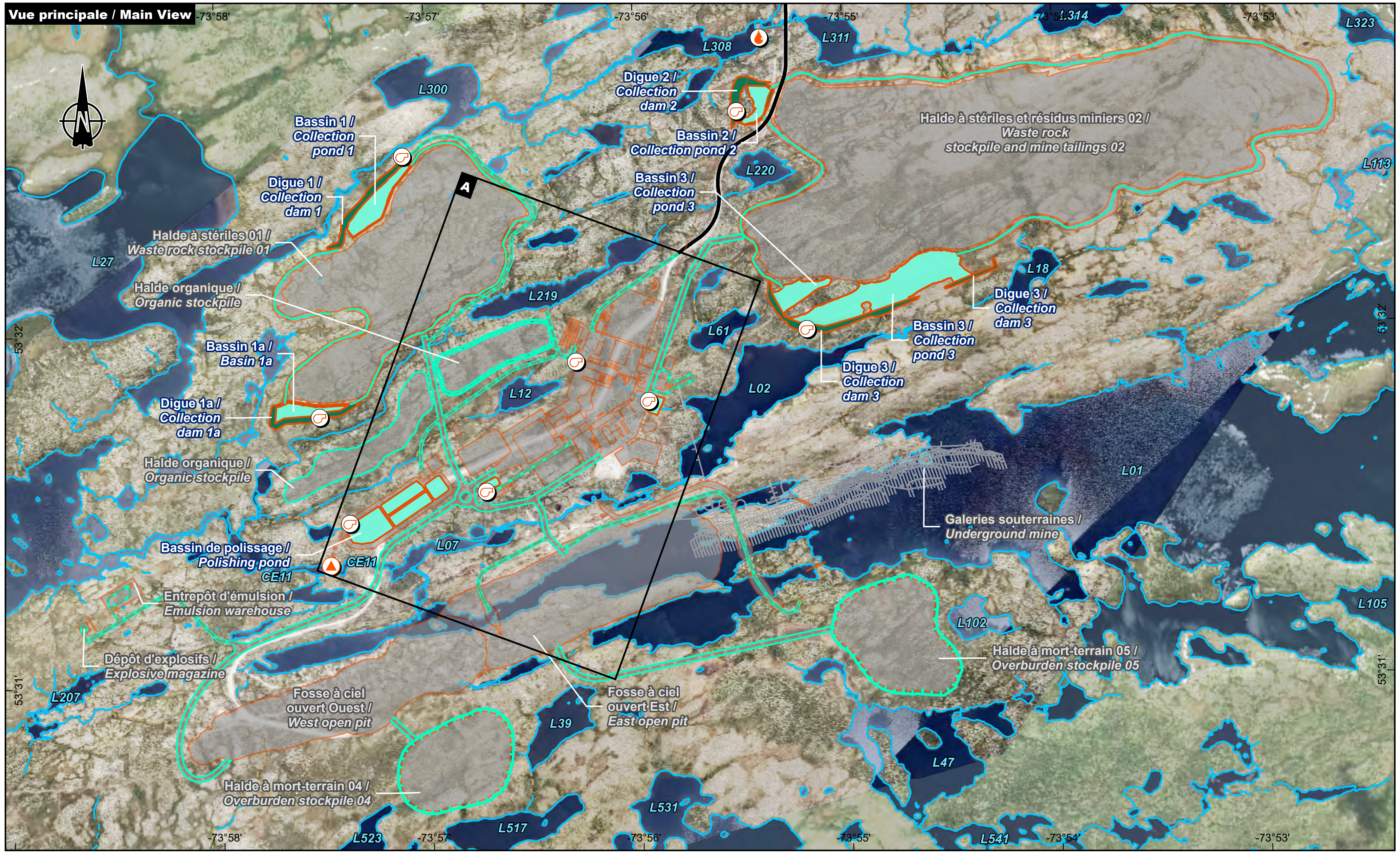
Figure 5-10 Typical section for Stockpile 02 lined water collection ditch

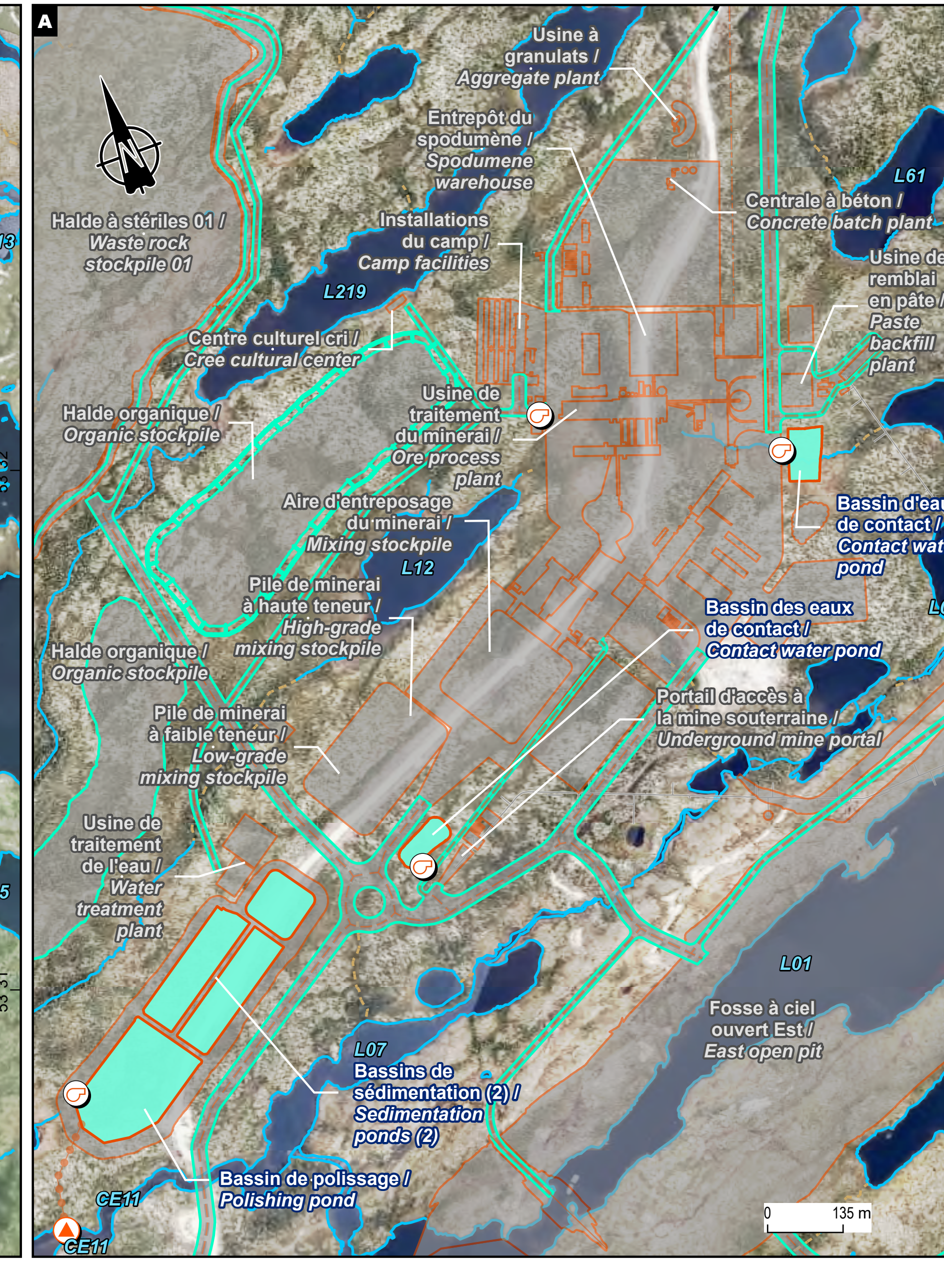
5.4.2.2 Contact water collection ponds

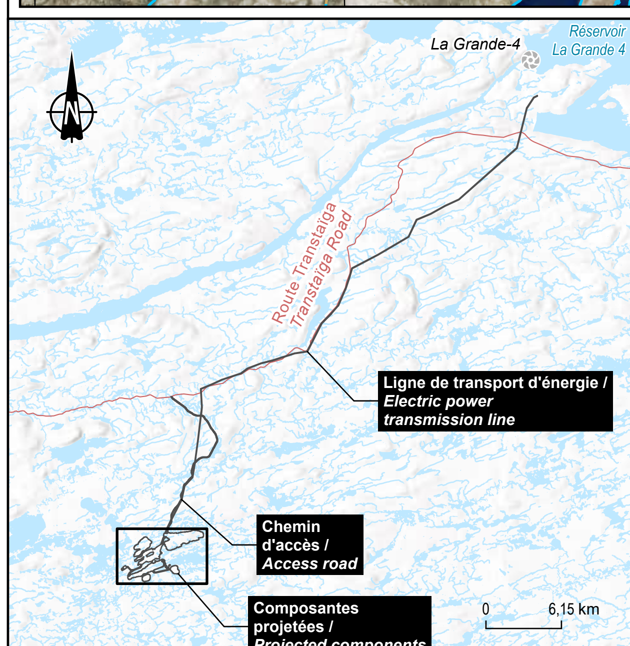
These ponds will serve as initial containment to collect runoff from Stockpiles 01 and 02 and the industrial area (Map 5-8). Once the contact water has been collected in these ponds, will be transferred by pumping systems to the treatment infrastructure for treatment (Section 5.4.4). In addition, emergency spillways will be incorporated into the design of all pond embankments to safely discharge inflows exceeding the EDF.

A total of six collection ponds are planned for the mine site, as detailed below and in Table 5-6. The ponds were designed with a capacity that takes into account the risk of failure in the event of severe weather conditions:

- Stockpile 01 (Pond 01 and Pond 01A): Combination of 24-hour freezing and 100-year snowmelt in 13 days, with a required freeboard of 1.0 m above the peak environmental design flood (EDF) water level.
- Stockpile 02 (Pond 02 and Pond 03): Combination of the 2,000-year rainfall event in 24 hours and the 100-year snowmelt in 13 days, with a required freeboard of 1.5 m above the peak EDF water level.
- Industrial area collection ponds (CP1 and CP2): Combination of the 100-year rainfall event in 24 hours and the 100-year snowmelt in 13 days.







Zone d'étude / *Study Area*

Projet / *Project*

Composantes du projet / *Project Components*

Existante / *Existing*

Chemin d'accès / *Access road*

Projetées / *Projected*

Effluent minier / *Mining effluent*

Prise d'eau / *Water intake*

Station de pompage / *Pumping station*

Barrage / *Dam*

Canal / *Channel*

Chemin secondaire / *Secondary road*

Galerie souterraine / *Underground mine*

Ligne de transport d'énergie / *Power transmission line*

Fossé / *Ditch*

Bassin / *Basin*

Digue des bassins / *Basins dam*

Autres infrastructures projetées / *Other projected infrastructures*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Souterrain / *Underground*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-8 / *Map 5-8*

Bassins et fossées collecteurs du site/ *Basins and Collector Ditches of the Site*

Sources / Sources

SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025

0 260 520 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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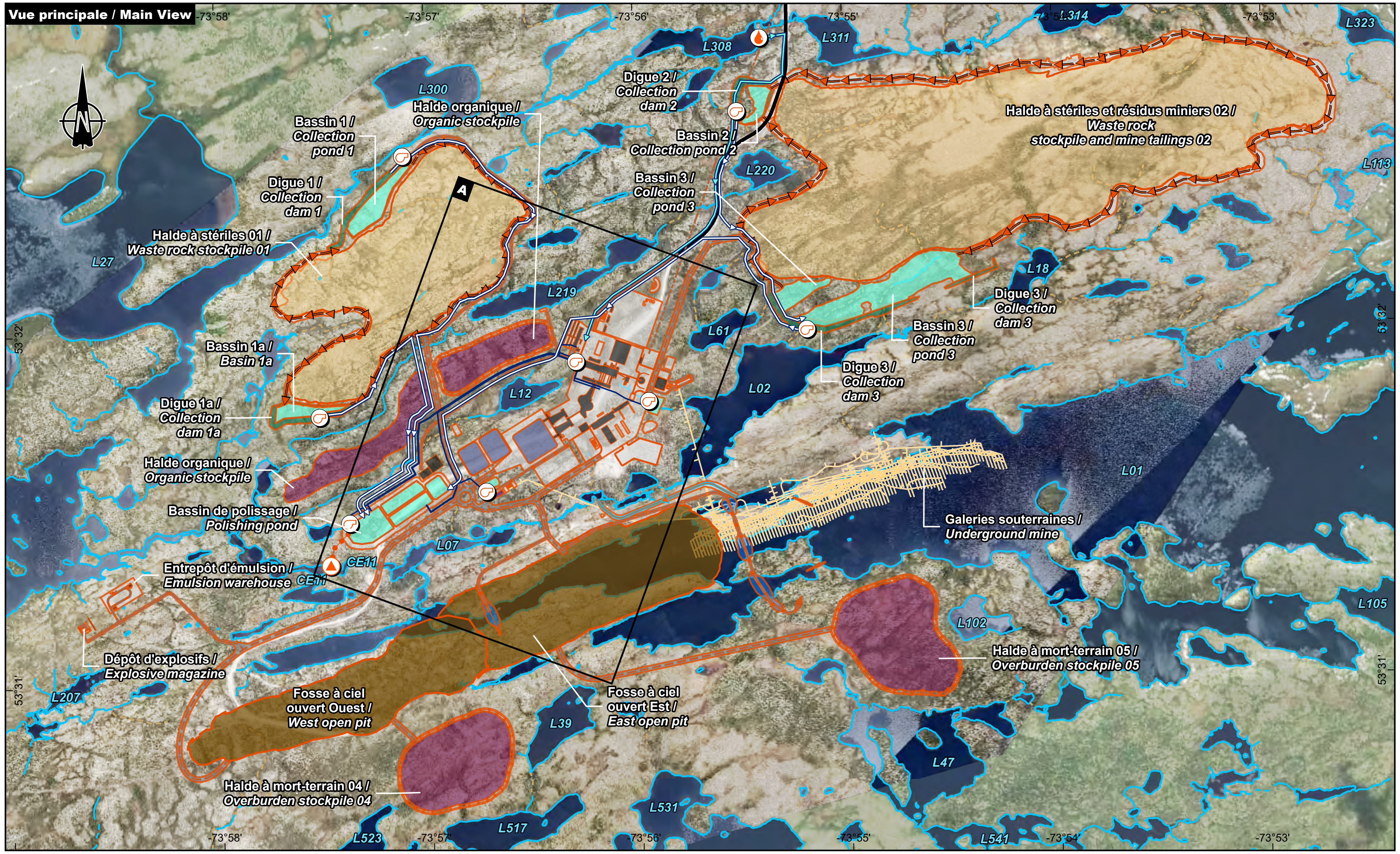

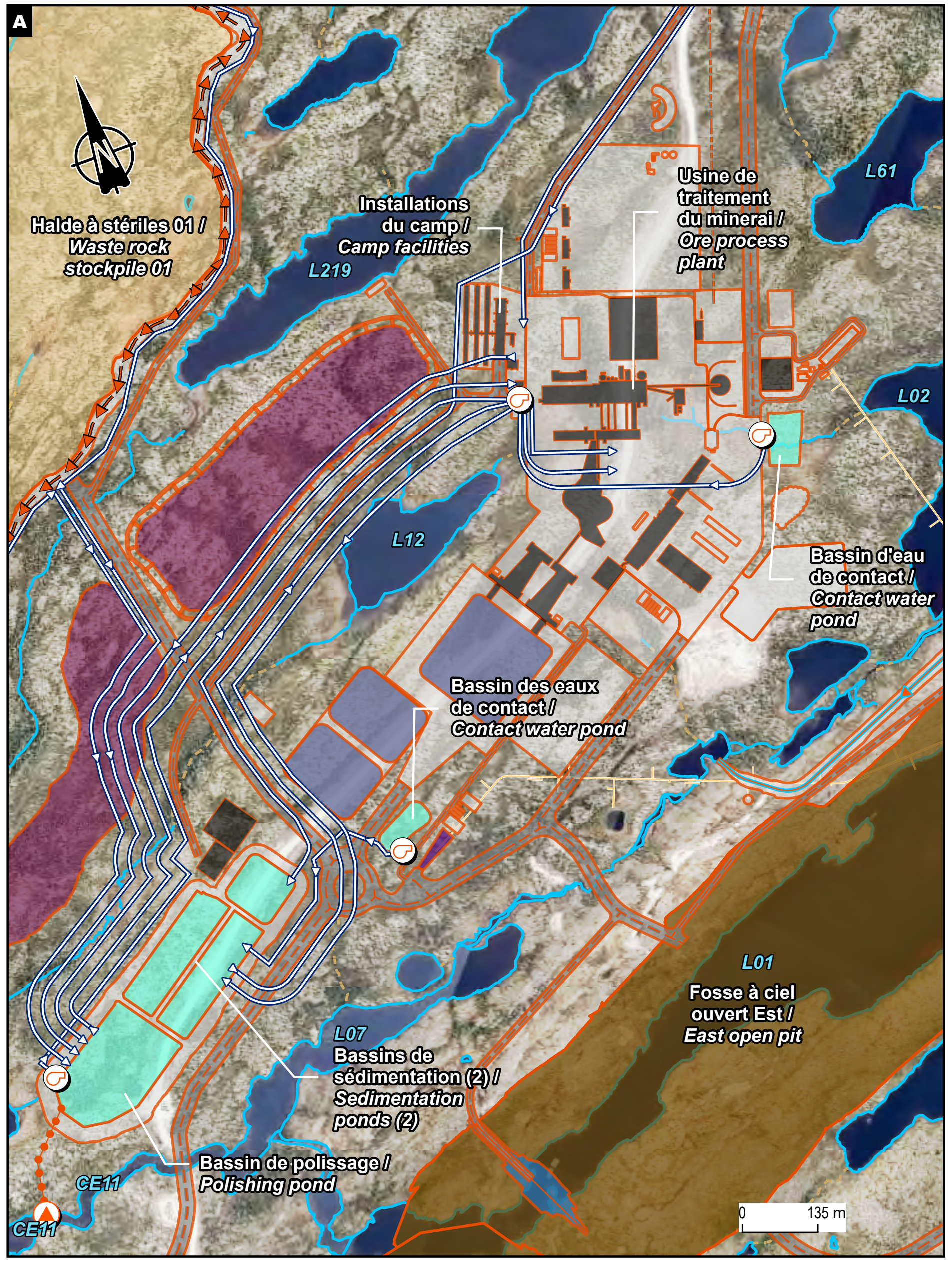

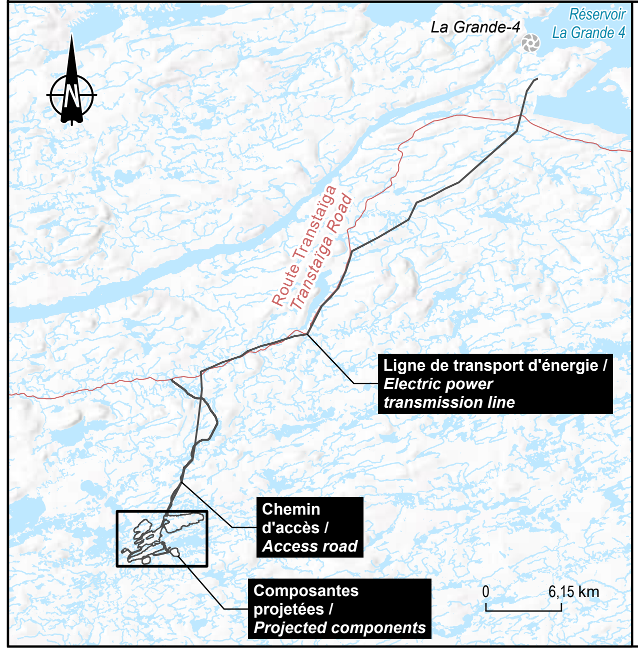

Zone d'étude / *Study Area*

Projet / *Project*

Composantes du projet / *Project Components*

Existante / *Existing*

Chemin d'accès / *Access road*

Projetées / *Projected*

Effluent minier / *Mining effluent*

Prise d'eau / *Water intake*

Station de pompage / *Pumping station*

Barrage / *Dam*

Canal / *Channel*

Canal de dérivation / *Diversion Channel*

Chemin secondaire / *Secondary road*

Fossé / *Ditch*

Galerie souterraine / *Underground mine*

Ligne de transport d'énergie / *Power transmission line*

Canalisation projetée / *Projected Pipelines*

Conduite d'eau potable (représentation) / *Drinking water pipe (representation)**

Conduite d'eau non potable (représentation) / *Non-potable water pipe (representation)**

Autre conduite / *Other pipe*

Composantes du projet / *Project Components*

Aire d'entreposage du minerai mixte / *Mixed ore stockpile*

Autre / *Other*

Bâtiment ou équipement / *Building or equipment*

Digue / *Dam*

Bassin / *Basin*

Digue des bassins / *Basins dam*

Fosse / *Pit*

Halde à mort-terrain et organique / *Overburden stockpile*

Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*

Portail d'accès à la mine souterraine / *Underground mine portal*

Voie de circulation / *Roadway*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Souterrain / *Underground*

* Affichage pour représentation seulement (ne correspond pas à l'emplacement réel) / *Display for representation only (does not correspond to the actual location)*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-9 / *Map 5-9*

Canalisations projetées pour les eaux potable, sanitaires et industrielles / *Pipelines Planned for Drinking Water, Sanitary, and Industrial Use*

Sources / Sources

SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014 / CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025
AtkinsRéalis, Canalisation projetée, 2025

0 260 520 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-26

Préparation / *Prepared by* : M-H. Brisson
Dessin / *Drawn by* : J. Roy
Approbation / *Approved by* : M-H. Brisson
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La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Table 5-6 Summary of the design specifications of the proposed collection ponds

Pond	Description	Catchment Area (m^2)	Required Storage Capacity (m^3)	Associated Collection Ditches
Pond 01	Collect runoff from Stockpile 01	621,400	80,000	Ditches 01-01 and 01-02
Pond 01A	Collect runoff from Stockpile 01	378,500	52,000	Ditches 01A-01 and 01A-02
Pond 02	Collect runoff from Stockpile 02	935,300	137,000	Ditches 02-01 and 02-02
Pond 03	Collect runoff from Stockpile 02	1,933,200	293,000	Ditches 03-01 and 03-02
Pond CP1	Collect runoff from the industrial area infrastructure	435,000	10,000	N/A
Pond CP2	Receives runoff from the industrial infrastructure section	230,000	6,000	N/A

Ponds 01, 01A, 02, and 03 will require embankments made of waste rock, with a layer of stones and sand. All embankments will be lined with a 1.5 mm textured geomembrane and the collection ponds for Stockpile 02 will also be lined with a 1.5 mm textured LLDPE geomembrane. Figure 5-11 shows a typical section of the embankments of contact water collection ponds.

5.4.2.3 Pumping stations

These pumping stations are strategically distributed across the site and are used to transfer contact water between the collection system and the treatment facilities (Section 5.4.5). The pumping system was also designed to provide operational support to supply water for various mining activities.

5.4.3 Dikes and watercourse diversion

As presented in Section 5.2.2.1, the open pit mine will be developed in two (2) phases, the West Pit and the East Pit, which will incorporate a portion of Lake L01. The project therefore includes the construction of a series of diversion and cut-off dikes, as well as a diversion channel to keep the mine footprint dry while ensuring the natural flow of water from Lake L01 (Map 5-1). The diversion channel will be constructed in a single stage in Year 2.

The diversion and cut-off dikes will hydraulically isolate the mine area while diverting water from the lake away from the mine footprint. Lake L01 has a total surface area of 4,478,314 m^2, an estimated volume of 24,463,185 m^3, an average depth of 6.3 m, and a maximum depth of 18.0 m. These parameters were incorporated into the dewatering planning and the design of the diversion structures.

The total watershed area of Lake L01 is 106 km^2. The total drainage area affected by the diversion is approximately 1.9 km^2 or 1.7% of the entire Lake L01 watershed.

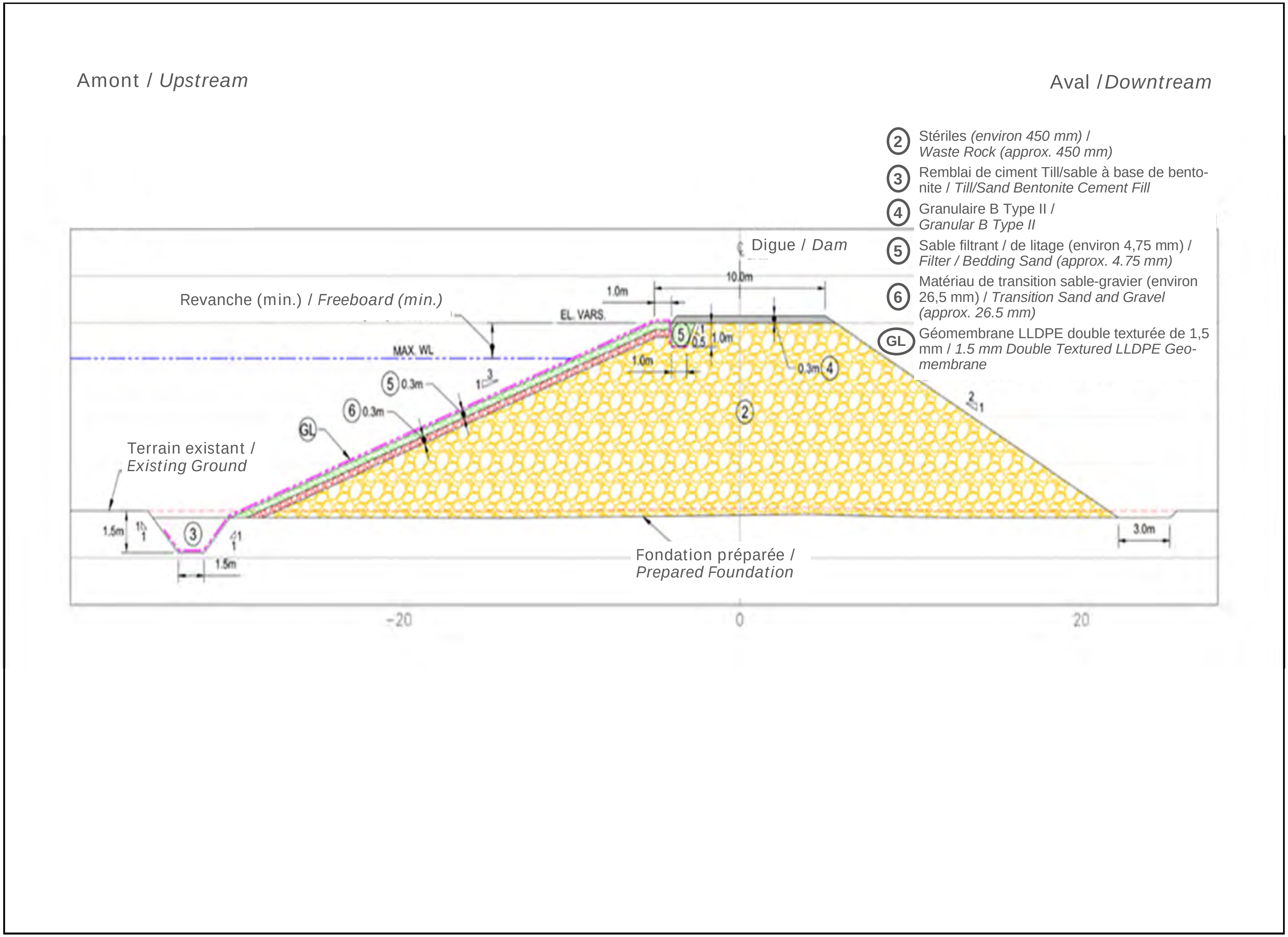


Figure 5-11 **Coupe type d'un remblai de rétention d'eau de contact conçu pour les bassins** / *Typical cross-section of a contact water retention embankment designed for the basins*

The diversion channel will redirect flow from Lake L01 to Lake L05. It will be approximately 870 m long with a 5 m base and an average gradient of approximately 0.3%. Most of the channel will be routed through bedrock with 1H:1V side slopes. The alignment of the channel was chosen to have a minimum offset of 45 m from the open pit mine, a minimum offset of 60 m from Lakes L02 and L03, and an offset of 10 m from Lake L04.

The diversion channel will replace the existing natural watercourse discharging from Lake L01 to Watercourse CE15. The design of the channel must therefore replicate the hydraulic conditions of the natural watercourse for fish habitat and fish passage. This will be achieved by providing a series of drops and pools along the channel bed to create varying hydraulic conditions. These hydraulic conditions will facilitate rapid flows and water depths, both upstream and downstream of the drops. Boulders will be placed between sections of the channel where high velocities are present to provide shelter for fish during their migration from downstream to upstream.

Figure 5-12 shows a schematic representation of the proposed fishway channel. Comparison between the results of the hydraulic modelling and field measurements showed that the velocities at the depths of the diversion channel are within a similar range of values to those measured in the natural watercourse.

Flow control structures, such as sluice gates or spillways, are not required for the diversion channel as designed. No additional control works are planned at this stage.

The cut-off dikes will be constructed on the east side of the open pit mine and will be developed in two (2) phases to match the pit development. For the West Pit, a single dikes is required, while four (4) dikes will be constructed during the development of the East Pit. These dikes will be located to the east of the West Pit dam.

The lake sediments present in the area where the dikes will be built will be removed by dredging to ensure a stable foundation for the structures.

The dikes are classified as “Extreme” by the CDA and “Class C” by Quebec’s *Dam Safety Act*, with a P value of 58. The dam classification determines the return period for the seismic event and the Inflow Design Flood (IDF) used in the dike design.

For a dike classified as “Extreme,” a return period of 1 in 10,000 or the Maximum Credible Earthquake is required according to 2019 CDA guidelines and 2025 MELCCFP guidelines.

The following features are included in the Lake L01 cut-off dike design (Figure 5-13):

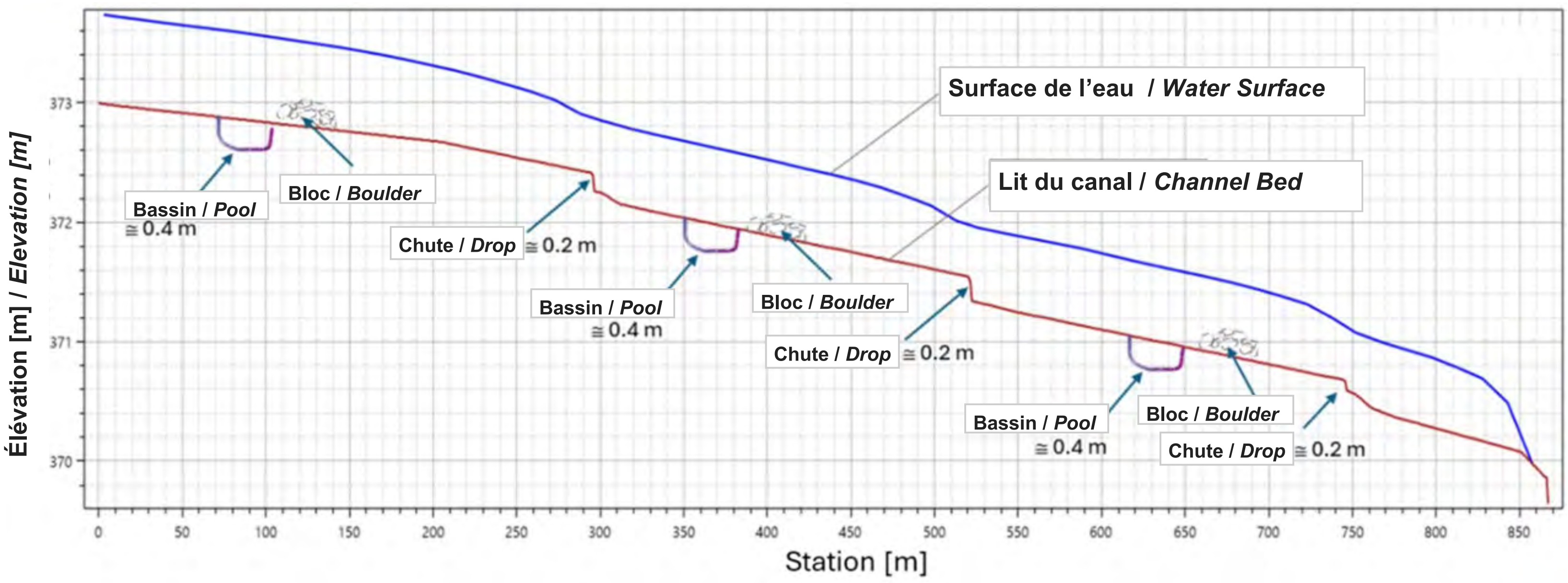
— Silt curtains will be required during construction to reduce sediment transport.

— Lake sediments will be removed from the dike foundation by dredging.

— The dikes will be constructed with geochemically inert rockfill.

— The berms will be constructed by dumping and dozing the rockfill, starting at the edge of the lake.

The berm crest elevation is designed to maintain a height of approximately 1 metre above the lake water level. The crest width of the dike has been designed to be 6.0 metres.



Source : AtkinsRéalis, Juillet 2025

Figure 5-12 **Profil du canal de dérivation avec habitat/passe à poissons proposé** / Cross-section of the diversion channel proposed with fish habitat/fish passage

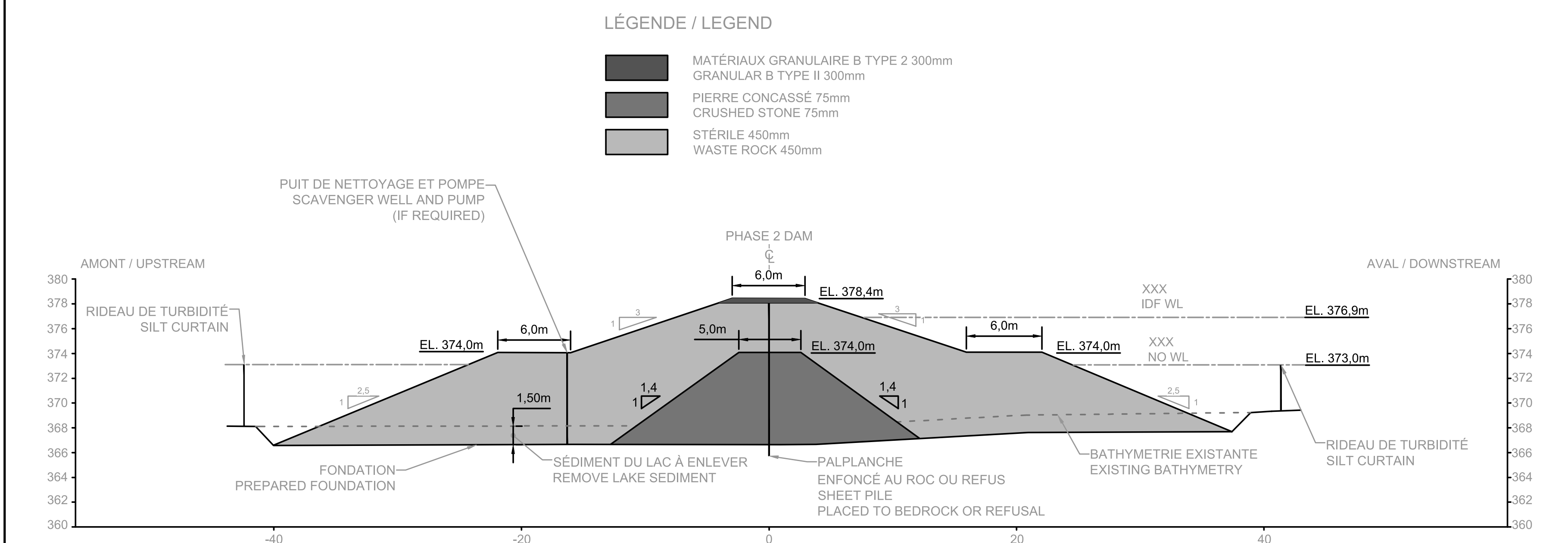


Figure 5-13 **Coupe transversale typique de la digue de coupure (section critique) /** ***Typical cross-section of the cut-off dam (critical section)***

5.4.4 Dewatering of Lake 01 – Sediment and water management

The dewatering of Lake 01 as part of the phased development of the open pit requires a staged sediment and water management strategy to mitigate environmental risks, ensure operational efficiency, and the long-term stability of the structures. Strategies have been developed for the West phase and the East phase of pit development based on the evolving footprint of the pit and the associated drainage area, as well as the topography/bathymetry of the area, according to the existing boundaries of the lake.

West Pit phase

For the West Pit phase, the western portion of Lake L01 is to be dewatered following the construction of the West Pit cut-off dams. The sediment and water management approach for the West Pit is based on dividing the dewatered area into two zones (West and East) by constructing a sediment control dam (Berm 1) at a narrow and shallow point within the former lakebed approximately 400 metres west of the mouth Watercourse CE1 (Figure 5-14).

In the East zone of the dewatered area, sediments are to be removed to prevent mobilization into the pit. The runoff will be directed to the open pit, where it will be classified as contact water and subsequently transferred to the industrial area ponds for treatment of TSS.

In the West zone of the dewatered area, sediments will be left in place. To prevent sediment from being carried into the pit, the permeable berm (mentioned above) along with a pumping system will be installed to manage runoff flows up to a 10-year flood. The water collected in this way will be pumped to a sedimentation pond in the industrial area before being discharged into the environment.

East Pit phase

For the East Pit phase, the open pit footprint will be extended further into the former lake, requiring additional sediment and water management measures across three zones of the dewatered area: North, Central, and South

In the North and Central zones, sediments will be removed to eliminate the risk of mobilization. Runoff water will be collected in the pit and then pumped to the industrial area for treatment (Figure 5-15).

The South zone will be separated by a sediment control dam (Berm 2) to prevent sediment from reaching the pit (Figure 5-15). This berm, located at the highest surface of the natural topography, was designed to contain flow volumes up to a 10-year flood. In the South zone, sediments will be left in place. A pumping system will direct runoff to a sedimentation pond to control TSS prior to discharge.

5.4.5 Mine and industrial water treatment plant

A water treatment plant (WTP) has been designed to treat the collected water, which may be acidic or contain metals. The plant operates using a physico-chemical process (Figure 5-16) that includes:

- metal precipitation through pH adjustment and the use of chelating agents;
- coagulation and ballast-assisted flocculation;
- high-rate clarification.

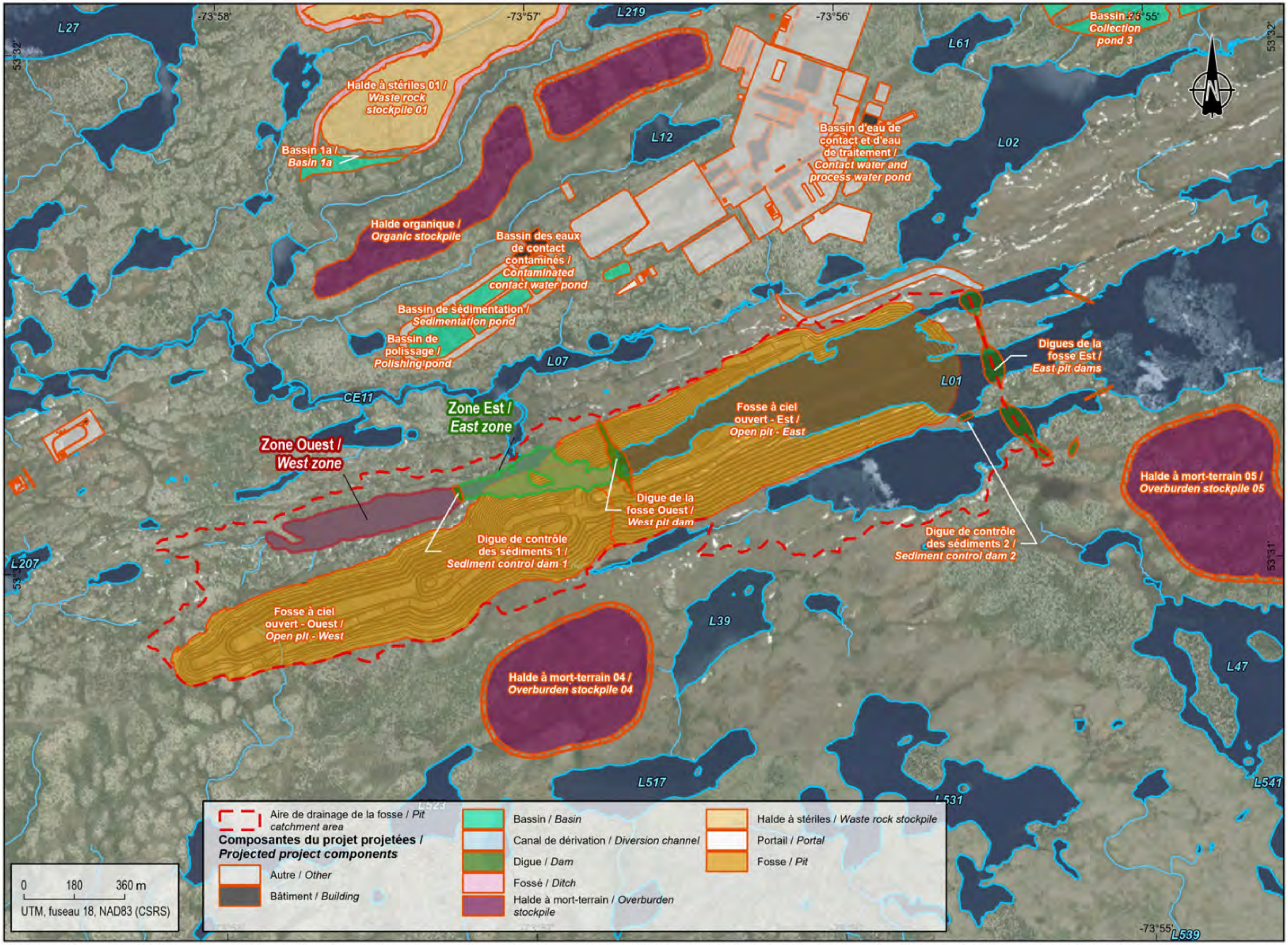


Figure 5-14 Concept de gestion des sédiments et de l'eau au niveau de la fosse ouest de la mine à ciel ouvert - Fosse Ouest / *Sediment and Water Management Concept for the West Pit of the Open-pit Mine – West Pit*

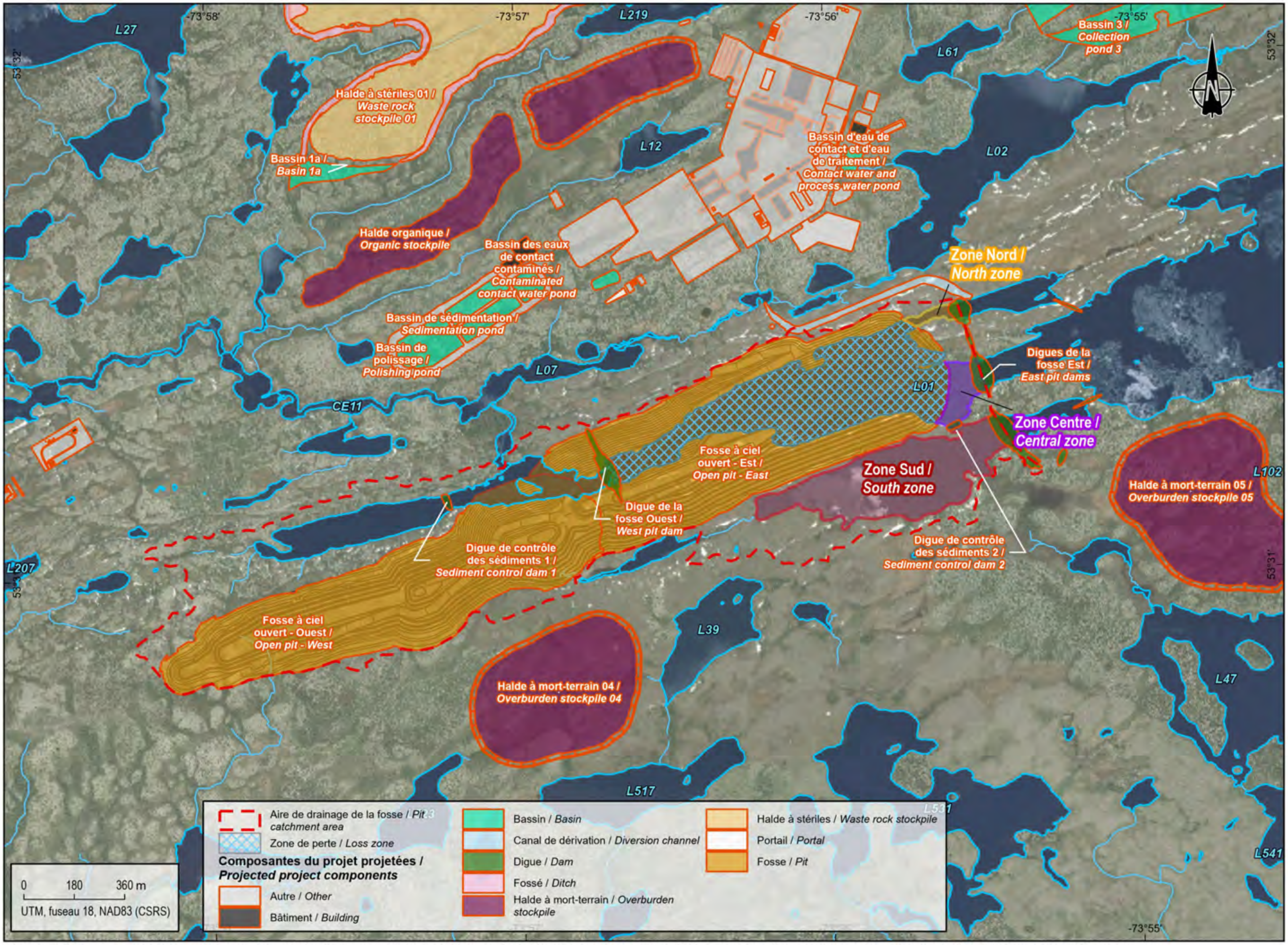


Figure 5-15 Concept de gestion des sédiments et de l'eau au niveau de la fosse Est de la mine à ciel ouvert - Fosse Est / *Sediment and Water Management Concept for the East Pit of the Open-pit Mine – East Pit*

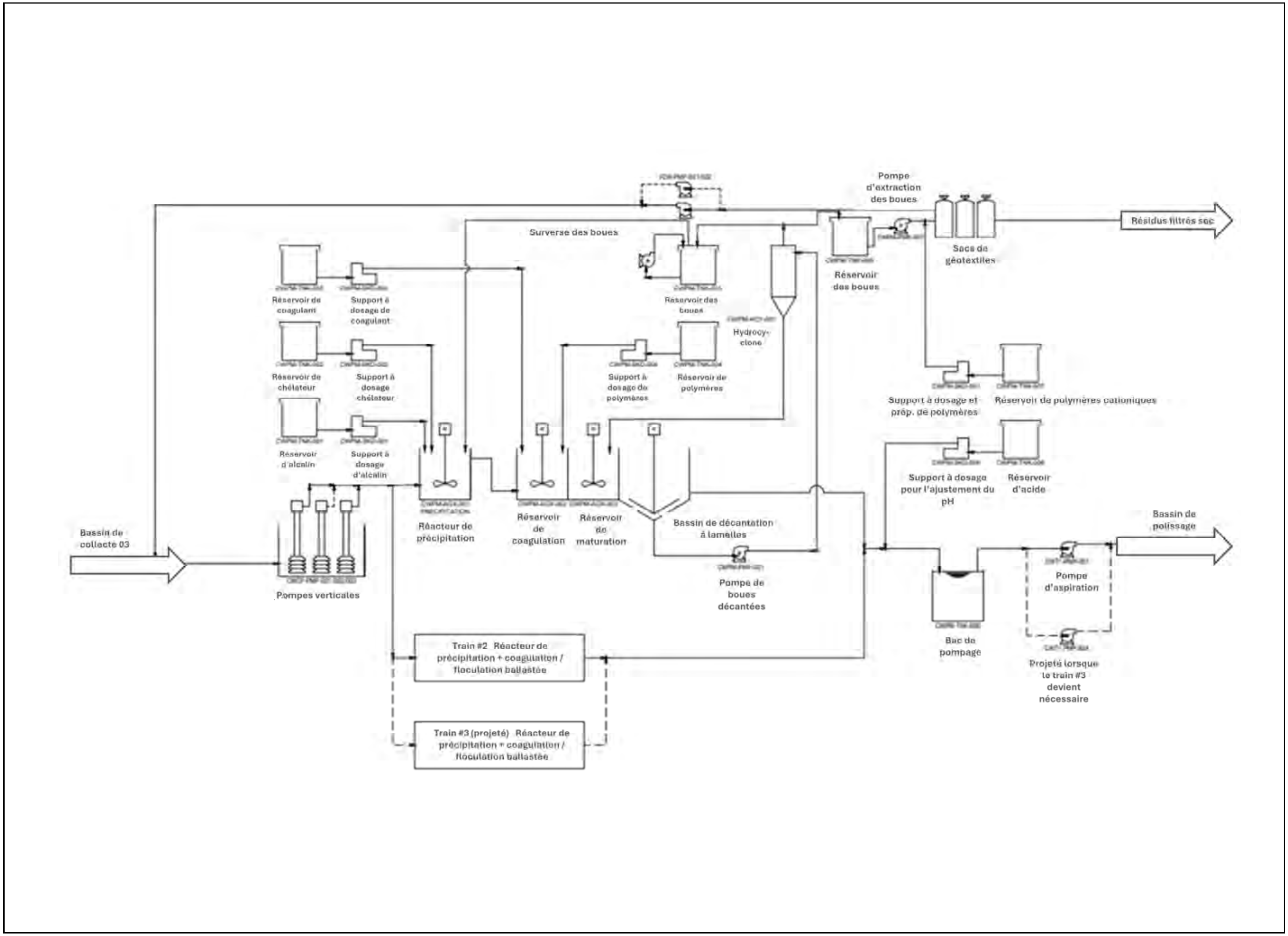


Figure 5-16 **Schéma simplifié de l'usine de traitement des eaux usées minières et industrielles /** *Simplified diagram of the mining and industrial wastewater treatment plant*

This process also includes a containerized lamellar clarifier using microsand to optimize settling, as well as a hydrocyclone for recovering the microsand for reuse. A distribution box allows part of the sludge to be recirculated upstream of the process to promote particle agglomeration.

The treated water is discharged to a pump-box, which then feeds the polishing pond to complete the treatment process and ensure compliance with effluent regulations. The filtrate from the dewatering bags is collected in a drainage ditch and returned to the treatment system by a sump pump, while the water from the polishing pond can be used to supply the process plant, cemented paste plant, or underground mine.

The sludge generated during treatment will be stored and dewatered using geosynthetic filtration bags. The consolidated sludge will then be removed from the bags and transferred to Stockpile 02 for final disposal. The water extracted from the bags will be pumped to the treatment.

The system will be pre-assembled in fully mounted containers and then shipped to the site. This modular configuration allows for flexible and gradual installation according to operational needs. The concrete pad housing the geosynthetic filtration bags will be divided into multiple bays, each containing one filtration bag. At any given time, one bay will remain on standby while the others are active. When the bags in the active bay are full, clarified water will be redirected to the standby bay. Three bays will be used during the initial phases of operations, and a fourth bay will be added when the mine reaches its full development level. The collected sludge will then be further dewatered, and the resulting dry sludge will be transferred to Stockpile 02.

The facility will ensure compliance with the discharge criteria set out in the *Metal and Diamond Mining Effluent Regulations* (C.R.C., c. 819), Directive 019, and the *Regulation respecting the quality of drinking water* (Q-2, r. 40). Additional environmental discharge objectives (EDOs) may be added to the above requirements. These EDOs will be defined as necessary by the Ministère de l’Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP) during the authorization process.

5.4.6 Mine effluent

The treated mine effluent will be discharged into Watercourse CE11, which flows into Lake L27 after passing through Lake L10 and Watercourse CE15 (Appendix 5-10). This receiving environment was selected on the basis of a hydrological and biological study. There will be only one discharge point for the entire mine complex. The final effluent discharge point is located at km 2.5 of the series of lakes and watercourses between the entrance to the diversion channel and Lake L27.

The polishing pond will collect all treated effluent from the water treatment plant to ensure final treatment and homogenization of the effluent. Given the proximity between the polishing pond and the Watercourse CE11, as well as favourable topography, the final treated effluent will be discharged by gravity. To establish the modelling conditions, the average flow rate of the upstream diversion channel was set at 3.1 m^3/s and the final effluent flow rate at 0.93 m^3/s.

To ensure adequate mixing of the final treated effluent in the receiving environment, a subsurface discharge diffuser system will be required. The discharge from the polishing pond consists of three (3) pipes with a diameter of 91 cm (36 in.), which gradually reduce to 61 cm (24 in.), 41 cm (16 in.), and 15 cm (6 in.) at the outlet into the watercourse. This configuration ensures sufficient flow velocity within the diffusion system. Each submerged pipe, 90 m long, is equipped with 14 15 cm (6 in.) diffusers fitted with check valves and held in place by 277 kg (610 lb) concrete blocks acting as ballast.

The longitudinal mixing zone extends approximately 200 m downstream from the discharge point, promoting gradual homogenization of the effluent before it reaches Lake L27 (Map 5-10, Appendix 5-10). According to the model, complete mixing occurs well upstream of the lake.

Monitoring stations at the mine effluent will continuously measure flow rate, pH, conductivity, dissolved metals, and turbidity.

5.4.7 Potable water

Fresh water for potable use will come from Lake L308 (Map 5-1). A study was conducted to estimate the hydrological capacity of Lake L308 using a water balance for the lake, which is attached in Appendix 5-11. There will be only one intake and one treatment plant for the entire site. Water will be pumped from a barge using two submersible pumps to ensure full redundancy. An above-ground, insulated, and heat-traced pipe will run between the pumps and the treatment plant.

The raw water will be treated using ultrafiltration and nanofiltration to remove total suspended solids (TSS) and total organic carbon (TOC) from the surface water year-round, in accordance with environmental requirements. Disinfection will be achieved through ultraviolet (UV) treatment and chlorination. Potable water storage tanks will ensure a continuous supply, even during peak demand periods such as shift changes.

5.4.8 Sewage water

Sewage generated from various buildings will be collected and directed to an equalization tank to buffer flow variations. The wastewater will then undergo biological treatment using a moving bed biofilm reactor (MBBR) system. To ensure compliance with effluent standards, phosphorus removal will be achieved through chemical coagulation, followed by disinfection using UV lamps.

All sludge produced during the domestic wastewater treatment process will be extracted, stored in a dedicated tank, and transported by a specialized contractor to an authorized disposal facility. The potential for sludge stabilization through liming and subsequent disposal on the overburden pile will be assessed in future studies.

The treated effluent will be discharged into a polishing pond via an above-ground pipe, ensuring a single discharge point during operations.

5.4.9 Other water treatment systems

Secondary systems will ensure the targeted treatment of specific effluents:

- equipment washing: recycling and cartridge filtration;
- oily water: API separators and coalescing filters;
- firewater: temporary containment ponds prior to treatment.

All these systems will be integrated into the overall water management plan and incorporated into the annual environmental monitoring program.

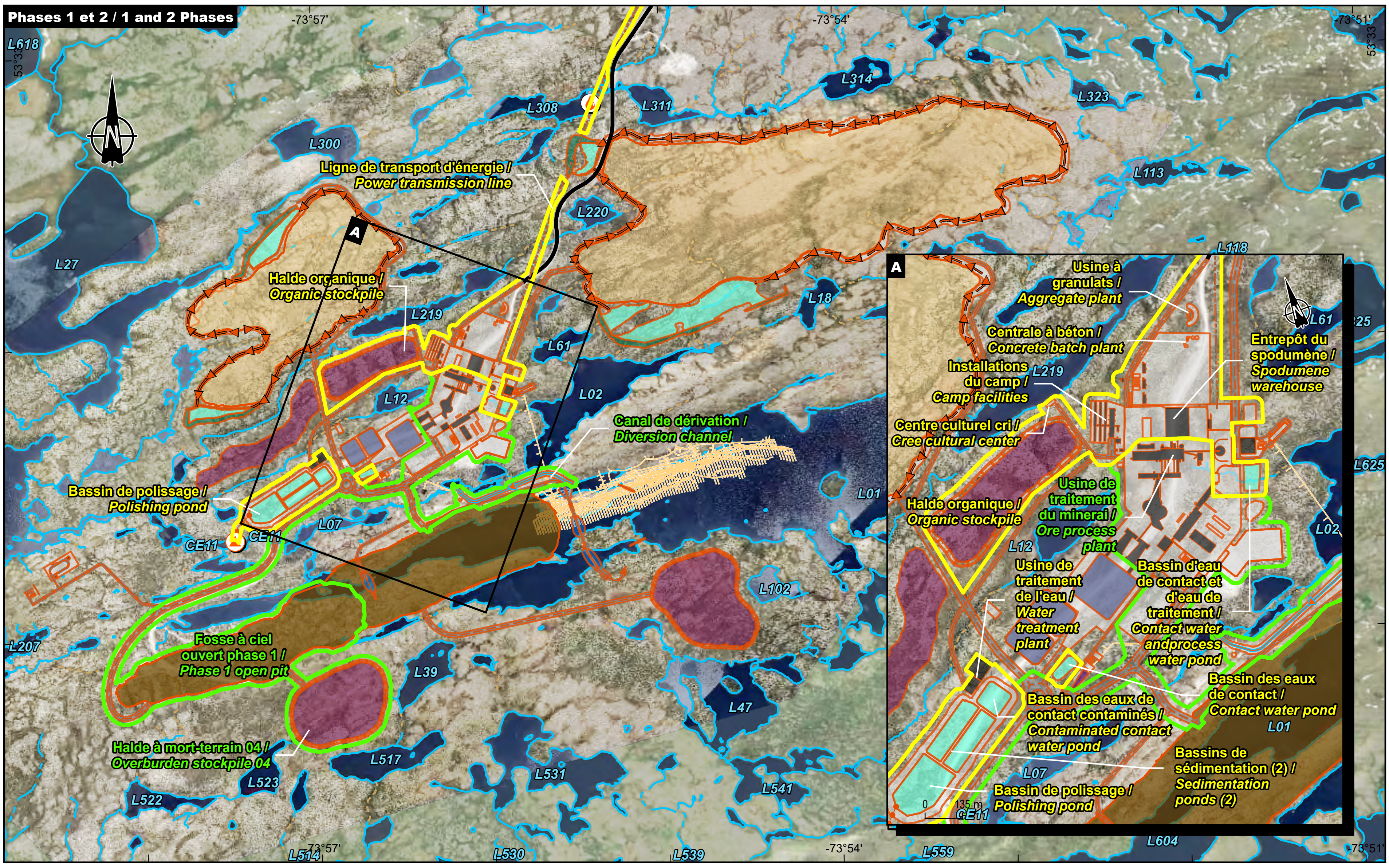
5.5 Activities planned during the construction, operations, and closure phases

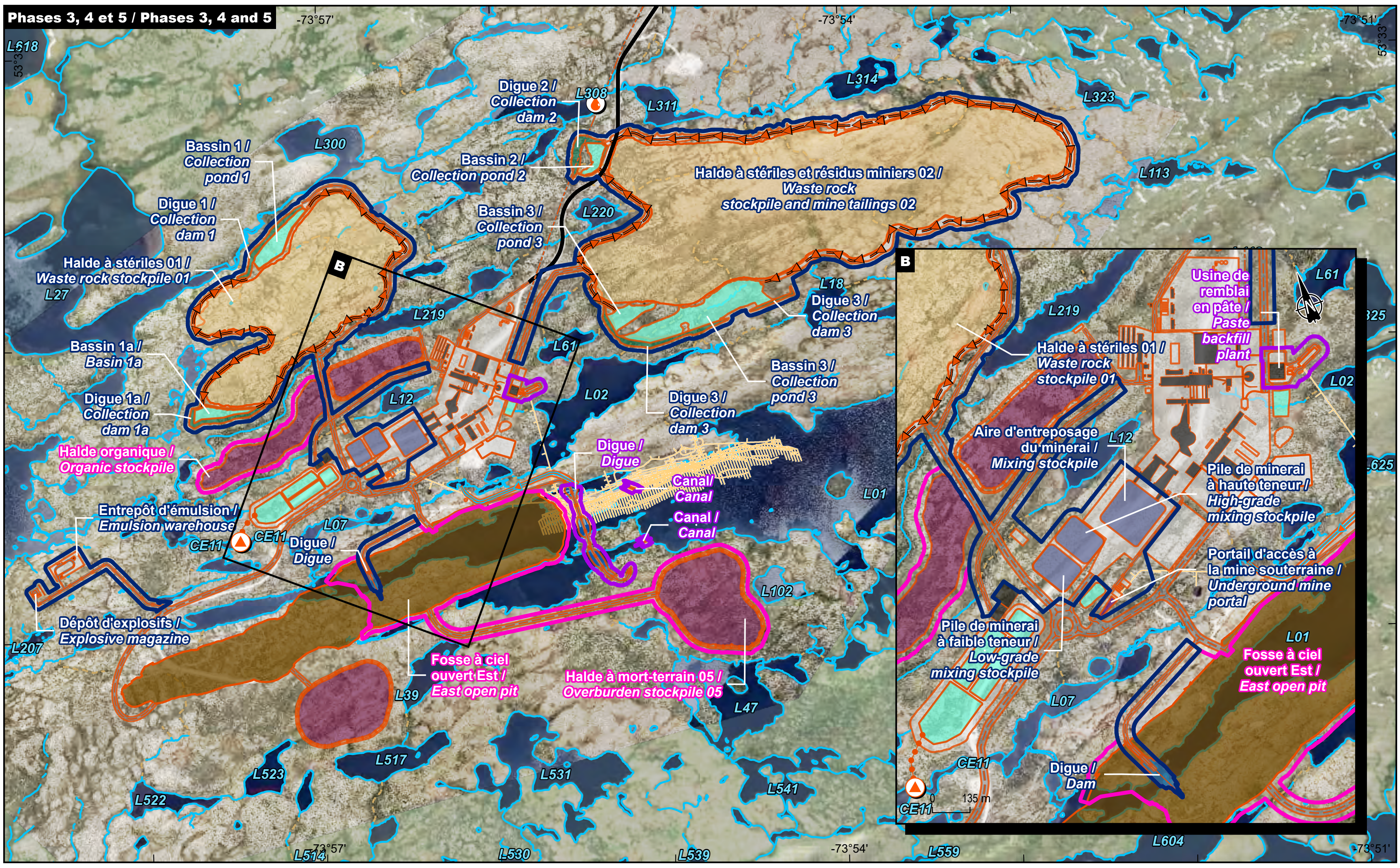
The project will proceed in three main phases: construction, operations, and closure/restoration. Each includes planned activities aimed at ensuring the technical performance, safety, and environmental compliance of the mine site.

5.5.1 Construction activities

The construction phase will take place in several phases and span approximately 4 years, from February 2028 to March 2032, and will include the following activities:

- **Site preparation:** This activity includes selective tree clearing, stripping of organic soil and its storage in designated areas, and the installation of temporary fences and roads.
- **Earthwork and drainage:** This activity includes levelling the areas where the infrastructure will be built, removing overburden for the pit and storing it at Stockpiles 04 and 05, and preparing the waste rock stockpiles, ponds, and installation areas for the various buildings and the plant. Map 5-11 shows the water management during the construction period.
- **Construction of key infrastructure:** This activity includes:
  - bringing the 20 km access road up to standard (bridges and culverts);
  - the construction of the 120 kV power line and the planned transformer station at the mine site;
  - the construction of industrial, maintenance, and administrative buildings;
  - the installation of water management ponds and treatment plants (potable water and wastewater);
  - the installation of the permanent camp and telecommunications systems.
- **Installation of ore processing equipment:** This activity involves installing components related to the concentration plant, including crushers, DMS circuits, magnetic separators, and filter presses.
- **Installation of security and environmental systems:** This activity involves the installation of emergency ponds, monitoring stations, and weather stations.





Composantes du projet / *Project Components*

Existante / *Existing*

- Chemin d'accès / *Access road*

Projetées / *Projected*

- Effluent minier / *Mining effluent*
- Prise d'eau / *Water intake*
- Barrage / *Dam*
- Canal / *Channel*
- Canal de dérivation / *Diversion channel*
- Chemin secondaire / *Secondary road*
- Fossé / *Ditch*
- Galerie souterraine / *Underground mine*
- Ligne de transport d'énergie / *Power transmission line*
- Aire d'entreposage du minerai mixte / *Mixed ore stockpile*
- Autre / *Other*
- Bâtiment ou équipement / *Building or equipment*
- Digue / *Dam*
- Bassin / *Basin*
- Digue des bassins / *Basins dam*
- Fosse / *Pit*
- Halde à mort-terrain et organique / *Overburden stockpile*
- Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*
- Portail d'accès à la mine souterraine / *Underground mine portal*
- Voie de circulation / *Roadway*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Souterrain / *Underground*

Étapes de construction des composantes projetées / *Construction Stages of the Projected Components*

- Étape 1 / *Stage 1*
- Étape 2 / *Stage 2*
- Étape 3 / *Stage 3*
- Étape 4 / *Stage 4*
- Étape 5 / *Stage 5*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 5-10 / *Map 5-10*
Gestion des eaux durant la période de construction / *Water Management During the Construction Period*

Sources / Sources
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2026-03-26

Préparation / Prepared by : M-H. Brisson
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La précision des limites et des mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Table 5-7 shows a summary schedule of the main stages of surface construction work only. It describes the sequence of five preparatory stages corresponding to the work carried out in the various areas of the mine site. These stages are illustrated in Map 5-11, which also shows the planned water management during this period.

Table 5-7 Summary schedule of key construction milestones (surface work only)

Milestone	Start date	End date
Preparation for pre-work and construction	**February 2028**	**March 2032**
Stage 1—Clearing and construction of ponds in the industrial area and their access roads, the workers' camp, the aggregate plant, the North industrial zone, the fuel storage area and the organics stockpile. Clearing along the power line and associated access roads.	February 2028 (tree clearing)	March 2028 (tree clearing)
Stage 2 – Clearing for the diversion channel, overburden stockpile 04, the ore processing plant area, and the land portion of phase 1 of the pit, stripping, and water management.	March 2028 (tree clearing)	April 2028 (tree clearing)
Stage 3 - Clearing and development of dike 1, the emulsion and explosives plant, the ore stockpile area, the underground mine portal, Stockpiles 01 and 02, and their associated ponds and roads.	April 2028 (tree clearing) July 2028 (work in water)	May 2028 (tree clearing) August 2028 (work in water)
Drainage of Lake L01- West pit	July 2028	February 2029
Construction of surface infrastructure – Part One (Steps 1 and 3).	February 2028	February 2030
Stage 4 – Clearing and development of dike 2, paste plant and construction of the second phase of the ore processing plant.	August 2031 (tree clearing) August 2031 (work in water)	September 2031 (tree clearing) November 2031 (work in water)
Stage 5 – Clearing and stripping of overburden stockpile 05, phase 2 of the pit and the second organics stockpile	September 2031 (tree clearing)	December 2031 (tree clearing)
Drainage of Lake L01 – East pit	November 2031	November 2032
Construction of surface infrastructure – Part Two (Stages 4 and 5).	August 2031	November 2032

Note : * This should be discussed with DFO to assess the possibility of conducting the work outside the low-risk period for salmonids.

All construction sites will be governed by an environmental management plan and a health and safety program that complies with CNESST regulations.

5.5.2 Mining operations

The operations phase will run from 2030 to 2049, corresponding to the estimated lifespan of the mine. The main activities include:

- The extraction of ore from the open pit and underground mines by drilling and blasting, as well as its loading and transport to the concentration plant.
- Management of waste rock through segregation of low risk (Stockpile 01) and potentially metal leaching (Stockpile 02) waste rock stockpiles and gradual rehabilitation of stabilized areas.

- Ore processing at the concentrator, which will operate continuously (5.1 Mt/year) with monitoring of recovery and concentrate quality parameters.
- Ongoing maintenance of infrastructure, including regular inspection of dikes, ponds, and roads.
- Environmental monitoring of the site, including monitoring of water quality, air quality, noise levels, and wildlife, in accordance with the environmental monitoring plan.
- Transportation of the concentrate by truck to the rail transshipment site in Matagami, including monitoring of transport-related logistics and emissions.

Operations will maintain a permanent workforce of approximately 1,100 employees, including operational, maintenance, laboratory, and administrative staff. A continuing education program will be offered in collaboration with Cree communities and regional institutions.

5.5.3 Mine site restoration

Closure and restoration activities will begin gradually in 2045, in parallel with the winding down of mining operations, and will continue until 2052. These activities will focus on restoring the site to a safe, stable, and ecologically functional state.

A redevelopment and restoration plan will be prepared in accordance with the *Guide de préparation du plan de réaménagement et de restauration des sites miniers au Québec* (Guide for the preparation of redevelopment and restoration plans for mine sites in Quebec) (MERN, 2022) and submitted to the Ministère des Ressources naturelles et des Forêts (MRNF) for approval. All mining infrastructure will be subject to redevelopment and restoration measures, including mining waste storage areas, open pits, various buildings, etc.

The main measures planned are:

- the dismantling of non-reusable infrastructure and the removal of equipment;
- profiling of waste rock piles and covering with inert materials to limit erosion and infiltration (Figure 5-17);
- pits flooding;
- soil rehabilitation and revegetation using local species;
- post-closure monitoring (water, stability, vegetation) for a minimum period of five years;
- monitoring of community engagement, including consultation on the final restoration of the site.

A budget of CAD 248,4 million is planned for the closure, including post-closure monitoring and a contingency margin of 20%. These costs will be covered by a financial bond with the MRNF, in accordance with Quebec regulatory requirements.

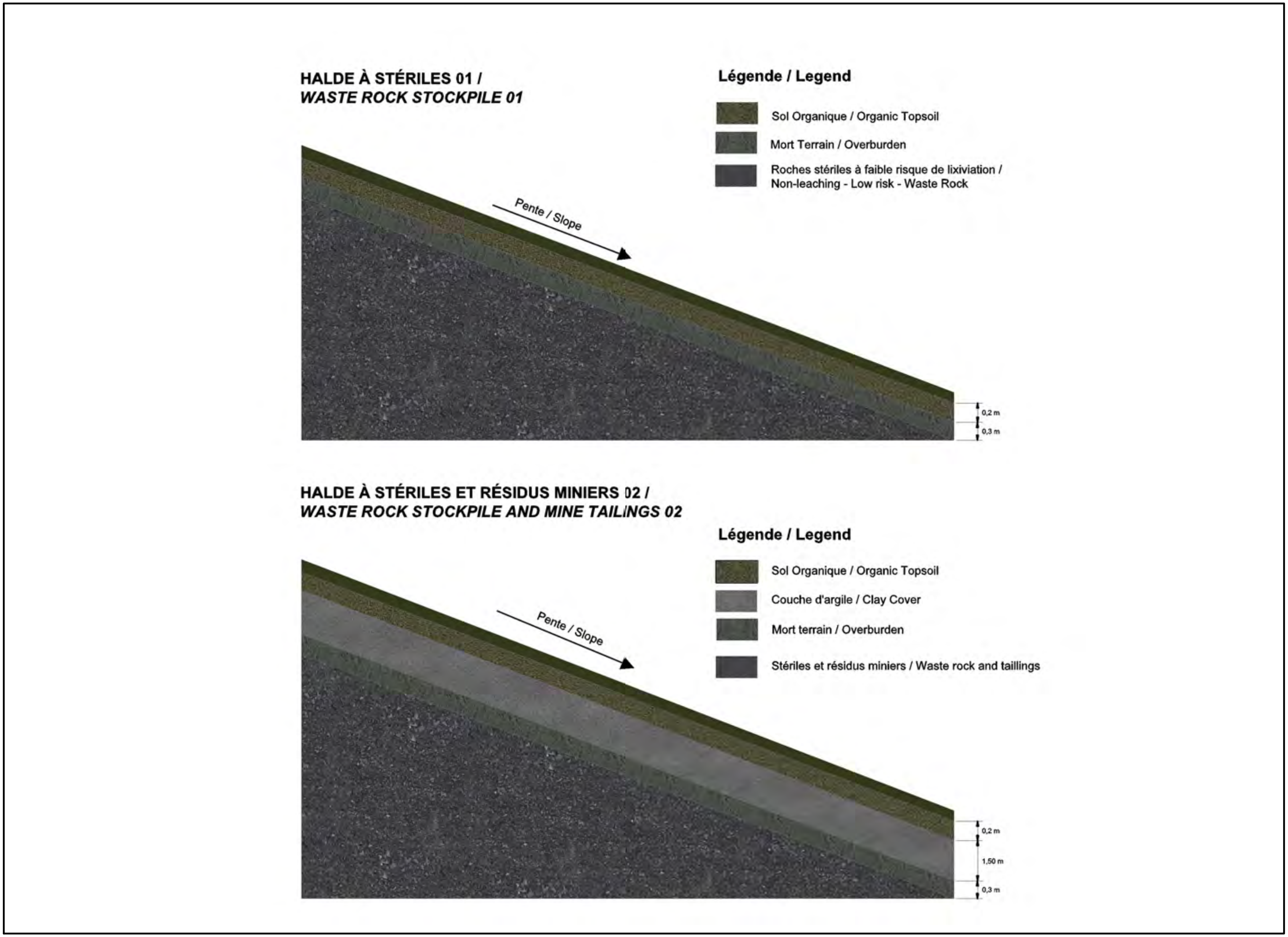


Figure 5-17 **Schéma conceptuel de la restauration des haldes 01 et 02 / *Conceptual Diagram of the Restoration of Waste Rock Stockpiles 01 and 02***

5.6 Waste management and the 4R approach

Waste management will promote the implementation of practices based on the 4 Rs, i.e., prioritizing reduction, reuse, recycling, and recovery of waste materials. Residual materials will be managed in accordance with applicable laws and regulations. A management plan will be established at a later stage of the project, including the monitoring of waste flows through the implementation of an environmental register.

As the management of hazardous waste is regulated, the disposal of these products will be carried out in accordance with applicable laws and regulations. A management plan will be established at a later stage of the project.

If any other category of waste were to be produced by the project, PMET would manage it in accordance with applicable laws and regulations.

5.6.1 Solid household waste

The domestic waste generated by the camp and administrative offices (approximately 120 tonnes/year) will mainly consist of organic matter, paper, plastic, and various types of non-recyclable waste.

The management approach envisaged for this waste includes the implementation of selective collection on site and a composting facility for organic matter (food waste). Final waste will be sent to the town of Radisson. Lastly, as part of the environmental management system, monthly monitoring will be implemented to track disposal volumes and recovery rates.

Awareness campaigns on selective sorting will be conducted among staff to maintain a recovery rate of over 60%.

5.6.2 Dry waste

Non-hazardous dry waste (wood, metals, concrete, rubble, cables, packaging materials, etc.) will mainly come from construction and infrastructure maintenance work.

The management approach envisaged for this waste includes sorting at source in designated areas of the site. Inert materials will be reused as much as possible for backfilling or maintaining access roads. A system for the recovery of ferrous and non-ferrous metals will be set up in association with one or more approved recovery companies. Anything that cannot be recovered will be periodically disposed of, as necessary, at authorized external sorting centres.

Special attention will be paid to reducing packaging and reusing form lumber and pallets. The target is to recover at least 70% of the dry materials generated.

5.6.3 Hazardous materials

Hazardous materials that may be generated at the mine site include used oils, filters, solvents, paints, laboratory reagents, batteries, and contaminated sludge.

The proposed management approach for this waste involves storing it in a dedicated, ventilated, and leakproof room with an impermeable floor and equipped with retention bins. Labelling in accordance with the *Transportation of Dangerous Substances Regulation* will be implemented and checked regularly. An agreement with an authorized carrier will be reached to ensure that this waste is disposed of at certified facilities (RECYC-QUÉBEC). The environmental management system to be implemented at the mine site will include the creation and maintenance of a tracking log that will record, among other things, the volumes recovered and shipped, the disposal methods chosen for each type of waste, and copies of transport and disposal manifests. The management system will also provide for annual staff training on emergency response procedures associated with hazardous materials used and generated as waste.

PMET is committed to recycling used oil with a target of over 90%. This recycling will be carried out by a specialized supplier. Similarly, all batteries shall be returned to manufacturers or approved collection points.

5.7 Energy consumption

The project will be powered primarily by hydroelectricity supplied by Hydro-Québec, ensuring a low-carbon energy footprint. Energy requirements are determined based on the mining plan and the size of industrial facilities.

5.7.1 Total requirements

The total energy consumption of the mining complex is estimated at 89,369 GJ/year, corresponding to an average installed capacity of approximately 75 MW for the combined operations of the mine, processing plant, and related infrastructure (Table 5-8).

Table 5-8 Estimated annual energy consumption

Energy source	Primary use	Estimated consumption	In GJ/year
Electricity (Hydro-Québec)	Processing plant, offices, underground mine	131.2 MWh/year	472
Compressed natural gas (CNG)	Heating of buildings, camp, and underground mine	87,691 GJ	87,691
Diesel	Mining vehicles, emergency generators, concentrate transport	31.5 M litre/yr*	1,206
		Total	**89,369**

Note: * GHG estimate, Appendix 5-12.

5.7.2 Energy optimization

The project's energy optimization effort involves a gradual approach, which will be defined in detail and implemented during operations. At this stage of the project, the main measures under consideration are:

- Exclusive use of renewable electricity for industrial processes and lighting to reduce GHG emissions.
- Use of high-efficiency motors (IE3/IE4) and variable speed drives to improve the energy efficiency of equipment.
- Heat recovery from compressed air and ventilation systems, contributing to reduced heating requirements.
- Implementation of an energy management program compliant with ISO 50001 during the operations phase to ensure monitoring and continuous improvement.
- Gradual replacement of light diesel vehicles with electric models, depending on their availability on the market.

5.7.3 Autonomy in emergencies

A standby power plant consisting of three diesel generators, each with a capacity of 2 MW, will ensure the continuity of critical operations in the event of a power failure. This equipment will operate for less than 100 hours per year and will be equipped with vapour recovery and spill containment systems.

5.8 Greenhouse gases

The project design places central importance on reducing greenhouse gas (GHG) emissions from the earliest stages of engineering. The project's energy profile, largely powered by hydroelectricity, minimizes direct and indirect CO_2 emissions. The sectoral report on GHG emissions is presented in Appendix 5-12.

5.8.1 Emission sources

GHG emissions come mainly from the following sources:

Source	Description	Annual estimate (t eq. CO_2)
Diesel (mining vehicles)	Trucks, drills, loaders, mobile equipment	54,127
Mining equipment	Generators and other fixed equipment	3,226
CNG heating	Heating of buildings and camp	8,035
Explosives	Explosives used in mining extraction areas	1,050
Concentrate transport (truck)	Transport by truck to rail transshipment	27,457
Concentrate transport (train)	Transport by train to the port facility by a third party	24,555
Electricity (Hydro-Québec)	Treatment plant and pumps	492

Estimated total emissions at the site (excluding electricity from Hydro-Québec): approximately 64 kt eq. CO_2 per year during the operations phase, representing an **average carbon intensity of 0.08 t eq. CO_2 per tonne of concentrate produced**, which is lower than the global average for lithium mines (~0.10 t eq. CO_2/t conc.).

Annual direct emissions related to site operations are estimated to range from a minimum of 24 kt CO2-eq during the first year of operations to a maximum of approximately 87 kt CO2-eq in 2036. The annual average over the entire operations period is 64 kt CO_2-eq.

5.8.2 Reduction and compensation measures

Mitigation measures will be applied at each stage of the project to minimize GHG emissions, namely:

- **Optimizing mining transport**: short routes, preventive vehicle maintenance, and low-resistance tires.
- **Gradual replacement** of light diesel vehicles with electric models.
- **Heat recovery** in the processing plant to heat buildings.
- **Training staff** in eco-driving and reducing fuel consumption.
- **Annual monitoring of GHG emissions** in accordance with ISO 14064-1 methodology and reporting to MELCCFP.
- **Voluntary participation** in carbon offset programs (reforestation, verified credits).

5.8.3 Climate performance target

The proponent's goal is to **reduce direct emissions** by 2035 compared to the baseline scenario, in particular through increased electrification of the fleet and energy efficiency in processes. Such a performance supports the government's target of **net-zero emissions by 2050** for the Quebec mining sector.

The project's greenhouse gas emissions were estimated based on preliminary engineering data available. At this stage of the project, emissions have been estimated for the construction and operations phases only.

Total emissions associated with construction are estimated at 95 kt of CO_2eq, mainly due to deforestation of the site. During this phase of the project, emissions are broken down as follows:

- diesel consumption by machinery: 4,439 t CO_2eq;
- deforestation: 88 kt CO_2eq;
- diesel consumption during logistics transport: 2.1 kt CO_2eq.

Annual emissions associated with operations are estimated at 101 kt CO_2eq. Machinery accounts for 59% of these emissions, with logistical transport and explosives accounting for 38% and 3% of emissions, respectively. It should be noted that these emissions are annual and vary from year to year during the operations phase. On average during the operations phase, emissions break down as follows:

- diesel consumption (mobile sources): 60 kt CO_2eq per year;
- use of explosives: 3 kt CO_2eq per year;

- logistical transport (truck): 25 kt CO_2eq per year;
- logistical transport (train): 13.6 kt CO_2eq per year.

5.9 Project timeline

The overall project will span approximately 19 years, including planning, construction, operation, and decommissioning of the site.

This timeline is based on the results of the feasibility study (NI 43-101, 2025) and will be updated as the detailed engineering phases progress. The construction and operations periods are expressed in quarters (Q).

Table 5-9 Timeline of the main phases of the project

Period	Key activities	Details and objectives
2025–2027	Environmental studies, permits, and detailed engineering	Completion of basic studies, submission of the ESIA, COMEX hearings, obtaining provincial and federal certificates of authorization, and detailed engineering.
Q1 2028–Q2 2030	Construction et mise en service	Development of road, electrical, and industrial infrastructure; construction of the camp and processing plant; no-load and load testing.
Q3 2030–2048	Mining operations (Phases 1 and 2)	Nominal production of 5.1 Mt/year of combined underground and open-pit ore.
2048–2052	Gradual closure and rehabilitation	Dismantling, reprofiling of stockpiles, revegetation, and post-closure environmental monitoring (≥ 10 years).

5.9.1 Key milestones

More specifically, the key milestones of the project include:

1. ESIA approval and obtaining permits – Q4 2027
2. Start of construction work – Q1 2028
3. Completion of electrical substation and access road – Q4 2029
4. Commissioning of the ore processing plant (concentration) – Phase 1 – Q2 2029
5. Attainment of nominal capacity (5.1 Mt/year) – Q1 2032
6. Start of underground mining operations - Phase 2 – Q1 2032
7. Start of gradual closure – Q1 2048
8. End of post-closure monitoring and release of bonds – 2052

This list of milestones incorporates the constraints associated with the northern climate: earthworks and concrete work mainly planned during the summer and seasonal logistical windows for oversized equipment.

Schedule-related risk management

Schedule management will be based on an integrated planning and monitoring system by the owner, with:

- monthly monitoring of physical and financial progress;
- measures to mitigate winter supply and transportation risks;
- ongoing coordination with Cree and government authorities;
- flexibility margins built into critical timeframes (± 3 months) to compensate for weather-related or logistical delays.

5.10 Workforce, economic spin-offs, and overall project costs

The project is a key initiative for Quebec's lithium industry in support of the global decarbonization of the economy and the socioeconomic development of the James Bay region. In addition to creating direct jobs, it will generate significant economic spin-offs in the construction, services, transportation, and mineral processing sectors.

5.10.1 Workforce and economic spin-offs

The project's labor requirements and economic impacts were assessed based on the expenditure flows associated with the construction, operation, capital maintenance, and decommissioning phases, as defined in the feasibility study (NI 43-101, 2025). The economic impacts were estimated using the Institut de la statistique du Québec's Quebec Inter-sectoral Model (MISQ), according to a methodology detailed in Appendix 5-13.

The results presented below correspond to the direct, indirect, and induced effects generated by project expenditures in the Quebec economy. Jobs are expressed in person-years, i.e., the equivalent of one full-time job sustained for one year. Table 5-10 presents a summary of labor requirements associated with the various phases of the project, expressed in person-years. It aims to provide an order of magnitude for the jobs supported by the project; a detailed analysis of the economic impacts is presented in Appendix 5-13. For clarity, the table also presents annual averages over the duration of each phase.

Table 5-10 Labour force requirements by project phase

Phase du projet	Period (months)	Jobs (total)	Jobs (average annual)
Construction			
Phase 1	41	7 545	2 208
Phase 2	43	3 629	1 013
Operations	19 ans	66 282	3 489
Closure and follow-up	30	1 537	615

Note : Total job numbers are for the duration of the entire project phase.

Construction Phase

The construction phase, which includes the construction of the open-pit mine (Phase 1) and the underground mine (Phase 2), represents a period of concentrated investment and generates significant economic benefits for Quebec. According to MISQ results, this phase supports approximately 11,200 person-years of employment province-wide, corresponding to an average of more than 3,200 jobs per year over the duration of the work. The associated value added is estimated at nearly $1.5 billion, including approximately $860 million in pre-tax wages and salaries.

At the regional level, the effects are more modest but remain significant. Preliminary results suggest that approximately 9% of the jobs and 8% of the value added generated during construction could materialize in the Nord-du-Québec region, reflecting both the anticipated share of regional labor and the geographic structure of supply chains.

Operational Phase and Maintenance Capital

Over the mine's entire lifespan (approximately 19 years), operating and maintenance capital expenditures constitute the primary source of economic benefits. MISQ simulations indicate that these activities support approximately 66,300 person-years of employment in Quebec, or an average of about 3,500 jobs per year. The total associated value added is estimated at approximately $8.8 billion, including over $5.2 billion in wages and salaries.

At the regional level, the share of economic impacts attributed to the operational phase is higher than that observed during construction, as illustrated by the regional results presented in Appendix 5-13. Preliminary results suggest that approximately 15% of the jobs and 10% of the value added generated during operations could benefit the Northern Quebec region. In addition, the feasibility study projects approximately $54.7 million in municipal and school taxes over the mine's lifespan, which constitute direct benefits for the host community.

Closure Phase

The closure and restoration phase, although shorter, also generates significant economic benefits. The associated expenditures support approximately 1,500 person-years of employment in Quebec and generate nearly $200 million in value added, primarily through decommissioning activities, civil works, and environmental restoration. The regional effects account for approximately 7% of the provincial impacts.

Summary of Economic Benefits

Combining all project phases, the total economic benefits are estimated at approximately 79,000 person-years of employment and $10.5 billion in value added across Quebec. At the regional level, cumulative impacts are estimated at approximately 10,400 person-years of employment and $1.3 billion in value added, representing 13% and 12% of the provincial results, respectively. These results should be interpreted as indicative orders of magnitude, as the regional impacts are not derived from a standalone regional intersectoral model, but rather from an allocation of provincial results based on conservative and documented assumptions.

The project will also contribute to **Quebec's 2030–2050 Energy and Mining Strategy**, positioning the province as a key supplier of critical materials for the global energy transition.

5.10.2 Total project costs

The cost estimates are based on the feasibility study (NI 43-101, 2025) and are expressed in 2025 Canadian dollars. The total cost of the Project is estimated at $2,914.7 million. It is important to note that this amount excludes pre-production revenue of $101.7 million during the construction of Phase 1, as well as restoration and closure costs, estimated at $248.4 million.

Table 5-11 Cost estimates for the mining project

Cost category	Amount (M CAD)	Comments
Initial capital	1,497.7	Construction of the pit, plant, infrastructure, road, and power line, and 23% of the underground mine.
Expansion capital	480.5	Underground development, camp expansion, the second train of the processing plant, as well as related indirect costs and contingencies.
Sustaining capital	936.4	All capital expenditures necessary to sustain operations throughout the LOM
Operating costs (OPEX, LOM)	6,785	Mining, processing, transportation, G&A, and environmental management.
Closure and rehabilitation	248.4	Dismantling, restoration, and post-closure monitoring.
Contingencies (CAPEX only)	Included	Approximately 11% by category; Class 3 estimate (AACE International).

The unit operating cost is estimated at CAD 729.1/t of concentrate, for an all-in sustaining cost (AISC) of CAD 799.8/t of concentrate.

The economic assumptions are based on:

- CAD/USD exchange rate = 1.34;
- average price of SC 5.5 concentrate = USD 1,221/t FOB;
- a combined open-pit and underground mine life of 19 years at nominal production.

These estimates illustrate the scale of the potential economic benefits associated with project expenditures.

6 Description of the receiving environment

6.1 Delineation of study areas

The Project is located north of the 53rd parallel in the Nord-du-Québec administrative region, on Category III lands in the Eeyou Istchee James Bay territory. It is located approximately 250 km east of the town of Radisson and lies within the traditional territory of three Cree communities: Chisasibi (village located 205 miles west), Wemindji (205 miles southwest), and Mistissini (215 miles south).

To identify and locate sensitive elements of the environment that could be affected by the mining project, five study areas were delineated: two regional areas for components located far from social and biophysical environments, two local areas for components close to these same environments, and a project area corresponding to the effects directly associated with the footprint of the planned infrastructure.

The consideration of these various areas is justified by the fact that some components are only affected in the immediate vicinity of the mining site, while others may be influenced over larger areas. The boundaries of these areas are shown on the maps presenting the initial state of the biophysical and social environments in sections 6.2 to 6.4 of this chapter, as well as those relating to the impacts on the valued components identified in chapter 8.

6.1.1 Regional study area of the social environment

The regional study area of the social environment (social RSA) situates the project in its socioeconomic and geographic context (Map 6-1). It provides the spatial framework to describe the components of the social environment, some elements of which are found outside the boundaries of the local study area of the social environment (social LSA). This area covers 346,997 km² and includes the boundaries of the Eeyou Istchee James Bay territory. It is delineated to document the demographic and economic characteristics of the non-Indigenous communities and First Nations members concerned, as well as the land's development trends and uses.

6.1.2 Regional study area of the biophysical environment

The regional study area of the biophysical environment (biophysical RSA)—defined by a 50-kilometre radius around the mining site (7,854 square kilometres)—situates the project in its environmental context (Map 6-1). It provides the spatial framework for describing biophysical components, some of which extend beyond the boundaries of the local study area of the biophysical environment (biophysical LSA).

6.1.3 Local study area of the social environment

The social LSA encompasses, in particular, the biophysical LSA and a portion of the Trans-Taiga Road. It is bounded by the official boundaries of trapline CH39 (formerly VC7), which is part of the traditional territory of Chisasibi, as well as traplines M02A (Mistissini) and VC26 (Wemindji) (Map 6-2). The area covers a total surface area of 6,521 km².

The social LSA is used to describe and assess impacts on components of the land that are perceptible beyond the boundaries of the biophysical LSA. The effects on land users (both Indigenous and non-Indigenous), vacation resort leaseholders, and the landscape (particularly visual effects) are analyzed. Certain components of the physical environment must also be assessed at this scale when sensitive receptors are located outside the biophysical LSA and the effects are more widespread.

6.1.4 Local study area of the biophysical environment

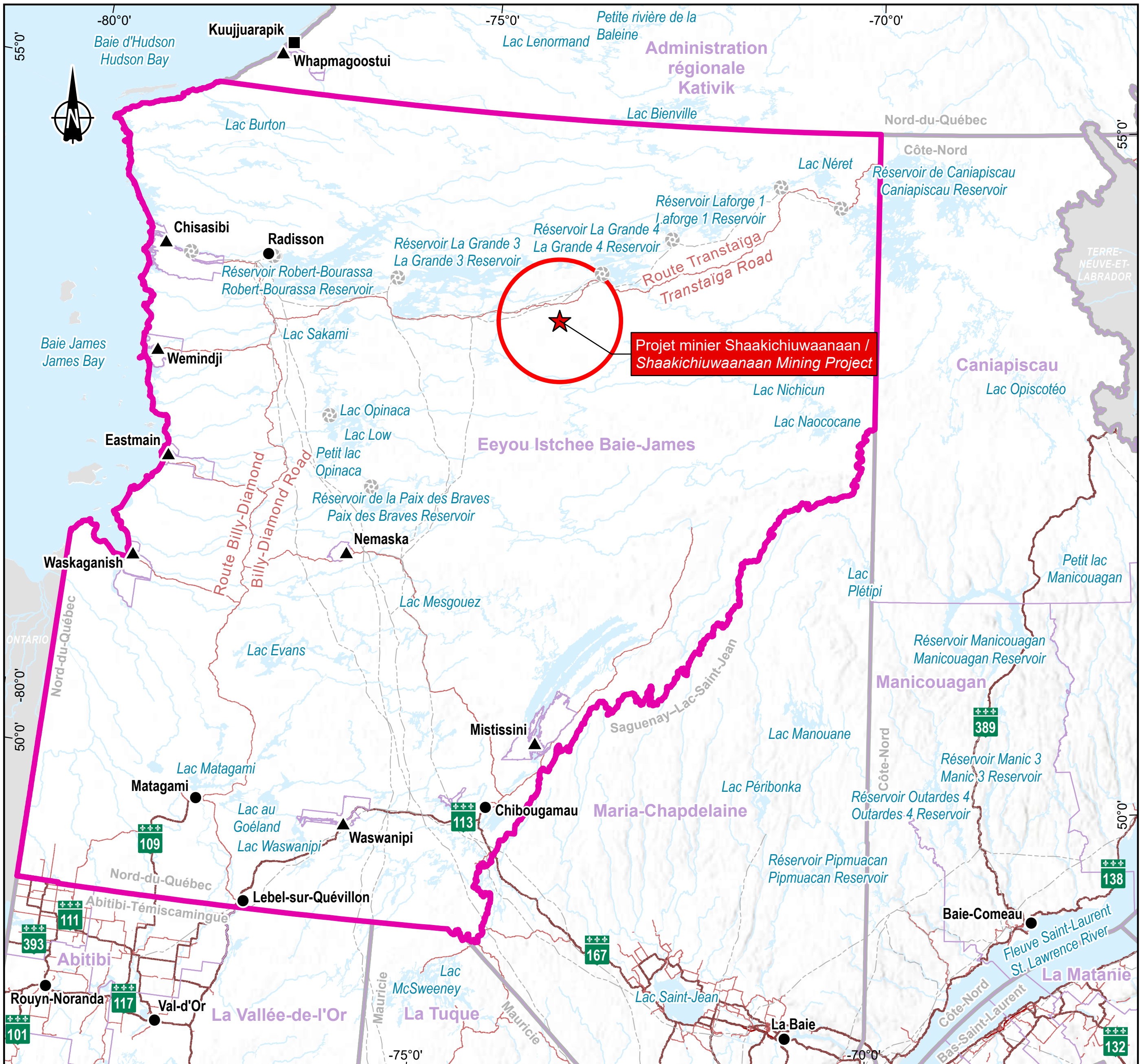
The biophysical LSA includes the physical and biological elements of the receiving environment most likely to be affected by project activities during the construction, operations, and closure phases (Map 6-2). It includes existing PMET facilities as well as key natural features located on the periphery of the site, including several lakes.

This area is the result of combining a 3 km buffer zone around the mining section of the project area and a 1 km buffer zone surrounding the project area for the access road and power line sections, for a total area of 207 km². The biophysical components were inventoried over representative surface areas, as described in the sectoral reports and in the sections on the current state of the environments.

For large wildlife, however, the biophysical RSA is preferred, as the potential effects may extend beyond the boundaries of the biophysical LSA.

6.1.5 Project area

The project area includes all existing and planned facilities, as well as a 25-metre buffer zone around them (Map 6-2), covering a total area of 12 km². In sections where the buffer zone cuts across bodies of water, its boundaries have been adjusted to avoid these areas, since the planned infrastructure will be built in such a way as to avoid any impact on them.



Zones d'étude / *Study Areas*

- Régionale - Biophysique / *Regional - Biophysical*
- Régionale - Humain / *Regional - Human*

Repères géographiques / *Geographical Landmarks*

- Communauté crie (zone d'étude régionale) / *Cree community (regional study area)*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Autoroute / *Highway*
- Route nationale ou régionale / *National or regional road*
- Autre / *Other*

Limites / *Boundaries*

- Région administrative / *Administrative Region*
- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-1 / *Map 6-1*
Zones d'étude régionales /
Regional Study Areas

Sources :
SDA, 1/20 000, MRNF, 2024-02
Canvec, 1/250 000, 1/5 000 000 et 1/15 000 000, RNCan, 2019
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/5 000 000, MRNF Québec, 2010
AQréseau+, réseau routier, MERN, 2024-03-01
RNCan, Frontières géopolitiques, 2002

0 50 100 km

NAD 1983 Quebec Lambert

2026-03-25

Préparation / Preparation : M.-H. Brisson
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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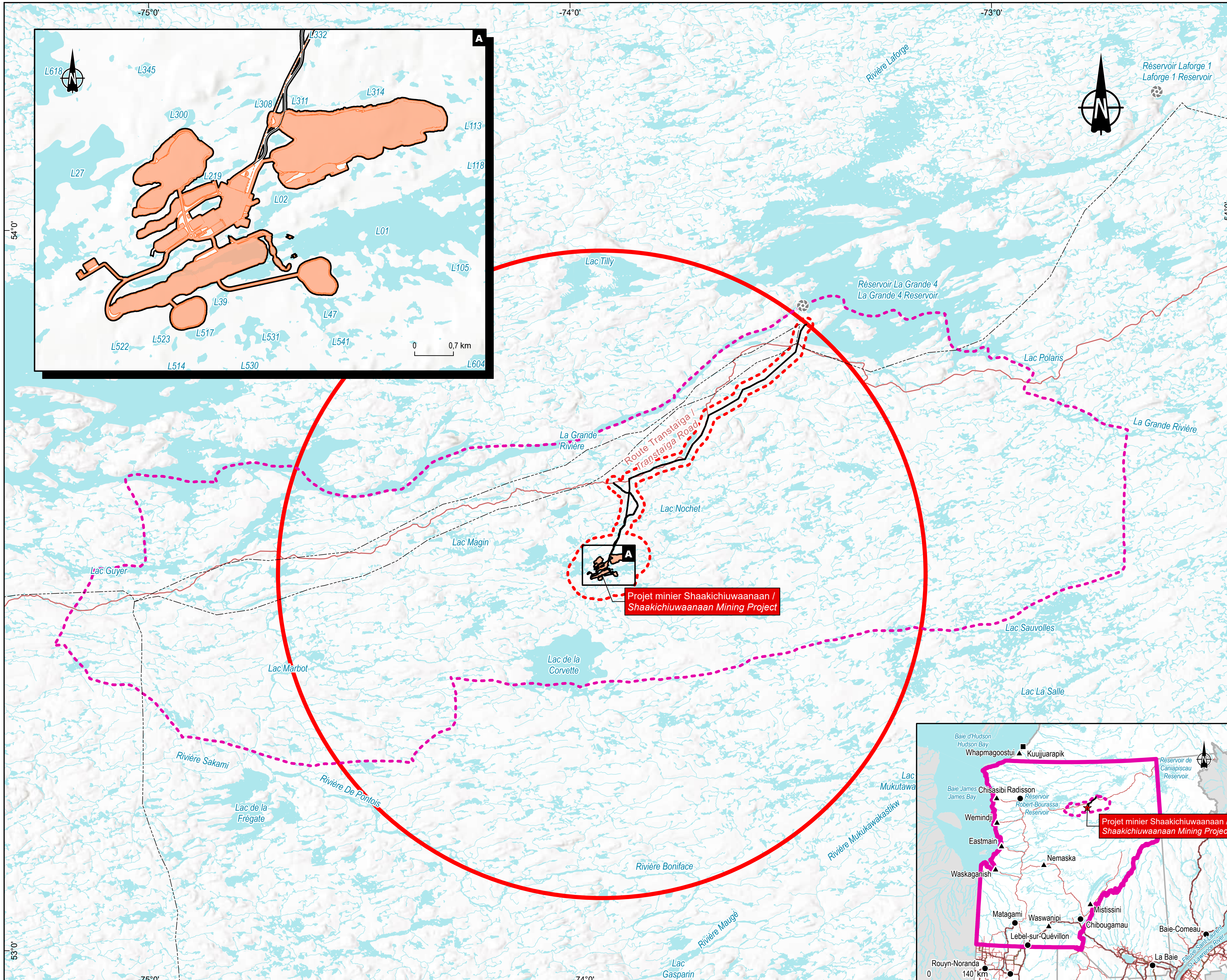
CA0001724_3318_eie_c06_01_085_ze_reg_260325



Projet / *Project*

- ★ Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Biophysique / *Regional - Biophysique*
- Locale - Biophysique / *Local - Biophysical*
- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Composantes du projet / *Project Components*

Existante / *Existing*

- Chemin d'accès / *Access road*

Projeté / *Projected*

- Ligne de transport d'énergie / *Power transmission line*
- Limites des composantes de projet / *Limit of project components*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*

PMET

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-2 / *Map 6-2*
Zones d'étude locales et de projet / *Local and Project Study Areas*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014
AQréseau+, réseau routier, MERN, 2024-03-01
MRNF, Ombrage MNT 50k, 2019
ESRI, World Imagery / ESRI, World Topographic

0 6 12 km
UTM, fuseau 18, NAD83 (CSRS)

2026-03-23

Préparation / Prepared by : M.-H. Brisson
Dessin / Drawn by : J. Roy
Approbation / Approved by : M.-H. Brisson
CA0001724_3318_eie_ch06_c01_02_260218.aprx
CA0001724_3318_eie_c06_02_086_ze_locales_260323

wsp

La précision des limites et des mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

6.2 Physical Environment

6.2.1 Climate

The study area has a subpolar continental climate, characterized by long cold winters and short cool summers.

Weather data on temperatures, extreme precipitation, and winds are from the station located at La Grande IV (ECCC, 2025a). This weather station is located in the biophysical RSA approximately 31 km northeast of the mine site. The temperature data are taken from climatological averages for the period from 1991 to 2020. Given the lack of data on average monthly precipitation at the La Grande IV station, the data used comes from the Nitchequon station and covers the period from 1961 to 1990 (ECCC, 2025b). The Nitchequon station is located approximately 200 km east of the mine site.

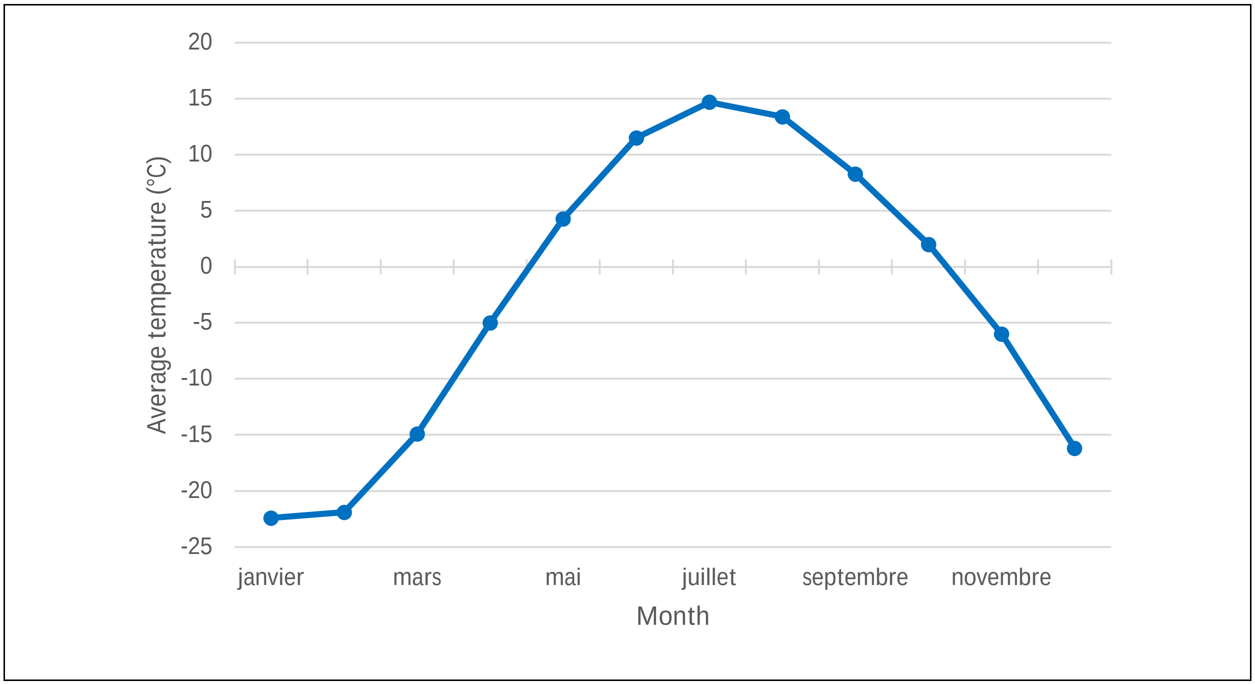
6.2.1.1 Temperature

Temperature is highly variable, with extremes ranging from -50.4 °C to 35.5 °C (Table 6-1). January is the coldest month with an average temperature of -22.4 °C, while July is the warmest month with an average temperature of 14.7 °C. Figure 6-1 shows the average temperature variation for the 1991 to 2020 period.

Table 6-1 Temperature normals at the Grande IV weather station (1991 to 2020 period)

Month	Daily average (°C)	Daily maximum (°C)	Daily minimum (°C)
January	-22.4	-16.8	-27.9
February	-21.9	-15.4	-28.3
March	-14.9	-7.3	-22.3
April	-5.0	1.2	-11.1
May	4.3	10.3	-1.8
June	11.5	18.1	4.8
July	14.7	20.5	8.8
August	13.4	18.7	8.0
September	8.3	12.8	3.8
October	2	5.3	-1.2
November	-6	-2.6	-9.4
December	-16.2	-11.5	-21.0
Year	**-2.7**	**2.8**	**-8.1**

Source: Environment and Climate Change Canada (ECCC), 2025a.



Source: Environment and Climate Change Canada (ECCC), 2025a

Figure 6-1 Variation of average temperature (1991 to 2020 period)

6.2.1.2 Precipitation

Total annual precipitation averages 827.2 mm and is highest from June to October (Tables 6-2 and 6-3). Snowfall occurs from August to May and averages 328.2 cm annually. Figure 6-2 shows the monthly rainfall amounts and Figure 6-3 shows the monthly snowfall amounts.

Table 6-2 Average monthly precipitation norms at La Grande IV weather station (1991 to 2020 period)

Month	Rainfall (mm)	Snowfall (cm)	Total precipitation (mm)	Mean snow cover (cm)	Median snow cover (cm)	Snow cover, end of month (cm)
January	0.7	39.4	32.7	43	44	47
February	1.8	23.9	23.9	46	46	49
March	3.2	25.9	28.4	48	48	44
April	8.8	20.6	31.3	28	30	8
May	N/A	N/A	51.2	N/A	N/A	N/A
June	N/A	N/A	78.4	N/A	N/A	N/A
July	N/A	N/A	N/A	N/A	N/A	N/A
August	N/A	N/A	N/A	N/A	N/A	N/A
September	N/A	N/A	109.1	N/A	N/A	N/A
October	N/A	N/A	78.6	N/A	N/A	5

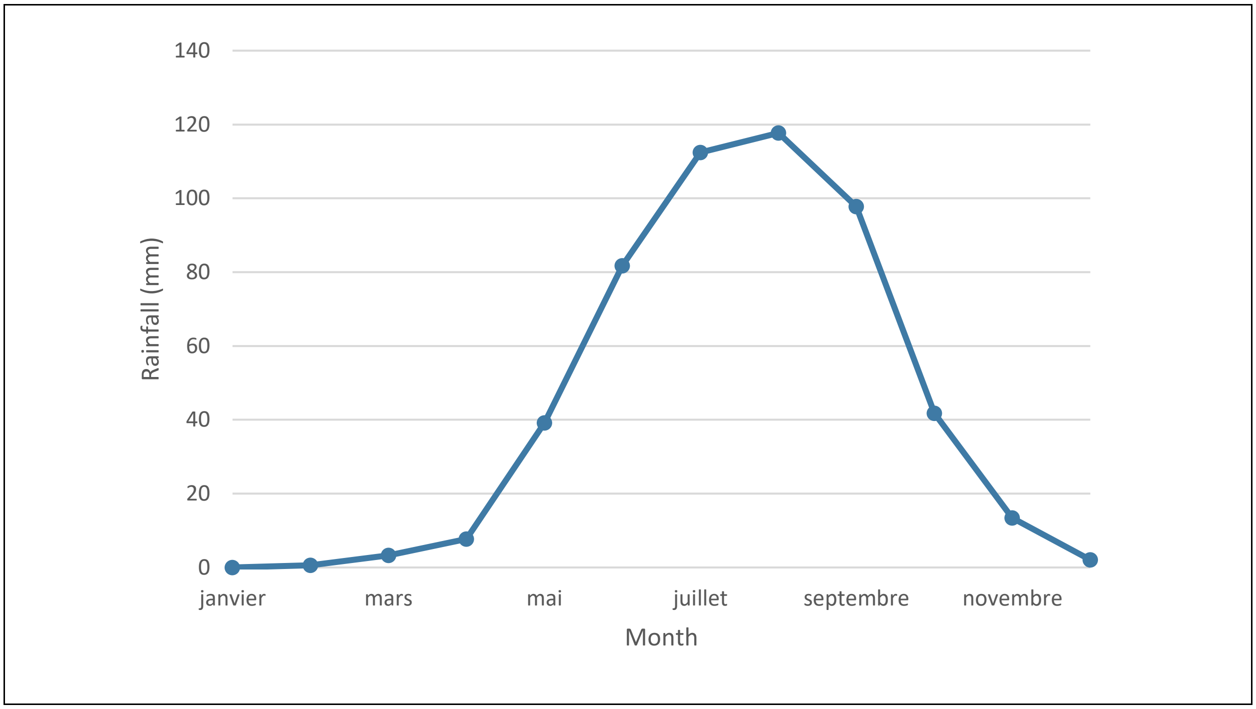
Month	Rainfall (mm)	Snowfall (cm)	Total precipitation (mm)	Mean snow cover (cm)	Median snow cover (cm)	Snow cover, end of month (cm)
November	18.3	53.4	59.7	11	10	19
December	4.9	42.8	N/A	26	26	34
Year	N/A	N/A	N/A	N/A	N/A	N/A

Source: Environment and Climate Change Canada (ECCC), 2025a.

Table 6-3 Average monthly precipitation normals at the Nitchequon weather station (1961 to 1990 period)

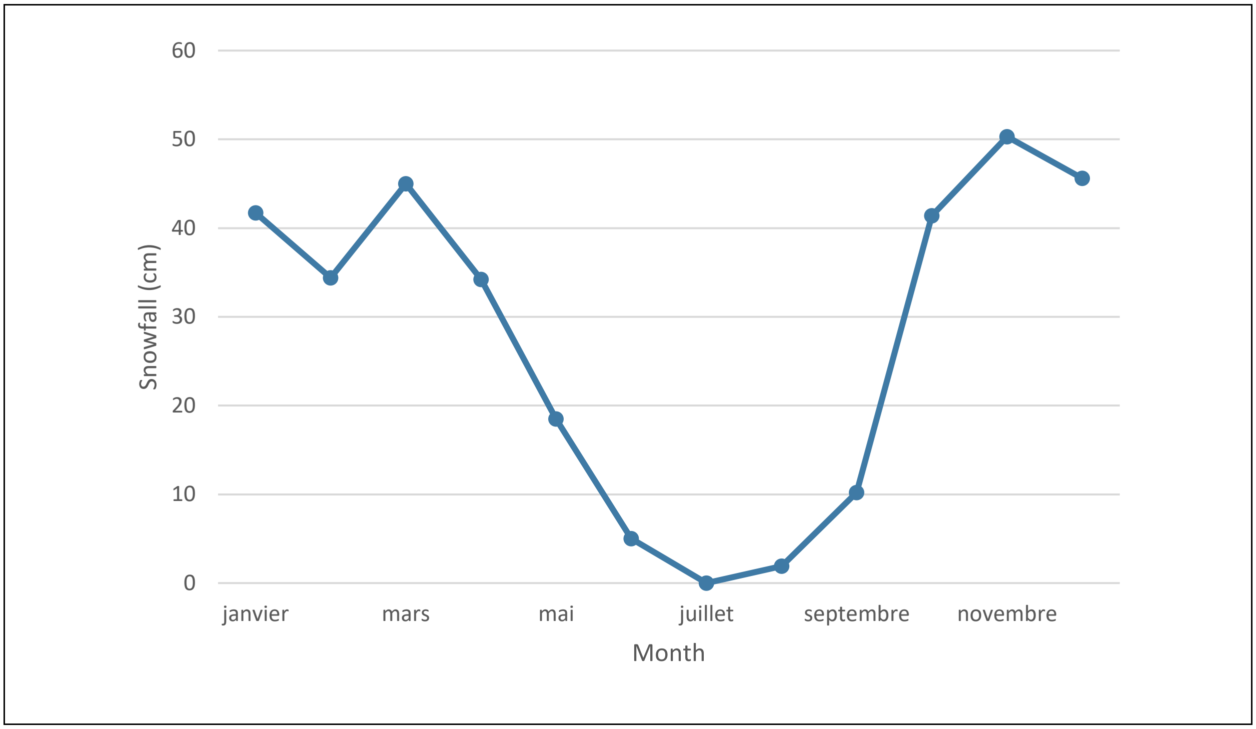
Month	Rainfall (mm)	Snowfall (cm)	Total precipitation (mm)	Mean snow cover (cm)	Median snow cover (cm)	Snow cover, end of month (cm)
January	0	41.7	38.5	N/A	N/A	70
February	0.6	34.4	30.9	N/A	N/A	78
March	3.3	45.0	44.9	N/A	N/A	84
April	7.7	34.2	40.8	N/A	N/A	51
May	39.2	18.5	57.5	N/A	N/A	3
June	81.7	5.0	87.7	N/A	N/A	0
July	112.4	0	112.4	N/A	N/A	0
August	117.7	1.9	119.6	N/A	N/A	0
September	97.8	10.2	107.7	N/A	N/A	0
October	41.8	41.4	82.1	N/A	N/A	0
November	13.4	50.3	60.6	N/A	N/A	9
December	2.1	45.6	44.4	N/A	N/A	29
Year	**517.6**	**328.2**	**827.2**	N/A	N/A	**56**

Source: Environment and Climate Change Canada (ECCC), 2025b.



Source: Environment and Climate Change Canada (ECCC), 2025b.

Figure 6-2 Monthly rainfall at the Nitchequon weather station (period from 1961 to 1990)



Source: Environment and Climate Change Canada (ECCC), 2025b.

Figure 6-3 Monthly snowfall at the Nitchequon weather station (period from 1961 to 1990)

The highest daily precipitation (Table 6-4) was approximately 60.7 mm of rain recorded on July 1, 2014, and 33 mm of snow water equivalent recorded on February 19, 1994. The snow cover on the ground reached a record of 99 cm in March 2015.

Table 6-4 Extreme precipitation (long-term) at La Grande IV weather station (1991 to 2020 period)

Month	Rain (mm)	Date (yyyy/dd)	Snow (cm)	Date (yyyy/dd)	Total precipitation (mm)	Date (yyyy/dd)	Extreme snow cover (cm)	Date (yyyy/dd)
January	13.2	2003/21	17.6	1989/08	16.0	2011/05	96	2015/30
February	5.4	2003/04	30.6	1994/19	33.0	1994/19	96	2015/01
March	14.0	2003/29	16.6	2007/21	20.5	2007/22	99	2015/05
April	12.6	1993/30	19.2	2013/19	21.0	2013/19	98	2015/03
May	25.6	1990/11	11.4	1986/02	54.9	2018/31	36	1990/01
June	45.6	2004/19	1.6	1992/03	45.6	2004/19	3	2002/02
July	33.2	1994/29	0	N/A	60.7	2014/01	0	N/A
August	49.8	1992/10	1.0	1986/30	58.2	2015/30	0	N/A
September	49.2	1989/08	13.8	1995/22	49.2	1989/08	9	1992/24
October	30.2	1994/08	30.2	1993/05	30.2	1994/08	29	1987/13
November	22.0	2015/06	31.0	2014/24	28.3	2014/24	52	2014/30
December	9.2	2010/01	24.8	2014/25	19.5	2012/22	91	2014/29

Source: Environment and Climate Change Canada (ECCC), 2025a.

6.2.1.3 *Winds*

The meteorological data used to determine the prevailing winds in the biophysical RSA are those compiled by Environment Canada, recorded by the La Grande IV weather station.

The data included temperature, relative humidity, barometric pressure, and wind direction and speed. These data were used to produce wind roses, which are shown in Figures 6-4 to 6-7 for each season: fall (September to November), winter (December to February), spring (March to May), and summer (June to August). They are based on data available from 2018, 2020, 2021, 2022, and 2024.

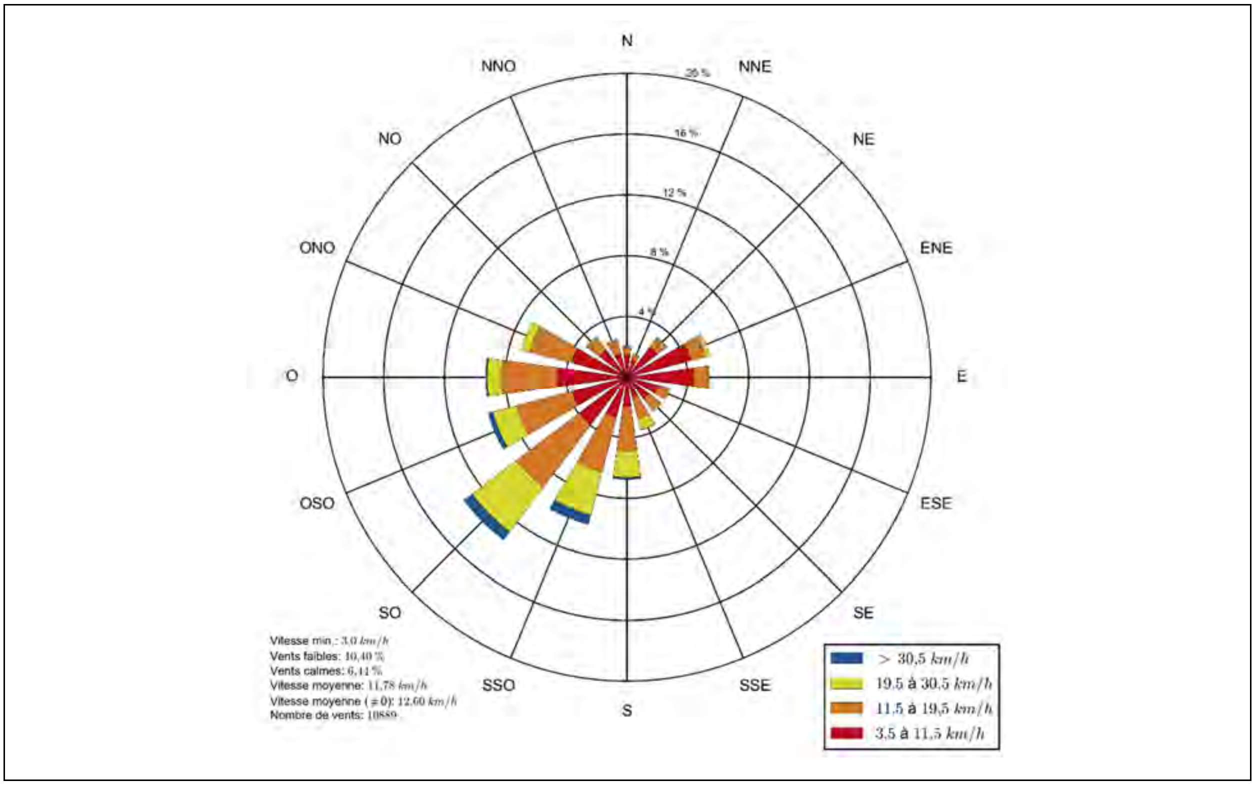


Figure 6-4 Wind rose illustrating the direction from which the winds originate – Fall

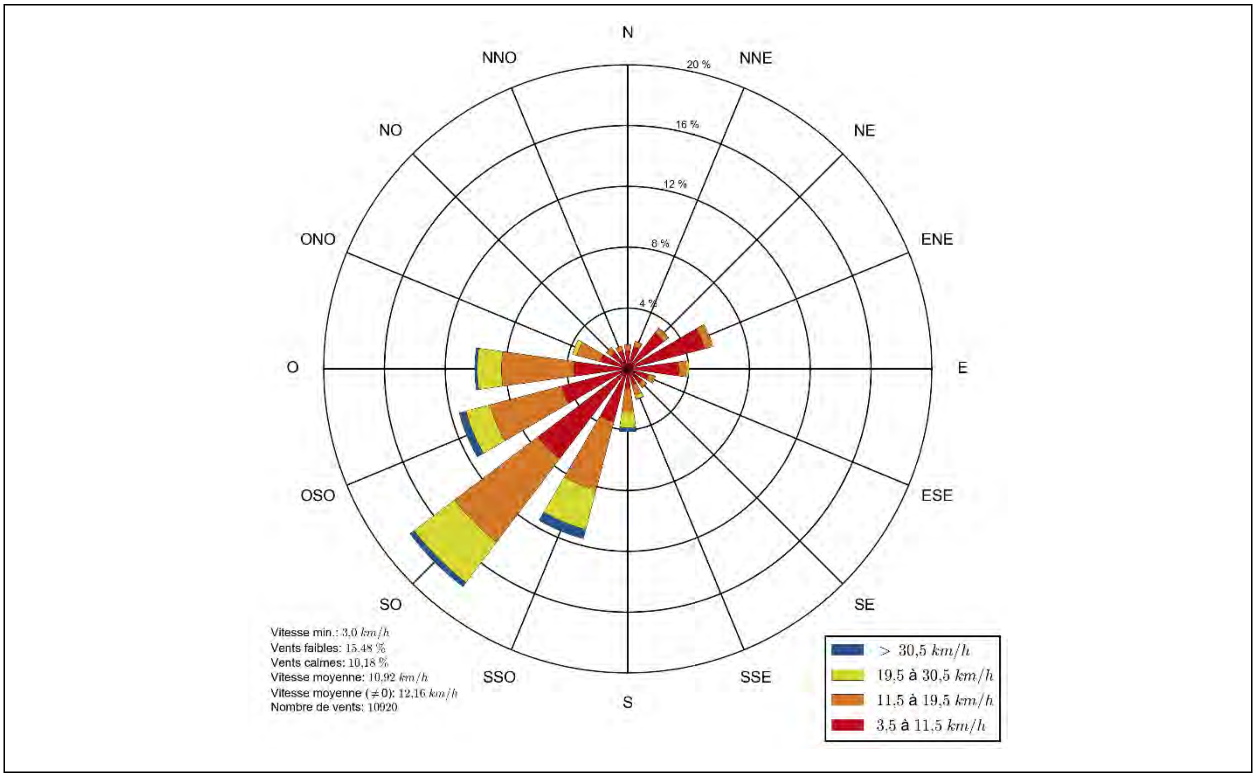


Figure 6-5 Wind rose illustrating the direction from which the winds originate - Winter

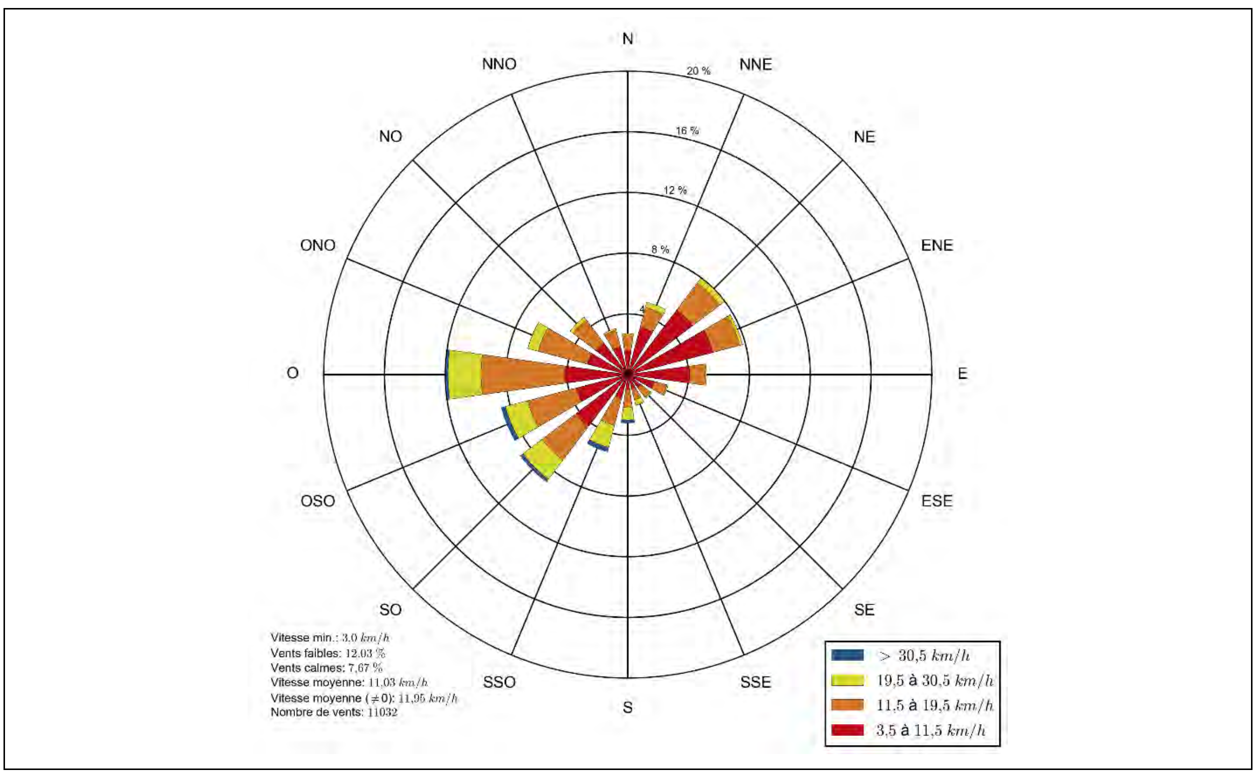


Figure 6-6 Wind rose illustrating the direction from which the winds originate - Spring

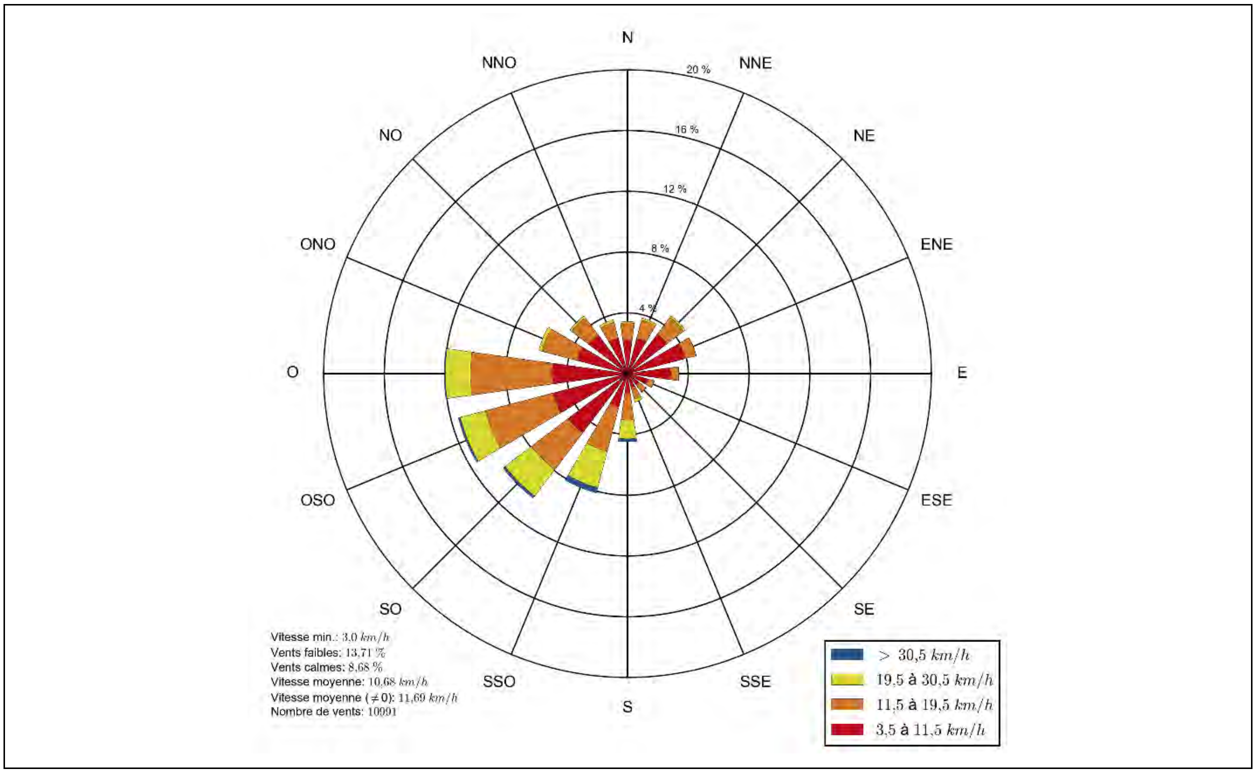


Figure 6-7 **Wind rose illustrating the direction from which the winds originate - Summer**

The prevailing winds remain largely the same throughout the year, blowing from the southwest. Winds from the west are also observed, but they are more frequent in spring and summer. Winds from the northeast are also common in spring. Every year, southwesterly winds are also capable of reaching the highest speeds, exceeding 30.5 km/h.

6.2.2 Ambient air

To determine the initial concentrations of contaminants in ambient air, different approaches may be considered. Initial concentrations can be established based on:

- Measurements taken on site to obtain actual values.
- Measurements taken by federal, provincial, or municipal monitoring networks, such as Environment and Climate Change Canada's (ECCC) National Air Pollution Surveillance (NAPS) or the MELCCFP's Quebec Air Quality Surveillance Network (RSQAQ).
- Initial generic concentrations defined by the MELCCFP.

In the case of this project, data from the Radisson National Air Pollution Surveillance (NAPS) station, located about 250 km west of the project site and at approximately the same latitude, were analyzed and taken into account (Appendix 6-1). This station samples total particulate matter, fine particulate matter (PM2.5), ozone, and certain metals in total particulate matter.

However, some of the pollutants that may be emitted by the project are not measured at this station. In this context, and in accordance with MELCCFP recommendations, the initial concentrations prescribed for northern projects (NP) in the document *Guide d'instructions – Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques – Projets miniers* [Instruction guide – Preparation and implementation of air emission dispersion modelling – Mining projects] (MELCCFP, 2025a) were also considered. A comparison between concentrations for NP and data from the Radisson station was also performed.

Finally, for all other substances not available for northern projects, the initial concentrations used are generic initial concentrations taken from the document *Normes et critères de qualité de l'air du Québec [NCQQA v10]* (MELCCFP, 2025b).

For the specific case of NOx, a low exposure level was selected in accordance with the *Guide de la modélisation de la dispersion atmosphérique* [Guide to atmospheric dispersion modelling] (MELCCFP, 2025c).

Table 6-5 shows the initial concentrations selected for each of the modelled contaminants.

Table 6-5 Standards and criteria associated with the modelled components

Substance	CAS, Chem. Formula or Acronym	Gov. / Org.	Threshold Type	Averaging Period	Statistical	Limit (µg/m³)	Background Concentration reference	Background Concentration (µg/m³)
Total particulates	PMT	MELCCFP	Norme	24-hour	1st maximum	120	Radisson Station	26.09
Fine particulates	PM2.5	MELCCFP	Norme	24-hour	1st maximum	30	Radisson Station	10.42
Carbon monoxide	CO	MELCCFP	Norme	1-hour	1st maximum	34000	Northen Projects	600
Carbon monoxide	CO	MELCCFP	Norme	8-hour	1st maximum	12700	Northen Projects	400
Nitrogen dioxide [OLM;0.2;70]	NO2	MELCCFP	Norme	1-hour	1st maximum	414	MELCCFP, 2025, Low Level	43
Nitrogen dioxide [TC]	NO2	MELCCFP	Norme	24-hour	1st maximum	207	MELCCFP, 2025, Low Level	28
Nitrogen dioxide [TC]	NO2	MELCCFP	Norme	1-year	1st maximum	103	MELCCFP, 2025, Low Level	9
Sulfur dioxide	SO2	MELCCFP	Norme	4-minute	1st maximum	1310	Northen Projects	40
Sulfur dioxide	SO2	MELCCFP	Norme	4-minute	99.5th percentile	1050	Northen Projects	40
Sulfur dioxide	SO2	MELCCFP	Norme	24-hour	1st maximum	288	Northen Projects	10
Sulfur dioxide	SO2	MELCCFP	Norme	1-year	1st maximum	52	Northen Projects	2
Silver	Ag	MELCCFP	Norme	1-year	1st maximum	0.23	Radisson Station	0.001
Arsenic	As	MELCCFP	Norme	1-year	1st maximum	0.003	Radisson Station	0.001
Barium	Ba	MELCCFP	Norme	1-year	1st maximum	0.05	Radisson Station	0.00102
Beryllium	Be	MELCCFP	Norme	1-year	1st maximum	0.0004	Radisson Station	0.0002
Ethyl benzene	100-41-4	MELCCFP	Norme	4-minute	1st maximum	740	NCQQA v10	140
Ethyl benzene	100-41-4	MELCCFP	Norme	1-year	1st maximum	200	NCQQA v10	3
Styrene	100-42-5	MELCCFP	Norme	1-hour	1st maximum	1910	NCQQA v10	0

Substance	CAS, Chem. Formula or Acronym	Gov. / Org.	Threshold Type	Averaging Period	Statistical	Limit (µg/m³)	Background Concentration reference	Background Concentration (µg/m³)
Styrene	100-42-5	MELCCFP	Norme	1-hour	98th percentile	150	NCQQA v10	0
1,3-Butadiene	106-99-0	MELCCFP	Critère	4-minute	1st maximum	352	NCQQA v10	2
1,3-Butadiene	106-99-0	MELCCFP	Critère	1-year	1st maximum	0.5	NCQQA v10	0.14
Acrolein	107-02-8	MELCCFP	Critère	4-minute	99th percentile	8.3	-	-
Acrolein	107-02-8	MELCCFP	Critère	1-year	1st maximum	0.02	-	-
Toluene	108-88-3	MELCCFP	Norme	4-minute	1st maximum	600	NCQQA v10	260
Pentane	109-66-0	MELCCFP	Critère	4-minute	1st maximum	4120	NCQQA v10	76
Pentane	109-66-0	MELCCFP	Critère	1-year	1st maximum	240	NCQQA v10	8
Hexane	110-54-3	MELCCFP	Norme	4-minute	1st maximum	5300	NCQQA v10	140
Hexane	110-54-3	MELCCFP	Norme	1-year	1st maximum	140	NCQQA v10	3
Propionaldehyde	123-38-6	MELCCFP	Critère	4-minute	1st maximum	460	NCQQA v10	10
Propionaldehyde	123-38-6	MELCCFP	Critère	4-minute	99th percentile	20	NCQQA v10	10
Pyrene	129-00-0	MELCCFP	Critère	1-year	1st maximum	13	NCQQA v10	0
dimethylbenzene	1330-20-7	MELCCFP	Norme	4-minute	1st maximum	350	NCQQA v10	150
dimethylbenzene	1330-20-7	MELCCFP	Norme	1-year	1st maximum	20	NCQQA v10	8
Formaldehyde	50-00-0	MELCCFP	Norme	15-minute	1st maximum	37	NCQQA v10	3
Benzo[a]pyrene	50-32-8	MELCCFP	Norme	1-year	1st maximum	0.0009	NCQQA v10	0.0003
2,2,4-trimethylpentane	540-84-1	MELCCFP	Critère	1-hour	1st maximum	3500	NCQQA v10	0
2,2,4-trimethylpentane	540-84-1	MELCCFP	Critère	1-year	1st maximum	350	NCQQA v10	0
Benzene	71-43-2	MELCCFP	Norme	24-hour	1st maximum	10	NCQQA v10	3
Acetaldehyde	75-07-0	MELCCFP	Critère	4-minute	99th percentile	3	-	-

Substance	CAS, Chem. Formula or Acronym	Gov. / Org.	Threshold Type	Averaging Period	Statistical	Limit (µg/m³)	Background Concentration reference	Background Concentration (µg/m³)
Acetaldehyde	75-07-0	MELCCFP	Critère	1-year	1st maximum	0.5	-	-
Naphthalene	91-20-3	MELCCFP	Norme	4-minute	1st maximum	200	NCQQA v10	5
Naphthalene	91-20-3	MELCCFP	Norme	1-year	1st maximum	3	NCQQA v10	0
2-methylnaphthalene	91-57-6	MELCCFP	Critère	1-hour	1st maximum	30	NCQQA v10	0
2-methylnaphthalene	91-57-6	MELCCFP	Critère	1-year	1st maximum	4	NCQQA v10	0
Cadmium	Cd	MELCCFP	Norme	1-year	1st maximum	0.0036	Radisson Station	0.0002
Cobalt	Co	MELCCFP	Critère	1-year	1st maximum	0.1	Radisson Station	0.0002
Chromium(VI)	Cr(VI)	MELCCFP	Norme	1-year	1st maximum	0.004	Northen Projects	0.002
Chromium(III)	Cr(III)	MELCCFP	Norme	1-year	1st maximum	0.1	Radisson Station	0.003
Copper	Cu	MELCCFP	Norme	24-hour	1st maximum	2.5	Radisson Station	0.116
Polycyclic aromatic hydrocarbons	PAH	MELCCFP	Critère	1-year	1st maximum	0.0024	NCQQA v10	0.0014
Mercury	Hg	MELCCFP	Norme	1-year	1st maximum	0.005	Northen Projects	0.002
Lithium	Li	MELCCFP	Critère	1-hour	1st maximum	2	NCQQA v10	0
Magnesium	Mg	MELCCFP	Critère	1-hour	1st maximum	24	NCQQA v10	6
Manganese	Mn	MELCCFP	Critère	1-year	1st maximum	0.08	Radisson Station	0.00249
Nickel	Ni	MELCCFP	Norme	24-hour	1st maximum	0.07	Radisson Station	0.003
Nickel	Ni	MELCCFP	Norme	1-year	1st maximum	0.02	Radisson Station	0.003
Lead	Pb	MELCCFP	Norme	1-year	1st maximum	0.1	Radisson Station	0.002
Dioxins and Furans	PCDD/F	MELCCFP	Norme	1-year	1st maximum	0.00000006	NCQQA v10	0.00000004
Antimony	Sb	MELCCFP	Norme	1-year	1st maximum	0.17	Radisson Station	0.001
Selenium	Se	MELCCFP	Critère	1-hour	1st maximum	2	NCQQA v10	0.15

Substance	CAS, Chem. Formula or Acronym	Gov. / Org.	Threshold Type	Averaging Period	Statistical	Limit (µg/m³)	Background Concentration reference	Background Concentration (µg/m³)
Silica-crystalline, Quartz	SiO2	MELCCFP	Critère	1-hour	1st maximum	23	NCQQA v10	6
Silica-crystalline, Quartz	SiO2	MELCCFP	Critère	1-year	1st maximum	0.07	NCQQA v10	0
Tin	Sn	MELCCFP	Critère	4-minute	1st maximum	2	NCQQA v10	0
Tin	Sn	MELCCFP	Critère	1-year	1st maximum	0.1	Radisson Station	0.003
Titanium	Ti	MELCCFP	Critère	24-hour	1st maximum	2.5	Radisson Station	0.0064
Vanadium	V	MELCCFP	Norme	1-year	1st maximum	1	Radisson Station	0.007
Zinc	Zn	MELCCFP	Norme	24-hour	1st maximum	2.5	Radisson Station	0.06
Fine particulates	PM2.5	CCME	NCQAA	24-hour	98th percentile [3YA]	27	Radisson Station	10.42
Fine particulates	PM2.5	CCME	NCQAA	24-hour	98th percentile [3YA]	23	Radisson Station	10.42
Fine particulates	PM2.5	CCME	NCQAA	1-year	1st maximum [3YA]	8.8	Radisson Station	2.99
Fine particulates	PM2.5	CCME	NCQAA	1-year	1st maximum [3YA]	8	Radisson Station	2.99
Nitrogen dioxide [OLM;0.2;70]	NO2	CCME	NCQAA	1-hour	98th percentile [DM] [3YA]	79	MELCCFP, 2025, Low Level	43
Nitrogen dioxide [TC]	NO2	CCME	NCQAA	1-year	1st maximum	22.6	MELCCFP, 2025, Low Level	9
Sulfur dioxide	SO2	CCME	NCQAA	1-hour	99th percentile [DM] [3YA]	170.2	Northen Projects	20.9
Sulfur dioxide	SO2	CCME	NCQAA	1-year	1st maximum	10.5	Northen Projects	2

[MQ] Percentile calculated from the daily maxima of hourly average concentrations.
[MM] Moving average.
[M3A] Three-year average.

6.2.3 Greenhouse gases (Energy transition)

Greenhouse gas (GHG) emissions refer to the quantities in metric tonnes of GHG emissions, primarily carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O).

6.2.3.1 In Canada

According to the National GHG Emissions Report 1990–2023 (ECCC, 2025), total GHG emissions in 2023 for Canada reached 694 Mt of CO_2eq.

According to the sectors of activity defined in the executive summary of the National Inventory Report 1990-2023, the mining activities other than exploitation of oil and gas are classified in the "Heavy Industry" category. This sector emitted 78 Mt of CO_2 eq in 2023.

6.2.3.2 In Quebec

In 2023, Quebec's total GHG emissions were 78 Mt CO_2eq, or 8.8 t per capita, representing 11.3% of Canada's total emissions of 694 Mt CO_2eq.

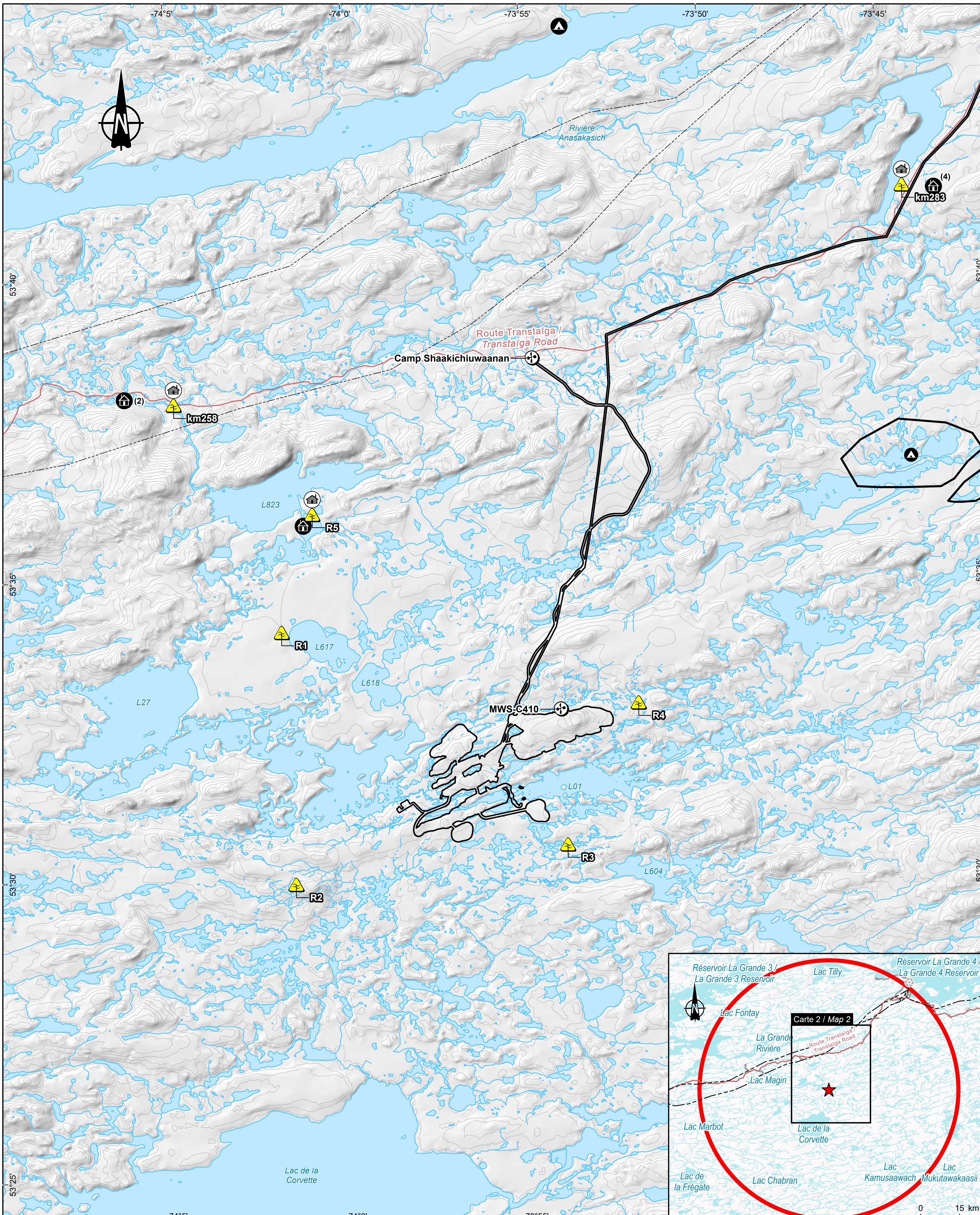
The sector that produced the most GHG emissions in Quebec in 2023 was transportation (road, air, sea, rail, and off-road). The industry sector ranked second, reaching 24.7 Mt CO2eq, or 31.7% of total emissions.

These emissions are distributed as follows: 47.4% from energy consumption, 51.5% from industrial processes, and 1.1% from fugitive emissions and the use of solvents and other products (MELCCFP, 2025b).

6.2.4 Acoustic environment

The study area is located within the territory of the Eeyou Istchee James Bay Regional Government in an area where regulations allow, among other things, single-family dwellings, outfitters, mining activities, and parks and green spaces. The applicable noise criteria are those set out in Directive 019 on the mining industry (D019; MELCCFP, 2025) and the guidelines on environmental noise management (MELCCFP, 2026). The prescribed noise limit for this area (hourly average) is 45 dBA at night and 50 dBA during the daytime, as the dwellings appear to be rudimentary shelters (not connected to a potable water supply or wastewater treatment system).

The acoustic environment (reference state) was determined by field measurements using sound level meters installed at sensitive receptors (Map 6-3). The methodology used is presented in Appendix 6-2. Identification of sensitive receptors, including consultations carried out by PMET, did not identify any permanent residences or resort areas near the project site or within the study area. The sensitive receptors were identified by land use research and confirmed by PMET during consultations with land users. They include three Cree campsites located within15 km of the project site, as shown in Table 6-6.



Zones d'étude / *Study Areas*

Projet / *Project*

Régionale - Biophysique / *Regional - Biophysical*

Ambiance sonore / *Sound Ambiance*

Station de mesure du bruit / *Noise measurement station*

Utilisation du territoire / *Land Use*

Camp cri permanent / *Cree permanent Camp*

Campement cri temporaire / *Cree temporary camp or campsite*

Camp de chasse / *Hunting camp*

Aire de camps et de campements / *Camps and campsites area*

Climat / *Climate*

Station météo / *Weather station*

Infrastructures / *Infrastructure*

Centrale hydroélectrique / *Hydroelectric generating station*

Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

Route collectrice municipale / *Municipal collector road*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

PMET

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-3 / *Map 6-3*

État initial de l'ambiance sonore / *Baseline Acoustic Environment*

Sources / Sources

AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 1,2 2,4 km

UTM, fuseau 18, NAD83 (CSRS)

2026-03-23

Préparation / Prepared by : M. Deshais
Dessin / Drawn by : M. Dupraz
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CA0001724_3318_eie_ch06_c03_04_260303.aprx
CA0001724_3318_eie_c06_03_114_amb_sonore_260323

wsp

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Table 6-6 Identified sensitive receptors

Sensitive receptors	Coordinates	
	NAD83, MTM zone 8 (dd,dddd)	WGS84 (dd,dddd)
KM258 – Campsite at km 258 on the Trans-Taiga Road	53.632602° N, -74.080211° E	53.6326° N, -74.0802° E
KM283 – Campsite at km 283 on the Trans-Taiga Road	53.691001° N, -73.738200° E	53.6910° N, -73.7382° E
R5 – Campsite approximately 4 km south of the Trans-Taiga Road, 6 km northwest of the project site	53.601696° N, -74.016095° E	53.6017° N, -74.0161° E

Four additional sound measurement stations were selected by PMET to characterize the acoustic environment (baseline) around the study area. The measurement stations and their coordinates are shown in Table 6-7.

Table 6-7 Sound measurement stations around the project site

Measurement station	Coordinates	
	NAD83, MTM zone 8 (dd,dddd)	WGS84 (dd,dddd)
R1 – northwest of the project site	53.569102° N, -74.031096° E	53.5691° N, -74.0311° E
R2 – southwest of the project site	53.499097° N, -74.025805° E	53.4991° N, -74.0258° E
R3 – southeast of the project site	53.590202° N, -73.898995° E	53.5092° N, -73.8990° E
R4 – northeast of the project site	53.548301° N, -73.865105° E	53.5483° N, -73.8651° E

Table 6-8 shows the equivalent noise levels (LAeq) at the seven measurement stations for two time periods: daytime (7 a.m. to 7 p.m.) and nighttime (7 p.m. to 7 a.m.), as well as for the 24-hour period. The equivalent noise level corresponds to the average noise level during the measurement period. To determine the noise criteria according to provincial regulations, residual noise measurements (ambient noise without the mine’s activities) must be compared to the maximum sound levels permitted by the MELCCFP’s environmental noise management guidelines. Should the measured residual noise be above the maximum noise levels permitted by the guidelines, the measured level becomes the standard. The measured noise levels were all below the criteria established by the applicable guidelines. The applicable noise criteria are therefore 45 dBA at night and 50 dBA during the daytime at all monitoring locations.

Table 6-8 Measured noise levels

Measurement site	$L_{eq,\ 24h}$ (dBA)[a]	$L_{eq,\ 7h\text{-}19h}$ (dBA)[1]	$L_{eq,\ 19h\text{-}7h}$ (dBA)[1]	Minimum hourly level, daytime (dBA)[1]	Minimum hourly level, nighttime (dBA)[1]
KM258	45	46	44	32	42
KM283	33	35	23	19	18
R1	20	21	19	17	17
R2	20	21	17	16	16
R3	31	31	32	30	31
R4	27	29	23	15	15
R5	27	28	25	16	17

Note: 1 Noise level rounded to 1 dBA, ref.: $2x10^{-5}$ Pa.

For comparison with federal standards, daytime noise levels Ld, nighttime noise levels Ln, and the Ldn indicator were used. These results are used to calculate the % HA (Highly Annoyed) and determine compliance with the Health Canada noise criterion. The Ld noise indicator represents the average noise measured between 7 a.m. and 10 p.m. The Ln noise indicator represents the average noise measured between 10 p.m. and 7 a.m. Finally, the Ldn indicator represents the average daily noise to which a weighting of 10 dBA is added for the nighttime period (10 p.m. to 7 a.m.). Table 6-9 presents the results of ambient noise surveys conducted prior to the project.

Table 6-9 Results of ambient noise surveys – federal criteria

Measurement site	L_d (7h-22h) (dBA)[1]	L_n (22h-7h) (dBA)[1]	L_{dn} (dBA)[1]	%HA
KM258	46	43	50	2.2
KM283	34	20	33	0.9[2]
R1	21	19	26	0.3[2]
R2	21	16	24	0.3[2]
R3	31	32	38	1.7[2]
R4	28	24	31	0.7[2]
R5	33	25	32	0.8[2]

Notes: 1 Noise level rounded to 1 dBA, ref.: $2x10^{-5}$ Pa;
2 An additional 10 dBA is applied to the day-night level for calculating the %HA at the receptor in a quiet area (L_d < 45 dBA and L_n < 35 dBA).

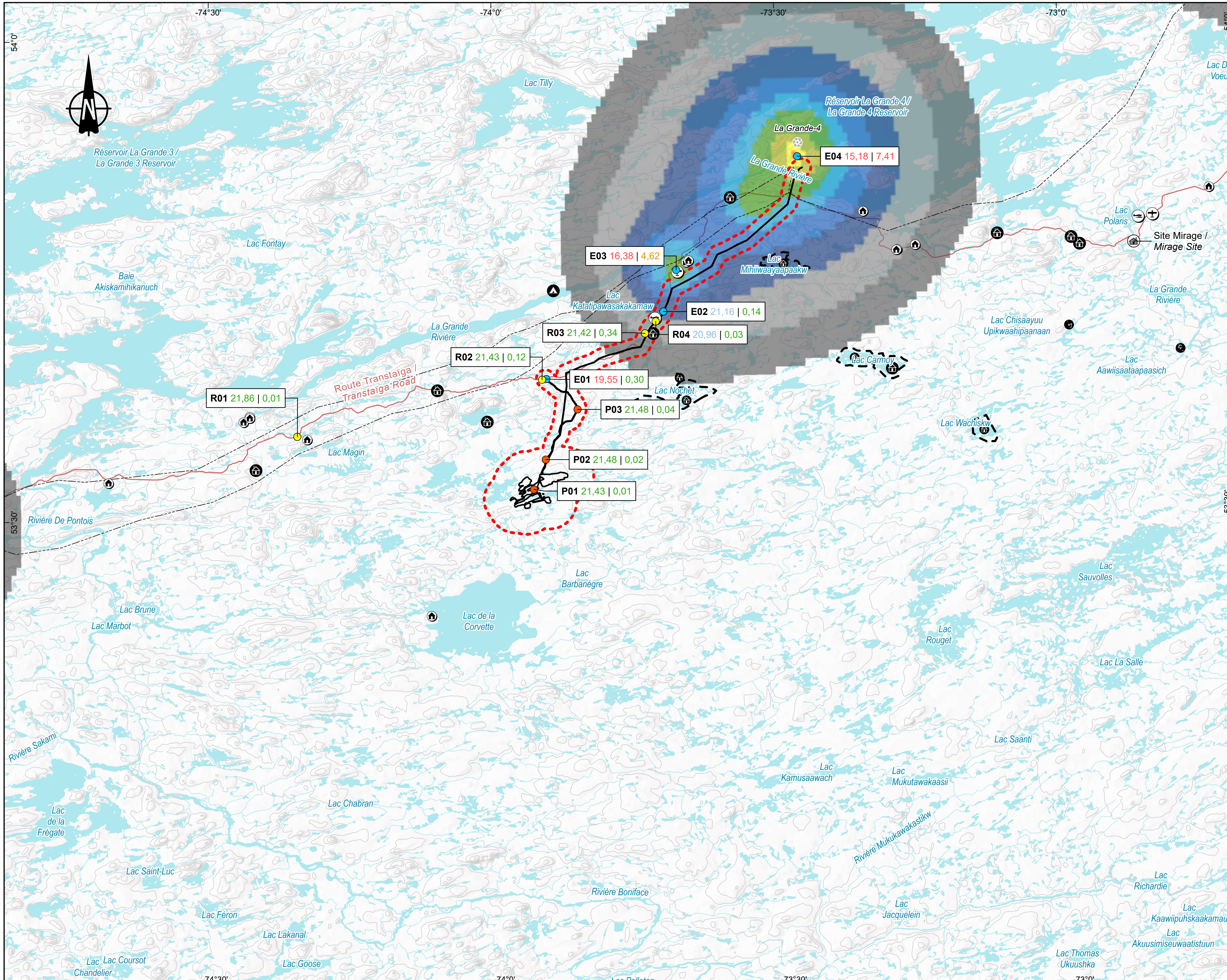
All ambient noise (e.g., road and air traffic, activities of users in the area) was taken into account in ambient noise measurements. However, the start time for each 24-hour measurement period was selected to minimize the influence of noise from the occasional helicopter flights that took place on site during the measurement campaign and that were used to transport the noise measurement instruments.

The main noise contribution at measurement site KM283 comes from traffic on the Trans-Taiga Road, with an average daytime noise level of 35.3 dBA. At measurement site KM258, a generator operating to power the campsite during the night of November 3 to 4 produced a relatively high noise level, with the minimum hourly noise level at night at 42.1 dBA.

When moving away from the Trans-Taiga Road, the noise level is relatively low, which corresponds to the levels typically measured at the beginning of winter in an environment far from human habitation and activity, when wind speeds are low. At locations far from the road, with the exception of measurement site R3, average noise levels ranged from 19.6 dBA to 26.9 dBA. At measurement site R3, the flow of water in a stream was audible, resulting in a higher noise level than that measured at other sites along the Trans-Taiga Road.

6.2.5 Ambient light

The analysis of current ambient light conditions in the biophysical LSA is based on a review of the literature and field surveys. The details of the information summarized below can be found in the luminosity report presented in Appendix 6-3. Measuring stations representative of the biophysical LSA were selected following an analysis of existing sources of artificial light present at nighttime in the study area. In total, four sensitive receptor stations (R), four stations corresponding to emitters (E), and three stations at the project site (P) were selected for light measurements. The location of each of these stations is shown on Map 6-4, and a brief description of each is provided in Table 6-10.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Ambiance lumineuse / *Luminous Environment*

- Projet / *Project*
- Récepteur / *Receiver*
- Émetteur / *Transmitter*

Numéro de la station / *Station number*
E = Émetteur / *Transmitter*
R = Récepteur / *Receiver*
P = Projet / *Project*

E13 19,71 | 0,02

Couleur : Zone de la CIE / *Color : CIE Zone*
Lumière intrusive (lux) / *Intrusive light (lux)*
Clarté du ciel / *Sky clarity* (mag/arcsec²)

Zone de la CIE pour chaque station / *CIE Area for Each Station*

- XXX Secteur peu influencé par la luminosité / *Sector little influenced by the luminosity*
- XXX Secteur de faible luminosité / *Area of low brightness*
- XXX Secteur de luminosité moyenne / *Area of medium brightness*
- XXX Secteur de forte luminosité / *Area of high brightness*

Résultat des mesures de clarté du ciel / *Sky Brightness Measurement Result* (mag/arcsec²)

>21,97	21,09-21,45
21,96-21,97	20,6-21,09
21,94-21,96	20,02-20,60
21,90-21,94	19,35-20,02
21,82-21,90	18,65-19,35
21,68-21,82	17,93-18,65
21,45-21,68	< 17,93

Infrastructures / *Infrastructure*

- Aérodrome / *Aerodrome*
- Hydroaérodrome / *Hydroaerodrome*
- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Utilisation du territoire / *Land Use*

- Bail de villégiature / *Resort purpose*
- Camp de chasse / *Hunting camp*

Campements cri / *Cree Camps*

- Camp permanent / *Permanent Camp*
- Campement temporaire / *Temporary camp or campsite*
- Aire de camps et de campements / *Camps and campsites area*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-4 / *Map 6-4*
Clarté du ciel et résultats d'échantillonnage de l'ambiance lumineuse /
Sky Brightness and Light-environment Sampling Results

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01 / MTMD, Aéroports 2024-05-28
Données du nouvel Atlas 2016 / Data from the new 2016 Atlas : Falchi et al. 2016

0 4,5 9 km

UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

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CA0001724_3318_eie_c06_04_115_clarte_ciel_260325

wsp

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Table 6-10 Description of ambient light survey stations

Station	Type	Location in relation to the project	Description
R01	Sensitive receptor	Northwest	Trans-Taiga Road, resort lease
R02	Sensitive receptor	North	Trans-Taiga Road
R03	Sensitive receptor	Northeast	Trans-Taiga Road
R04	Sensitive receptor	Northeast	Camp Nouchimi
P01	Project	Project	Project site
P02	Project	North	Access road to the project site
P03	Project	Northeast	Access road to the project site
E01	Emitter	North	Exploration camp, inhabited section of the camp
E02	Emitter	Northeast	Communication tower
E03	Emitter	Northeast	Trans-Taiga street light, airfield
E04	Emitter	Northeast	LG-4 hydroelectric complex

Measurements were taken in the field during the nights of October 2 and 3, 2024. This field campaign enabled specific measurements to be taken of sky clarity and light pollution, and photographs to be taken of the surrounding nighttime landscapes. As the moon influences measurements, surveys were conducted during the new moon (less than 1% visible during the night of October 2). In addition, since cloud cover can also influence measurements, particular attention was paid to weather conditions to ensure that surveys were carried out under the best possible conditions. All measurements were taken after astronomical twilight, specifically between 8:00 p.m. and 1:15 a.m.

SKY CLARITY

Data on the quality of the night sky in the project area are presented in Map 6-4. These data are illustrated using a colour chart corresponding to the level of sky clarity, with orange representing the least clear sky and transparent representing the clearest sky for the area under study.

The study area is located between the town of Radisson (west of the boundaries of Map 6-4) and the LG-4 hydroelectric complex (clearly visible on Map 6-4). The project site (P stations) is located in a section where sky clarity is optimal, as it is in an area identified as having more than 21.97 mag/arcsec2 (transparent area on Map 6-4). The closer one gets to stations E02, E03, and E04, the greater the amount of nighttime artificial light can be detected. This high level of light is mainly due to the infrastructure of the exploration camp, the LG-4 hydroelectric complex, and its airfield.

INTRUSIVE LIGHT

The results show that there is currently very little intrusive light (at ground level) emitted toward the receptor stations (zone E1,[1] levels below 1 lux). Emitters E03 and E04 are the stations with the highest levels of intrusive light, with zone E3 having levels up to 2 lux and zone E4 having levels up to 5 lux. Hydro-Québec's facilities (airfield and LG-4 hydroelectric complex) are, once again, the main causes of intrusive light.

NIGHTTIME LANDSCAPE

The project site and selected receptor stations have a very dark nighttime landscape, with little or no visible artificial light emissions. Emitter stations offer a much brighter nighttime landscape, where existing infrastructure is the main source of light pollution.

6.2.6 Geology and geomorphology

6.2.6.1 Geology

The biophysical LSA and RSA are entirely located within the Superior geological province, which covers nearly half of Quebec's territory (Government of Quebec, 2026). It consists of very old geological formations, between 2.5 and 2.8 billion years old, and is subdivided into nine sub-provinces. More specifically, the biophysical LSA is entirely located within the La Grande subprovince, while the biophysical RSA encompasses a small portion of the Opinaca subprovince in its southern part. Within the biophysical RSA, the two sub-provinces meet at the Quentin Shear Zone (Map 6-5). The formations present are mainly from the Neoarchean era (2.8 to 2.5 billion years ago) and are granitoid and sedimentary in type. However, formations from the Mesoarchean era (3.2 to 2.8 billion years ago) are also present and include metavolcanic and metasedimentary rocks, as well as formations comprising a composite of tonalite, diorite, quartz diorite, and granodiorite.

The project facilities are located entirely within a Mesoarchean formation comprising metavolcanic and metasedimentary rocks (Map 6-5). This formation contains a wide variety of rock types, as shown in the legend for Map 6-5, some of which contain spodumene pegmatite intrusions that contain the mineral targeted by the project. The pegmatite intrusion targeted by the mining project is presented in detail in Section 5.2.1 of the chapter on the project description. It should be noted that this formation is bounded to the north by the Ponthois-Sud fault, which exhibits reverse shearing, and to the south by a zone of shearing with indeterminate movement, known as the Nochet zone.

6.2.6.2 Geomorphology

Physical geography

The topography within the biophysical RSA is generally uniform, with maximum elevations around 400 m. The average elevation tends to decrease toward the northwest, on the north side of the Ponthois-Sud fault, where the maximum elevations drop to 360 m and 320 m. With regard to the project area itself, the LiDAR survey indicates that the center of the site's elevation varies between 335 m and 340 m above mean sea level (Appendix 6-4). The site is relatively flat, with a slight slope to the north (Appendix 6-4).

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[1] International Commission on Illumination classification system for artificial light at night (CIE, 2003)

Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Biophysique / *Regional - Biophysical*
- Locale - Biophysique / *Local - Biophysical*

Géologie du socle / *Bedrock Geology*

Failles régionales / *Regional Faults*

- Position déduite de levés géophysiques, mouvement indéterminé (FGID) / *Position deduced from geophysical surveys, undetermined movement (FGID)*

Cisaillements régionaux / *Regional Shears*

- Position certaine, mouvement indéterminé (CCID) / *Certain position, undetermined movement (CCID)*
- Position certaine, mouvement inverse (CCIV) / *Certain position, reverse movement (CCIV)*
- Position certaine, mouvement normal (CCNO) / *Certain position, normal movement (CCNO)*

Zones géologiques générales / *General Geological Areas*

- Arénite quartzitique, conglomérat et mudrock / *Quartz arenite, conglomerate and mudrock*
- Conglomérat, wacke et formation de fer / *Conglomerate, wacke and iron formation*
- Regroupement de roches quartzifères ou non telles que le granite, la granodiorite, la diorite, la monzonite et la monzodiorite. / *Grouping of quartz-bearing or non-quartz-bearing rocks such as granite, granodiorite, diorite, monzonite, and monzodiorite.*
- Regroupement de roches telle que la tonalite, le gneiss tonalitique la diorite, la diorite quartzifère et le granodiorite et le granite; parfois sous forme de brèche intrusive à fragments. / *Groupings of rocks such as tonalite, tonalitic gneiss, diorite, quartz diorite, granodiorite, and granite; sometimes in the form of intrusive breccia with fragments.*
- Regroupement de roches telles que la diorite, la granodiorite, la monzodiorite et la monzonite, quartzifères ou non. / *Grouping of rocks such as diorite, granodiorite, monzodiorite, and monzonite, whether quartz-bearing or not.*
- Regroupement de roches telles que la granodiorite, la tonalite, le granite, la granodiorite à niveaux de tonalite, la diorite et la tonalite, quartzifère ou non. / *Grouping of rocks such as granodiorite, tonalite, granite, granodiorite with tonalite layers, diorite, and tonalite, whether quartz-bearing or not.*
- Regroupement de roches telles que la tonalite, la diorites, le granodiorite et le gneiss tonalitique, quartzifères ou non. / *Grouping of rocks such as tonalite, diorite, granodiorite, and tonalitic gneiss, whether quartz-bearing or not.*
- Regroupements de diverse roches telle que l'amphibolite, le tuf felsique à intermédiaire, la formation de fer, le wacke, le mudrock, le basalte, le gneiss mafique et autres roches métavolcaniques et métasédimentaires. / *Groupings of various rocks such as amphibolite, felsic to intermediate tuff, iron formation, wacke, mudrock, basalt, mafic gneiss, and other metavolcanic and metasedimentary rocks.*
- Regroupements de paragneiss, de conglomérat, de formation de fer, de métatexite, de diatexite, d'amphibolite, d'arénite quartzitique et de mudrock. / *Assemblages of paragneiss, conglomerate, iron formation, metatexite, diatexite, amphibolite, quartzitic arenite, and mudrock.*

Hydrographie / *Hydrography*

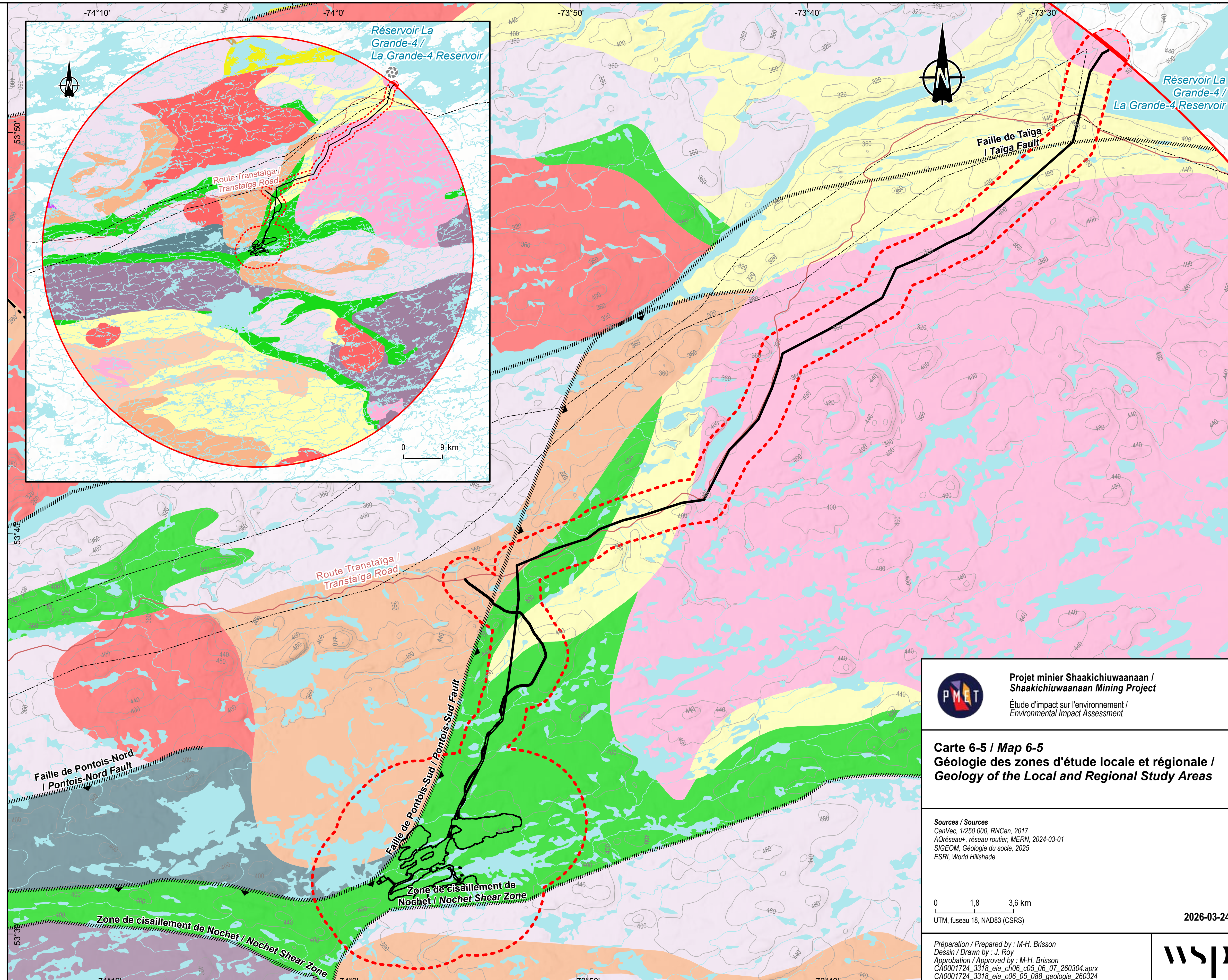
- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*



Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-5 / *Map 6-5*

Géologie des zones d'étude locale et régionale / *Geology of the Local and Regional Study Areas*

Sources / *Sources*

CanVec, 1/250 000, RNCan, 2017
AQréseau+, réseau routier, MERN, 2024-03-01
SIGEOM, Géologie du socle, 2025
ESRI, World Hillshade

0 1,8 3,6 km

UTM, fuseau 18, NAD83 (CSRS)

2026-03-24

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CA0001724_3318_eie_ch06_c05_06_07_260304.aprx
CA0001724_3318_eie_c06_05_088_geologie_260324

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Superficial deposits

Superficial deposits, both in the biophysical RSA and biophysical LSA, consist mainly of undifferentiated till with numerous discontinuous areas of melt-out till or ablation till (Map 6-6). Undifferentiated till covers large continuous areas across both study areas, covering 71% of the territory in the RSA and 72% in the LSA. The materials generally found in this type of deposit are silty sand or sandy silt with the presence of gravel, pebbles, and boulders in varying proportions depending on the area. The melt-out or ablation till occupies 13% of the RSA and 15% of the LSA. Undifferentiated lacustrine sediments, juxta-glacial sediments, and outcrops of undifferentiated bedrock are also relatively abundant (14%) in the RSA. Finally, four other types of deposits are present in the RSA, but more sporadically (>1%). It should be noted that organic deposits occupy barely 1% of the biophysical RSA and are scattered sporadically across the territory in small cells.

With regards to the soils present in the project study area, the soil survey carried out by BBA (2025) as part of the baseline studies help to define the main horizons present. These are described below in the section presenting the results of this assessment.

Assessment of the existing soils

A study to assess the natural background level (NBL) in soils was conducted at the project site (Appendix 6-4). According to this study, the soils observed in the exploration trenches and boreholes showed some heterogeneity in their composition, grain granulometry, and stratigraphic sequence. However, in general, a layer of organic soil was found on the surface with a thickness varying from 0.05 m to 0.67 m. Beneath this layer, two main stratigraphic layers were observed. The first horizon consisted of sand and gravel with traces of gravel, varying in colour from grey to brown, and the second horizon observed consisted of sand and silt with traces of silt, varying in colour from beige to grey to dark brown. These last two horizons were used for the NBL calculations on the site (Appendix 6-4).

As part of the NBL assessment, 16 exploratory trenches and 3 boreholes were drilled in areas that had not been affected by human activities (Map 6-7). The selected samples, 19 samples for the sand and gravel horizon and 17 samples for the sand and silt horizon, were analyzed for metals,[2] total organic carbon (TOC), moisture content, and pH (BBA, 2025).

The NBL assessment conducted by BBA for the study site showed NBLs in the A-B range for silver (Ag) and arsenic (As) in both natural soil horizons studied. All other metals had NBLs below the generic criterion A suggested by the MELCCFP.

Soil quality

According to the Phase I Environmental Site Assessment (Appendix 6-5), based on the property inspection and the historical review conducted, one (1) potential contamination indicator was identified, suggesting that soil quality and/or groundwater quality at the site may have been affected.

2 The metals analyzed were: Ag, Al, Sb, Cd, Ca, Cr, Co, Cu, Sn, Fe, Li, Mg, Mn, Hg, Mo, Ni, Pb, K, Se, Na, S, Ti,V, Zn.

The site inspection has not yet been carried out, as the site is inaccessible during the winter period according to information provided by the Client. A site visit will have to be conducted by a specialist as soon as conditions permit, in order to carry out a Phase II Environmental Site Assessment.

6.2.7 Hydrology

As part of the baseline hydrology study (Appendix 6-6), several field campaigns were carried out over a period of three years (2023 to 2025) to characterize the hydrological environment of the LSA. In particular, rain gauges and level sensors were installed, gauging was done, and profiles were surveyed along watercourses. This field data also helped establish rating curves[3] for key calculation points. Details of the data collected are available in the hydrology report (Appendix 6-6).

A total of 11 calculation points were selected in the biophysical LSA, and the characteristic watersheds and flows were assessed at each of these points.

Watersheds

Table 6-11 presents the 11 selected calculation points, the lake or watercourse in which they are located, the primary watershed to which they belong, and the watershed area. These calculation points and their associated watersheds are illustrated on Map 6-8.

Table 6-11 Watersheds at the 11 points of interest, under existing conditions

Name of calculation point	Lake or watercourse	Watershed tributary	Watershed area (km^2)
LL01	Lake L01	La Grande River	108
LL12	Lake L27	La Grande River	219
L633	Lake L633	Lac de la Corvette	20.9
Corvette	Lac de la Corvette	Pontois River	3163
LL5	CE15	La Grande River	116
LL6	CE300	La Grande River	12.2
LL7	Watercourse, downstream of Lake L601	Lac de la Corvette	11.9
LL8-b	Lake L540	Lac de la Corvette	1.63
LL9	Lake L219	La Grande River	1.01
LL10	Lake L308	La Grande River	8.85
LL11	CE413, at the outlet of Lake L413	La Grande River	3.44

[3] Relationship between flow rate and water level for a given hydrometric station.

Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Biophysique / *Regional - Biophysical*
- Locale - Biophysique / *Local - Biophysical*

Géologie du Quaternaire / *Quaternary Geology*

Dépôts de surface / *Superficial Deposits*

- Dépôt anthropogénique (H) / *Anthropogenic deposit (H)*
- Roche en place non différenciée (R) / *Undifferentiated in-situ rock (R)*
- Sédiment juxtaglaciaire (Gx) / *Proglacial sediment (Gx)*
- Sédiment lacustre non différencié (L) / *Undifferentiated lake sediment (L)*
- Sédiment organique non différencié (O) / *Undifferentiated organic sediment (O)*
- Sédiment éolien (Ed) / *Aeolian sediment (Ed)*
- Till de fusion ou d'ablation (Tf) / *Fusion or ablation till (Tf)*
- Till non différencié (T) / *Undifferentiated till (T)*

Hydrographie / *Hydrography*

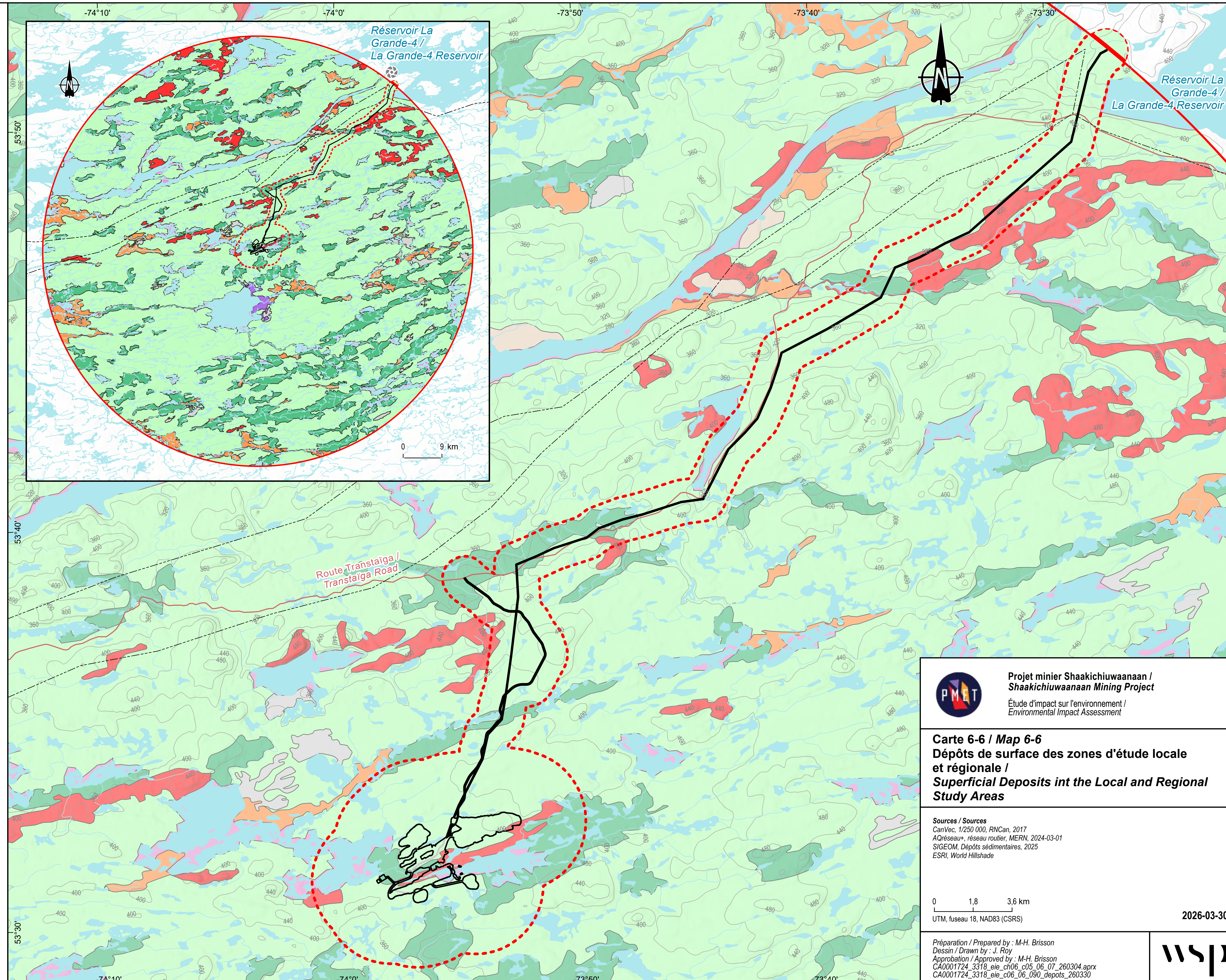
- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*



Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-6 / *Map 6-6*

Dépôts de surface des zones d'étude locale et régionale /

Superficial Deposits int the Local and Regional Study Areas

Sources / Sources
CanVec, 1/250 000, RNCan, 2017
AQréseau+, réseau routier, MERN, 2024-03-01
SIGEOM, Dépôts sédimentaires, 2025
ESRI, World Hillshade

0 1,8 3,6 km

UTM, fuseau 18, NAD83 (CSRS)

2026-03-30

Préparation / Prepared by : M-H. Brisson
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
CA0001724_3318_eie_ch06_c05_06_07_260304.aprx
CA0001724_3318_eie_c06_06_090_depots_260330

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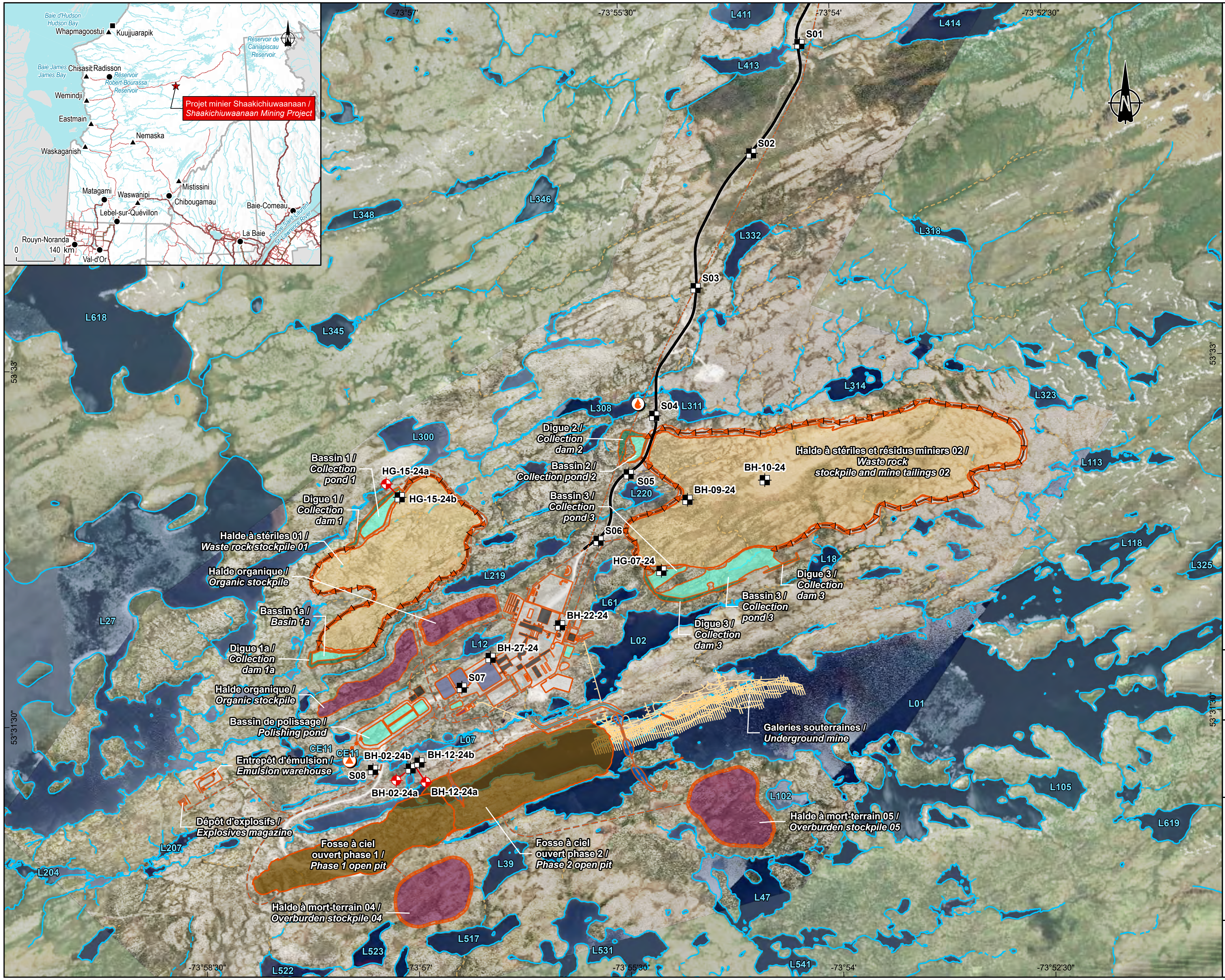

Sondages / *Soil Samplings*

- Forage / *Borehole*
- Tranchée / *Test pit*

Composantes du projet / *Project Components*

Existante / *Existing*

- Chemin d'accès / *Access road*

Projetées / *Projected*

- Effluent minier / *Mining effluent*
- Prise d'eau / *Water intake*
- Barrage / *Dam*
- Canal / *Channel*
- Canal de dérivation / *Diversion Channel*
- Chemin secondaire / *Secondary road*
- Fossé / *Ditch*
- Galerie souterraine / *Underground mine*
- Ligne de transport d'énergie / *Power transmission line*
- Aire d'entreposage du minerai mixte / *Mixed ore stockpile*
- Autre / *Other*
- Bâtiment ou équipement / *Building or equipment*
- Digue / *Dike*
- Bassin / *Basin*
- Digue des bassins / *Basins dike*
- Fosse / *Pit*
- Halde à mort-terrain et organique / *Overburden stockpile*
- Halde à stériles et/ou résidus / *Waste rock and/or tailings stockpile*
- Portail d'accès à la mine souterraine / *Underground mine portal*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermittent*
- Permanent / *Permanent*
- Souterrain / *Underground*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-7 / *Map 6-7*
Localisation des sites de sondages des sols / *Location of Soil Sampling Sites*

Sources / *Sources*

SDA, 1/20 000, MERN, 2024-02
CanVec+, 1/50 000, RNCan, 2014 / CanVec, 1/250 000, RNCan, 2017
BDGA, 1/1 000 000, MRN Québec, 2014 / BDGA, 1/1 000 000, MRN Québec, 2002
AQréseau+, réseau routier, MERN, 2024-03-01
G Services Miniers, Composantes projetées, CASN-A-001-GE-SKE-0005-A, 2025
BBA, Rapport d'évaluation de la teneur de fonds naturelle dans les sols, 2024-12-05

0 260 520 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-30

Préparation / *Prepared by* : S. St-Cyr
Dessin / *Drawn by* : J. Roy
Approbation / *Approved by* : M-H. Brisson
CA0001724_3318_eie_ch06_c05_06_07_260304.aprx
CA0001724_3318_eie_c06_07_111_sondages_260330

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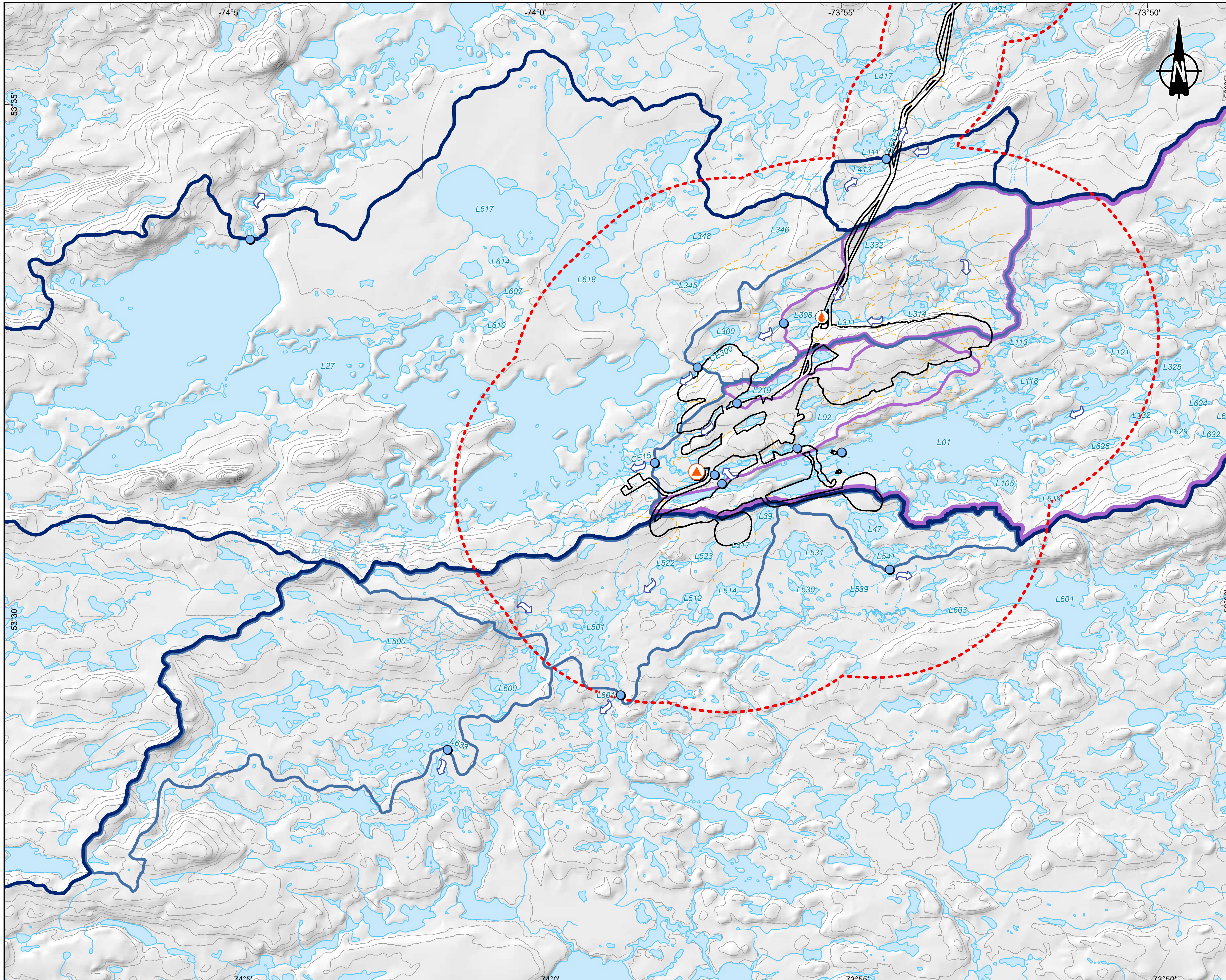


Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Hydrologie / *Hydrology*

- Sens d'écoulement de l'eau / *Waterflow direction*
- Point de calcul / *Calculation point*

Bassins versants / *Watersheds*

- Principal / *Principal*
- Intermédiaire / *Intermediate*
- Sous-bassin versant / *Sub-watershed*

Composantes du projet projetées / *Projected Project Components*

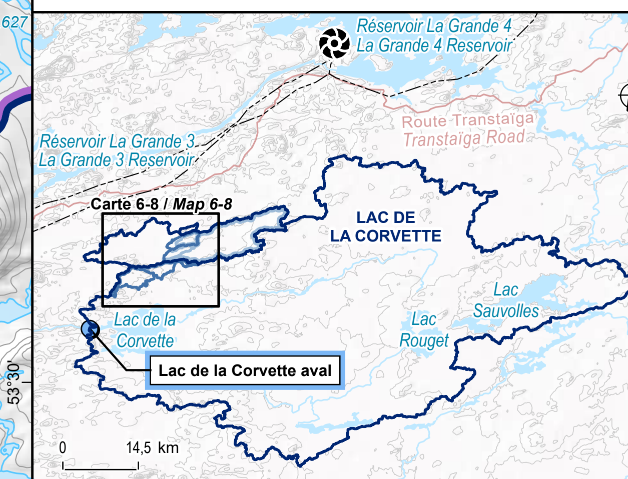
- Effluent minier / *Mining effluent*
- Prise d'eau / *Water intake*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermittent*
- Permanent / *Permanent*
- Souterrain / *Underground*



Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-8 / *Map 6-8*
Bassins versants aux conditions actuelles / *Existing Watersheds*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013

0 700 1 400 m
NAD 1983 CSRS UTM Zone 18N

2026-03-30

Préparation / Preparation : E. Sormain
Dessin / Drawing : V. Venne
Approbation / Approval : M.-H. Brisson
CA0001724_3318_eie_ch06_c06_08_09_10_14_260325.aprx
CA0001724_3318_eie_c06_08_107_hydrologie_260330

Characteristic flows

Various methods were used to estimate characteristic flows (average monthly flows, flood flows, and low water flows) at the various calculation points.

First, a frequency analysis of flood, average, and low water flows was carried out using data from 19 hydrometric stations (MELCCFP, 2024 and ECCC, 2024) and six sections of the Hydroclimatic Atlas (MELCCFP, 2022) deemed relevant. Two stations were then selected as they were considered to be the most representative of the watersheds in the biophysical LSA based on the area of the watersheds and their physical characteristics. These stations correspond, in one case, to watersheds smaller than 220 km^2 and, in the other case, to watersheds larger than 220 km^2. The other stations were used for comparison and sensitivity analysis purposes.

The average monthly flows at all calculation points were estimated by transposing the quantiles obtained by the frequency analysis. A comparison with the average flow observed during field campaigns (obtained by converting the water level recorded by the probes using the established discharge curves) was carried out, validating the order of magnitude obtained, which confirmed that the estimated water volumes for the study area’s ungauged watercourses are relatively accurate.

Flood flows were estimated using the rational method for watersheds smaller than 25 km^2 and by transposing the quantiles obtained by frequency analysis for watersheds larger than 25 km^2. A comparison with the maximum flow observed during field campaigns (obtained by converting the water level recorded by the probes using the established discharge curves) was carried out and showed that the theoretical flood flows with a 2-year recurrence interval are significantly higher than the maximum flows observed in the field, which is to be expected. However, this comparison should be treated with caution, as the discharge curves are uncertain for the maximum levels recorded, and only one spring flood is available for most of the calculation points.

Low water flows were estimated using the linear regression method proposed by MELCCFP (2017) for watersheds smaller than 25 km^2 and by transposing the quantiles obtained by frequency analysis for watersheds larger than 25 km^2. A comparison with the maximum flow observed during field campaigns (obtained by converting the water level recorded by the probes using the established discharge curves) was carried out and showed that for most probes, the observed and estimated low water flows are of the same order of magnitude.

Tables 6-12 and 6-13 show the characteristic flow rates selected at each of the calculation points after this analysis.

Table 6-12 Flood and low water flows selected for calculation points in the study area

Watershed name	Low water levels (m^3/s)					Flood levels (m^3/s)				
	q_{2-7}	q_{10-7}	q_{5-30}	2 years	5 years	10 years	20 years	25 years	50 years	100 years
Lake L01 (LL1)	0.313	0.169	0.243	13.1	16.1	17.8	19.3	19.8	21.1	22.4
Lake L27 (LL12)	0.635	0.344	0.493	26.6	32.7	36.2	39.3	40.2	42.9	45.5
Lake L633	0.035	0.017	0.023	6.77	9.18	10.7	-	12.7	14.1	15.6
Lac de la Corvette	10.7	10.3	11.2	194	241	268	292	299	321	340
CE15 (LL5)	0.335	0.181	0.260	14	17.2	19.1	20.7	21.2	22.6	24.0
CE300 (LL6)	0.020	0.010	0.013	5.88	8.09	9.51	-	11.3	12.6	14.0
Downstream Lake L601 (LL7)	0.020	0.010	0.013	3.34	4.56	5.35	-	6.34	7.07	7.82
Lac L540 (LL8-b)	0.003	0.001	0.002	1.27	1.79	2.13	-	2.57	2.88	3.20
Lake L219 (LL9)	0.002	0.001	0.001	0.35	0.49	0.58	-	0.70	0.78	0.86
Lake L308 (LL10)	0.015	0.007	0.010	4.86	6.72	7.91	-	9.42	10.5	11.7
CE413 (LL11)	0.006	0.003	0.004	1.86	2.61	3.09	-	3.71	4.15	4.61

Table 6-13 Average monthly flows used for calculation points in the study area

Station name	Jan. (m^3/s)	Feb. (m^3/s)	Mar. (m^3/s)	Apr. (m^3/s)	May (m^3/s)	Jun. (m^3/s)	Jul. (m^3/s)	Aug. (m^3/s)	Sep. (m^3/s)	Oct. (m^3/s)	Nov. (m^3/s)	Dec. (m^3/s)
Lake L219 (LL9)	0.005	0.004	0.004	0.008	0.065	0.042	0.018	0.020	0.024	0.020	0.017	0.009
Lake L540 (LL8-b)	0.009	0.007	0.006	0.013	0.105	0.068	0.029	0.032	0.038	0.032	0.028	0.014
CE413 (LL11)	0.019	0.015	0.013	0.027	0.222	0.143	0.061	0.067	0.081	0.068	0.059	0.030
Lake L308 (LL10)	0.048	0.038	0.033	0.069	0.575	0.370	0.158	0.173	0.209	0.177	0.151	0.077
Downstream Lake L601 (LL7)	0.064	0.051	0.044	0.093	0.769	0.494	0.211	0.232	0.279	0.237	0.202	0.103
CE300 (LL6)	0.066	0.052	0.045	0.095	0.788	0.507	0.217	0.238	0.286	0.243	0.208	0.105
Lake L633	0.113	0.090	0.078	0.163	1.35	0.868	0.371	0.407	0.490	0.416	0.356	0.180
Lake L01 (LL1)	0.584	0.465	0.401	0.841	6.98	4.48	1.92	2.10	2.53	2.15	1.84	0.931
CE15 (LL5)	0.627	0.499	0.431	0.903	7.49	4.82	2.06	2.26	2.72	2.31	1.97	1.00
Lake L27 (LL12)	1.18	0.942	0.813	1.71	14.1	9.09	3.89	4.27	5.14	4.36	3.73	1.89
Lac de la Corvette	26.0	17.7	13.8	16.3	106	113	64.8	65.6	69.5	87.1	74.7	46.4

Ice regime

A summary analysis of the ice regime was carried out using Sentinel-2 satellite images from 2016 to 2024. It shows that the formation and melting of ice on small lakes and watercourses in the biophysical LSA precede those on Lac de la Corvette, as might be expected. Thus, the formation of the ice cover varies between mid- and late November for small lakes and watercourses, while it tends to occur between late November and early December for Lac de la Corvette. In contrast, the ice melts in mid- to late May for small lakes and watercourses, and in late May to early June for Lac de la Corvette.

6.2.8 Surface water

Sampling and analysis of surface water began in 2022, when seven stations were established. Subsequently, several additional stations were added each year as the planned mining infrastructure plan evolved. In total, surface water quality was analyzed at 29 sampling stations distributed throughout the biophysical LSA, including six stations in the area that could potentially be exposed to mine effluent and 23 stations in the reference area. Four stations are located in watercourses, while the other 25 are located in small waterbodies and lakes. The locations of surface water sampling stations established between 2022 and 2025 are shown on Map 6-9.

To obtain a minimum of six sampling efforts spread over the ice-free period, as recommended by the Ministère (MDDELCC, 2017), water quality sampling campaigns were spread over two years for some stations. These were designed to record distinct hydrological conditions, namely spring and fall floods, as well as low water levels in summer.

All information (results and certificates of analysis) concerning surface water quality can be found in the surface water and sediment quality report in Appendix 6-7. A summary of the key results obtained is presented in the following paragraphs.

The results of in situ surface water quality measurements and laboratory analyses were compared, where possible, with the following quality criteria:

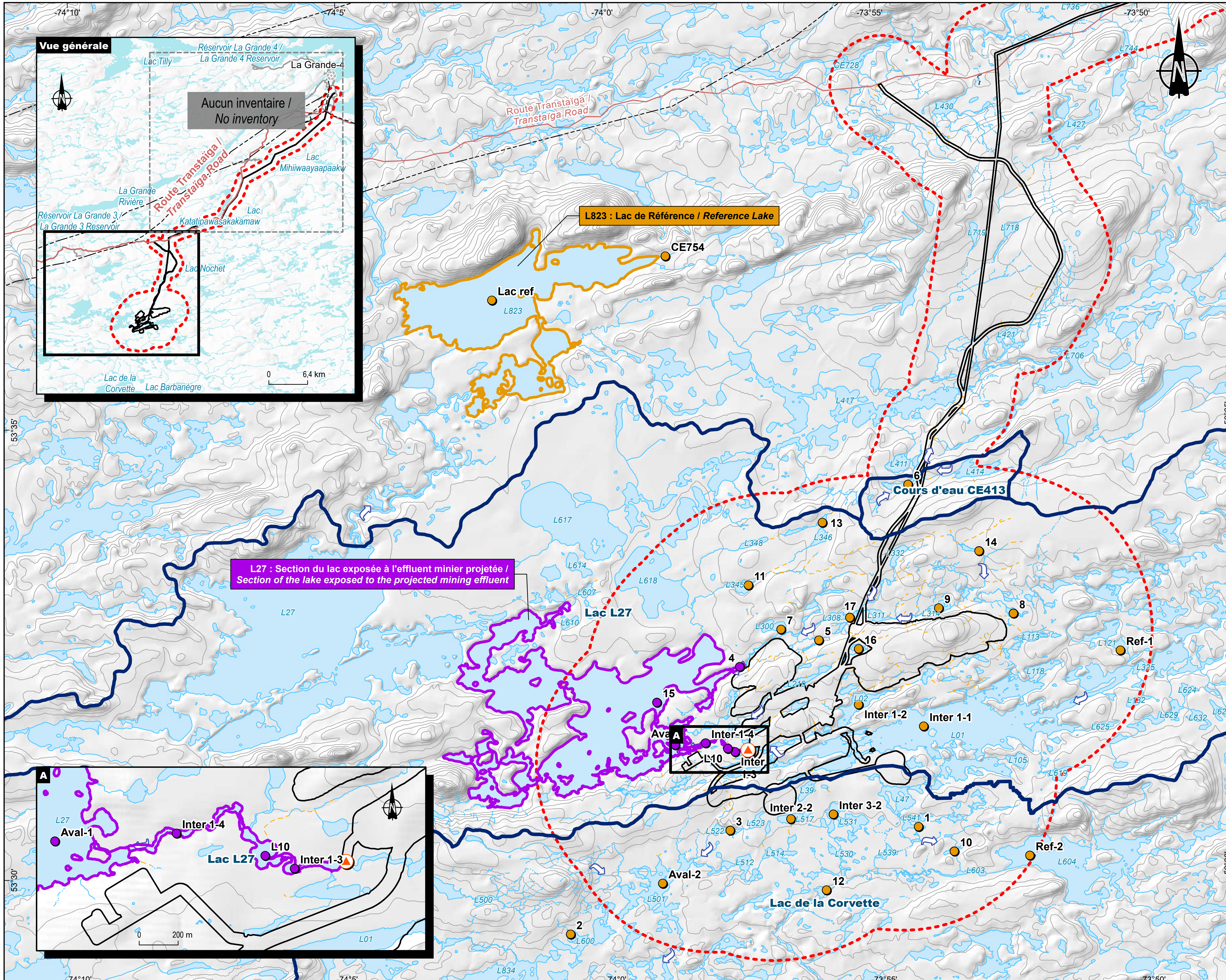
- MELCCFP's Protection of aquatic life (chronic effect): CVAC;
- MELCCFP's Prevention of contamination (water and aquatic organisms): CPC (EO);
- MELCCFP's Prevention of contamination (aquatic organisms only): CPC (O);
- MELCCFP's Protection of terrestrial fish-eating wildlife: CFTP;
- Canadian Water Quality Guidelines (Freshwater) – Protection of Aquatic Life – Long-term effect, of the Canadian Council of Ministers of the Environment (CCME): CWQG.

In general, the lakes studied shared the same characteristics: they were oligotrophic lakes with a slightly acidic pH (average 6–6.5), good surface oxygenation, clear waters, and low biological productivity.

Among the surface water samples collected at the 29 stations, guideline exceedances were observed mainly for pH, dissolved oxygen, and total extractable metals, particularly aluminum, iron, and mercury.

A few instances of exceedances of fluoride and zinc concentrations were also observed. All sampled stations exceeded the in situ pH level (below the optimal range of 6.5 to 9.5) and in situ dissolved oxygen level (CCME criterion of 9.5 mg/L) in at least one of the campaigns conducted. The acidity of the lakes is characteristic of the aquatic ecosystems of the Canadian Shield. With regard to dissolved oxygen, the criterion established by the CCME is a value that is often difficult to achieve in natural environments.

The metals with the highest exceedances were aluminum (CWQG) and mercury (CPC [EO], CPC [O], and CFTP). These exceedances are likely related to the geology and rock composition of the region.



Zones d'étude / *Study Areas*

Projet / *Project*

Locale - Biophysique / *Local - Biophysical*

Composantes du projet projetées / *Projected Project Components*

Effluent / *Effluent*

Hydrologie / *Hydrology*

Sens d'écoulement de l'eau / *Waterflow direction*

Bassin versant principal / *Principal watershed*

Milieux hydriques / *Hydrous Environments*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermitent*

Permanent / *Permanent*

Permanent partiellement souterrain / *Partially underground permanent*

Intermittent partiellement souterrain / *Partially underground intermittent*

Souterrain / *Underground*

Station d'échantillonnage / *Sampling Station*

Type d'échantillon / *Sample type*

Eau de surface

Catégorie d'échantillon / *Sampling Category*

Exposée à l'effluent minier projetée / *Exposed to the projected mining effluent*

Référence / *Reference*

Infrastructure / *Infrastructure*

Centrale hydroélectrique / *Hydroelectric power plant*

Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-9 / *Map 6-9*
Stations d'échantillonnage de l'eau de surface / *Surface Water Sampling Stations*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Synergis, État de référence du milieu aquatique pour le projet Shaakichiuwaanaan, 12-2025

0 800 1 600 m

NAD 1983 CSRS UTM Zone 18N

2026-03-25

Préparation / Preparation : I. Cartier
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
CA0001724_3318_eie_ch06_c06_08_09_10_14_260325.aprx
CA0001724_3318_eie_c06_XX_116_XXXX_260324

A reference lake (Lake L823) was established to the northwest outside the biophysical LSA. The water quality samples in the reference lake exceeded quality criteria for pH, dissolved oxygen, and aluminum.

Table 6-14 shows all parameters for which a criterion exceedance was noted in surface water samples collected between 2022 and 2025.

Table 6-14 Summary of exceedances of water quality criteria

Zone type	Station	Exceedance of criteria
Reference	Inter 1-2, 6, 7, 9, 11, 14, 17	Al: value exceeding CWQG, CVAC, and CPC (EO) Fe: value exceeding CWQG and CPC (EO) Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	13, 16	Al: value exceeding CWQG, CVAC, and CPC (EO) Hg: value exceeding CWQG, CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	Ref-1	Al: value exceeding CWQG Hg: value exceeding CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	Inter 1-1	Al: value exceeding CWQG Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range
	1	Al: value exceeding CWQG Fluorides: value exceeding CWQG Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	5, 10, Inter 3-2	Al: value exceeding CWQG Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	8	Al: value exceeding CWQG Fluorides: value exceeding CWQG pH: value below the optimal range
	2, 12, Ref-2, Inter 2-2	Al: value exceeding CWQG, CVAC, and CPC (EO) Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	3	Al: value exceeding CWQG and CPC (EO) Hg: value exceeding CPC (EO), CPC (O), and CFTP Zn: value exceeding CWQG pH: value below the optimal range Dissolved O_2: value lower than CWQG

Zone type	Station	Exceedance of criteria
	Aval-2	Al: value exceeding CWQG, CVAC, and CPC (EO) Fe: value exceeding CWQG and CPC (EO) Hg: value exceeding CWQG, CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	Lac ref	Al: value exceeding CWQG pH: value below the optimal range Dissolved O_2: value lower than CWQG
Potentially exposed to future mine effluent	4	Al: value exceeding CWQG, CVAC, and CPC (EO) Fe: value exceeding CWQG and CPC (EO) Hg: value exceeding CPC (EO), CPC (O), and CFTP Zn: value exceeding CWQG pH: value below the optimal range Dissolved O_2: value lower than CWQG
	15	Al: value exceeding CWQG Cu: value exceeding CWQG pH: value below the optimal range Dissolved O_2: value lower than CWQG
	Aval-1	Al: value exceeding CWQG Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range Dissolved O_2: value lower than CWQG
	L-10	Al: value exceeding CWQG, CVAC, and CPC (EO) pH: value below the optimal range Dissolved O_2: value lower than CWQG
	Inter 1-3	Al: value exceeding CWQG Hg: value exceeding CPC (EO), CPC (O), and CFTP pH: value below the optimal range
	Inter 1-4	Al: value exceeding CWQG Fluorides: value exceeding CEQG Hg: value exceeding CPC (EO), CPC (O), and CFTP Zn: value exceeding CWQG pH: value below the optimal range

6.2.9 Sediments

Sediment sampling was carried out during three sampling campaigns, in October 2024 and in May and June 2025. Since the first sampling carried out in 2024, several additional stations were added to accommodate the planned mining infrastructure (Map 6-10). In total, sediment quality was analyzed at 19 sampling stations, including 6 stations in the area which would potentially be exposed to the mine effluent and 13 stations in the reference area, including at the reference lake. Three stations are located in watercourses, while 16 stations are located in small waterbodies and lakes. All of the information (results and certificates of analysis) concerning sediment quality are included in the sediment quality report provided in Appendix 6-7. A summary of the key results obtained is presented in the following paragraphs.

The values obtained for the various sediment samples collected were compared to the criteria for assessing sediment quality in freshwater environments established by ECCC and the MDDEP (2007). These guidelines include three thresholds that can be used to assess whether a given sediment concentration could have an impact on aquatic fauna. These thresholds are as follows:

- rare effect concentration (REC);
- threshold effect concentration (TEC);
- probable effect concentration (PEC).

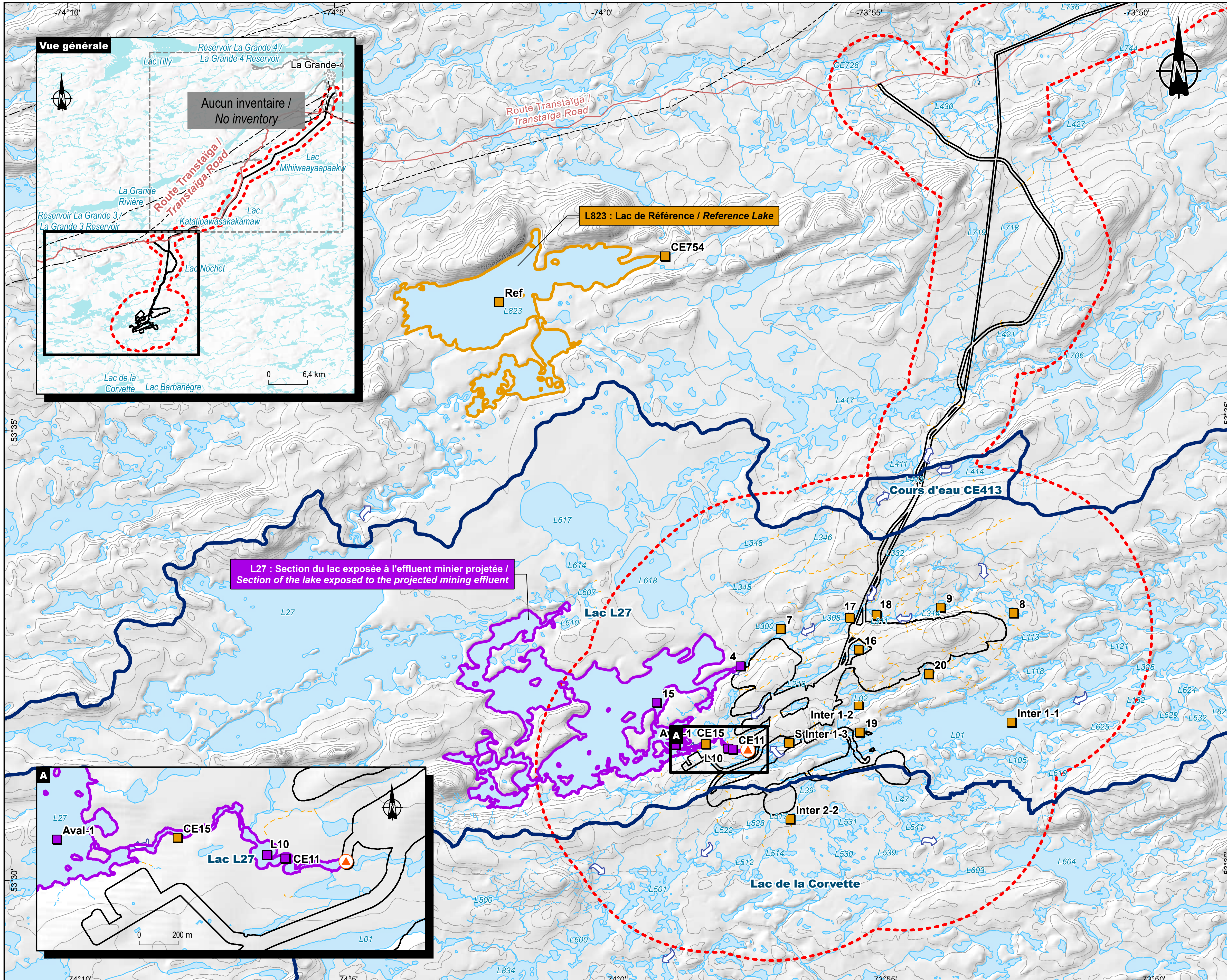
The REC and the TEC correspond to the two contamination prevention indicators. The observation of a value equal to or greater than the TEC indicates an onset of contamination, while if the observations are maintained below the REC, no impact is expected on aquatic life. The PEC is the threshold value used to guide decisions regarding site restoration. A concentration exceeding the PEC indicates that further analysis is desirable to assess the relevance of undertaking such work.

Table 6-15 shows all parameters for which a criterion exceedance was noted in sediment samples collected in 2024 and 2025.

Among the sediment samples collected at the 19 stations, exceedances of the TEC and REC were observed for metals such as arsenic, cadmium, chromium, copper, mercury, lead, and zinc. In addition, exceedances of the PEC were observed for arsenic (Stations 8, S Inter 1-3, and 15) and mercury (Station 16). The concentrations measured were generally within the geochemical background levels for the region, i.e., close to the metal content naturally present in the region’s soils and sediments. The presence of these metals in sediments is likely linked to regional geology, as their mobilization is influenced by local geochemical conditions—including pH, redox potential, and the presence of iron and manganese oxides.

In addition to metals, exceedances were observed in Lakes L10 and L27 (both which could potentially be exposed to mine effluent) for a polycyclic aromatic hydrocarbon (PAH), dibenz(a,h)anthracene. This compound is generally associated with the incomplete combustion of organic matter, with potential sources including long-range atmospheric fallout, emissions from forest fires, or historical natural inputs.

In terms of granulometry, the substrate of the lakes was mainly composed of clay and silt, sometimes mixed with sand. The substrate collected from the watercourses had the same characteristics.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composantes du projet projetées / *Projected Project Components*

- Effluent / *Effluent*

Hydrologie / *Hydrology*

- Sens d'écoulement de l'eau / *Waterflow direction*
- Bassin versant principal / *Principal watershed*

Milieux hydriques / *Hydrous Environments*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Intermittent partiellement souterrain / *Partially underground intermittent*
- Souterrain / *Underground*

Station d'échantillonnage / *Sampling Station*

Type d'échantillon / *Sample type*

- Sédiments

Catégorie d'échantillon / *Sampling Category*

- Exposée à l'effluent minier projetée / *Exposed to the projected mining effluent*
- Référence / *Reference*

Infrastructure / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric power plant*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*
Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-10 / *Map 6-10*
Stations d'échantillonnage des sédiments / *Sediment Sampling Stations*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Synergis, État de référence du milieu aquatique pour le projet Shaakichiuwaanaan, 12-2025

0 800 1 600 m
NAD 1983 CSRS UTM Zone 18N

2026-03-25

Préparation / Preparation : I. Cartier
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CA0001724_3318_eie_ch06_c06_08_09_10_14_260325.aprx
CA0001724_3318_eie_c06_XX_116_XXXX_260324

wsp

Table 6-15 Summary of exceedances of sediment quality criteria

Zone type	Lake/ Watercourse	Station	Parameter	Exceedance of criterion
Reference	L01	Inter 1-1-1, Inter 1-1-3, Inter 1-1-4, Inter 1-1-5	Arsenic, cadmium, chromium, copper, mercury, zinc	REC
		Inter 1-1-2	Cadmium, chromium, copper, mercury, zinc	REC
		Inter 1-1-1, Inter 1-1-2, Inter 1-1-3, Inter 1-1-4	Cadmium	TEC
		19-1, 19-2, 19-3, 19-4, 19-5	Arsenic	TEC, REC
		19-2,19-4, 19-5	Cadmium, chromium, mercury	REC
		19-1, 19-3	Chromium	REC
	L02	Inter 1-2-1, Inter 1-2-2, Inter 1-2-3, Inter 1-2-4, Inter 1-2-5	Arsenic	TEC, REC
		Inter 1-2-1	Lead	REC
		Inter 1-2-1, Inter 1-2-2, Inter 1-2-3, Inter 1-2-4, Inter 1-2-5	Cadmium, copper, mercury,	REC
		Inter 1-2-1, Inter 1-2-4	Mercury	TEC, REC
		Inter 1-2-5	Chromium	REC
	CE11	S Inter 1-3-1, S Inter 1-3-2, S Inter 1-3-3, S Inter 1-3-4, S Inter 1-3-5	Arsenic	TEC, REC, PEC
		S Inter 1-3-1, S Inter 1-3-2, S Inter 1-3-3, S Inter 1-3-4, S Inter 1-3-5	Cadmium, mercury, lead	REC
		S Inter 1-3-3	Chromium	REC
	L18	20-1, 20-2, 20-3, 20-4, 20-5	Arsenic	TEC, REC
	L323	8-1, 8-2, 8-3, 8-4, 8-5	Arsenic	TEC, REC, PEC
		8-1, 8-2, 8-3, 8-4, 8-5	Mercury	REC
		8–4	Cadmium	REC
	L314	9-1, 9-2, 9-3, 9-4, 9-5	Cadmium	REC
		9-1, 9-3	Mercury	REC
		9–1	Arsenic	REC
	L220	16–2	Mercury	TEC, REC, PEC
	L517	Inter 2-2-1, Inter 2-2-2, Inter 2-2-3, Inter 2-2-4, Inter 2-2-5	Cadmium	TEC, REC
		Inter 2-2-1, Inter 2-2-2, Inter 2-2-3, Inter 2-2-4, Inter 2-2-5	Zinc	REC
	L311	18-1, 18-2, 18-3, 18-4, 18-5	Mercury	REC
		18–1	Arsenic	REC
		18–2	Cadmium	REC
	L823 (reference lake)	Ref-1, Ref-2, Ref-3, Ref-4, Ref-5	Arsenic, cadmium	TEC, REC
		Ref-1, Ref-2, Ref-3, Ref-4, Ref-5	Chromium, mercury, zinc	REC
		Ref-2, Ref-3, Ref-5	Lead	REC
Potentially exposed to future mine effluent	L27	Aval 1-1, Aval 1-5	Arsenic, cadmium, chromium, mercury	REC
		Aval 1-2, Aval 1-3, Aval 1-4	Arsenic, cadmium, chromium	REC
		4–3	Arsenic	REC
		4–4	Arsenic, mercury	REC
		15-1, 15-2, 15-3, 15-5	Arsenic	TEC, REC, PEC
		15–4	Arsenic	TEC, REC
		15–3	Cadmium	REC
		15-1, 15-2, 15-4, 15-5	Cadmium	TEC, REC
		15-1, 15-2	Chromium	REC
		15–1	Dibenz(a,h)anthracene	REC
		15-3, 15-4, 15-5	Copper, chrome	REC
		15-4, 15-5	Mercury and zinc	REC
	L10	L10-3, L10-5	Dibenz(a,h)anthracene	REC

6.2.10 Hydrogeology

A conceptual hydrogeological model of the project site was developed following the review of existing information. The review included data from the baseline hydrogeological study carried out in 2024 by BBA (BBA, 2024; Appendix 6-8), BBA's technical report on packer testing (BBA, 2025a; Appendix 6-9), the hydrogeological characterization study of section CV5 of the mine site (BBA, 2025b; Appendix 6-10), the technical note on hydrogeological assessment for the underground mine and open pit by Mailloux Hydrogéologie inc. (Mailloux, 2026; Appendix 6-11), as well as the baseline hydrogeological study and numerical modelling of stockpile 002 by AtkinsRéalis (AtkinsRéalis, 2026; Appendix 6-12).

A review of the hydrogeological studies undertaken for the project makes it possible to define the hydrostratigraphic units, the hydraulic properties of the rock and unconsolidated deposits, the structural elements (faults), groundwater flow, aquifer recharge, and estimates of groundwater infiltration rates in the future mine (pit and underground).

6.2.10.1 Hydrostratigraphic units

Superficial deposits at the project site consist mainly of glacial till (sand with varying proportions of fine particles [silt and clay]) (Appendix 6-8) (Map 6-6).

In the project area, the thickness of unconsolidated deposits generally varies between 0.8 m and 20.6 m, according to BBA drilling reports (2024).

Based on the superficial deposit map and the results of hydrogeological characterization work, four hydrostratigraphic units were defined for the hydrogeological model:

- Glacial deposits, consisting of ablation till or undifferentiated till;
- Shallow rock;
- Intermediate rock;
- Deep rock.

It should be noted that structural elements (faults and shear zones) were also taken into account when establishing the hydrogeological model.

The following sections describe in more detail the different hydrostratigraphic units identified in the local study area of the biophysical environment.

Unconsolidated deposits

The unconsolidated deposits are found around Lake L01 and consist of sand with varying proportions of fine particles (silt and clay). Sediments present at the bottom of the lake, collected during ice drilling carried out by BBA in 2024 (BBA, 2024), consisted of layers of silt or clay. According to the mapping by the Ministère des Ressources naturelles et des Forêts (MRNF), these unconsolidated deposits are described as follows (MRNF, 2025):

- Undifferentiated till: Glacial diamicton whose exact origin could not be determined.
- Melt-out till or ablation till: Loose-grained diamicton, generally weathered, associated with slow ice ablation and usually exceeding 1 m in thickness. Surface generally dotted with numerous pebbles and boulders.

- Undifferentiated lake sediment: Sediment deposited in a current lake system, but whose exact origin could not be determined.

Permeability tests were conducted in the till unit to measure hydraulic conductivity, which ranges from 3 x 10^{-8} to 3.9 x 10^{-6} m/s for all unconsolidated deposits (BBA, 2024). The geometric mean of the hydraulic conductivity values is 1.1 x 10^{-6} m/s (Appendix 6-8).

Rock

The rock geology is part of the Superior geological province. Two general types of geology are found here, namely:

- a Mesoarchean lithology of the Guyer Group consisting of amphibolite derived from basalt, felsic to intermediate tuff, iron formation, wacke, and mudrock;
- an Archean lithology of the Langelier complex composed of tonalite and tonalitic gneiss.

The rock was divided into three different layers to better represent the hydraulic conductivities found during permeability and packer tests (Mailloux, 2026; Appendix 6-11):

1. A shallow rock layer corresponding to the first 50 metres of rock. Permeability tests measured hydraulic conductivity between 4 x 10^{-9} and 2 x 10^{-6} m/s. The geometric mean of the hydraulic conductivity values is 2 x 10^{-7} m/s (Appendix 6-11).
2. An intermediate layer divided into two thicknesses, either 50 to 100 m and 100 to 150 m. Hydraulic conductivities range from 2.3 x 10^{-9} to 8.2 x 10^{-8} and 2.9 x 10^{-9} to 8.2 x 10^{-8}, with geometric means of 2.3 x 10^{-8} and 1.5 x 10^{-8} (Appendix 6-11).
3. A deep layer, divided into two thicknesses, 150 to 200 m and 200 to depth. The hydraulic conductivities range from 1.7 x 10^{-9} to 5.2 x 10^{-8} and from 8.6 x 10^{-10} to 6.7 x 10^{-8}, with geometric means of 5.6 x 10^{-9} and 6.6 x 10^{-9} (Appendix 6-11).

The hydraulic conductivity of the bedrock was assessed as part of the BBA 2024 study (Appendix 6-8), and six faults were identified in the vicinity of the pits and underground workings in the BBA 2025 study (Appendix 6-10). Hydraulic tests conducted near or within these faults indicate that hydraulic conductivity values are low.

6.2.10.2 Piezometry

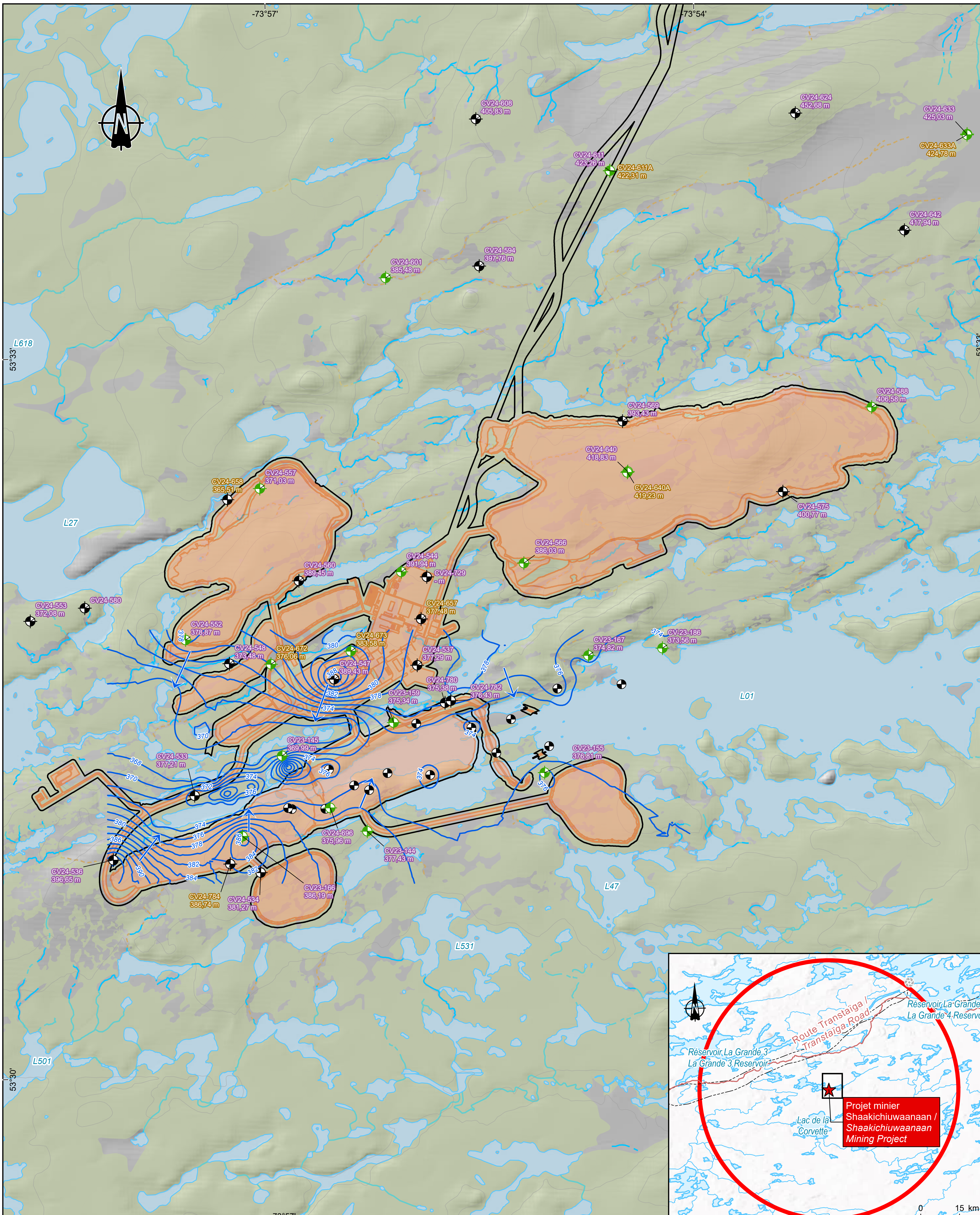
Groundwater levels measured in 2023 and 2024 are generally close to the ground surface, with measured depths ranging from 0.11 m to 7.4 m for rock and 0.13 m to 2.67 m for unconsolidated deposits (BBA, 2025b, Appendix 6-10). In general, groundwater flow directions are controlled by topography, flowing from higher rock formations to lower locations such as lakes and marshes.

Map 6-11 shows the piezometry of the rock, which was defined based on the groundwater level survey conducted in June 2024 and generated by BBA (Appendix 6-10).

The measured water levels were presented in Mailloux’s study (Appendix 6-11) and are shown in Table 6-16.

Table 6-16 Piezometry for the various wells

Well	Measured water level (m)	Well	Measured water level (m)
CV23-153	378.51	CV24-536	377.4
CV23-150	373.72	CV24-537	377.08
CV23-147	375.80	CV24-544	391.99
CV23-194	375.29	CV24-547	390.43
CV23-199	372.20	CV24-548	373.34
CV23-192	375.20	CV24-552	378.78
CV23-174	374.35	CV24-553	372.08
CV23-169	377.60	CV24-557	371.03
CV23-164	378.02	CV24-560	389.45
CV23-157	375.59	CV24-566	386.03
CV23-167	374.82	CV24-569	393.43
CV23-159	375.3	CV24-575	400.77
CV23-145	370.01	CV24-588	406.58
CV23-166	387.72	CV24-594	397.76
CV23-144	377.95	CV24-601	385.48
CV23-155	376.91	CV24-640	417.93
CV23-186	374.1	CV24-640A	418.42
CV24-533	377.1	CV24-657	377.48
CV24-534	381.2	CV24-658	364.66
CV24-673	383.58	CV24-672	376.06



Zones d'étude / *Study Areas*

Projet / *Project*

Régionale - Biophysique / *Regional - Biophysical*

Piézométrie / *Piezometry*

Courbe piézométrique (m) / *Piezometric level curve (m)*

Direction d'écoulement / *Flow direction*

Forage / *Borehole*

Puit d'observation / *Monitoring well*

Puit d'observation échantillonné / *Sampled monitoring well*

CV24-536 — Nom de la station / *Station name*

396,65 m — Élévation du niveau d'eau / *Water level elevation*

Couleur / *Color*
Unité hydrostratigraphique / *Dydrostratigraphic unit*

CV24-536 — Roc / *Rock*

CV24-536 — Dépôt meuble/ *Unconsolidated deposit*

Composante du projet / *Project Component*

Projetée / *Projected*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Souterrain / *Underground*

Infrastructures / *Infrastructure*

Centrale hydroélectrique / *Hydroelectric generating station*

Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-11 / *Map 6-11*
Piézométrie du roc (août à novembre 2024) et emplacement des forages et des puits /
Rock Piezometry (August to November 2024) and Borehole and Well Locations

Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 300 600 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-30

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CA0001724_3318_eie_c06_11_125_piezo_260330

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

6.2.11 Groundwater quality

6.2.11.1 Current conditions

Data on groundwater quality are available for the years 2023 and 2024 in the previous studies consulted. Map 6-11 shows the location of the wells used to determine current conditions. Twenty-three wells (15 from the bedrock aquifer and 6 from sandy deposits) were sampled during three annual campaigns. The list of wells identified in previous studies is presented in Table 6-17.

Table 6-17 List of wells sampled in 2023–2024

Nº	Name	X (UTM_U18)	Y (UTM_U18)	Ground elevation (m)	Intercepted unit	Well depth (m)	Water level rise (m)	No. of campaigns
1	CV23-167	-73,91344045	53,5288629	374.92	Rock	25.00	374.82	1
2	CV23-159	-73,93625753	53,5244027	375.59	Rock	50	375.34	3
3	CV23-145	-73,9493151	53,522208	372.69	Rock	50	369.99	3
4	CV23-166	-73,95403741	53,5166582	389.14	Rock	50	386.19	3
5	CV23-144	-73,93950767	53,5168807	379.98	Rock	25	377.43	3
6	CV23-155	-73,91874594	53,5207668	379.81	Rock	25	376.81	3
7	CV23-186	-73,90479995	53,5292874	374.16	Rock	50	373.56	2
8	CV24-544	-73,93509	53,5348646	393.4	Rock	14.65	391.94	1
9	CV24-552	-73,96033836	53,5303495	379.38	Rock	11.47	378.87	1
10	CV24-557	-73,95143556	53,540789	371.5	Rock	7.77	371.03	1
11	CV24-558	N/A	N/A	N/A	Unconsolidated deposit	N/A	N/A	1
12	CV24-566	-73,92078893	53,53533863	387.23	Rock	11.2	386.03	1
13	CV24-588	-73,87996875	53,54580411	408.93	Rock	19	406.58	1
14	CV24-601	-73,93640375	53,55529042	386.04	Rock	9.45	385.48	1
15	CV24-611	-73,91008761	53,56248745	423.37	Rock	23.9	423.26	1
16	CV24-611A	-73,91005719	53,56249616	422.52	Unconsolidated deposit	12.34	422.31	1
17	CV24-633	-73,86834256	53,56465267	426.17	Rock	20.6	425.03	1
18	CV24-633A	-73,86835909	53,56459889	427.24	Unconsolidated deposit	9.4	424.78	1
19	CV24-640	-73,90851171	53,54159146	421	Rock	21.52	418.83	1
20	CV24-640A	-73,90857368	53,54152911	421.09	Unconsolidated deposit	18.44	419.23	1

Nº	Name	X (UTM_U18)	Y (UTM_U18)	Ground elevation (m)	Intercepted unit	Well depth (m)	Water level rise (m)	No. of campaigns
21	CV24-672	-73,95043968	53,5285821	376.41	Unconsolidated deposit	5.62	376.06	1
22	CV24-673	-73,94111074	53,52940774	383.99	Unconsolidated deposit	5.24	383.58	1
23	CV24-696	-73,9437798	53,51854557	379.26	Rock	100	375.96	1

N/A : information not available

6.2.11.2 Analysis program

The choice of parameters was based on the risks associated with the use of the site and the requirements of Directive 019 (MELCCFP, 2025). The campaigns for the groundwater quality studies took place in March, April, and September 2023 and from July to September 2024. Groundwater samples were analyzed for one or more of the following parameters:

- inorganic compounds (total cyanides, fluorides, total sulphides);
- nitrogen compounds;
- C_{10}-C_{50}; petroleum hydrocarbons (PH);
- major ions (bicarbonates, calcium, carbonates, chlorides, magnesium, potassium, sodium and sulphates);
- dissolved metals;
- radionuclides (2023, 2024);
- Physicochemical parameters (pH, electric conductivity, oxidation-reduction potential and temperature).

6.2.11.3 Water quality criteria

Considering that the groundwater of the biophysical LSA could be resurgent in the surface water, the chemical analysis results with the resurgence in surface water criteria (RES) of the *Response Manual — Soil Protection and Contaminated Sites Rehabilitation* of the MELCCFP (Beaulieu, 2021). The identified potential receptors are the streams and lakes within the biophysical LSA.

The results of the groundwater sampling program for 2020 and 2021 were compared to the RES and the drinking water (EC) presented in the Response Manual. All of the 2023–2024 results are presented in the Table 6-18 (radionuclides) and in the tables of Results of Appendix 6-10 (radionuclides).

Table 6-18 Analytical results for radionuclides (2023, 2024)

Parameters	Units	CV23-166A	CV24-558	CV24-558	CV24-633
		2024-07-28	2024-08-19	2024-09-20	2024-09-18
Radionuclides					
Lead$_{-210}$	Bq/L	<1	<1	<1	<1
Radium$_{-226}$	Bq/L	<1	<1	<1	<1
Radium$_{-228}$	Bq/L	<0.5	<0.5	<0.5	<0.5
Thorium$_{-228}$	Bq/L	<0.1	<0.1	<0.1	<0.1
Thorium$_{-232}$	Bq/L	-	-	-	-
Uranium$_{-234}$	Bq/L	-	-	-	-
Uranium$_{-238}$	Bq/L	<0.01	0.03	<0.01	0.125

Analysis results

For the 2023–2024 campaigns, exceedances of EC criteria were observed for dissolved antimony (1 sample), dissolved arsenic (24), molybdenum (1), dissolved manganese (17), ammoniacal nitrogen (11), sulphide in the form of S2- (9), and fluoride (1). Exceedances of RES criteria were observed for dissolved copper (2) and for sulfide (9). No HP C10-C50 was detected in the test results. Table 6-19 summarizes the exceedances observed during this period.

Table 6-19 Summary of exceedances observed for the 2023–2024 campaign

Parameter (criteria At/RES/EC µg/l)	Number of analyses	Frequency of exceedances, 2023–2024 campaign		
		Alert threshold (AT)	Resurgence in surface water (RES)	Drinking water (DW)
Antimony (550/1100/6)	34	0	0-	**1**
Arsenic (170/340/0.3)	34	0	0	**24**
Copper (3.65/7.3/1000)	34	2	2	0
Manganese (1150/2300/50)	34	0	0	**17**
Ammoniacal nitrogen (-/-/0.05)	21	-	-	**11**
Molybdenum (14 500/29000/40)	34	0	0	**1**
Fluoride (2/4/1.5)	28	0	0	**1**
Sulphide–S_2^- (-/-/0.05)	33	1	9	9

LEGEND:

100	: > RES criterion
100	: > Alert threshold
100	: > Criterion/recommendation Drinking water

Piper diagrams were compiled to categorize the groundwater at the site (BBA, 2024; Appendix 6-8). The groundwater is considered to be between bicarbonated, calcic, and magnesian; and bicarbonated, sodic, and potassic.

6.3 Biological environment

6.3.1 Vegetation and wetlands

Vegetation and wetlands are described at the scale of the biophysical LSA, covering an area of 20,661 ha. Detailed information used as a basis for assessing the project's impacts on this component is presented in the vegetation and wetlands baseline study reports in Appendices 6-13 and 6-14.

According to the ecological classification of the territory (MRNF, 2023), the biophysical LSA is located in the spruce-lichen stand bioclimatic domain (western subdomain) and in the ecological regions of the Eastmain and Sakami rivers, the Robert-Bourassa reservoir, and Lake Naococane. The landscapes of the open boreal forest are not very diverse due to harsh climatic conditions and frequent fires. They are heavily dominated by black spruce. Black spruce-lichen stands, characterized by an open forest canopy and a lichen mat are the most abundant type of stand in the area (MRNF, 2023).

Plant communities

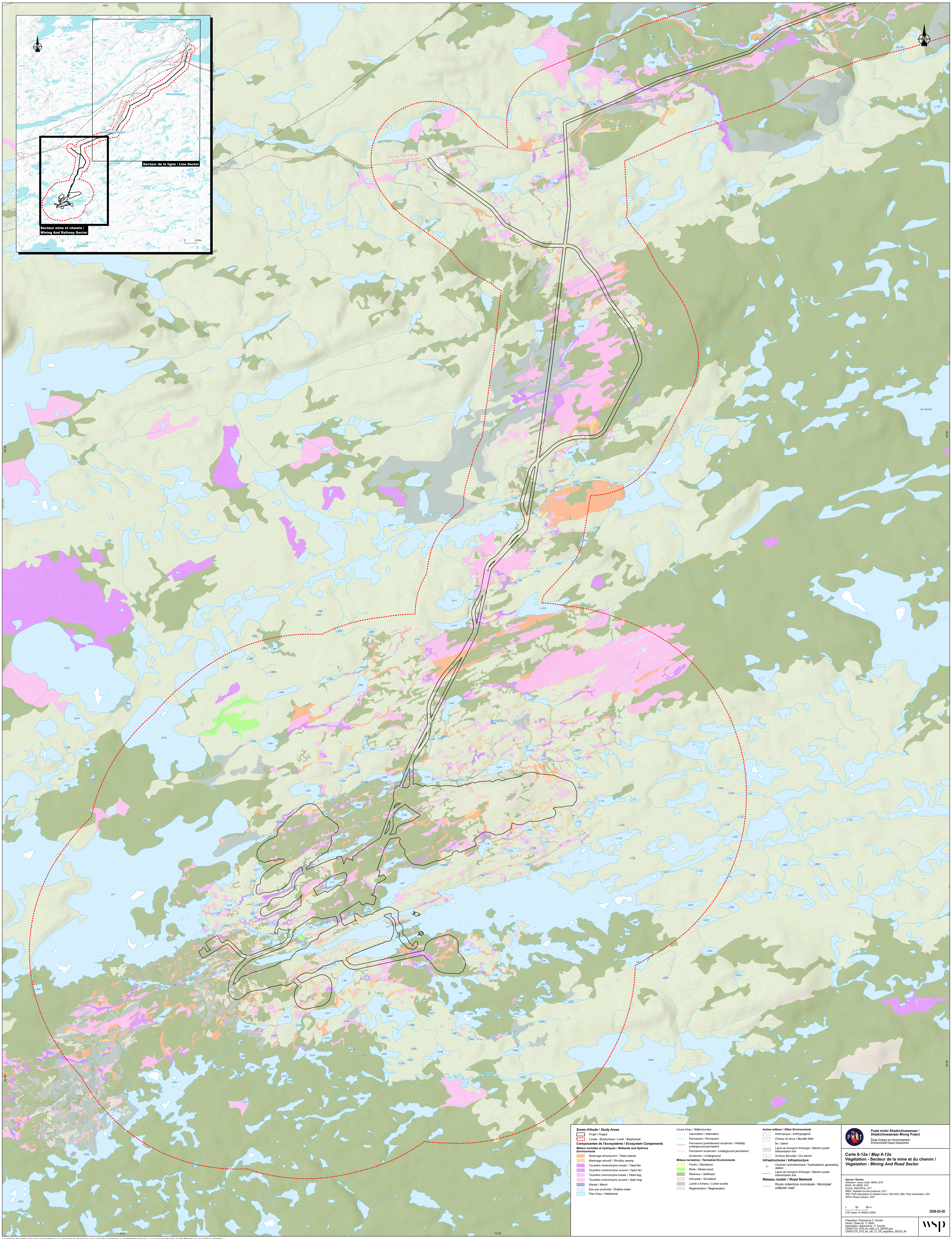
Following fieldwork and photo interpretation in 2023, 2024, and 2025, 14 plant communities were identified and mapped in the biophysical LSA (Table 6-20). Terrestrial and wetland environments occupy 75.1% and 11.8% of the biophysical LSA, respectively (Map 6-12). The main types of terrestrial environments in the biophysical LSA are, in ascending order of area, forest regeneration areas, softwood stands, lichen tundra, scrublands, mixedwood stands, and hardwood stands.

The main types of wetlands are, in ascending order of surface area, wooded ombrotrophic bogs, open ombrotrophic bogs, tree swamps, shrub swamps, open fens, wooded fens, ponds or shallow waters, and marshes.

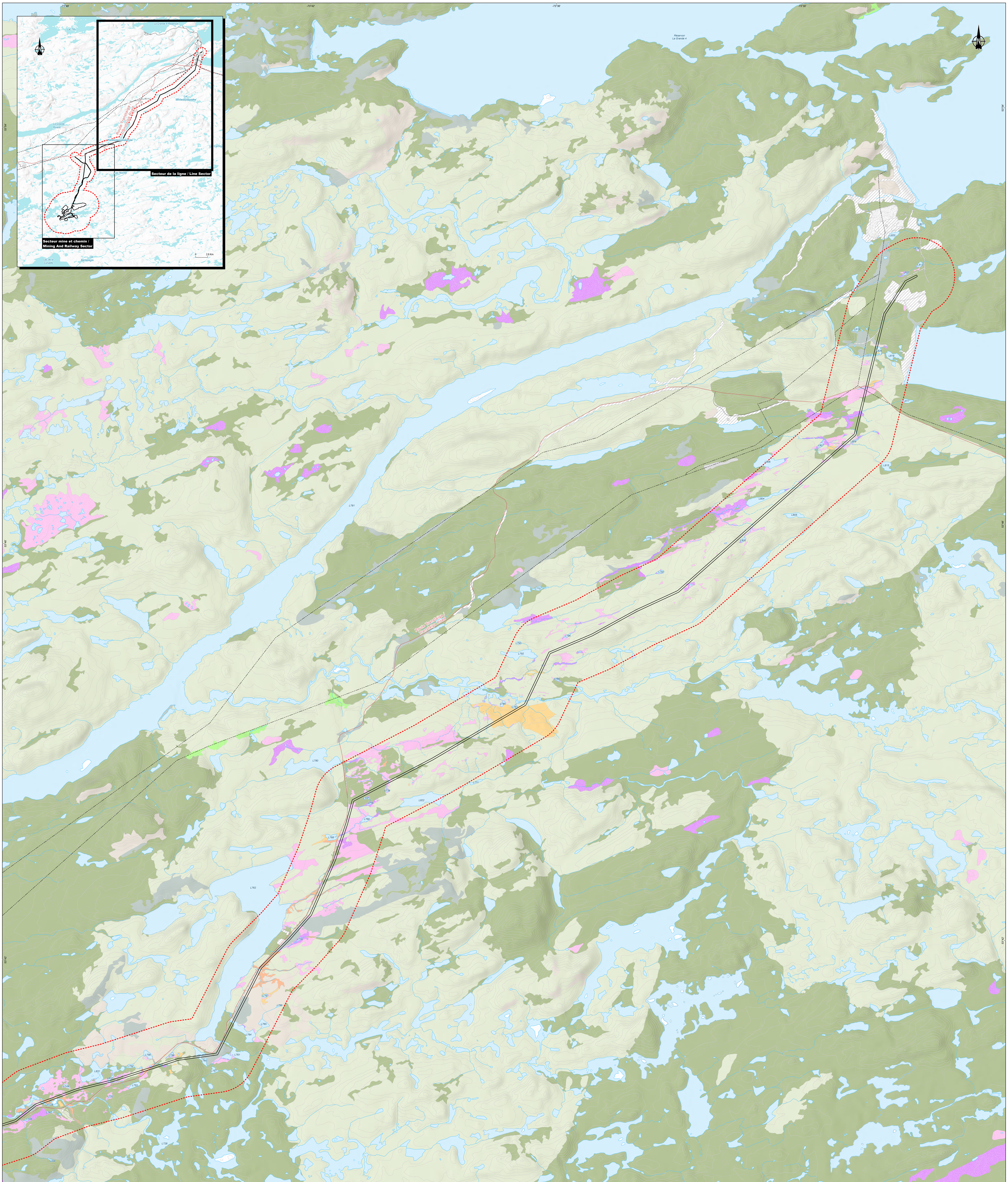
Water bodies (lakes and large watercourses) cover 2,547 ha, or 12.3% of the biophysical LSA. Lastly, the biophysical LSA includes a very small proportion of other environments, such as anthropogenic environments (130 ha).

Table 6-20 Areas of natural environments in the biophysical LSA

Type of environment	Area (ha)	Proportion of biophysical LSA (%)
Terrestrial environments		
Scrublands	378	1.8
Hardwood	0.3	0.002
Lichen tundra	519	2.5
Mixedwood	28	0.1
Regenerating forest	8,774	42.5
Softwood	5,814	28.1
Subtotal	**15,513**	**75.1**
Wetlands		
Pond/shallow water	15	0.1
Marshes	6	0.03
Tree swamp	372	1.8
Shrub swamp	245	1.2
Wooded fen	67	0.3
Open fen	177	0.9
Wooded ombrotrophic bog	820	4.0
Open ombrotrophic bog	728	3.5
Sub-total	**2,430**	**11.8**
Other environments		
Anthropogenic	130	0.6
Block field	5	0.02
Body of water	2,547	12.3
Island	34	0.2
Bare surface	2	0.01
Subtotal	**2,718**	**13.2**
Total	**20,661**	**100**



La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*

- Marécage arborescent / *Treed swamp*
- Marécage arbustif / *Shrubby swamp*
- Tourbière minérotrophe boisée / *Treed fen*
- Tourbière minérotrophe ouverte / *Open fen*
- Tourbière ombrotrophe boisée / *Treed bog*
- Tourbière ombrotrophe ouverte / *Open bog*
- Marais / *Marsh*
- Eau peu profonde / *Shallow water*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Permanent souterrain / *Underground permanent*
- Souterrain / *Underground*

Milieux terrestres / *Terrestrial Environments*

- Feuillu / *Deciduous*
- Mixte / *Mixed-wood*
- Résineux / *Softwood*
- Arbustaie / *Scrubland*
- Lande à lichens / *Lichen tundra*
- Régénération / *Regeneration*

Autres milieux / *Other Environments*

- Anthropique / *Anthropogenic*
- Champ de blocs / *Boulder field*
- Île / *Island*
- Ligne de transport d'énergie / *Electric power transmission line*
- Surface dénudée / *Dry barren*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*
- Route locale / *Local road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-12b / *Map 6-12b*
Végétation - Secteur de la ligne électrique / *Vegetation - Electrical Line Sector*

Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017
MRNF, Végétation du Nord québécois, 2013
WSP, Photo interprétation et validation terrain, 2024-2025 / BBA, Photo interprétation, 2023
GRHQ, Réseau hydrique, 2024

0 310 620 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-20

Préparation / Prepared by S. Faucher
Dessin / Drawn by : E. Kheiri
Approbation / Approved by : S. Faucher
CA0001724_3318_eie_ch06_c12_260305.aprx
CA0001724_3318_eie_c06_12_105_vegetation_260320_A0

Terrestrial environments

Regenerating forest areas are the most commonly observed terrestrial environments in the biophysical LSA, accounting for 42.5% (8,774 ha). These are natural environments resulting from disturbances, most of which correspond to forest fires dating back several decades. These areas do not have a dominant tree stratum, but rather regeneration consisting mainly of black spruce, jack pine, and tamarack (*Larix laricina*) in the shrub stage, with a canopy cover of more than 10%. It is therefore estimated that these areas will become wooded again in the long or short term if they are not disturbed again. Other shrub species observed in these environments include dwarf birch (*Betula glandulosa*), mountain alder (*Alnus alnobetula subsp. crispa*), leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Rhododendron groenlandicum*), and lowbush blueberry (*Vaccinium angustifolium*). The herbaceous layer is generally not very dense, but wavy hairgrass (*Avenella flexuosa*), yellow clintonia (*Clintonia borealis*), bunchberry (*Cornus canadensis*), Sitka ground-cedar (*Diphasiastrum sitchense*), and wild lily-of-the-valley (*Maianthemum canadense*) are common. The soil in regenerating environments is in most cases composed of a sandy horizon and sometimes a thin organic horizon resting on rock.

Softwood stands are also abundant in the biophysical LSA, accounting for 28.1% (5,814 ha) of the total area. The most common stand type observed in the field is spruce-moss, followed by spruce-lichen and jack pine. Spruce stands are dominated by black spruce. Spruce-lichen stands differ from spruce-moss stands in that lichens dominate the ground cover rather than mosses. The main shrub species in spruce stands are regenerating black spruce, leatherleaf, Labrador tea, lowbush blueberry, velvetleaf huckleberry (*Vaccinium myrtilloides*), and dwarf birch. As for herbaceous vegetation, it is denser in spruce-moss stands forests than in spruce-lichen stands. The main species observed in abundance are three-fruited sedge (*Carex trisperma*), yellow clintonia, bunchberry, woodland horsetail (*Equisetum sylvaticum*), stiff clubmoss (*Spinulum annotinum* subsp. *annotinum*), and cloudberry (*Rubus chamaemorus)*. The soil in spruce stands is generally composed of sand, or sandy loam, sometimes with a thin organic horizon on the surface. These are sites where drainage varies from good to poor and where rock is sometimes close to the soil surface. As for jack pine stands, shrub and herbaceous vegetation is generally less abundant than in spruce stands. The main shrub species are sheep-laurel, Labrador tea, lowbush blueberry, mountain serviceberry (*Amelanchier bartramiana*), prairie willow (*Salix humilis*), and regenerating black spruce and jack pine, while the most common herbaceous plants are yellow clintonia, bunchberry, and wild lily-of-the-valley. The soil of jack pine stands consists of sand, often over shallow rock.

Other wooded areas, namely mixedwood and hardwood stands, are much less abundant, accounting for 0.1% (28 ha) and 0.002% (0.3 ha) of the biophysical LSA, respectively.

The only characterized hardwood forest is a white birch stand located on soil with very little organic matter on rock. The tree stratum is sparse, dominated solely by white birch (*Betula papyrifera*), while the shrub stratum is dense, also dominated by white birch, with mountain alder, squashberry (*Viburnum edule*), and skunk currant (*Ribes glandulosum*). The stiff clubmoss is the only dominant herbaceous species.

Two mixedwood groupings were identified, both located along banks on very thin fibrous soil over rock. This is a mature stand of black spruce and white birch with moderately dense shrub strata, dominated by mountain alder and mountain serviceberry, and herbaceous species such as stiff clubmoss and yellow clintonia. The other grouping is quite similar, with a predominance of black spruce and mature trembling aspen (*Populus tremuloides*) in the tree stratum. The shrub and herbaceous strata are dense and dominated by speckled alder (*Alnus incana* subsp. *rugosa*) and red-osier dogwood (*Cornus sericea*) among the shrubs, and by long beechfern (*Phegopteris connectilis*), northern lady fern (*Athyrium angustum*), and bunchberry among the herbaceous plants.

Scrublands, of which 20 were inventoried in the field, represent 1.8% (378 ha) of the biophysical LSA. Scrublands are environments characterized by little or no tree regeneration (less than 10% coverage), shrub cover of more than 70%, and/or a predominance of shrubs over lichens. Most of the scrubland is dominated by heath plants, mainly Labrador tea, leatherleaf, and lowbush blueberry. Some scrublands are dominated by mountain alder or dwarf birch. Yellow clintonia, bunchberry, and wavy hairgrass are the most common and abundant herbaceous plants in these environments. The soils in these environments generally had good drainage, being composed partly or entirely of sand or thin organic soil resting on till or rock.

Lichen tundra is not very abundant in the biophysical LSA, accounting for 2.5% (519 ha). Twelve (12) such environments have been characterized in the field. As with scrublands, these are natural environments where tree regeneration is absent or scarce (less than 10% cover), but where lichens dominate over shrubs. Dwarf birch, Labrador tea, lowbush blueberry, and sheep-laurel generally form the shrub stratum. The herbaceous plants provide sparse cover. Thin soil (15 cm on rock) or sandy soil supports the characterized environments.

Wetlands

In the biophysical LSA, wetlands cover 2,430 ha, or 11.8% of the area, and consist of eight types of groupings. Among all wetland vegetation groupings, wooded ombrotrophic bogs and open ombrotrophic bogs predominate. In fact, these two types of plant communities account for 63.7% of the wetlands in the biophysical LSA (1,548 ha out of 2,430 ha).

Although most open peatlands are not very diverse and are dominated by heaths, some open peatlands, particularly those located along watercourses, contain a greater diversity of herbaceous and shrub species. These riparian peatlands are minerotrophic (fens), which differ from ombrotrophic peatlands (bogs) in terms of their water source. Ombrotrophic bogs are wetlands fed mainly by precipitation (rain and snow), while the water supply in fens also comes from surface water that has been enriched with minerals through contact with the soil in neighbouring habitats. Fens therefore contain a much greater species richness. Wooded peatlands differ from open peatlands in terms of tree cover, which is greater than 25% in wooded peatlands. All of the characterized peatlands have organic soils ranging in thickness from 30 cm to over 100 cm and therefore rest on so-called hydromorphic soils.

Ombrotrophic bogs are generally lacking in diversity, and whether wooded or open, the plant species found there are essentially the same. Although they are still dominated by black spruce in the tree stratum, it is not uncommon to also see tamarack. These species are also abundant in the shrub stratum. The shrub stratum, which is normally dense in wooded environments, is dominated by heaths (*Ericaceae*) and mainly includes the following species: bog rosemary (*Andromeda polifolia* var. *latifolia*), leatherleaf, Labrador tea, black crowberry (*Empetrum nigrum*), creeping snowberry (*Gaultheria hispidula*), pale bog laurel (*Kalmia polifolia*), lowbush blueberry, velvetleaf huckleberry, small cranberry (*Vaccinium oxycoccos*), and bog bilberry (*Vaccinium uliginosum*).
Speckled alder, dwarf birch, sweet gale (*Myrica gale*), and common juniper (*Juniperus communis*) are also common, especially in open peatlands. As for the non-woody stratum, it is still dominated by peat mosses. Herbaceous plants are more abundant in open peatlands, with the main species being few-seeded sedge (*Carex oligosperma*), three-fruited sedge, starry false Solomon's seal (*Maianthemum stellatum*), cloudberry, and tufted clubrush (*Trichophorum cespitosum*). Although rarely dominant in terms of coverage, the boreal bog sedge (*Carex magellanica* subsp. *irrigua*), the few-flowered sedge (*Carex pauciflora*), the threeleaf goldthread (*Coptis triflora*), the dew plant (*Drosera rotundifolia*), the wood horsetail, the northern comandra (*Geocaulon lividum*), the stiff clubmoss, the buckbean (*Menyanthes trifoliata*), the pitcher plant (*Sarracenia purpurea*), and the marsh scheuchzeria (*Scheuchzeria palustris*) have been observed very frequently in open ombrotrophic bogs.

Wooded fens are not very common in the biophysical LSA, covering 0.3% (67 ha). Wooded fens feature a tree stratum dominated by black spruce. Leatherleaf, speckled alder, Labrador tea, and black spruce regeneration are the main species in the shrub stratum. The herbaceous strata of the characterized wooded fens were sparse, with three-fruited sedge, few-flowered sedge, and cloudberry being the most common and abundant species. Open fens are also few in number in the biophysical LSA (177 ha, or 0.9%). Black spruce and tamarack are common there, both as trees (with low cover) and as shrubs. Leatherleaf and sweet gale clearly dominate the shrub stratum and are often accompanied by bog rosemary. Speckled alder, dwarf birch, blue honeysuckle (*Lonicera caerulea*), and several species of heath plants are also very common here, but rarely dominant. As for the herbaceous stratum, it is generally dense and diverse, with the main dominant species being Canada bluejoint (*Calamagrostis canadensis*), meagre sedge (*Carex exilis*), mud sedge (*Carex limosa*), few-seeded sedge, three-leaved Solomon's seal (*Maianthemum trifolium*), buckbean, bog aster (*Oclemena nemoralis*), cloudberry, tufted clubrush, and horned bladderwort (*Utricularia cornuta*).

Shrub swamps, and tree swamps cover only 245 ha (1.2%), and 372 ha (1.8%) respectively in the biophysical LSA. The vegetation present in these groupings is similar to that found in wooded ombrotrophic bogs. The thickness of organic matter (<30 cm) on the surface is the main element differentiating them from peatlands. The tree swamps are dominated by black spruce in the tree stratum, sometimes co-dominant with tamarack. In shrub swamps, black spruce trees can reach a cover of up to 20%. Speckled alder, dwarf birch, leatherleaf, sweet gale, Labrador tea, and black spruce or tamarack regeneration are the main shrub species found in these swamps. Three-fruited sedge, Canada bluejoint (*Calamagrostis canadensis*), bunchberry, wood horsetail, stiff clubmoss, creeping snowberry, northern starflower (*Lysimachia borealis*), cloudberry, and dwarf raspberry (*Rubus pubescens*) are the main herbaceous species in these swamps, but are less abundant in shrub swamps. The soils of these swamps are generally composed of a thin organic horizon over a sandy mineral horizon and are often covered with peat moss.

Ponds and shallow waters cover 15 ha (0.1%) of the biophysical LSA. These are shallow bodies of water that are not connected to beaver activity and have no woody vegetation. Unlike shallow waters, ponds characterized in the field are isolated from the hydrographic network. In both cases, vegetation is sparse, but varies greatly in species diversity from one habitat to another. Buckbean, yellow cowlily (*Nuphar variegata*), marsh scheuchzeria, boreal bog sedge (*Carex magellanica* subsp. *irrigua*), and russet sedge (*Carex saxatilis*) are among the species observed in these flooded environments.

The marshes in the study area are either riparian, located on the edges of lakes or watercourses, or isolated from the hydrographic network. They cover 6 ha (0.03%) of the biophysical LSA. The marshes in question have poor or very poor drainage and, at the time of the visit, all had waterlogged soil, sometimes flooded. The vegetation is dominated by herbaceous water plant species, including sedges (Carex spp.), rushes (Juncus spp.), tufted clubrush, and buckbean.

Only 4% of the characterized wetlands had been disturbed by human activities (roads, partial logging, drainage), while approximately 11% had been disturbed by natural events, such as recent forest fires (10%), or by beaver activity (1%).

Plant species of special status

In general, boreal forests dominated by spruce-moss stands or spruce-lichen stands, such as those in the biophysical LSA, follow a dynamic associated with the fire regime and generally have a relatively undiversified vascular flora. The habitats are fairly homogeneous, and the relative lack of noteworthy plant life is characteristic of the territory as a whole.

The interactive map of occurrences of species at risk from the Quebec Natural Heritage Data Centre (CDPNQ, 2025) was consulted to obtain known occurrences of species of special status within a 15 km radius of the biophysical regional study area (biophysical RSA). It turns out that there are no occurrences in this area.

Taking into account the influence of substrate on plant communities, research was conducted to identify the geology and nature of soils in the biophysical LSA, by consulting data from maps of surface deposits in northern Quebec (MRNF, 2024a) and the interactive regional geology map of the Quebec geomining information system (SIGÉOM) (MRNF, 2024b). A few small areas of ultramafic/ultrabasic intrusive rock formations, composed of metaperidotite and metapyroxenite, are found beneath the soils of the biophysical LSA. These rock formations, which are exposed in places or subject to the action of water, could provide favourable conditions for basophilous plant species, including several species of special status.

A query performed using the CDPNQ (2024) *Potential* tool yielded a list of 95 vascular plant species of special status identified in the Nord-du-Québec region. Analysis of each of the listed species revealed that the vast majority had a zero probability of occurrence in the biophysical LSA based on the distribution of known occurrences and the absence of their preferred habitat. Table 6-21 lists the 10 species with the potential to be present in the biophysical LSA. All of these species are likely to be designated as threatened or vulnerable in Quebec, and none have a status under Schedule 1 of Canada's *Species at Risk Act* (Government of Canada, 2025b).

In the field, an inventory of plant species of special status was carried out in parallel with the work to characterize the environments. The environments targeted by the sampling plan, which generally have characteristics conducive to harbouring species of special status, were surveyed in greater detail. During field trips, particular attention was also paid to all habitats with distinctive characteristics, such as certain open peatlands (ombrotrophic and minerotrophic), shorelines, rocky outcrops, boulder fields, and riparian wetlands. No plant species of special status were observed during field surveys conducted in 2023, 2024, and 2025.

Table 6-21 Plant species of special status likely to be present in the biophysical LSA

Common name	Scientific name	Status in Quebec[a]/ Canada	Ideal observation period	Habitat type	Probability of being present
Brown-edged pussytoes	*Antennaria rosea subsp. confinis*	LDTV/None	Late spring/early summer	Dry to moist sandy herbaceous meadow and bushes and foot of escarpment.	Low
Modest aster	*Canadanthus modestus*	LDTV/None	Late summer/early fall	Shores, wet scrublands, peaty fields.	Low
Spatulate moonwort	*Botrychium spathulatum*	LDTV/None	Late spring/early summer	Open gravelly or rocky, well-drained areas, often near the sea; very open grasslands and scrublands, usually in association with Virginia strawberry.	Low
Botrychium ascendens	*Botrychium ascendens*	LDTV/None	Late spring/early summer	Open mesic to relatively xeric habitats, herbaceous coastal grasslands, sandy or sandy-stony, behind the crest of the backbeach.	Low
Ojibway waterwort	*Elatine ojibwayensis*	LDTV/None	Summer	Clayey, exposed riverbanks.	Low
Rocky Mountain willowherb	*Epilobium saximontanum*	LDTV/None	Summer	Mainly wet silty-clay or rocky banks; also sandy edges of paths and subalpine meadows.	Low
Limestone swamp bedstraw	*Galium brevipes*	LDTV/None	Late summer/early fall	Marly ponds, marshes, and moderately rich fens.	Low
Nahanni oak fern	*Gymnocarpium continentale*	LDTV/None	The entire growing season	Stabilized schistose talus slopes and cracks and ledges of rocky escarpments.	Low
Purple meadow-rue	*Thalictrum dasycarpum*	LDTV/None	Summer	Riverbanks on clay or peaty substrate; also, herbaceous wildland.	Low
McCall willow	*Salix maccalliana*	LDTV/None	Summer	Banks, peatlands, burned areas, willow stands, and black spruce stands; at least partially on basic substrate.	Medium

Note: a LDTV: Species likely to be designated as threatened or vulnerable in Quebec.

Invasive alien species

Invasive alien plant species (IAPS) are plants that have been introduced outside their natural range and may pose a threat to the environment and biodiversity. Because of their ability to disperse and grow rapidly, these species have competitive advantages over native species, allowing them to become dominant in the plant community of a given environment or even to locally eliminate some uncompetitive native species.

For Quebec's IAPS, the MELCCFP's online tool for detecting invasive alien species (MELCCFP, 2025) was consulted to verify the presence of IAPS occurrences in the biophysical RSA. Field inventories were specifically designed to identify the presence of IAPS considered to be priorities by the MELCCFP (Gouvernement du Québec, 2025a).

The IAPS-specific inventories were conducted simultaneously with the general plant group inventories. The search for species was conducted visually in the inventory areas. Particular attention was paid to environments particularly favourable to IAPS, such as roadsides, logging roads, anthropogenic environments, disturbed areas, and areas near these environments. During the inventories, no IAPS were observed in the biophysical LSA.

Vascular plants having traditional uses

During the plant inventories, special attention was paid to plants of interest that are traditionally used by the Cree communities. The plant species observed during the inventory campaigns carried out in 2023, 2024, and 2025 for which a traditional use is known were collected and catalogued (Uprety et al., 2012).

Of the more than 200 plant species observed overall in the biophysical LSA, 48 have known traditional uses for members of the Cree community (Table 6-22). These include seven tree species, 25 shrub species or genera, 15 herbaceous species or genera, and a group of non-vascular species (peat mosses).

Overall, species of traditional interest observed in the field are abundant in the biophysical LSA and common at the regional level.

Plant ecotoxicology

Two plants traditionally valued by local land users, blueberries (*Vaccinium spp.*) and Labrador tea, were sampled and sent for analysis to determine the natural concentration of metals in the plant parts known to be consumed by land users. To this end, four plant sampling plots were selected for ecotoxicological monitoring, two of which were within the potential radius of influence of future project activities based on prevailing winds, and two located outside the area of influence.

In 2025, 72 samples of structural tissue (excluding duplicate soil samples) were collected, including Labrador tea leaves and blueberry plant berries. These were analyzed in the laboratory to measure the median concentrations of 25 metals in the tissues. It should be noted that there are no thresholds (criteria) for the parameters analyzed in blueberries and Labrador tea leaves. In fact, there are currently no standards set by the Canadian Council of Ministers of the Environment (CCME) or the MELCCFP for the presence of metals in vegetation.

For this initial sampling and analysis effort, no parameter showed a concentration high enough to cause concern in the plants studied. For both blueberries and Labrador tea, most of the metals found in the samples, including antimony, silver, tin, lithium, uranium, arsenic, and lead, are below the detection limit or have very low median concentrations. Manganese is the most abundant metal, followed by iron, both of which are present at levels consistent with the natural levels in the species studied. Detailed results of the ecotoxicological analysis are available in Appendix 6-15.

Table 6-22 Vascular and non-vascular plants with traditional Cree uses observed in the biophysical LSA

Scientific name	French name	English name	Cree name	Parts used
Trees				
Abies balsamea	Sapin baumier	Balsam fir	Pikew-ahtik, nupukasik, pīkowāhtik, napakāsīt, nāpukasītuk, nāpukasī	Resin, needles, bark, wood, stems
Betula papyrifera	Bouleau à papier	Paper birch	Htik, owkimawa, waskway, waskwah, waskwaha, wasgwah, waskwayahtik, wuskwi-atik	Twigs, buds, stems, leaves, roots, bark, wood, sap
Larix laricina	Mélèze laricin	Tamarack	Waachinaakan	Inner bark
Picea glauca	Épinette blanche	White spruce	Wapiskimnahik, Eyinatik, Minuhik, Mīnahik, Sī(h)ta	Buds, bark, sap, gum, wood, leaves
Picea mariana	Épinette noire	Black spruce	Inaatuk	Buds, bark, sap, gum, wood, leaves, cones
Pinus banksiana	Pin gris	Jack pine	Ushichishk	Cones and inner bark
Populus tremuloides	Peuplier faux-tremble	Trembling aspen	Mitos, mitosinipiah	Inner bark
Shrubs				
Alnus alnobetula subsp. *crispa*	Aulne crispé	Green alder	Mathato	Leaves
Alnus incana subsp. *rugosa*	Aulne rugueux	Mountain alder	Utuspii	Bark
Andromeda polifolia var. *latifolia*	Andromède glauque	Glaucous-leaved bog rosemary	Kakouboushk	Twigs
Cornus sericea	Cornouiller hart-rouge	Red-osier dogwood	Unknown	Bark, fruit, pith, and roots
Empetrum nigrum	Camarine noire	Crowberry, Curlewberry	Askīmināsiht, Ebshjimend	Fruit
Gaultheria hispidula	Petit thé	Creeping snowberry	Unknown	Leaves and fruit
Ilex mucronata	Némopanthe mucroné	Mountain holly	Unknown	Leaves
Juniperus communis	Genévrier commun	Juniper	Kaahkaachiiminaahtikw	Roots
Kalmia angustifolia	Kalmia à feuilles étroites	Sheep laurel	Uschipikwh	Leaves
Prunus pensylvanica	Cerisier de Pennsylvanie	Pine cherry	Pusawemina, pasisāwimin, pāsuwiymayātik	Bark and roots
Prunus virginiana	Cerisier de Virginie	Chokecherry	Takwahīminâna, takwēhiminān, tākwuhiymin	Bark, leaves, stems, and roots
Rhododendron groenlandicum	Thé du Labrador	Labrador tea	Kachebuk	Leaves
Ribes americanum	Gadelier d'Amérique	American black currant	Unknown	The whole plant
Ribes glandulosum	Gadellier glanduleux	Skunk currant	Mithicimin	Stems
Rubus idaeus	Framboisier sauvage	Raspberry	Athoskan, athoskunatikwah, ayosikan, uyooskan, ayuwskun, ayooskunak, anosh'kanek	Stems, roots and fruit
Salix bebbiana	Saule de Bebb	Bebb's willow	Nepise, nepiseatik, wekope, atikwupamuk, nīpīsīs, nīpīsī, nīpīsīah, nīpīsīgībī, nīpīstakwah	Bark, twigs, and roots
Salix discolor	Saule discolore	Pussy willow	Nīpisī	Inner bark
Salix planifolia	Saule à feuilles planes	Tea-leaved willow	Waskayabaduk	Bark
Salix sp.	Saules	Willow	Utusphi	Inner bark
Sorbus americana	Sorbier d'Amérique	American mountain-ash	Esniywachiywa, maskominanatik	Bark and roots
Sorbus decora	Sorbier plaisant	Northern mountain-ash	Maskōminānātik	Bark, branches, and leaves
Vaccinium angustifolium	Bleuet à feuilles étroites	Early lowbush blueberry	Unknown	Roots and fruits
Vaccinium myrtilloides	Bleuet fausse-myrtille	Velvet-leaved blueberry	Sipikomin, ithinimina, iynimin, iyinimin, inimena	Stems, roots and fruit
Vaccinium vitis-idaea	Airelle rouge	Mountain cranberry	Wesakemina, wīsaki(h)min, wiysukiymin	Stems, roots and fruit
Viburnum edule	Viorne comestible	Squashberry	Moosomina, mōsomina, moosominahtik, mōsōminā(h)tik	Twigs, buds, leaves, and stems
Herbaceous plants				
Chamaenerion angustifolium	Épilobe à feuilles étroites	Fireweed	Hapaskwa, askapask, athkāpask, ākāpuskwah, liy(h)kāpusk	The whole plant
Dryopteris carthusiana	Dryoptère spinuleuse	Spinulose shield fern	Ku(h)kuguwpuk	Fronds
Dryopteris expensa	Dryoptère dressée	Spreading wood fern	Unknown	Young fronds and roots
Equisetum arvense	Prêle des champs	Field horsetail	Mistatimosoy, okotāwask, enskowusk, kiychiwiykusk	Green shoots and stems
Equisetum hyemale	Prêle d'hiver	Scouring rush, Horsetail	Unknown	The whole plant
Equisetum sylvaticum	Prêle des bois	Horsetail	Mistatimosoy, okotawask, enskowusk, kiychiwiykusk	The whole plant
Fragaria spp.	Fraises	Strawberry	Otehimina, otīhīminah, okdeamena, owtiyhiymin, otīhīminipukwah	The whole plant
Geocaulon lividum	Comandre livide	Northern comandra	Unknown	Fruit
Lycopodium clavatum	Lycopode claviforme	Common club-moss	Unknown	The whole plant
Maianthemum canadense subsp. *canadense*	Maïanthème du Canada	Wild lily-of-the-valley	Sosowipukosak, soskopukwagoh	Leaves
Nuphar variegata	Grand nénuphar jaune	Yellow pond lily	pwakumosikum, oskotamo, waskātamow, wāskātamo, waskutamo, ōskītīpak, waskītīpak	The whole plant
Sagittaria cuneata	Sagittaire cunéaire	Arrowhead	Unknown	Leaves
Sarracenia purpurea	Sarracénie pourpre	Pitcher plant	Ayekitas, ayikitās, ayīkicās, athīkacās	The whole plant
Symphyotrichum puniceum	Aster ponceau	Purple-stemmed aster	Mistasakewusk, mistahīsakwīwask, mstahiysāgiywusk, pāwistiko(h)maskīhkīh, bigonbimaskgigiah, pikōnbīmaskīgīah, pikwanpīmāskīgah	The whole plant
Triglochin maritima	Troscart maritime	Seaside arrow-grass	Mminahikos	The whole plant
Mosses				
Sphagnum sp.	Sphaigne	Peat moss	Uske, muskak, askiyah, mikaskwahkawow, asaskumkwa, eskiya, awasistche	The whole plant

6.3.2 Ichthyofauna and benthos

6.3.2.1 Current conditions

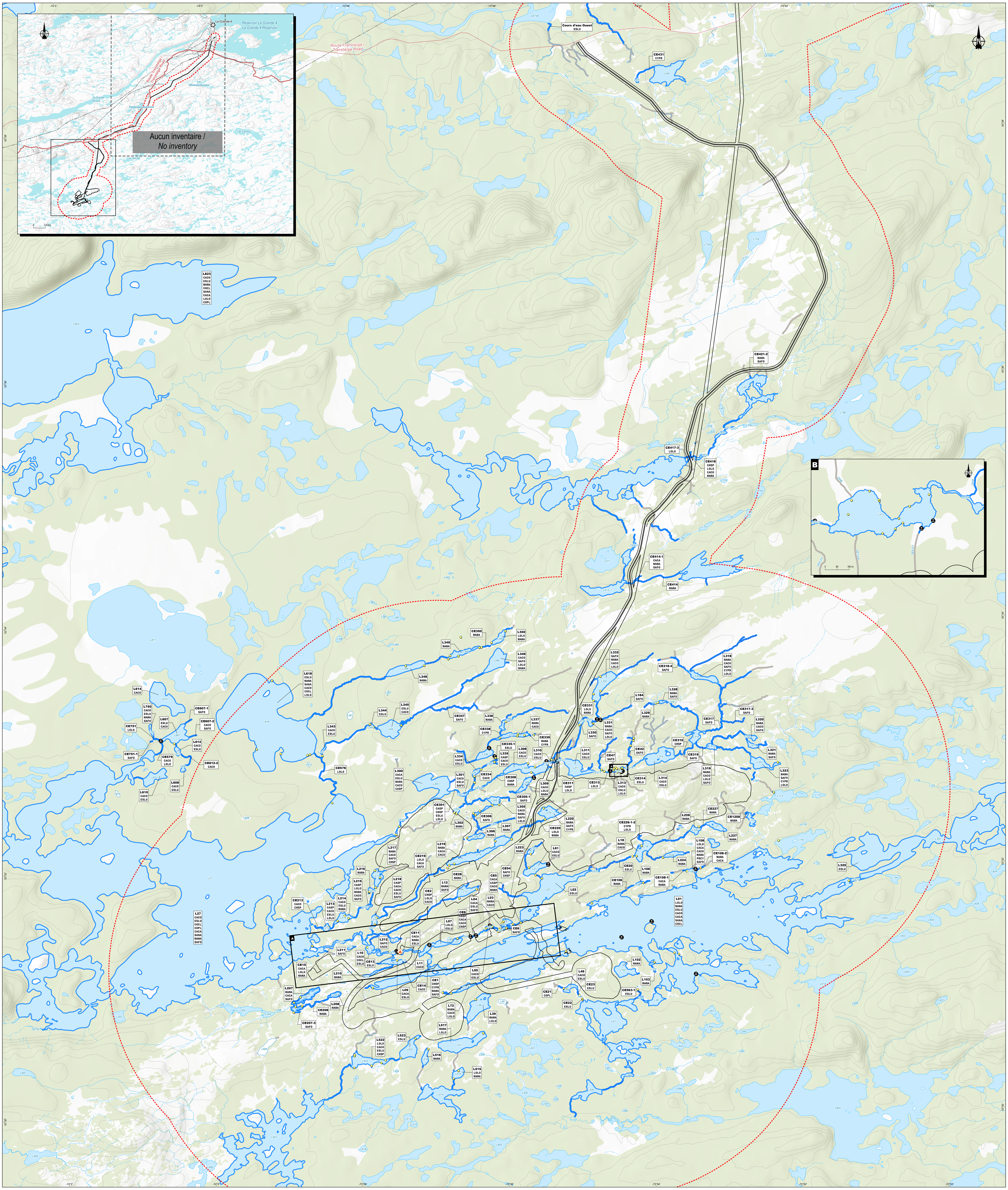
Field inventories for characterizing fish and benthic invertebrate habitats were conducted between 2022 and 2025 (Niigaan, 2025a,b). These inventories covered all bodies of water and watercourses that may be directly or indirectly affected by the project’s planned infrastructure, including components of the water environment exposed to the potential future mine effluent and reference features that will be used to detect any changes in the aquatic environment through project construction and operations. All information concerning the baseline environment for fish habitat, benthic invertebrates and the analysis of metal content in fish flesh is presented in Appendices 6-16 to 6-18.

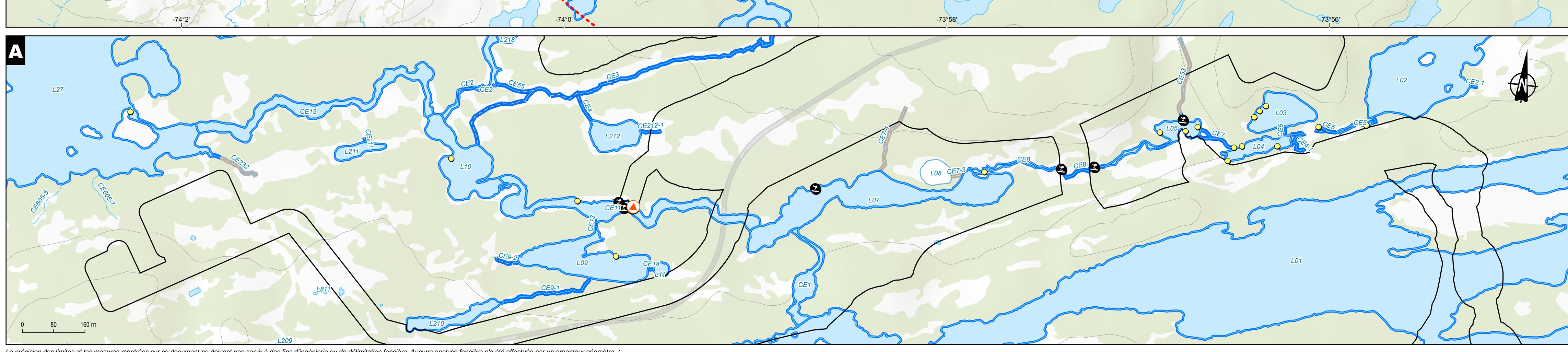
There are two major watersheds in the biophysical LSA: Lac de la Corvette (part of the Pontois River watershed) and La Grande, which is subdivided into northern and southern sectors (Map 6-8).

Between 2022 and 2025, the following activities were carried out in the biophysical LSA:

- characterization of water bodies (bathymetry and morphometry, water physiochemistry, fish inventory, sampling of benthic invertebrates, metal content in fish flesh);
- characterization of watercourses (physiochemistry of water, fish inventory, sampling of benthic invertebrates);
- assessment of fish habitat (potential, species description, ecological functions).

The data collected throughout four years of field studies form the basis for assessing the potential impacts of the project on the aquatic environment and for the development of aquatic habitat monitoring and proposed compensation measures. The tables in the following sections, as well as Maps 6-13 and 6-14, present a summary of the inventories carried out to characterize the aquatic environment.





Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composante du projet projetée / *Projected project component*

- Effluent / *Effluent*

Composantes du projet existantes / *Existing project components*

- Chemin d'accès / *Access road*
- Chemin d'accès à démanteler / *Access road to be dismantled*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Permanent partially underground*
- Souterrain / *Underground*

Caractérisation de l'habitat / *Habitat Characterization*

- Habitat / *Habitat*
- Pas un habitat / *Not a habitat*
- Herbier aquatique / *Aquatic plant*
- Frayère confirmée / *Confirmed spawning ground*
- Frayère potentielle / *Potential spawning ground*

Pêche / *Fishing*

CE20 — Nom de la station / *Station name*
ESLU — Espèce / *Species*

Espèces / *Species*

CACA	Meunier rouge	Longnose sucker
CACO	Meunier noir	White sucker
CASP	Meunier sp.	Sucker sp.
CHSP	Chabot sp.	Sculpin sp.
COCL	Grand corégone	Lake whitefish
COPL	Mulet de lac	Lake chub
CYPR	Cyprinidés	Cyprinidae
ESLU	Grand brochet	Northern pike
LOLO	Lotte	Burbot
MAMA	Mulet perlé	Pearl mullet
PRCY	Ménomini rond	Round whitefish
SAFO	Omble de fontaine	Brook trout
SANA	Touladi	Lake trout

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*
Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-13 / *Map 6-13*
Habitat du poisson / *Fish Habitat*

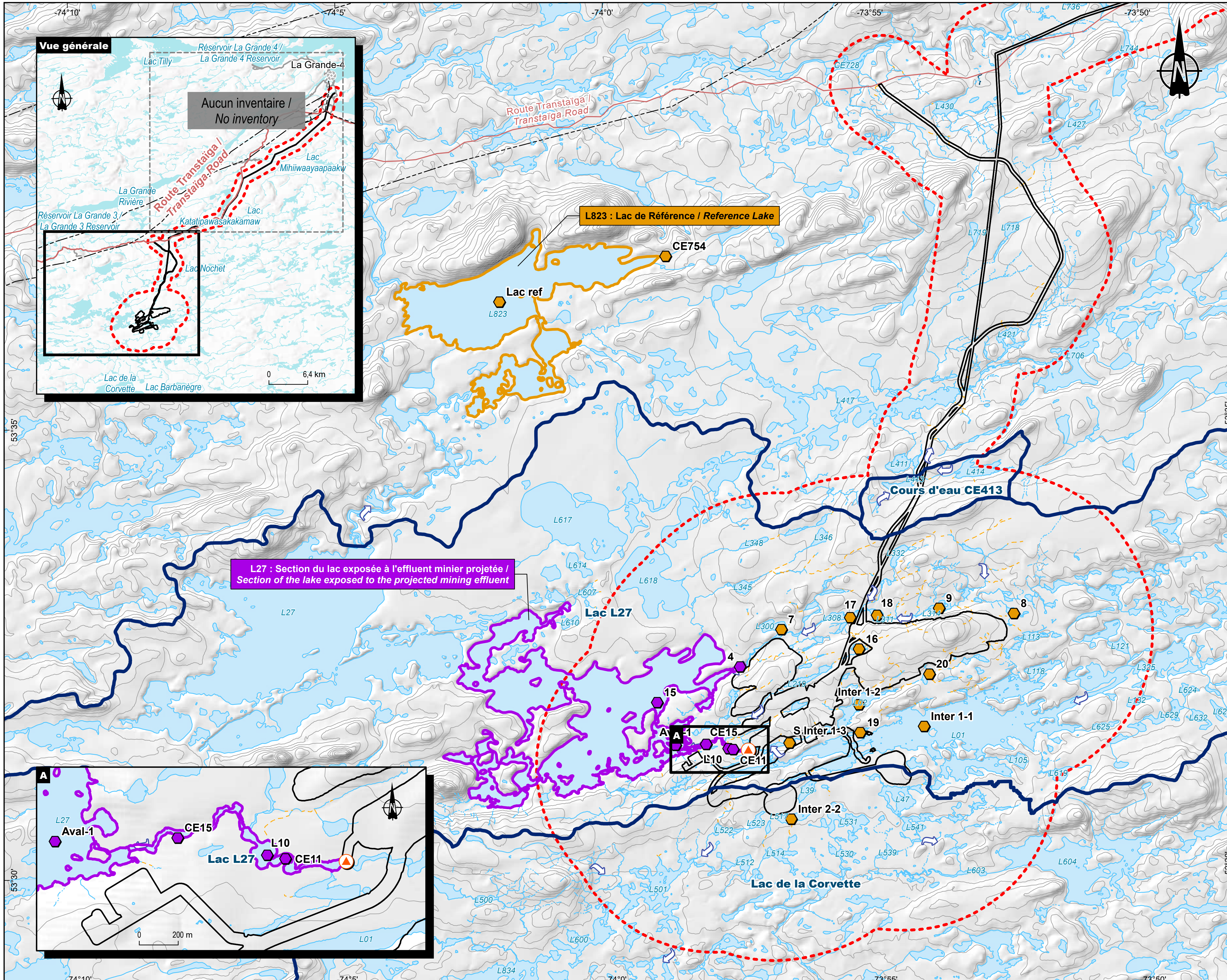
Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 180 360 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-17

Préparation / Prepared by : M.-H. Brisson
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : M-H. Brisson
CA0001724_3318_eie_ch06_c13_260310.aprx
CA0001724_3318_eie_c06_13_098_faune_aqua_260317_A0

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composantes du projet projetées / *Projected Project Components*

- Effluent / *Effluent*

Hydrologie / *Hydrology*

- Sens d'écoulement de l'eau / *Waterflow direction*
- Bassin versant principal / *Principal watershed*

Milieux hydriques / *Hydrous Environments*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermittent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Intermittent partiellement souterrain / *Partially underground intermittent*
- Souterrain / *Underground*

Station d'échantillonnage / *Sampling Station*

Type d'échantillon / *Sample type*

- Benthos

Catégorie d'échantillon / *Sampling Category*

- Exposée à l'effluent minier projetée / *Exposed to the projected mining effluent*
- Référence / *Reference*

Infrastructure / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric power plant*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-14 / *Map 6-14*
Stations d'échantillonnage du benthos / *Benthos Sampling Stations*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Synergis, État de référence du milieu aquatique pour le projet Shaakichiuwaanaan, 12-2025

0 800 1 600 m

NAD 1983 CSRS UTM Zone 18N

2026-03-25

Préparation / Preparation : I. Cartier
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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CA0001724_3318_eie_c06_XX_116_XXXX_260324

wsp

Sampling of benthic invertebrates

Sampling of benthic invertebrates took place in October 2024 and September 2025, during which time most taxa would have reached a sufficient size to be captured. A total of 13 stations were inventoried in the reference area and six in the area which could be potentially exposed to future mine effluent. Analysis of benthic indicators was used to assess the structure of communities in lakes and watercourses. Most of these lakes, characterized by their oligotrophic nature, are shallow (between 0.5 m and 6 m), with the exception of Lake L01 (18 m) and Lake L27 (18 m), and have a substrate composed mainly of silt or clay.

Stations located in areas that could be potentially exposed to the future mine effluent (Aval-1, 4, 15, CE15, L10, CE11) and certain reference stations (Inter 2-2, S Inter 1-3, 17) reveal significant variability in the structure of benthic communities (Table 6-23). Stations CE15, Inter 2-2, S Inter 1-3, 4, 17, and L10 are characterized by high organism densities, significant taxonomic richness, and low Simpson evenness indices, reflecting diverse and well-distributed communities. In contrast, Stations 15, Inter 1-1, Inter 1-2, 9, 16, 18, 19, 20, and Lac ref have poorer profiles, characterized by low diversity, lower densities, and a marked dominance of certain taxa, which may limit the availability of varied prey for fish and indicate increased sensitivity to disturbances.

Table 6-23 Ecological indicators by benthos sampling station in 2024 and 2025

Name of watercourse/body of water	Station	Total number of organisms	Total density (number of organisms/m^2)	Taxonomic richness (number)	Simpson evenness index*	Shannon diversity index**
Reference area						
Lake L01	Inter 1-1	22	319	14	0.69	3.55
	19	8	116	6	0.76	2.41
Watercourse CE11	S Inter 1-3	146	2116	26	0.24	3.45
Lake L02	Inter 1-2	43	623	8	0.47	2.22
Lake L18	20	20	739	14	0.58	3.35
Lake L220	16	51	739	14	0.58	3.35
Lake L308	17	200	2899	21	0.29	3.25
Lake L322	7	149	2159	21	0.29	3.25
Lake L323	8	53	768	16	0.23	2.48
Lake L311	18	3	259	6	0.23	1.58
Lake L314	9	60	870	12	0.42	2.92
Lake L517	Inter 2-2	202	2928	27	0.42	3.92
Lake L823	Lac ref	2	29	2	1	1
Area potentially exposed to future mine effluent						
Lake L27	15	22	319	11	0.73	3.23
	Aval-1	86	1246	23	0.46	3.90
	4	194	2812	30	0.36	3.96
Watercourse CE15	CE15	282	4087	28	0.41	2.95
Lake L10	L10	163	2362	20	0.48	3.15
Watercourse CE11	CE11	135	1957	14	0.13	1.69

* The Simpson evenness index assesses the distribution of individuals among taxa by combining dominance and richness, indicating that a value close to 1 reflects low diversity.

** The Shannon diversity index measures benthic diversity by integrating richness and evenness, where high values indicate a homogeneous distribution of individuals and greater diversity.

From a taxonomic point of view, arthropods dominate most stations, mainly represented by chironomids, followed by mollusks (bivalves and gastropods). Some stations have a balanced mix of arthropods and mollusks (e.g., CE15, L10, S Inter 1-3), while others are heavily dominated by a single phylum (e.g., Inter 2-2, CE11 by arthropods; Inter 1-2 by mollusks).

The diversity and structure of the benthic communities observed at the various stations highlight significant ecological heterogeneity, making it possible to identify areas with diverse communities and others with more limited diversity.

Fish inventory

Fish inventories, supplemented by eDNA analyses, confirmed the presence of several species in the lakes and watercourses of the biophysical LSA, including northern pike (*Esox lucius*), brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), white sucker (*Catostomus commersonii*) and Northern sucker (*Catostomus catostomus*), Allegheny pearl dace (*Margariscus margarita*), burbot (*Lota lota*), round whitefish (*Prosopium cylindraceum*), sculpins (*Cottus sp.*), and various cyprinids (*Cyprinidae sp.*). Among these, northern pike, brook trout, lake trout, lake whitefish, and burbot are of interest to both Indigenous and non-Indigenous communities. No rare, threatened, or vulnerable species were identified in the study area or within a 10-kilometre radius of the project site. No invasive alien species were detected.

To facilitate the representation and understanding of the results, the biophysical LSA, characterized by a large area with a high number of aquatic environments, has been subdivided into seven sectors. This approach made it possible to structure the analysis of data from inventories carried out on nearly 150 waterbodies and just under 250 permanent, intermittent, or underground watercourses. The main waterbodies and watercourses likely to be impacted by the construction of future project infrastructure are presented for the Lake L01, La Grande A, and Lake L27 sectors, due to their ecological importance and proximity to the planned development areas (Tables 6-24 and 6-25). The rest of the inventoried sectors can be found in the baseline fish and fish habitat report (Niigaan, 2025a; Appendix 6-16).

Lake L01 sector

The Lake L01 sector contains 12 bodies of water and 51 watercourses that have been characterized. Most of the water bodies in this sector, including L01, L72, L102, L103, L106, L108, and L325, are considered confirmed fish habitats, while L48 is also recognized as such due to its connectivity to the water network. In contrast, ponds L101 and L107, which are isolated and show no catches or detection by eDNA, are not considered to be fish habitats. Lake L01 is particularly noteworthy for its great fish diversity, with ten species recorded, and for its physical characteristics that are conducive to the growth, feeding, and spawning of lithophilic (coarse substrate) and phytophilic (vegetated areas) guilds. However, despite a favourable environmental context, the targeted inventory of potential spawning shoals proved inconclusive, and the potential for lake trout remains limited due to the presence of clogged substrate. Connected water bodies, particularly L72 and L325, offer favourable conditions for spawning and fry rearing, although they have lower diversity. L102 is dominated by Allegheny pearl dace, while L108, despite its small size, has notable diversity due to its connectivity. The other ponds in the area have limited potential for fish breeding due to their shallow depth and often restrictive physical and chemical conditions. Among the watercourses, CE1, CE27, CE102, CE105, CE106, CE108, CE108-1, CE108-2 and CE1208 are confirmed as fish habitats, while others, such as CE1-2, CE1-4, CE1-5, CE1-51, CE19, CE26, CE103, CE104, CE106-3 and CE107, are considered potential habitats due to their connectivity despite modest flows or partially underground segments. CE1 and CE27 are distinguished by their alternating areas of white water, pools, and sills that can serve as spawning grounds for lithophilic species, while CE26 has a high presence of aquatic vegetation favourable for phytophilic species. Lastly, the remaining waterways, CE1-13 and CE1208-3, do not appear to be fish habitats due to the presence of impassable sills located upstream of the inventoried segments.

La Grande A sector

The La Grande A sector, located just north of Lake L01 in the La Grande Sud watershed, includes 27 characterized water bodies and 106 characterized watercourses. Most of the bodies of water connected to the main network, including L02, L03, L04, L05, L06, L07, L08, L09, L10, L11, L12, L18, L61, L63, L16, L210, L211, L212, L218, L219, L220, L223, L224, L226, L227, and L228 are confirmed fish habitats based on experimental fishing or eDNA analysis, while some very shallow ponds, including L06, L08, L63, and L161, have more marginal conditions and have not yielded any fish, ruling them out as fish habitats. Lake L10 stands out for having the greatest species diversity in the sector, with ten species detected mainly through eDNA analysis, and for its varied shoreline, which includes submerged grass beds that are favourable for fry rearing and feeding. Lake L02, the main hydrological hub in the sector, has physical characteristics that are conducive to feeding and shelter, although its species richness is lower. Water bodies L03, L05, L10, and L18 have coarse substrates and grass beds suitable for both lithophilic and phytophilic species, while the ponds upstream of L10, notably L12, L212, L218, L219, and L220, have strong plant growth that supports fry rearing, but their diversity is limited by their shallow depth. Among the watercourses, CE2, CE3, CE4, CE4-1, CE5, CE6, CE7, CE8, CE9-1, CE9-2, CE10, CE11, CE13, CE14, CE15, CE20, CE28, CE31, CE34, CE53, CE54, CE55, CE211, CE212-1, CE218-2, CE219, CE220, CE220-1, CE223, CE223-1, CE224, CE226, CE226-51, CE226-1-2 and CE227 are confirmed fish habitats, while other watercourses with intermittent flows or underground segments, such as CE2-1, CE29, CE30, CE33, CE35, and CE36, are considered potential habitats. Several segments, particularly those connecting L02 to L07 and those located downstream of L10, feature a succession of river pools, sills, and grass beds that can serve as spawning grounds for lithophilic species or preferred areas for phytophilic species.

Lake L27 sector

The L27 lake sector, located in the La Grande watershed downstream from the La Grande A, La Grande B, and La Grande C sectors, is one of the largest and most interconnected water systems in the inventory area. It includes 42 bodies of water, including 12 lakes and 30 ponds, as well as 82 watercourses characterized between 2022 and 2025. The presence of fish has been confirmed in 23 bodies of water, the largest of which are lakes L27, L618, L350, L346, L345, and L216, recognized as confirmed habitats for various species present in the area. The other bodies of water were not considered fish habitats due to their lack of hydraulic connectivity, absence of catches, or absence of eDNA detection, while lakes L609 and L1200 have inconclusive hydrographic potential, with their fish status unable to be confirmed. In this sector, Lake L27 plays a major structural role as it is the largest body of water in the study area and is located directly downstream from the planned discharge point for mine effluent, making it a lake of priority interest for assessing fish habitat potential and essential ecological functions. The watercourses in the Lake L27 sector exhibit a wide range of flow variability, ranging from permanent segments to intermittent or entirely underground sections, the latter being common in several areas. The facies observed are mainly glides, with the notable exception of CE348, which includes a waterfall. A significant number of these are confirmed fish habitats, notably CE213, CE214, CE215, CE216, CE344, CE345, CE346, CE347, CE348, CE349, CE350, CE350-1, as well as several watercourses in the CE576 to CE612-2 and CE751 series. The dominant functions are fry rearing and feeding, generally of low to medium quality due to organic substrates, shallow depths, and limited widths. Some watercourses offer slightly more functional habitats, such as CE217, CE577, and CE607-2, due to the presence of aquatic vegetation. Watercourses without hydraulic connectivity or with underground flows, such as CE38, CE342-1, and CE342-2, are not considered fish habitats. Overall, the sector features a mosaic of scattered fish habitats, dominated by fry rearing and feeding functions, with generally marginal spawning potential.

Reference sector

Lake L823, located approximately 5 km north of Lake L27, is a large body of water with morphometric parameters comparable to those of Lakes L27 and L01, and will be used as a reference lake for monitoring environmental effects. Conventional fishing confirmed the presence of the vast majority of species associated with the mine sector, including CACO, CACA, COCL, ESLU, MAMA, SANA, COPL, and LOLO (see footnote to Table 6-24 for full names).

Metal content in fish flesh

The fishing trips to collect specimens for metal content analysis were carried out from July 31 to August 9, 2024, and from July 9 to 16, 2025. The three bodies of water selected to establish the reference state for heavy metal concentrations in fish flesh are Lakes L27, L01, and reference lake L823. This reference lake provides a point of comparison for detecting any changes attributable to the mining project or natural variations in the environment. The analysis focuses primarily on arsenic, mercury, and lead, in accordance with Health Canada guidelines (CFIA, 2025) governing the marketing of fishery products.

Mercury concentrations measured in the flesh of northern pike and lake trout between 2024 and 2025 (Table 6-26) are comparable to the averages observed in natural lakes in the Canadian Shield, where levels frequently exceed standards, regardless of fish size. Large specimens from exposed lakes exceed Health Canada criteria, while medium-sized specimens from the reference lake remain below the threshold of 0.5 mg/kg, unlike those from exposed lakes. Arsenic and lead were also measured, as federal guidelines exist for certain fishery products (e.g., fish protein concentrate), although no maximum concentration has been established for fresh fish muscle.

However, statistical analysis reveals no significant difference between mercury concentrations in northern pike from exposed areas and those from the reference lake. The established values will now be used to compare changes in metal content between exposed areas and the reference area as the mining project develops, so as to distinguish anthropogenic effects from natural variations.

Table 6-24 Summary of information collected in water bodies

Lake	Area (ha)	General description	Fish inventory	Habitat characterization	Physicochemical parameters (surface)				Fish species caught
					Water temperature (°C)	Dissolved oxygen (mg/l)	Specific conductivity (µs/cm)	pH	
Lake L01 sector									
L01	447.83	Lake L01 is the largest body of water in the area and will be directly impacted by the project, with plans to develop an open pit mine that will drain the western portion of the lake. It is fed by several tributaries, the main one coming from Lake L325, and its outlet (CE1) is located on the north bank. The lake has a high riparian quality index, indicating good potential for spawning grounds and diverse habitats. Connected watercourses serve as migration corridors and nursery areas, despite limited connectivity due to several underground and intermittent sections.	This body of water has ten species, genera, or families, seven of which are caught by conventional fishing and the rest detected by eDNA, including COPL, PRCY, and COSP.	The segmentation of the banks indicates a predominantly coarse substrate over more than 80% of the coastline, with areas of rocky substrate, fine sediments, and aquatic grass beds covering less than 20%. Shallow areas and potential spawning grounds for phytophilic and lithophilic species have been identified. Its morphology, with an average depth of 6.3 m and a maximum depth of 18 m, remains conducive to winter survival. The lake exhibits marked summer thermal stratification with a thermocline at around 14 m, influencing the distribution of aquatic habitats, while autumn mixing restores homogeneous conditions favourable to all species. The pH and dissolved oxygen values meet the optimal thresholds for protecting aquatic life (CCME, 2018).	19.4 (August 2024)	9.02	10.4	6.9	CACO ESLU SANA CACA COCL LOLO MAMA
L72	N/A	Lake L72, connected by an underground watercourse to Lake L01, has less diversity, but its coarse, vegetated banks are conducive to lithophilic spawning and fry rearing.	Three species were caught by conventional fishing and one species of the genus *Salvelinus* was detected by eDNA, bringing the species richness to four species.	The moderately indented shoreline and coarse substrate banks, covering approximately two thirds of the perimeter, provide favourable refuges for the growth and spawning of lithophilic species, while the dense vegetation to the west promotes fry rearing and feeding.	6.3 (October 2022)	10.73	10.0	6.0	LOLO MAMA CACO
L325	100.37	Lake L325, separated upstream from Lake L01 by a passable sill, offers similar conditions but is shallower, which limits the presence of species such as lake trout; only northern pike have been observed there. However, the sill and some tributaries could be suitable for lithophilic fish to spawn.	Only one phytophilic species was captured in this body of water.	The lake shores are mainly composed of coarse substrate. There are numerous shoals here, offering a variety of habitats conducive to feeding and breeding. A potential spawning ground for lithophilic species has been identified, although these species have not been documented. It is the second largest lake in the area, both in terms of surface area and riparian quality index, with a maximum depth of 6 m.	n/a	n/a	n/a	n/a	ESLU
L102	4.34	Lake L102 is isolated and dominated by Allegheny pearl dace; it offers favourable conditions for the biological cycle of this species. Located near the mining complex, it could be connected to the hydrological network during periods of high water via an adjacent wetland.	Only one lithophilic species was captured in this body of water.	The banks are mainly composed of fine substrate, and the lake has an average depth of 2.9 m, with a maximum depth of 5.5 m.	16.1 (Sept. 2024)	9.76	3.8	5.9	MAMA
L108	0.11	Despite its small size, Lake L108 is home to six species of fish, possibly due to its connectivity with L01. It offers a variety of habitats that are favourable for spawning and feeding.	Six species were caught in this body of water.	The banks are mainly composed of grass beds, with a smaller proportion of coarse substrate. The maximum depth is 4.8 m and the average depth is 1.4 m. The lake offers varied conditions: some banks have a gravelly to coarse substrate favourable to lithophilic species, while other areas with flooded vegetation are conducive to feeding and fry rearing. No phytophilic species were recorded.	11.1 (Sept. 2023)	8.76	16.6	5.5	CACO LOLO MAMA PRCY CACA SAFO

Lake	Area (ha)	General description	Fish inventory	Habitat characterization	Physicochemical parameters (surface)				Fish species caught
					Water temperature (°C)	Dissolved oxygen (mg/l)	Specific conductivity (µs/cm)	pH	
La Grande A sector									
L02	23.57	Lake L02 is the main body of water in the La Grande A sector and acts as a transitional lake between Lakes L01 and L27. It is also surrounded by planned future mine infrastructure (buildings, open pit, and waste rock stockpile).	Genetic surveys (eDNA) identified six species, highlighting a diverse fish community despite limited overall reproductive potential.	The bathymetry shows an average depth of 2.8 m and a maximum depth of 6.1 m, with a moderate riparian quality index. Its habitat is dominated by coarse substrate covering most of the shoreline, with three shoals located mainly in the eastern part of the water body and the presence of aquatic vegetation, which provides some structural diversity. Fish habitats are well represented, but the potential for lithophilic spawning remains low, as does that for fry rearing, which varies from low to moderate depending on the area. The feeding potential is high due to the diversity of coastal habitats and shoals. The physicochemical conditions measured indicate an environment favourable to species typical of the cool, well-oxygenated waters of the boreal region.	17.6 (July 2024)	8.94	13.0	6.5	ESLU CACA COCO COSP COPL LOLO
L61	3.59	Lake L61 is located upstream of Lake L02 and is directly connected to it by CE1. This is a body of water entirely bordered by banks dominated by aquatic grass beds, mainly composed of emergent plants that form the dominant coastal structure.	Two species were caught in this body of water, indicating good potential for complementary habitats.	The lake has an average depth of 1.2 m and a maximum depth of 3.2 m, and its substrate is mainly fine, contributing to a homogeneous structure favourable to feeding. The emerging vegetation also provides favourable conditions for the spawning of phytophilic species, particularly northern pike.	6.5 (October 2022)	11.45	16.9	6.1	ESLU CACO
L07	4.46	Lake L07 is a widening of the watercourse located downstream of Lake L02 and upstream of Lake L27. The planned open-pit mining area, which would result in the drainage of part of Lake L01, previously flowed directly into it.	Two predatory species were captured there.	The lake has an average depth of 1.0 m and a maximum depth of 3.5 m, and its banks are mainly composed of coarse substrate, offering potential for lithophilic spawning.	1.9 (October 2024)	13.13	10.0	6.8	LOLO ESLU
L10	1.26	Lake L10 is located between L07 and L27 and is a transitional lake with notable ecological diversity.	Three species were captured there and eight others were identified by eDNA, namely CACA, COSP, COPL, ESLU, LOLO, PRCY, SANA, and SLSP.	The banks show a varied composition, including rocky, coarse, and fine substrates, accompanied by aquatic vegetation. The average depth of the water body is 1.2 m, with a maximum depth of 3.7 m. The habitat is dominated by submerged aquatic plants, which occupy most of the water body.	8.2 (October 2022)	11.99	9.0	6.6	CACO COCL UNKN
L12	3.03	Pond L12 is located at the heart of the planned infrastructure. Its tributaries would be partially drained and its water level reduced.	Fishing using bait traps, gill nets, and trap nets confirmed the habitat of brook trout and Allegheny pearl dace.	With an average depth of 0.9 m and a maximum depth of 1.1 m, the pond has aquatic vegetation that can serve as a spawning site for phytophilic species, and a mainly fine substrate on the banks.	6.1 (October 2022)	11.82	15.6	5.8	MAMA SAFO
Lake L27 sector									
L27	879.36	Lake L27 is the largest body of water in the study area and will be affected by the project, particularly by the discharge of mine effluent.	Inventories conducted using gill nets, line fishing, and visual observations have detected several species of fish.	The substrate is mainly coarse along the banks on nearly 80% of the area, with shoals and aquatic vegetation covering just under 20%. The riparian quality index is high, reflecting a good diversity of habitats. The lake has an average depth of 6.4 m and a maximum depth of 18 m. The oxygen profile is relatively stable and remains favourable for ichthyofauna throughout the year. The spawning potential is higher for phytophilic species than for lithophilic species, which seem to use nearby watercourse areas more for breeding.	20.5 (August 2024)	8.85	11.9	7.5	ESLU CACO COCL SANA CACA MAMA SAFO COPL
L618	121.13	Lake L618 is one of the main bodies of water connected to Lake L27 by a slow-moving, lentic watercourse.	Fishing using bait traps, gill nets, and seine nets caught several fish.	The water body has an average depth of 1.6 m and a maximum depth of 7.9 m, a substrate combining coarse and fine materials, and the presence of aquatic grass beds providing a favourable habitat.	17.2 (Sept. 2024)	9.23	11.2	6.8	ESLU CACO MAMA COCL SANA UNKN

Measurements of the physicochemical parameters presented in the table were taken at a depth of between 0.3 m and 0.5 m below the surface.
CACA = Northern sucker (Catostomus catostomus); CACO = white sucker (Catostomus commersonii); CASP = sucker sp. (Catostomus sp.); COSP = sculpin sp., COCL lake whitefish (Coregonus clupeaformis); COPL = lake chub; CRSP = Coregonus sp., CYPR = cyprinids; ESLU = northern pike (Esox lucius); LOLO = burbot (Lota lota); MAMA – Allegheny pearl dace (Margariscus margarita); PRCY = round whitefish (Prosopium cylindraceum); SAFO = brook trout (Salvelinus fontinalis); SANA = lake trout (Salvelinus namaycush); SLSP = Salvelinus sp. UNKN = unidentified species.
Species were ranked in order of relative abundance based on catch data.
n/a Not applicable. The bathymetry of ponds, bodies of water less than 2 m deep, was not carried out.

Table 6-25 Summary of information collected in watercourses

Watercourse	Length characterized (m)	Coastal limit (min-max) (m)	Depth (min-max) (m)	General description	Fish inventory	Habitat characterization	Fish species caught
Lake L01 sector							
CE1	261	7–30	0.2–0.8	Outlet of Lake L01 connecting Lake L27 via Lake L07, CE11, Lake L10, and CE15 through the La Grande A sector.	Electric fishing and line fishing confirming the presence of a diversity of species.	Alternating sections of whitewater and pools that provide favourable conditions for feeding and spawning lithophilic species. Dominant substrate of boulders and cobbles.	SAFO CYPR COSP MAMA
CE27	146	11–26	0.5–1.8	Main tributary of Lake L01 coming from Lake L325 from the northeast.	Presence of fish confirmed.	Transition between lotic and lentic environments favourable for spawning of lithophilic species. Dominant substrate of boulders and cobbles.	N/A
La Grande A sector							
CE5	400	2.2–7.0	0.1–0.9	Outlet of Lake L02 flowing toward L07.	Electric fishing	Diverse substrate spawning potential and aquatic vegetation. Permanent and partially underground flow in a mainly lentic environment.	CACO CACA CASP MAMA
CE11	852	11–30	0.20–0.75	Outlet from L07 flowing to L10, which will receive the mine effluent.	Electric fishing and visual observation	Spawning potential for lithophilic species such as brook trout over an area of 240 m². Permanent flow passing from a lotic channel to a lentic channel alternating with a shallow current, a channel, and a shallow lentic area.	CACA MAMA ESLU
CE15	755	14–30	0.4–1.3	Outlet of L10 flowing into L27.	Electric fishing	Spawning potential via a diverse substrate and aquatic vegetation. Permanent flow alternating between a shallow current and a lentic channel.	LOLO MAMA CACA
Lake L27 sector							
CE576	1103	>30	0.29	Outlet of Lake L618 flowing into Lake L27.	Electric fishing	Transitional watercourse of the shallow, lentic type with permanent flow over a substrate of sand and organic matter.	LOLO
CE300	892	4–30	0.25–1.0	Water connectivity link between lakes north of the planned infrastructure that flow into Lake L27. CE300 receives intermittent partially underground watercourses CE37, CE38, and CE39, which will be partially drained by waste rock stockpile 001. These watercourses are not considered fish habitats due to the presence of impassable obstacles.	Electric fishing	Series of rapids and lentic channels including aquatic beds of emergent plants in more lentic sections.	UNKN

CACA = Northern sucker (Catostomus catostomus); CACO = white sucker (Catostomus commersonii); CASP = sucker sp. (Catostomus sp.); COSP = sculpin sp., COCL lake whitefish (Coregonus clupeaformis); COPL = lake chub; CRSP = Coregonus sp., CYPR = cyprinids; ESLU = northern pike (Esox lucius); LOLO = burbot (Lota lota); MAMA – Allegheny pearl dace (Margariscus margarita); PRCY = round whitefish (Prosopium cylindraceum); SAFO = brook trout (Salvelinus fontinalis); SANA = lake trout (Salvelinus namaycush); SLSP = Salvelinus sp.
Species were ranked in order of relative abundance based on catch data.
n/a Not applicable.

Table 6-26 Metal content in fish caught in Lakes L01, L27, and L823

Lake	Species	Size class (mm)	Total number of individuals analyzed	Average mercury content (mg/kg)	Average arsenic content (mg/kg)	Average lead content (mg/kg)
L01	Northern pike	400 - 550	10	0.200	0.0288	0.00107
		550–700	23	**0.513**	0.0586	0.00143
		≥ 700	1	**0.610**	0.0280	0.00020
	Lake trout	≥ 450	2	0.300	0.1100	0.00225
		450–550	12	**0.554**	0.0077	0.00066
		550 - 700	2	**0.505**	0.0126	0.00655
L27	Northern pike	400–550	10	0.229	0.0208	0.00129
		550–700	15	**0.605**	0.0272	0.00187
		≥ 700	9	**0.898**	0.0350	0.00388
	Lake trout	450–550	1	0.160	0.0120	0.00200
		550–700	6	**0.622**	0.0074	0.00133
L823	Northern pike	550–700	15	0.301	0.0162	0.00062
		≥ 700	15	**0.580**	0.0202	0.00066

* The averages in bold indicate that Health Canada's criteria of 0.5 mg/kg for mercury content in fishery products, 3.5 mg/kg for arsenic in processed products, and 0.5 mg/kg for lead have been exceeded.
n/a Not applicable.

6.3.3 Herpetofauna

6.3.3.1 Current conditions

No species inventory was carried out in the field as part of the project. However, alongside the 2023 and 2024 inventories for avian fauna, opportunistic surveys were carried out and particular attention was paid to this wildlife group. Details regarding this component are presented in Appendix 6-19 (Niigaan, 2025a). A summary of the methodology and results obtained is presented in the following sections.

Existing literature

A literature review was conducted to provide an overview of the herpetofauna likely to use the biophysical RSA. This was done by considering the following sources of information:

- Aires de répartition des mammifères terrestres, des reptiles, des amphibiens et des poissons d'eau douce du Québec [Distribution ranges of land mammals, reptiles, amphibians, and freshwater fish in Quebec] (Données Québec, 2025);
- Amphibiens et reptiles du Québec et des maritimes [Amphibians and reptiles of Quebec and the Maritimes] (Desroches and Rodrigue, 2004);
- Atlas des amphibiens et reptiles du Québec (AARQ) [Atlas of amphibians and reptiles of Quebec] (SHNVSL, 2025);
- Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre] (CDPNQ, 2025);

- Observations from iNaturalist (2025) accessed via the Global Biodiversity Information Facility database (GBIF, 2025).

Inventories

Opportunistic surveys of amphibians and reptiles were conducted in June and July 2024, in parallel with bird surveys. Observations were made at listening stations during trips between listening points and around camps. In addition, when analyzing data from sound level meters for the bird inventory, observations of anurans were also collected.

An active search was conducted within a 5-metre radius of each station, including inspection of rocks, wood debris, and rocky streams. Targeted searches were also conducted in open areas suitable for the common garter snake (*Thamnophis sirtalis*).

Field data from 2023 and 2024, including analysis of collected sound recordings, identified five species of anurans, namely, in order of relative importance, the spring peeper (*Pseudacris crucifer*), the American toad (*Bufo americanus*), the mink frog (*Rana septentrionalis*), the wood frog (*Rana sylvatica*) and the northern leopard frog (*Rana pipiens*). These species were widely distributed throughout the biophysical LSA, with the exception of the northern leopard frog (*Rana pipiens*). No reptiles were detected.

Among the species potentially present according to their distribution ranges, the blue-spotted salamander (*Ambystoma laterale*) and the Northern two-lined salamander (*Eurycea bislineata*) were not observed. However, the northern leopard frog was detected even though it is not on the list of potentially present species due to its range being located mainly further south of the biophysical LSA.

No herpetofauna species of special status have been documented in the biophysical RSA, and no observations were made during the inventories carried out.

6.3.4 Avian fauna

6.3.4.1 Current conditions

Proposed general approach

Inventories

As part of this project, several inventories of avian fauna during breeding, migration, and wintering periods were carried out within and near the biophysical LSA. These were, in chronological order, as follows:

- transects and listening stations during the winter (2023);
- automated recording stations during breeding and migration periods (2023 and 2024);
- helicopter survey for waterfowl, waterfowl and other water birds, and birds of prey during the breeding season (2024 and 2025) and spring migration (2025);
- daytime listening stations and twilight observation stations during the breeding season (2024 and 2025).

The sectoral studies, including the methodology used and the results obtained, are presented in Appendices 6-19 and 6-20 (Niigaan, 2025a, 2025b). A summary of these is presented in the following sections.

Existing literature

A literature review was conducted to provide an overview of the bird species likely to use the biophysical RSA. The following sources of information were considered:

- Aires de répartition des mammifères terrestres, des reptiles, des amphibiens et des poissons d'eau douce du Québec [Distribution ranges of land mammals, reptiles, amphibians, and freshwater fish in Quebec] (Données Québec, 2025);
- Hydro-Québec's Environment & Communities Documentation Centre;
- Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- eBird data (Cornell et al., 2025);
- Data from the Quebec Breeding Bird Atlas (northern project) (Birds Canada et al., 2025);
- eBird: Trends Maps and public sites (2025);
- North American Breeding Birds Survey (Ziolkowski et al., 2024);
- Observations from iNaturalist (2025) accessed via the Global Biodiversity Information Facility database (GBIF, 2025).

The list of species identified during inventories in the biophysical LSA and nearby areas, as well as those mentioned in the literature consulted regarding the biophysical LSA and RSA, are presented in Appendices 6-19 and 6-20.

Waterfowl, other water birds, shorebirds, and birds of prey

Specific methodology

Helicopter surveys were conducted to document the presence of waterfowl, other water birds, and nesting birds of prey, targeting three types of habitats: bodies of water, peatlands, and rock faces. The flyovers were conducted according to the protocols of the Black Duck Joint Venture (BDJV) (Bordage and Plante, 1997; Bordage et al., 2003). These species were also inventoried during ground observations from stations located near potential habitats.

Helicopter surveys totalled 12.0 flight hours in June 2024 and 25.5 hours in May and June 2025, divided between spring migration (8.5 hours) and breeding (17 hours). The entire biophysical LSA was covered under favourable observation conditions.

Results

During all inventories conducted from 2023 to 2025, a total of 34 species of waterfowl, shorebirds, and other water birds were observed. In addition to the species recorded during helicopter surveys (Tables 6-9 and 6-10), snow geese (*Anser caerulescens*), common eiders (*Somateria mollissima*), and long-tailed ducks (*Clangula hyemalis*) were detected using sound level meters. The American woodcock (*Scolopax minor*), the semipalmated sandpiper (*Calidris pusilla*) and the semipalmated plover (*Charadrius semipalmatus*) were also recorded using this method.

Nesting has been confirmed only for the sandhill crane (*Grus canadensis*) through observation of diversionary behaviour. Apart from one shorebird, the lesser yellowlegs, no other species of special status was observed.

During spring migration, 14 species of waterfowl were recorded, including four species of dabbling ducks and nine species of diving ducks (Table 6-27). The most abundant species include the common merganser (*Mergus merganser*), the surf scoter (*Melanitta perspicillata*), and the American black duck (*Anas rubripes*). Flocks of migratory ducks have been observed, consisting of long-tailed ducks, black scoters (*Melanitta americana*), and surf scoters. In addition, breeding pairs of bufflehead (*Bucephala albeola*) (3 pairs), Northern pintail (*Anas acuta*) (1 pair), and mallard (*Anas platyrhynchos*) (1 pair) were also recorded. Five species of shorebirds and three other species of water birds were also observed.

Table 6-27 Occurrence of waterfowl and other water bird species detected during helicopter surveys during the spring migration period in 2025

Group	Species	Total number of individuals	Occurrence
Geese (*Branta* and *Anser* genus)	Canada goose	2	7
	Subtotal	*2*	*7*
Dabbling ducks	Mallard	1	1
	American black duck	41	15
	Northern pintail	1	1
	Common teal	11	6
	Subtotal	*54*	*23*
Diving ducks	Ring-necked duck	2	2
	Lesser scaup	35	8
	Common goldeneye	4	2
	Bufflehead	5	3
	Common merganser	85	29
	Hooded merganser	56	11
	Red-breasted merganser	18	7
	Black scoter	55	2
	Surf scoter	35	13
	Subtotal	*295*	*77*
Total		**351**	**107**

Group	Species	Total number of individuals	Occurrence
Shorebirds	Least sandpiper	5	11
	Wilson’s snipe	2	9
	Greater yellowlegs	6	9
	Lesser yellowlegs	5	6
	Solitary sandpiper	2	2
Other water birds	American herring gull	4	2
	Red-throated loon	2	1
	Common loon	8	5

Note: Species of special status are in **bold**.

Thirteen (13) species of waterfowl, including three dabbling ducks and nine diving ducks, were recorded during aerial surveys conducted during the nesting season (Table 6-28). The species most commonly encountered were the American black duck, the common teal (*Anas crecca*), the common merganser, and the hooded merganser (*Lophodytes cucullatus*). In 2024, family groups of American black ducks and common teals were observed, confirming their status as breeders in the biophysical LSA. In addition, six species of shorebirds and six other species of water birds were recorded.

Table 6-28 Occurrences and densities of waterfowl and other water bird species surveyed by helicopter during the nesting season in 2024 and 2025

Group	Species	2024			2025		
		Total number of individuals	Occurrence	Density (IP/100 km^2)	Total number of individuals	Occurrence	Density (IP/100 km^2)
Goose	Canada goose	19	4	0.00	78	13	7.87
	Subtotal	*19*	*4*	*0.00*	78	13	7.87
Dabbling duck	American black duck	84	16	16.00	61	15	12.69
	Common teal	28	10	8.60	20	13	10.5
	Wood duck	0	0	0.00	3	2	1.75
	Subtotal	*112*	*26*	*24.60*	*84*	*30*	*24.94*
Diving duck	Ring-necked duck	5	3	3.10	11	4	3.50
	Lesser scaup	6	1	0.00	11	5	4.37
	Bluebill sp.	0	0	0.00	4	2	n/a
	Common goldeneye	15	1	0.00	19	4	1.75
	Bufflehead	0	0	0.00	5	2	2.62
	Common merganser	7	5	0.80	29	14	8.75
	Hooded merganser	12	5	1.60	43	17	9.62
	Red-breasted merganser	10	7	3.10	13	7	6.12
	White-winged scoter	2	1	0.00	0	0	0.00
	Surf scoter	6	5	0.80	54	23	21.00
	Subtotal	63	28	9.40	189	78	57.73
Total		**194**	**58**	**34**	**351**	**121**	**90.54**

Group	Species	2024			2025		
		Total number of individuals	Occurrence	Density (IP/100 km^2)	Total number of individuals	Occurrence	Density (IP/100 km^2)
Shorebirds	Least sandpiper	1	1	n/a	0	0	0.00
	Wilson's snipe	4	3	n/a	0	0	0.00
	Spotted sandpiper	6	6	n/a	5	5	n/a
	Solitary sandpiper	17	12	n/a	7	3	n/a
	Greater yellowlegs	22	16	n/a	8	8	n/a
	Lesser yellowlegs	1	1	n/a	0	0	0.00
	Yellowlegs sp.	5	4	n/a	2	2	n/a
	Shorebird sp.	0	0	0.00	1	1	n/a
Other water birds	American herring gull	10	8	n/a	18	7	n/a
	Sandhill crane	1	1	n/a	5	4	0.87
	Bonaparte’s gull	2	2	n/a	3	2	0.87
	Red-throated loon	2	1	0.80	2	2	0.00
	Common loon	4	3	0.00	12	9	2.62
	Arctic tern	1	1	n/a	0	0	0.00

Notes: IP: indicated pair.
Species of special status are in **bold**.
n/a : not applicable.

Inventories conducted in 2023, 2024, and 2025 identified several species of interest, in addition to species at risk. In addition to various species of ducks, the biophysical LSA is home to the Canada goose (*Branta canadensis*), the snow goose, Wilson’s snipe (*Gallinago delicata*), and the American woodcock, all of which are migratory birds considered game in Canada (Canadian Wildlife Service Waterfowl Technical Committee, 2023).

Birds of prey and corvids

During all inventories carried out between 2023 and 2025, a total of 13 species of birds of prey were recorded. These species are the golden eagle, American goshawk (*Accipiter atricapillus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), northern hawk-owl (*Surnia ulula*), sharp-shinned hawk (*Accipiter striatus*), peregrine falcon, great horned owl (*Bubo virginianus*), short-eared owl, long-eared owl (*Asio otus*), boreal owl (*Aegolius funereus*), Northern saw-whet owl (*Aegolius acadicus*), and bald eagle. Common raven (*Corvus corax*) was also observed. Several of these species were detected using sound level meters. Three of the recorded bird of prey species are considered to have special status: the golden eagle, the short-eared owl, and the bald eagle.

Helicopter surveys of birds of prey were conducted simultaneously with those of waterfowl. Five species of birds of prey were observed during these flyovers (Table 6-29). In 2024, the red-tailed hawk was confirmed as a breeding bird thanks to the discovery of an active nest containing at least one egg. In 2025, an active nest of a rough-legged hawk (*Buteo lagopus*) was detected on the outskirts of the biophysical LSA, representing a notable mention at the southern limit of its known range. The short-eared owl has been observed several times during the breeding season, notably through the observation of a pair regularly sighted in a favourable habitat, suggesting probable nesting. Lastly, several bald eagles (both adults and immature birds) were recorded, but no nesting structures were identified. A northern hawk-owl was also observed, with no signs of nesting.

Table 6-29 Observations of birds of prey and corvids during helicopter surveys in 2024 and 2025

Species	Migration		Nesting			
	2025		2024		2025	
	Total number of individuals	Occurrence	Total number of individuals	Occurrence	Total number of individuals	Occurrence
Red-tailed hawk	17	3	5	4	6	5
Rough-legged hawk	3	16	0	0	6	6
Hawk sp.	0	0	0	0	1	1
Northern hawk-owl	0	0	1	1	0	0
Short-eared owl	0	0	3	2	3	3
Bald eagle	2	2	5	5	7	4

Land birds

Nesting and migration periods – Sound level meters

In 2023 and 2024, a bird inventory was conducted using 18 automated recording stations (sound level meters), covering the spring migration, breeding, and fall migration periods, from April to October.

Approximately 10% of the recordings were analyzed, totalling 628.5 hours of listening time. The analysis detected 98 bird species, including 74 breeding migrants, 23 residents, and one non-breeding migrant. Among them, 64 species are land birds, 22 are waterfowl and other water birds or shorebirds, and 12 are birds of prey, including five nocturnal species.

were detected at all stations. The American robin (*Turdus migratorius*) and the grey jay (*Perisoreus canadensis*) were also frequently observed. In 2023, across all species, a total of 28,266 individuals were detected, compared to 19,214 in 2024.

Nine species at risk have been identified, namely the lesser yellowlegs, golden eagle, common nighthawk, peregrine falcon, short-eared owl, bank swallow, olive-sided flycatcher, bald eagle, and rusty blackbird. Most of the species at risk detected using sound level meters were much more abundant in 2024, possibly due to the forest fires of 2023.

The species richness and abundance of land birds vary according to the season (Table 6-30). Similar communities are observed in spring and summer. However, a distinct composition is observed in the fall, characterized by the predominance of Canada geese and American robins. In 2023, species richness and abundance were generally higher, except during the breeding season. In fact, in 2024, greater diversity was observed.

Among the species of land birds of interest, we have noted the presence of the ruffed grouse (*Bonasa umbellus*), the spruce grouse (*Canachites canadensis*), and the willow ptarmigan (*Lagopus lagopus*), species prized for hunting that have been observed during inventories (Gouvernement du Québec, 2025a).

Some species, such as the white-throated sparrow (*Zonotrichia albicollis*) and the dark-eyed junco (*Junco hyemalis*),

Nesting season - Listening stations and twilight observations

Inventories were conducted at listening points for 10 minutes using two methods: fixed-radius point count (FRPC of 50 m; Bibby et al., 2000) and point abundance index (PAI). In 2024, 522 stations were visited, while in 2025, 121 stations were randomly sampled from the grids produced in 2024. Twilight surveys were conducted in the evening in accordance with federal and provincial protocols, at 24 stations in 2024 and 15 in 2025. These inventories specifically targeted the detection of the common nighthawk and the short-eared owl, two species of special status.

In 2024, 73 species were recorded, including 62 migratory and 11 resident species. These included 48 species of land birds, 18 species of waterfowl and other water birds, four species of diurnal birds of prey, and three species of nocturnal birds of prey. Nesting was confirmed for 19% of species, considered probable for 52%, and considered possible for 27%. Six species at risk were recorded, namely the common nighthawk, short-eared owl, bank swallow, olive-sided flycatcher, bald eagle, and rusty blackbird.

The average density observed is 37.0 breeding pairs per 10 ha for all habitats (Table 6-31). The most commonly observed species were the white-throated sparrow, the ruby-crowned kinglet (*Regulus calendula*), the dark-eyed junco, and the hermit thrush (*Catharus guttatus*). Species richness varies depending on habitat type, with open spruce stands and peatlands hosting distinct bird communities. The dominant species are similar in all habitats, with the exception of certain species associated with specific wetlands or softwood forests.

In 2025, 45 species were recorded, including 34 species of land birds, 8 species of waterfowl and other water birds, and three diurnal birds of prey. The most abundant species were the dark-eyed junco, the ruby-crowned kinglet, and the white-throated sparrow. Nesting was confirmed only for the grey jay. In addition, nesting was assessed as likely for 11% of species and possible for 76%. The average density observed is 35.0 breeding pairs per 10 ha (Table 6-31).

Eight species at risk were detected during the 2025 inventories, for a total of 73 recorded observations. In order of number of occurrences, these are the rusty blackbird, the common nighthawk, the bald eagle, the bank swallow, the lesser yellowlegs, the short-eared owl, the olive-sided flycatcher, and the evening grosbeak. The average density observed is 35.1 breeding pairs per 10 ha for all habitats (Table 6-31).

Table 6-30 Species richness and abundance observed at automated recording stations by year and inventory period

Year	Period	Number	Species richness					Abundance (number of recorded observations)				
			Total	Mean	Standard deviation	Minimum	Maximum	Total	Mean	Standard deviation	Minimum	Maximum
2023	Spring	18	70	26.3	8.7	13	45	11,388	632.7	316.9	232	1,642
2024	Spring	17	72	35.9	10.3	0	48	11,506	639.2	226.3	0	857
2023	Breeding	18	65	22.8	4.9	13	33	8,718	484.3	148.6	143	730
2024	Breeding	15	59	28.1	4.3	21	35	7,503	468.9	60.6	355	596
2023	Fall	17	54	23.5	4.3	15	29	8,064	474.4	327.1	157	1,470
2024	Fall	18	51	19.2	3.4	12	24	1,531	85.1	23.7	35	131
Total		**103**	**380**	**26.0**	**6.0**	**0**	**48**	**48,710**	**464.1**	**183.9**	**0**	**1,642**

Table 6-31 Species richness and density counted by habitat in 2024 and 2025

Parameter	2024						2025				
	Swamp	Regenerating	Mixedwood	Softwood	Peat bogs	All[a]	Regenerating	Mixedwood	Softwood	Peat bogs	All[a]
Number of listening points	96	55	49	271	51	**522**	46	8	65	2	**121**
Number of species (FRPC < 50 m)[b]	32	28	28	42	30	**56**	18	10	26	3	**30**
Number of species (FRPC < 100 m)[c]	38	30	27	47	33	**61**	29	13	33	9	**40**
Total number of species	52	41	42	60	49	**68**	32	16	38	11	**45**
Average richness ± standard deviation (FRPC < 50 m)	3.0 ±1.8	3.0 ±1.8	3.3 ±1.5	3.4 ±1.8	3.0 ±1.6	**3.2 ±1.8**	1.9 ±1.6	2.6 ±0.7	3.5 ±1.4	1.5 ±0.7	**2.8 ±1.6**
Average richness ± standard deviation (PAI)	10.1 ±2.8	8.9 ±2	8.9 ±2.3	8.6 ±2.3	9.4 ±2.5	**9.0 ±2.5**	5.8 ±2.5	5.8 ±1.4	7.1 ±2.4	6.5 ±3.5	**6.5 ±2.5**
Density Couples/10 ha (FRPC < 50 m)	34.0	32.1	36.8	39.7	33.7	**37.0**	23.9	32.6	43.7	19.1	**35.0**

Notes: a All habitats combined.
b FRPC (< 50 m): counting within a radius of 50 m from the observer.
c FRPC (< 100 m): counting within a radius of 100 m from the observer.

Winter period – Listening stations and transects

In 2023, an inventory was carried out in winter. It covered 483 listening points spread across 160 transects. A total of 13 bird species were recorded (Table 6-32). The willow ptarmigan is the most widespread species, having been identified in 16.4% of the segments studied. It is also likely that several recorded observations of grouse are attributable to this species. The spruce grouse, the grey jay, and the common redpoll (*Acanthis flammea*) were observed in more than 2% of the segments. The transects richest in species have up to six species detected.

The presence of birds was most pronounced in black spruce stands (58.7% of segments), followed by areas undergoing shrub regeneration (16.5%) and mixed softwood forests (11.5%). No species at risk were detected.

The grey jay is the species most frequently observed at listening points (17.2%), although this frequency may be overestimated due to the species' tendency to follow observers. Other species such as the pine grosbeak (*Pinicola enucleator*), the common redpoll, the Boreal chickadee (*Poecile hudsonicus*), and the common raven were also frequently observed.

Table 6-32 Presence and frequency of bird species recorded at segments and transects in winter 2023

Species	Segments (n = 1,607)		Transects (n = 160)	
	Presence	Frequency (%)	Occurrence	Frequency (%)
Willow ptarmigan	263	16.37	3	0.62
Grouse sp.	160	9.96	0	0.00
Grey jay	109	6.78	83	17.18
Spruce grouse	44	2.74	2	0.41
Common redpoll	40	2.49	15	3.11
Pine grosbeak	26	1.62	17	3.52
Common raven	23	1.43	12	2.48
Boreal chickadee	22	1.37	13	2.69
Picidae sp.	19	1.18	1	0.21
White-winged crossbill	6	0.37	4	0.83
Black-backed woodpecker	6	0.37	2	0.41
American three-toed woodpecker	3	0.19	4	0.83
Red crossbill	2	0.12	1	0.21
Crossbill sp.	2	0.12	1	0.21
American goshawk	1	0.06	0	0.00
Finch sp.	1	0.06	0	0.00
Snow bunting	1	0.06	1	0.21
Total	**728**	-	**159**	-

Species of special status

Based on the literature consulted and known distribution ranges, 15 avian species at risk have been observed or are likely to be observed within a 50 km radius of the project area on an annual basis (Table 6-33).

During field campaigns conducted from 2023 to 2025, 11 bird species at risk were recorded (Table 6-33, Map 6-15), for a total of 474 sightings. The most frequently observed species were the rusty blackbird, the olive-sided flycatcher, and the common nighthawk. Other species such as the short-eared owl and bald eagle were observed opportunistically, while the peregrine falcon, golden eagle, lesser yellowlegs, bank swallow, red crossbill, and evening grosbeak were each recorded fewer than 10 times. The harlequin duck, the short-billed dowitcher, Barrow's goldeneye, and the yellow rail have not been recorded in the biophysical LSA, but are likely to be observed there. The list of bird species of special status potentially present in the biophysical LSA, their status, details concerning their sightings, and their preferred habitat are presented in the following sections and in the sectoral report on avian fauna in Section 2.3 (Appendix 6-19). Potential habitats of special-status species with nesting potential were reassessed at the scale of the biophysical local study area (LSA). The results of this analysis are presented in Chapter 8, which addresses impact identification and assessment.

Golden eagle

The golden eagle was detected only once by a sound level meter (Map 6-15) during the spring migration period. As with the peregrine falcon, the absence of cliffs suitable for nesting in the biophysical LSA suggests that the individuals observed are migrant or non-breeding. No reproductive behaviour was observed. Since no suitable cliffs were identified, the potential habitat of this species has not been mapped.

The species is threatened by accidental trapping, contamination by lead and other toxins, human disturbance near nests, collisions with infrastructure, and illegal hunting. Conservation objectives aim to maintain and improve population monitoring, protect nesting sites, monitor emerging threats, and raise public awareness (EROP, 2020).

Harlequin duck

The harlequin diver nests in habitats where there are fast-flowing watercourses and waterfalls. The species was not recorded during inventories or in the literature consulted. However, the biophysical LSA is part of its breeding range (MELCCFP, 2026).

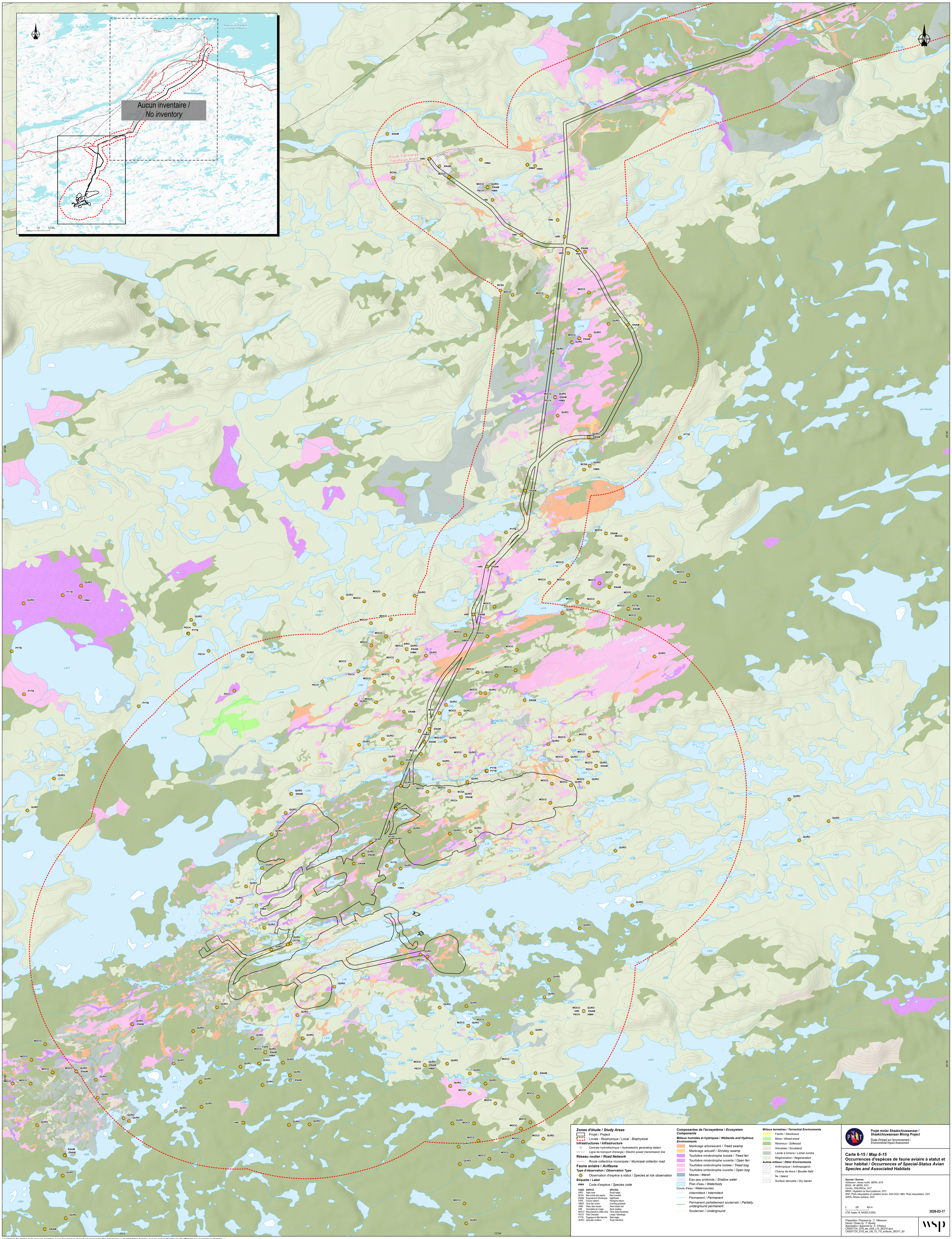
Pollution, habitat destruction or degradation, accidental mortality, aquaculture, disturbance and persecution, as well as consumption (illegal or accidental hunting) are the main threats to the harlequin duck (EC, 2007).

The objectives of the management plan are to better understand and mitigate threats to the harlequin duck, assess the status of the population, and protect key habitats for breeding, moulting, wintering, and gathering (EC, 2007). They also include working with governments, industry, Indigenous communities, and citizens to identify and reduce threats, as well as implementing targeted education and stewardship programs. An analysis of existing knowledge should help fill in the gaps, and increased cooperation with Greenland is sought to strengthen conservation efforts at the international level.

Table 6-33 List of bird species at risk recorded in the biophysical LSA in 2023, 2024, and 2025 or are likely to be found there

Group	Species	Scientific name	Species detected during inventories	Status[a]		
				LEMVQ[b]	COSEWIC[c]	SARA[d]
Birds of prey	Golden eagle	*Aquila chrysaetos*	X	Vulnerable	-	-
	Peregrine Falcon *anatum/tundrius*	*Falco peregrinus anatum/tundrius*	X	Vulnerable/LDTV	-	-
	Short-eared Owl	*Asio flammeus*	X	LDTV	Special concern	Special concern
	Bald eagle	*Haliaeetus leucocephalus*	X	Vulnerable	-	-
Waterfowl and other water birds	Harlequin duck	*Histrionicus histrionicus*	-	Vulnerable	Special concern	Special concern
	Barrow's Goldeneye	*Bucephala islandica*	-	Vulnerable	Special concern	Special concern
	Yellow rail	*Coturnicops noveboracensis*	-	Threatened	Special concern	Special concern
Shorebirds	Short-billed dowitcher	*Limnodromus griseus*	-	-	Threatened	Pending
	Lesser yellowlegs	*Tringa flavipes*	X	-	Threatened	Pending
Land birds	Red crossbill, *percna* subspecies	*Loxia curvirostra percna*	X	-	Threatened	Threatened
	Common nighthawk	*Antrostomus vociferus*	X	LDTV	Special concern	Special concern
	Evening grosbeak	*Coccothraustes vespertinus*	X	-	Special concern	Special concern
	Bank swallow	*Riparia riparia*	X	-	Threatened	Threatened
	Olive-sided flycatcher	*Contopus cooperi*	X	Vulnerable	Special concern	Special concern
	Rusty blackbird	*Euphagus carolinus*	X	LDTV	Special concern	Special concern

Notes: a: Status: LDTV: likely to be designated as threatened or vulnerable.
b: Ministère des Forêts, de la Faune et des Parcs Gouvernement du Québec, 2025b); List of threatened or vulnerable wildlife species in Quebec (LEMVQ).
c: Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2024); List of species at risk in Canada.
d: Government of Canada (Government of Canada, 2025). *Species at Risk Act.* List of species at risk.



Zones d'étude / *Study Areas*
Projet / *Project*
Locale - Biophysique / *Local - Biophysical*

Infrastructures / *Infrastructure*
Centrale hydroélectrique / *Hydroelectric generating station*
Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*
Route collectrice municipale / *Municipal collector road*

Faune aviaire / *Avifauna*
Type d'observation / *Observation Type*
Observation d'espèce à statut / *Species at risk observation*

Étiquette / *Label*
HIMA Code d'espèce / *Species code*

CODE	ESPECE	SPECIES
AIRO	Aigle royal	Royal eagle
BCSA	Bec-croisé des sapins	Red crossbill
ENAM	Engoulevent d'Amérique	Nighthawk
FAPE	Faucon pèlerin	Peregrine falcon
GBER	Gros-bec errant	Evening grosbeak
HIMA	Hibou des marais	Short-eared owl
HIRI	Hirondelle de rivage	Bank swallow
MOCO	Moucherolle à côtés olive	Olive-sided flycatcher
PECH	Petit Chevalier	Lesser Yellowlegs
PYTB	Pygargue à tête blanche	Bald eagle
QURO	Quiscale rouilleux	Rusty blackbird

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*
Marécage arborescent / *Treed swamp*
Marécage arbustif / *Shrubby swamp*
Tourbière minérotrophe boisée / *Treed fen*
Tourbière minérotrophe ouverte / *Open fen*
Tourbière ombrotrophe boisée / *Treed bog*
Tourbière ombrotrophe ouverte / *Open bog*
Marais / *Marsh*
Eau peu profonde / *Shallow water*
Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*
Intermittent / *Intermitent*
Permanent / *Permanent*
Permanent partiellement souterrain / *Partially underground permanent*
Souterrain / *Underground*

Milieux terrestres / *Terrestrial Environments*
Feuillu / *Deciduous*
Mixte / *Mixed-wood*
Résineux / *Softwood*
Arbustaie / *Scrubland*
Lande à lichens / *Lichen tundra*
Régénération / *Regeneration*

Autres milieux / *Other Environments*
Anthropique / *Anthropogenic*
Champ de blocs / *Boulder field*
Île / *Island*
Surface dénudée / *Dry barren*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*
Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-15 / *Map 6-15*
Occurrences d'espèces de faune aviaire à statut et leur habitat / *Occurrences of Special-Status Avian Species and Associated Habitats*

Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017
MRNF, Végétation du Nord québécois, 2013
WSP, Photo interprétation et validation terrain, 2024-2025 / BBA, Photo interprétation, 2023
GRHQ, Réseau hydrique, 2024

0 200 400 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-17

Préparation / Prepared by : C. Villeneuve
Dessin / Drawn by : P. Boulay
Approbation / Approved by : E. D'Astous
CA0001724_3318_eie_ch06_c15_260310.aprx
CA0001724_3318_eie_c06_15_110_avifaune_260317_A0

Short-billed dowitcher

The short-billed dowitcher nests in peat bogs. It was not recorded in the inventories or in the literature consulted. However, the biophysical LSA is part of its breeding range (Government of Canada, 2025a).

Sport hunting and subsistence hunting in its wintering grounds are the main threats to the species. Other major threats include the loss and degradation of wetlands and other habitats at migratory stopover sites, wintering grounds, and, increasingly, breeding sites. The species is also vulnerable to the effects of climate change and extreme weather events throughout its annual cycle (Government of Canada, 2025a).

Given that the species is currently under review for possible listing in Appendix 1 of the SARA, no conservation objectives have yet been established in a recovery strategy.

Red crossbill

The red crossbill is associated with coniferous forests. Although the *percna* subspecies (associated with type 8) is known to nest only on the islands of Newfoundland and Anticosti, red crossbills that could belong to the *percna* subspecies have been observed elsewhere in Quebec (COSEWIC, 2016).

Between 2023 and 2025, a total of six red crossbills were observed. Two individuals were detected by sound level meter in the spring of 2023, and three others were recorded during winter surveys using listening points and transects. An individual was heard at listening stations in 2024, but was identified as type 1. Since not all individuals observed between 2023 and 2025 were identified to subspecies level, undetermined occurrences were still represented on Map 6-15.

Threats identified in the recovery strategy for the red crossbill, *percna* subspecies, include habitat degradation caused by forestry activities, reduced food resources due to insect infestations and conifer diseases, and increased competition for seeds with other species, particularly the red squirrel (*Tamiasciurus hudsonicus*) (EC, 2006). Added to this are the effects of low density, which compromise the viability of the remaining populations.

To counter these threats, the recovery plan sets out objectives that include confirming the presence and distribution of the red crossbill in Newfoundland, studying its movements, habitat, and threats, and assessing the feasibility of recovery. These include identifying critical habitat, setting population targets, developing mitigation measures, and implementing stewardship and awareness programs (EC, 2006).

Common nighthawk

The common nighthawk nests in lichen tundra, open pine forests, and cutover areas. The species was recorded 98 times between 2023 and 2025 (Map 6-15), mainly using automated recording stations (sound level meters) and twilight observation stations. The species is associated with open environments undergoing regeneration, particularly burned areas. It is mainly present in late spring and during the breeding season, but rarely in fall. Although nesting has not been confirmed, the abundance and distribution of recorded entries suggest probable breeding status in the biophysical LSA.

The most serious threat to the common nighthawk is the decline in the insect populations on which it feeds (EC, 2016a). Other causes include forest fires, loss of breeding habitat, extreme temperatures and storms, and collisions with vehicles, aircraft, and buildings.

The objectives of the recovery plan were to halt the national decline by 2025 (less than a 10% decrease) and ensure a positive trend over the following ten years, as well as to maintain the current range of occurrence in Canada (EC, 2016a).

Peregrine falcon

The peregrine falcon was observed only during spring migration (Map 6-15), with no evidence of nesting. As with the golden eagle, the absence of cliffs suitable for nesting in the biophysical LSA suggests that the species is considered non-breeding, probably represented by migrating or hunting individuals. Since no suitable cliffs were identified, the potential habitat of this species has not been mapped.

The main threats include residential and commercial development, intensification of agriculture, energy production and mining, legal and illegal logging, and recreational activities. Added to this are the presence of invasive or problematic species, pollution, and the impacts of climate change, particularly severe weather events (EROP, 2018).

The conservation objectives for the peregrine falcon in Quebec are to maintain and improve population monitoring, ensure the long-term protection of nesting sites, strengthen monitoring of emerging threats to prevent further decline, and disseminate the knowledge necessary for the recovery of the species (EROP, 2018).

Barrow's goldeneye

No Barrow's goldeneye was observed during the inventories carried out between 2023 and 2025 or in the literature consulted. It is unlikely that the species is present in the biophysical LSA, as its nesting and wintering range in Quebec is limited to the eastern part of the province (EC, 2013a; Robert et al., 2019). Since adult males moult in the Arctic, along the coasts of Hudson Bay and Ungava Bay, sightings during migration are still possible, but highly unlikely. For this reason, the potential habitat of this species has not been mapped.

According to the management plan, the main threats to the eastern population are logging and stocking of fishless lakes, in addition to oil spills, hunting, and sediment contamination (EC, 2013a).

The objective is to maintain the eastern population of the Barrow's goldeneye at a minimum of 6,800 individuals over the next ten years and, in the long term, to maintain or increase its size and range in Canada (EC, 2013a).

Evening grosbeak

For nesting, the evening grosbeak generally prefers mature, open mixedwood forests. It was not detected during species inventories, but was observed opportunistically once in June 2025 (Map 6-15). Since the biophysical LSA is located north of the range of the evening grosbeak, it would be surprising if it nested there.

The main threats to the species include collisions with windows and vehicles, as well as habitat loss and fragmentation (ECCC, 2022a). Across Canada, the overall impact of threats remains low.

The management objectives for the evening grosbeak in Canada are to achieve a stable or increasing population trend over 30 years by 2036, and then to maintain this stability in the long term. It is also a matter of preserving the species' current range in Canada (ECCC, 2022a).

Short-eared owl

The short-eared owl is associated with large peatlands and shrubby marshes. The species was detected 28 times between 2023 and 2025, mainly through automated recording stations and helicopter surveys (Map 6-15). Probable nesting was noted in 2024, with the repeated presence of a pair in a favourable habitat. Other recorded entries refer to males heard on recordings or adults detected during helicopter flyovers in habitats suitable for nesting. In 2025, the species was recorded four times.

The loss and fragmentation of large areas of habitat caused by human activities represent the main threat to the short-eared owl (ECCC, 2018). These disturbances compromise habitats that are essential to the species during the various phases of its life cycle, thereby contributing to the decline of its populations.

The objectives of the management plan are to stabilize or increase the population of the short-eared owl between 2018 and 2028, while maintaining an area of occupancy of approximately 1,500,000 km². In the longer term, starting in 2028, the goal is to ensure a positive trend over ten years and increase the area of occupancy, particularly through the gradual recolonization of habitats located in the southern part of its Canadian range (ECCC, 2018).

Bank swallow

The bank swallow nests on sandy banks, along roadsides, and in sand pits. The species was observed mainly during the breeding season, with sightings concentrated in the northern part of the biophysical LSA, along the road leading to the mine site (Map 6-15). In 2025, an active colony was confirmed, comprising approximately 30 to 35 occupied cavities and at least 14 adults. Although no nesting sites were detected in 2023 or 2024, this observation confirms the nesting status of the species in the biophysical LSA.

Since 1970, the bank swallow has declined by 93% due to cumulative threats. This decline is mainly due to the decrease in flying insects, but also to water management, dam construction, the closure of quarries limiting nesting areas, accidental mortality due to collisions with vehicles, as well as predation and parasitism of nests (ECCC, 2022b).

The objectives of the recovery program are to maintain the current range of the bank swallow in Canada, as defined by critical habitat. In the short term, by 2033, the goal is to reduce the rate of decline and maintain a population that is at least 80% of the 2021 level. In the long term, by 2053, the goal is to achieve a stable trend over ten years while maintaining the population above 90% of the reference level (ECCC, 2022b).

Olive-sided flycatcher

The olive-sided flycatcher nests near beaver ponds, marshes, and burned areas. It was observed 119 times between 2023 and 2025 (Map 6-15), mainly by listening stations. The species has mainly been detected in swamps, peatlands, and burned scrublands.

It is present in late spring and summer, but rarely observed in fall. Nesting is considered likely, given the restless behaviour observed. Its distribution is stable in the wetland habitats of the biophysical LSA.

The most significant threats to the olive-sided flycatcher include reduced availability of insect prey, suppression of fires, and deforestation and land conversion (EC, 2016b).

The objectives of the recovery program are to halt the national decline by 2025 by limiting the population decline to less than 10%, and then to ensure a positive demographic trend over ten years after that period (EC, 2016b). There are also plans to maintain the current area of occurrence, which encompasses the geographical distribution of all known populations.

Lesser yellowlegs

The lesser yellowlegs nests in marshes and peatlands. This bird has been observed twice during the nesting season, mainly in peatlands. However, most sightings occur during spring migration. Data obtained in the biophysical RSA do not confirm its presence as a breeder, but the species is considered a probable breeder in areas located more than 50 km away, particularly along the North Road, northwest and northeast of the biophysical LSA (eBird, 2025). Its nesting status in the biophysical LSA remains possible.

The lesser yellowlegs is particularly sensitive to the cumulative effects of several threats, including the exploitation of biological resources, habitat loss and degradation, and the impacts of climate change and extreme weather events (COSEWIC, 2020).

Given that the species is currently under review for possible listing in Appendix 1 of the SARA, no conservation objectives have yet been established in a recovery strategy.

Bald eagle

The bald eagle builds its nests in mature forests near water bodies and watercourses. This bird of prey was observed 20 times between 2023 and 2025 (Map 6-15), mainly through opportunistic observations and helicopter flyovers. The individuals detected were isolated adults or immature birds, with no associated nesting structures. Although some individuals were observed during the breeding season, no evidence of nesting was found in the biophysical LSA. This species is therefore classified as non-nesting, likely consisting of individuals present during the summer but not breeding, or adults nesting near the biophysical LSA.

In Quebec, the main threats to bald eagles are habitat loss; disturbance caused by human activity; accidental trapping; collisions with vehicles, wind turbines, or power lines; illegal killing; and contamination by toxic substances (Comité de rétablissement du pygargue à tête blanche au Québec, 2002).

The objectives of the recovery plan were to maintain or exceed 50 active nests, ensure an annual productivity rate of more than 0.7 fledglings per active nest with at least 50% of productive nests at control sites inventoried twice, and establish a conservation strategy for 90% of known nests (CRPTBQ, 2002). The first two objectives of the recovery plan have been achieved or even exceeded, while the third has been almost entirely achieved (EROP, 2019).

Rusty blackbird

The rusty-blackbird breeds in peatlands, swamps, and marshes on the edge of forests. Between 2023 and 2025, 180 observations of the rusty blackbird were reported (Map 6-15), making it the most frequently detected species of special status during the surveys. The occurrences were identified using several inventory methods, including sound level meters, listening stations, and helicopter surveys. The species is widely distributed in wooded wetlands, often near bodies of water. Nesting was confirmed in the biophysical LSA in 2023 and 2024. In fact, adults have been observed carrying materials for nest building as well as food for chicks. The rusty-blackbird was observed during spring and fall migration periods as well as during the breeding season.

The most concerning threat to the species is the conversion of wetlands in the wintering area and in the migration area south of the boreal region (EC, 2015). Added to this are other losses or degradation of its habitat, deforestation, pollution in the form of mercury contamination, acidification of wetlands and agricultural pesticide residues, climate change, and the drying up of wetlands.

The objectives of the management plan are to first halt the decline in population and maintain the level reached in 2014, then to increase its abundance to ensure a ten-year increase in the population in Canada (EC, 2015).

Yellow rail

The yellow rail breeds in shallow, low-vegetation wetlands. No yellow rails were detected during the surveys conducted from 2023 to 2025, nor in the literature consulted. The main habitats occupied by this species are located along the banks of the Gulf of St. Lawrence and the St. Lawrence River (Robert et al., 2019). In the interior of Quebec, there is only one recorded instance of yellow rail nesting in Témiscamingue. In the Nord-du-Québec region, a breeding population has been confirmed along the coast of James Bay (EC, 2013b; Robert et al., 2019). However, no sightings of the species have been reported in the biophysical RSA located inland. Considering the documented habitat of the yellow rail, its presence in the biophysical LSA is unlikely. Thus, the potential habitat of this species has not been mapped.

The main threat to this species is the loss of wetlands due to human development and hydrological changes, exacerbated by invasive species, accidental mortality, overgrazing, pollution, recreational activities, and climate change (EC, 2013b).

The objectives of the management plan are to identify and monitor key sites used by the yellow rail, to conserve and effectively manage its habitat, to fill gaps in knowledge about threats and conservation practices, and to develop communication tools to raise awareness and mobilize public and private stakeholders (EC, 2013b).

6.3.5 Mammals – Large wildlife

6.3.5.1 Current conditions

Documentary research was conducted to obtain a picture of the large mammal species likely to occupy the biophysical RSA, in particular through public, institutional, and scientific data sources. The following sources of information were consulted:

- Carte des occurrences d’espèces en situation précaire via le Centre de données sur le patrimoine naturel du Québec [Map of occurrences of species at risk via the Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- Aires de répartition des mammifères terrestres [Distribution ranges of land mammals] (Données Québec, 2025);
- Global Biodiversity Information Facility (GBIF, 2025);
- Catalogue of Hydro-Québec documentation centres (CherLoc, 2025).

The biophysical RSA of the project is occupied by various species of large mammals, including woodland and migratory caribou (*Rangifer tarandus caribou*), moose (*Alces alces*), black bear (*Ursus americanus*), and grey wolf (*Canis lupus*). These species, which play an important ecological role in boreal ecosystems, are the focus of particular attention in this project. A sectoral study was conducted in 2025 to provide an up-to-date picture of the demographics, habitat quality, and habitat use of woodland and migratory caribou in the biophysical RSA. This study is presented in Appendix 6-21.

Woodland caribou (forest)

The woodland caribou plays a central role in the boreal forest, where it depends on vast, mature, undisturbed forest areas for its survival and reproduction. Its critical habitat consists mainly of mature softwood forests rich in lichens, open or wooded peatlands, as well as lichen tundra and rocky outcrops. These environments provide both food resources and protection from predators (Bastille-Rousseau et al., 2012; Leblond et al., 2014).

The woodland caribou is considered an “umbrella species.” This concept is based on the idea that protecting its essential habitat, namely vast, mature, minimally disturbed forest areas, benefits a multitude of other species that share the same environment, including forest birds, mammals, and insects. By preserving territories large enough to meet the ecological needs of caribou, the preservation of boreal biodiversity and essential ecological functions, such as the regulation of food webs and carbon sequestration, is indirectly ensured (Bichet et al., 2016; Labadie et al., 2024).

Caribou are particularly sensitive to anthropogenic disturbances, which cause fragmentation and a reduction in the size of high-quality habitat patches (Bastille-Rousseau et al., 2012). Disturbances can also cause an edge effect, which manifests itself in avoidance of the interface between natural and disturbed environments (Fortin et al., 2013). Caribou avoidance of human infrastructure can extend well beyond directly affected areas, resulting in functional habitat loss (Leblond et al., 2014). Disturbed environments can also lead to increased predation pressure on caribou (Raymond-Bourret, 2017).

Regenerating environments may have higher densities of alternative prey, such as moose (Brown et al., 2003; Whittington et al., 2011), which is favourable to predators such as grey wolves and black bears. In addition, disturbed environments, particularly linear infrastructure, generally promote predator movement within the habitat (Whittington et al., 2011).

In Quebec, the woodland caribou has been designated as a vulnerable species since 2005 under the *Act respecting threatened or vulnerable species* (LEMV; CQLR, c. E-12.01). This status has led to the development of recovery plans and guidelines for habitat management (ÉRCFQ, 2013a, 2013b) and the implementation of interim measures to limit the loss and fragmentation of woodland caribou habitat. In the James Bay region, the woodland caribou population is monitored using telemetry and aerial surveys (Szor and Gingras, 2020). In Canada, the woodland caribou has been listed as a threatened species under the *Species at Risk Act* (SARA; S.C. 2002, c. 29). A recovery strategy has been developed by Environment and Climate Change Canada (ECCC), defining critical habitat, population self-sufficiency indicators, and imminent threats to woodland caribou (ECCC, 2020, 2024).

The biophysical RSA for the project is located in the western portion of the James Bay woodland caribou knowledge acquisition area. Despite the vastness of the James Bay territory and its inclusion in the continuous range of the woodland caribou, knowledge about the status and dynamics of populations in this area remains limited. Relatively few comprehensive inventories have been conducted north of known populations, and the interpretation of historical data is complicated by the fluctuating presence of migratory caribou herds (Szor and Gingras, 2020).

According to the inventory conducted by Szor and Gingras in 2020, the average corrected density of woodland caribou in the West James Bay sector was very low, at 0.17 caribou/100 km². The total abundance estimated for this sector was approximately 166 individuals (95% CI: 82–277) divided into small groups (Szor and Gingras, 2020). The demographic structure indicated a ratio of 31.9 males per 100 females and a recruitment rate of 42.6 calves per 100 females, corresponding to 24.4% of calves among the individuals observed. Within the biophysical RSA of the project, no woodland caribou were observed during an aerial survey conducted in January 2023 (Niigaan, 2023).

Szor and Gingras (2020) estimated the total corrected abundance in the inventory area at 798 individuals (95% CI: 606–989). Despite a total population exceeding the threshold of 300 individuals generally recognized as the minimum criterion for a population's self-sufficiency (ECCC, 2024), the population in the West James Bay sector could be at high risk of extinction. This situation can be explained in particular by the combination of a finite growth rate potentially lower than 1 ($\lambda \approx 0.97$ for neighbouring sectors) and a habitat disturbance rate exceeding the critical threshold of 35% for woodland caribou. The disturbance rate in the biophysical RSA for woodland caribou is estimated at 48.2% according to the provincial method and at 42.5% according to the federal method.

For further details, the sectoral study is presented in Appendix 6-21.

Migratory caribou

Migratory caribou play a central role in the northern ecosystems of Quebec and Labrador. In Quebec, the migratory caribou population is divided into two herds: the Leaf River herd (LRH) and the George River herd (GRH). As the biophysical RSA of the project overlaps the southern boundary of the LRH's range, this herd is most likely to visit this area, particularly during the wintering period.

The migratory caribou of the LRH are among the mammals that undertake the longest terrestrial migrations (Milner-Gullan et al., 2011), using ecosystems seasonally according to the needs inherent to their life cycle (Taillon et al., 2016). Through its seasonal movements across vast territories, it shapes the structure and dynamics of the tundra and taiga landscapes. Migratory caribou are also a key species for certain predators in northern Quebec, such as grey wolves and black bears (Messier et al., 1988; Crête and Huot, 1993; Taillon et al., 2016). The LRH's wintering area is mainly located north of the La Grande hydroelectric complex, but may occasionally extend further south depending on winter conditions and food availability (Taillon et al., 2016).

In Quebec, migratory caribou are protected by measures relating to their calving grounds, which are recognized as critical habitats under the A*ct respecting the conservation and development of wildlife* (LCMVE, CQLR, C-61.1). The project's biophysical RSA does not include any identified calving areas or recognized critical habitat for migratory caribou, but it is a potential wintering area and travel corridor. In Canada, the eastern migratory caribou population was the subject of a 2017 COSEWIC recommendation for listing under SARA as an endangered species (COSEWIC, 2017), although this listing has not yet been formalized. To date, no specific federal legal protections apply to the migratory caribou of the LRH.

At the population level, the demographic dynamics of the LRH were marked by strong growth between 1975 and 2001, followed by a steady decline. Thus, the population peaked at an estimated 628,000 individuals in 2001 (Couturier et al., 2004; Taillon et al., 2016), declining to 175,000 individuals according to the most recent estimates (Brodeur et al., 2023). This decline represents a decrease of approximately 70% in its population since 2001 (MFFP, 2018; Gouvernement du Québec, 2025a). No migratory caribou were observed during an aerial survey conducted in January 2023 in the project's biophysical RSA (Niigaan, 2023).

LRH telemetry tracking data for migratory caribou indicate that the intensity of use of the biophysical RSA has varied over the years. A peak in use was observed between 2009 and 2015, with a maximum of 113 distinct individuals detected in 2009. Since 2016, there has been a decrease in use of the central part of the biophysical RSA, with areas of intensive use shifting further north and west of the proposed mine site, particularly between the La Grande 3 and La Grande 4 dam reservoirs and west of Lac de la Corvette.

The project is located on the traditional territory of the Cree Nation of Chisasibi, in the Eeyou Istchee James Bay region. Migratory caribou occupy a central place in Cree culture, both in terms of food and spirituality (AFNQL – FNQLSDI, 2022). However, the dramatic decline in the population of migratory caribou herds has prompted authorities to ask local communities to significantly reduce caribou hunting for conservation purposes (Cree Nation Government, 2025). Consultations with members of the Chisasibi community highlighted their concerns about declining caribou populations and changes in migration routes, as well as the importance of preserving habitats and continuing traditional activities (Gagnon et al., 2023; Cree Nation Government, 2025).

For further details, the sectoral study is presented in Appendix 6-21.

Moose

The moose is the largest species in the deer family in Quebec and occupies a very large range across the province (Gouvernement du Québec, 2025b). Its territory covers almost the entire forested area of Quebec, from the southern regions to the northern limits of the boreal forest. In the north, the northern limit of moose distribution corresponds to the transition between the boreal forest and the taiga, around the 52nd parallel. Beyond this limit, moose density declines rapidly due to the predominance of spruce-moss stands, taiga, and tundra, which are environments that are not conducive to the species (Lefort and Massé, 2015). In the James Bay region, moose are the main prey of grey wolves (Jolicoeur and Hénault, 2002).

Hunting zone 22, which covers most of the James Bay territory, has historically had a low moose population, but this has been growing over the past few decades. An aerial survey conducted in 1991 estimated the density at 0.26 moose per 10 km², representing a population of 8,841 individuals (after taking into account hunting harvests) across the hunting zone. A simulation conducted in 1997 suggested a density of 0.31 moose per 10 km², indicating an annual population growth of approximately 3%. Applying a growth rate of 3% between 1991 and 2012, the moose population in the hunting zone was estimated at 9,872 individuals, representing a density of 0.5 moose/10 km² (Société de la faune et des parcs, 2003; Lefort and Massé, 2015).

During the aerial survey conducted in January 2023 in the project's biophysical RSA, a total of 27 moose divided into 14 groups were counted. The observed demographic composition was balanced, with 37% females, 41% males, and 22% calves, representing a male-to-female ratio close to parity and an estimated productivity of 0.6 calves per female (60 calves/100 females). Moose density in the biophysical RSA was low, reaching 0.18 moose/10 km², or 0.23 moose/10 km² after correction for detectability (82%). This density is lower than the regional average estimated at 0.5 moose/10 km² for hunting zone 22, which is to be expected since the biophysical RSA is located near the northern limit of the species' range. Within the project's biophysical LSA, four moose were counted near the access road (Niigaan, 2023).

Sport hunting data for this area also suggest that the regional moose population is stable or even growing, with relatively constant annual harvests (Société de la faune et des parcs, 2003; Gouvernement du Québec, 2025c). In hunting zone 22, 84 and 87 moose were harvested by sport hunters in 2023 and 2024, respectively (Gouvernement du Québec, 2025c).

Moose select their habitat based on the availability of food, the presence of shelter from harsh weather and predators, and the structure of the forest landscape. In Quebec, moose prefer forest mosaics composed of hardwood and mixedwood stands, as well as recently disturbed areas (logging, burning, insect epidemics), which offer an abundance of browse (leaves and twigs) and a high diversity of food (Courtois, 1993). Dense softwood stands are used primarily as shelter, especially in winter, to minimize energy expenditure associated with travelling through snow and to protect against the cold (Samson et al., 2002).

In summer, moose seek out wetlands to access aquatic plants rich in minerals, which are essential for antler growth, lactation, and thermoregulation. They also seek out shaded areas to avoid heat stress when temperatures exceed 63 °F (Samson et al., 2002). In winter, they prefer mixedwood and hardwood stands rich in browse, but take refuge in dense softwood forests when the snow becomes deep or crusted (Courtois, 1993).

Moose habitat selection varies depending on the season and landscape structure. They have home ranges covering several dozen square kilometres, within which they seek an optimal mix of feeding and shelter sites (Samson et al., 2002). Habitat quality is therefore maximal when food and shelter are juxtaposed, reducing travel and optimizing periods of grazing, resting, and rumination (Courtois, 1993). The habitat’s carrying capacity for moose depends on the proportion of young stands (5 to 30 years old), the diversity of hardwood species, the presence of water bodies, and the availability of softwood refuges. The highest moose densities are found in mixedwood forests and landscapes structured by natural or anthropogenic disturbances, which promote regeneration and diversity of food resources (Samson et al., 2002).

The potential growth of the moose population in hunting zone 22 could be attributable to improved habitat conditions, particularly the increase in the area of mixedwood and hardwood stands (+30% between 1970 and 1990) (Lefort and Massé, 2015). The biophysical LSA habitat of the project, characterized by a mosaic of regenerating environments and older softwood forests, appears favourable to moose, providing both feeding sites and winter cover (Niigaan, 2023).

Moose are of great importance to local Indigenous communities, both culturally and as a food source. It is an essential wildlife resource for subsistence, traditional practices, and knowledge transfer. Moose thus remain central to the identity, food autonomy, and way of life of the region’s Indigenous communities (Lefort and Massé, 2015).

Black bear

The black bear has a wide range covering the entire province of Quebec (Gouvernement du Québec, 2025d). In the Nord-du-Québec region, where the project’s biophysical RSA is located, the status of black bear populations remains relatively poorly documented (Société de la faune et des parcs, 2003). No inventory focusing on this species has been conducted in this administrative region; the nearest inventories were conducted around Lac Péribonka, in the Saguenay–Lac-Saint-Jean region (Dussault et al., 2024a; 2024b).

In the early 1990s, the density of black bears was estimated at approximately 0.20 bears per 10 km² in hunting zone 22, corresponding to a population of approximately 5,600 individuals. This estimate is based on an indirect approach using annual harvest statistics provided by the Cree Trappers Association, combined with a demographic simulation model incorporating biological parameters adapted to northern conditions. However, this method has several limitations, including the relative reliability of harvest statistics, which may be incomplete or underreported, as well as uncertainty related to the transposition of biological parameters from studies conducted mainly in southern Quebec (Lamontagne et al., 1999; Lapointe, 1997, Société de la faune et des Parcs, 2003).

In hunting zone 22, black bear hunting and trapping activities are reserved exclusively for Indigenous Peoples, in accordance with the traditional practices and harvesting rights of these communities, as set out in the JBNQA and related agreements (Bédard, 2023). Sport hunting statistics, which are accessible and updated annually, cannot therefore be used as an indicator of the abundance of the species in the biophysical RSA or LSA.

A few black bears were observed opportunistically during a field survey in the biophysical LSA in the summer of 2022 (BBA, 2022).

For black bears, habitat selection is particularly guided by the availability of food resources. In spring, black bears prefer open areas and forest edges, where they find digestible herbaceous plants, young shoots, and insects. Regenerating forest stands, resulting from logging or natural disturbances, offer an abundance of small fruits (berries) and insects, making them valuable habitats for the species (Samson, 1996; Desnoyers and Dussault, 2014). Access to high-quality food resources is particularly important in the fall, since this is when black bears build up their fat reserves that will enable them to survive and reproduce during hibernation (Noyce and Garshelis, 1994; Samson and Huot, 1995).

In the fall, black bears show a strong preference for hardwood forests with species that produce hard fruits (e.g., acorns, nuts, beechnuts), such as oaks (*Quercus* spp.; Inman and Pelton, 2002), hickory trees (*Carya* spp.; Elowe and Dodge, 1989), and beech trees (*Fagus* spp.; Hugie, 1982). The black bear is also an opportunistic predator of caribou and moose calves (Bonin et al., 2020; McLaren et al., 2021). Black bears also use anthropogenic resources (Rogers, 1987), particularly when natural resources are scarce in their habitat (Elowe and Dodge, 1989; Zeller et al., 2019).

Grey wolf

The grey wolf is a wild canid that inhabits almost the entire territory of Quebec, with the exception of the regions south of the St. Lawrence River. It is permanently present in the James Bay region, where it plays a key ecological role as a top predator in boreal and subarctic ecosystems (Gouvernement du Québec, 2025e).

Estimates of grey wolf density in the James Bay region vary depending on the method used and the availability of prey. According to Jolicoeur and Hénault (2002), the wolf density in hunting zone 22 is estimated to be between 0.3 and 0.5 wolves per 100 km². Monitoring parameters suggest that grey wolf populations occupying the James Bay area are stable (MELCC, 2021).

In the boreal forest, grey wolves prefer large, unfragmented forest areas with little human presence and sufficient availability of their main prey to ensure the viability of their packs. Preferred habitats include black spruce-moss stands, mature mixedwood forests, areas with higher densities of moose (Jolicoeur and Hénault, 2002), as well as riparian environments and areas with high densities of beavers (*Castor canadensis*), which can be an important food resource, especially in the spring and summer (Hénault and Jolicoeur, 2003).

In the James Bay region, habitat fragmentation, increased road access, and trapping pressure may locally influence the distribution and dynamics of grey wolf packs. Although wolves generally avoid areas with high human infrastructure density, they may use linear infrastructure, such as forest roads and power lines, to facilitate their movements and access certain food resources, including ungulate carcasses left behind after hunting or trapping (Whittington et al., 2011; Lesmeries et al., 2012).

The diet of wolves in northern Quebec is primarily composed of moose, but also includes caribou, beaver, snowshoe hare (*Lepus americanus*), and, opportunistically, other small mammals or carcasses found in the territory. The selection of prey varies according to the season, local availability, and the vulnerability of individuals (Hénault and Jolicoeur, 2003).

In hunting zone 22, grey wolf hunting and trapping activities are reserved exclusively for Indigenous Peoples, in accordance with the traditional practices and harvesting rights of these communities, as set out in the JBNQA and related agreements (Gouvernement du Québec, 2025f).

The grey wolf plays an important role in local Indigenous communities, both culturally and economically. Harvesting this species through trapping contributes to the transmission of traditional knowledge and food autonomy in these communities (Hénault and Jolicoeur, 2003).

6.3.6 Mammals – Chiropterans

Inventories were carried out in 2023, 2024, and 2025 using 16 acoustic monitoring stations distributed across an inventory area of approximately 114.25 km^2, corresponding to a 2 km buffer zone around the project infrastructure and a 1 km buffer zone around the planned access road (Map 6-16). The results of this work are presented in a sectoral study (Appendix 6-22). These inventories aimed to establish a profile of the chiropterans visiting the inventory area at different times of the year (spring and fall) and to search for maternity roosts and hibernacula.

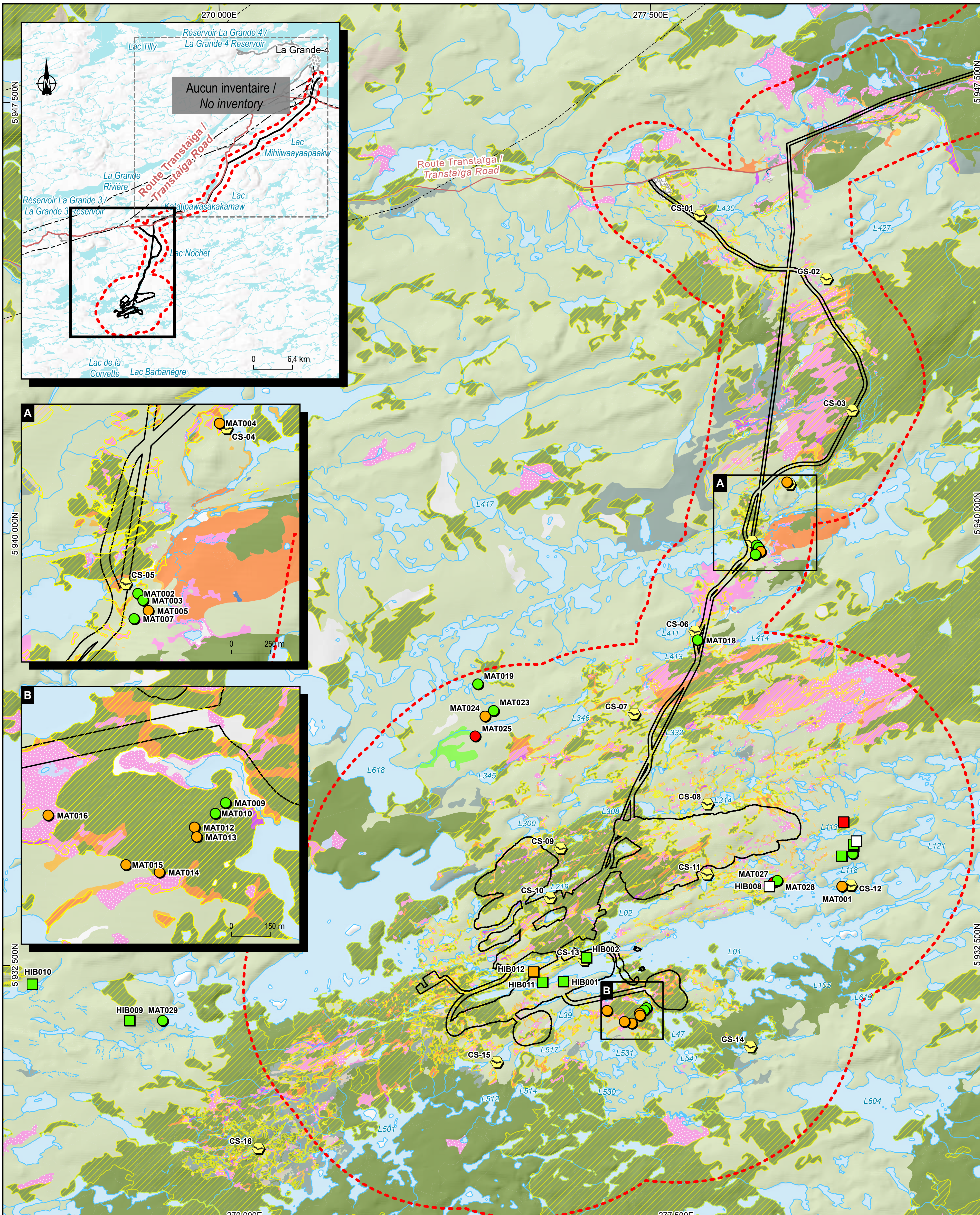
Inventories confirmed the presence of two resident species, the northern long-eared bat (*Myotis septentrionalis*) and the little brown bat (*Myotis lucifugus*), as well as other bats of the genus *Myotis*. In terms of migratory species, the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), and red bat (*Lasiurus borealis*), as well as the big brown bat (*Eptesicus fuscus*) and silver-haired bat (*Lasionycteris noctivagans*) complexes have been confirmed. It should be noted that the hoary bat was the species most frequently identified.

Existing literature

According to available information, three of the eight bat species found in Quebec are likely to be found in the biophysical LSA, namely the red bat, the brown bat, and the northern long-eared bat (Jutras et al., 2012; ECCC, 2018; ERCSQ, 2019; ERCSQ, 2021).

A summer colony of bats, observed in 2001 in a cottage located approximately 23 km east of the biophysical LSA, is mentioned in the Neighbourhood Bat Watch database. In addition, a network of several artificial bat roosts, one of which is occupied by a few individuals, is located approximately 69 km south of the biophysical LSA (Neighbourhood Bat Watch, 2025).

Data collected by the *Réseau québécois d'inventaire acoustique de chauves-souris* **[**Quebec bat acoustic inventory network] between 2003 and 2020 in the Chibougamau area, approximately 400 km south of the biophysical LSA, indicate the presence of the big brown bat, silver-haired bats, and red bats, and bats of the genus *Myotis* (Desrosiers and Berthiaume, 2024).



Zones d'étude / ***Study Areas***

Projet / *Project*

Locale - Biophysique / *Local - Biophysical*

Chiroptères / ***Chiroptera***

Station acoustique / *Acoustic station*

Habitat préférentiel de reproduction / *Preferred breeding habitat*

Résultats d'inventaire / ***Inventory Results***

Étiquette : Nom de la station / *Label : Station name*

MAT-01 Forme : Type d'habitat / *Shape : Habitat type*

Couleur : Potentiel de maternité / *Color : Maternity potentiel*

Type d'habitat / *Type of habitat*

Hibernacle / *Hibernaculum*

Maternité / *Maternity*

Potentiel / *Potential*

Nul / *Null*

Faible / *Low*

Moyen / *Medium*

Élevé / *High*

Composantes de l'écosystème / ***Ecosystem Components***

Milieux humides et hydriques / ***Wetlands and Hydrous Environments***

Marécage arborescent / *Treed swamp*

Marécage arbustif / *Shrubby swamp*

Tourbière minérotrophe boisée / *Treed fen*

Tourbière ombrotrophe boisée / *Treed bog*

Tourbière ombrotrophe ouverte / *Open bog*

Marais / *Marsh*

Eau peu profonde / *Shallow water*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Permanent partiellement souterrain / *Partially underground permanent*

Souterrain / *Underground*

Milieux terrestres / ***Terrestrial Environments***

Feuillu / *Deciduous*

Mixte / *Mixed-wood*

Résineux / *Softwood*

Arbustaie / *Scrubland*

Lande à lichens / *Lichen tundra*

Régénération / *Regeneration*

Autre milieu / ***Other Environment***

Autre milieu / *Other Environment*

Infrastructures / ***Infrastructure***

Ligne de transport d'énergie / *Electric power transmission line*

Centrale hydroélectrique / *Hydroelectric generating station*

Réseau routier / ***Road Network***

Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-16 / *Map 6-16*
Résultats d'inventaire des chiroptères / *Chiroptera Inventory Results*

Sources
BDGA, 1/1 000 000, MRN Québec, 2014
AQréseau+, réseau routier, MERN, 2024-03-01
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Géobase du réseau hydrographique du Québec (GRHQ), MELCC et MERN, 2021

0 675 1 350 m

NAD 1983 CSRS UTM Zone 18N

2026-03-10

Préparation / *Preparation* : J. Legros
Dessin / *Drawing* : P. Boulay
Approbation / *Approval* : R. Duhamel
CA0001724_3318_eie_ch06_c16_260302.aprx
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Acoustic inventories of chiropterans

The fixed acoustic inventory confirmed the presence of five species (northern long-eared bat, silver-haired bat, hoary bat, red bat, and the big brown bat), as well as brown/silver-haired bat and Myotis complexes. These include the little brown bat, the northern long-eared bat, and the eastern small-footed bat. In total, 35 passes were recorded in 2023, 220 passes in 2024, and 367 passes in 2025. It should be noted that only the fall migration period was recorded in 2023, which explains the differences between years.

The hoary bat is the species most commonly identified during inventories, accounting for up to 91% of records, while other species have only been recorded occasionally (Table 6-34).

Table 6-34 Species recorded and respective percentages for the 2023, 2024, and 2025 seasons

Species/Complex	Percentage (%) of recordings		
	2023	2024	2025
Myotis Complex	2.9	5.5	2.2
Northern long-eared bat	0	0.9	0
Big brown bat	0	1.4	0
Big brown/silver-haired complex	0	0.5	0
Silver-haired bat	5.7	0	0.3
Hoary bat	45.7	88.2	91.3
Red bat	11.4	0	3.0
Undetermined	34.3	3.6	3.3

More specifically, during the spring dispersal and migration period (2024 and 2025), only migratory species of the genus *Myotis* and the hoary bat were identified. Activity is therefore very low, with an average of 0.02 to 0.13 passes per night per station. During the breeding season, all species and species complexes are represented in the 2024 and 2025 inventories. The hoary bat largely dominates this period, accounting for approximately 90% of the records, and all stations were visited by one or more of the species present. Excluding the unidentified species and the big brown bat/silver-haired bat complex, since it includes a resident species and a migratory species, resident species are poorly represented, accounting for 2.1% (2024) and 6.2% (2025) of records, compared to 71.8% (2024) and 92% (2025) for migratory species. The number of passes per night and per station is very low, with a maximum of 0.41 passes per night in 2024 and 1.15 passes per night in 2025.

During the fall migration (2023, 2024, and 2025), all species and species complexes were recorded. The hoary bat is the species most often observed, with the number of passes per night varying from 0.05 to 1.12 per station. The other bats have a lower number of passes, equivalent to approximately 0.02 passes/night per station (Tables 4 to 7 of the sectoral study presented in Appendix 6-22).

Search for chiropteran hibernacula

Only two hibernacula are known to exist in the Nord-du-Québec region, one north of Lebel-sur-Quévillon (approximately 500 km southwest of the study site) and the other near Chibougamau (approximately 400 km south of the study site). Thus, no known hibernaculum is located near the biophysical LSA. According to data obtained from SIGÉOM, the *Gîtes métallifères du Québec* [Quebec metal-bearing deposits] website, and the *Carte des mines active et en maintenance du Québec* [map of mines in operation and under care and maintenance in Quebec] (Gouvernement du Québec, 2024a, 2024b, and 2024c), no human intervention has created openings suitable for a bat hibernaculum near the biophysical LSA, and no abandoned mines are listed in the biophysical LSA.

Furthermore, no speleological cavities with the potential to serve as bat hibernacula have been reported in the Eeyou Istchee James Bay administrative region (Gauthier et al., 1995). Lastly, it would be highly unlikely to find a bat hibernaculum in a natural cavity due to the excessively cold temperatures of the biophysical LSA.

Although it is unlikely that a hibernaculum would be found in the biophysical LSA, 12 rock outcrops within the LSA were nevertheless visited in the field to assess the potential for the presence of a chamber that could accommodate a hibernating bat population. Of these, 2 have zero potential, 8 have low potential, 1 has average potential, and 1 has good potential. However, no evidence of bat presence was found during the assessment of these various sites.

Search for chiropteran maternity roosts

The preferred breeding habitat of bats is found throughout the biophysical LSA, with areas of higher density in the centre and south of the LSA, as well as near the existing access road.

A total of 29 potential maternity roosts of natural origin were observed during daytime research activities. Among these sites, 2 were deemed to have high potential for use by bats, 9 had medium potential, 12 had low potential, and 6 had no potential. The potential maternity roosts of natural origin were mainly composed of stumps.

Furthermore, the potential presence of maternity roosts in the immediate vicinity of each fixed acoustic monitoring station was zero or low for most stations, with the exception of stations CS-12, CS-13, CS-04, and CS-01, which have average potential (Map 6-16). In fact, station CS-12 is located in a burned area with several large stumps. Stations CS-04 and CS-01 are located in forested areas, but several stumps have been observed.

No physical evidence of bats (guano) was observed, and no sounds (scratching or cries) were heard during the daytime assessment of potential maternity roosts.

Species of special status

In Quebec, recordings of chiropterans belonging to the Myotis genus complex generally include three species whose sonograms are difficult to differentiate: the little brown bat, the northern long-eared bat, and the eastern small-footed bat. As the latter species is very rare, it is considered absent from the region (Jutras et al., 2012). Thus, the recordings attributed to the *Myotis* genus are likely to be from the northern long-eared bat and/or the little brown bat. Both species are endangered in Canada according to Schedule 1 of the *Species at Risk Act* (Government of Canada, 2025b) and threatened in Quebec according to the *Act respecting threatened or vulnerable species* (Gouvernement du Québec, 2025).

In Quebec, the hoary bat and the silver-haired bat are likely to be designated as threatened or vulnerable, while the red bat is considered vulnerable (Gouvernement du Québec, 2025).

The hoary, silver-haired, and red bats were recently assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2023), although these species are not yet included in Schedule 1 of the *Species at Risk Act* (Government of Canada, 2025b).

6.3.7 Mammals – Other species

6.3.7.1 Existing literature

A review of the literature was carried out to obtain a picture of other mammal species likely to occupy the biophysical LSA, particularly using public, institutional, and scientific data sources. The following sources of information were consulted:

- Carte des occurrences d'espèces en situation précaire via le Centre de données sur le patrimoine naturel du Québec [Map of occurrences of species at risk via the Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- Aires de répartition des mammifères terrestres [Distribution ranges of land mammals] (MELCCFP, 2025);
- Atlas des micromammifères du Québec [Atlas of small mammals of Quebec] (Desrosiers *et al*., 2002);
- Global Biodiversity Information Facility (GBIF, 2025);
- Catalog of Hydro-Québec documentation centres (CherLoc, 2025).

6.3.7.2 Small mammals

An inventory of small mammals was conducted in September 2023 as part of establishing the project's reference wildlife status (Niigaan, 2025c, Appendix 6-23). The main objective of this campaign was to document the species diversity and relative abundance of small mammals in the various types of habitats present in the biophysical LSA, while paying particular attention to the detection of species of special status.

The inventory of small mammals was conducted in accordance with the *Protocole standardisé pour les inventaires de micromammifères au Québec* [Standardized protocol for small mammal inventories in Quebec] (MELCCFP, 2023). Sixteen (16) 320-metre transects were set up across three sectors representative of the site's habitats. Each transect included 33 inventory stations, each equipped with two peanut butter-baited traps, for a total of 66 traps per transect. The traps were checked every morning for five consecutive days at the end of summer 2023, the optimal period for this type of inventory. The specimens captured were identified in the laboratory, mainly using the identification key by Fauteux et al. (2014).

A total of eight species of small mammals were recorded in the three areas surveyed: the southern red-backed vole (*Myodes gapperi*), the deer mouse (*Peromyscus maniculatus*), the eastern heather vole (*Phenacomys ungava*), the meadow vole (*Microtus pennsylvanicus*), the northern bog lemming (*Synaptomys borealis*), the southern bog lemming (*Synaptomys cooperi*), the meadow jumping mouse (*Zapus hudsonius*), and the cinereous shrew (*Sorex cinereus*). These species have been observed in a variety of habitats, including softwood stands, regenerating areas, peat bogs, and lichen tundra. Table 6-35 shows the number of individuals caught by species.

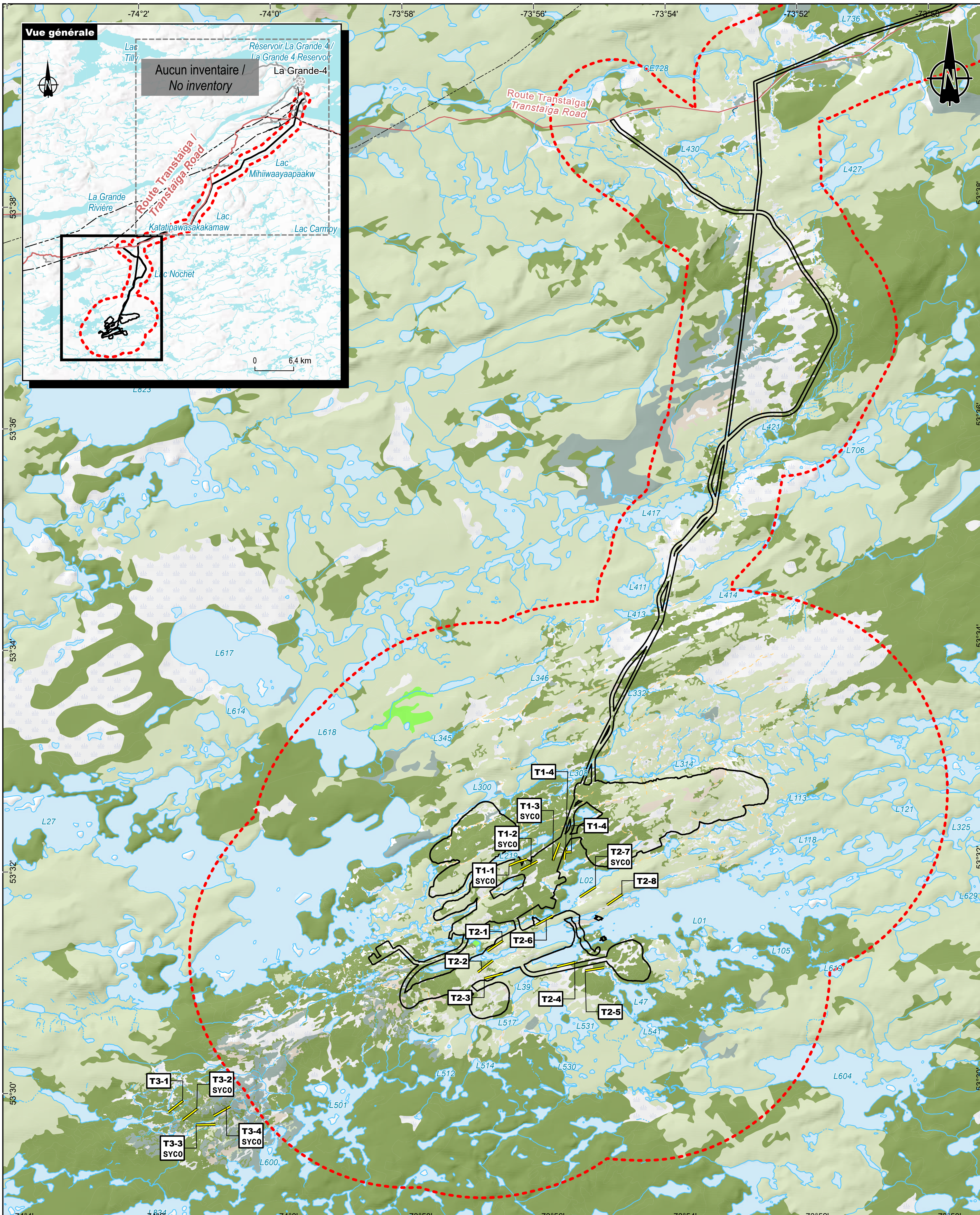
Table 6-35 Species and number of individuals captured per species during the small mammal inventory

Common name	Scientific name	Number of individuals captured
Southern red-backed vole	*Myodes gapperi*	345
Deer mouse	*Peromyscus maniculatus)*	192
Eastern heather vole	*Phenacomys ungava*	63
Meadow vole	*Microtus pennsylvanicus*	60
Northern bog lemming	*Synaptomys borealis*	39
Southern bog lemming[1]	*Synaptomys cooperi*	16
Cinereous shrew	*Sorex cinereus*	14
Meadow jumping mouse	*Zapus hudsonius*	12

Note: 1 Species likely to be designated as threatened or vulnerable in Quebec.

Among the species inventoried, the southern bog lemming is likely to be designated as threatened or vulnerable in Quebec. This species was captured in seven transects, with greater abundance in the T3 area (Map 6-17), characterized by the presence of lichen tundra. It has also been observed in the T1 sector, where a variety of habitats, including peat bogs and bodies of water, seem to favour its presence. However, its presence was more marginal in the T2 sector, dominated by regenerating stands, suggesting that this type of habitat is less favourable to the species.

The rock vole (*Microtus chrotorrhinus*), also a species likely to be designated as threatened or vulnerable, was not detected during the inventory. However, its preferred habitat (i.e., moist rocky slopes near water sources) is potentially present in the biophysical LSA, which justifies considering this species as potentially present. Considering the known distribution ranges of small mammal species (Desrosiers et al., 2002; MELCCFP, 2025), the northern water shrew (*Sorex palustris*), the pygmy shrew (*Sorex minutus*), and the star-nosed mole (*Condylura cristata*) are also small mammal species that may be present in the biophysical LSA.



Zones d'étude / *Study Areas*

Projet / *Project*

Locale - Biophysique / *Local - Biophysical*

Micromammifères / *Small Mammals*

Transect d'inventaire de micromammifère / *Small mammal inventory transect*

Étiquette / *Label*

T1-1 — Nom de la station / *Station name*

SYCO — Résultat d'inventaire / *Inventory result*

Code / *Code*	Espèce / *Species*
SYCO	Campagnol-lemming de Cooper / *Soutern bog lemming*

Infrastructures / *Infrastructure*

Centrale hydroélectrique / *Hydroelectric generating station*

Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

Route collectrice municipale / *Municipal collector road*

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*

Milieu humide / *Wetland environment*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermitent*

Permanent / *Permanent*

Permanent partiellement souterrain / *Partially underground permanent*

Souterrain / *Underground*

Milieux terrestres / *Terrestrial Environments*

Feuillu / *Deciduous*

Mixte / *Mixed-wood*

Résineux / *Softwood*

Arbustaie / *Scrubland*

Lande à lichens / *Lichen tundra*

Régénération / *Regeneration*

Autre milieu / *Other Environment*

Autre milieu / *Other Environment*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project

Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 6-17 / *Map 6-17*
Résultats d'inventaire des micromammifères / *Small Mammal Inventory Results*

Sources
BDGA, 1/1 000 000, MRN Québec, 2014
AQréseau+, réseau routier, MERN, 2024-03-01
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Géobase du réseau hydrographique du Québec (GRHQ), MELCC et MERN, 2021

0 650 1 300 m

NAD 1983 CSRS UTM Zone 18N

2026-03-24

Préparation / Preparation : V. Roy
Dessin / Drawing : P. Boulay
Approbation / Approval : M.H. Brisson
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CA0001724_3318_eie_c06_17_123_mimam_260324

6.3.7.3 Other land mammals

Although no targeted inventory was conducted for other land mammal species, several small to medium-sized species are likely to be present in the biophysical LSA. The diversity of available habitats, including forests, wetlands, banks of bodies of water, and open areas, encourages the presence of a wide range of mammals. This assessment is primarily based on the known ranges of land mammal species (MELCCFP, 2025).

Among the most common species are the snowshoe hare, well adapted to softwood stands and areas undergoing regeneration, and the American porcupine (*Erethizon dorsatum*), a discreet but widespread species. The muskrat (Ondatra zibethicus) found in wetlands and along riverbanks, while the Canadian beaver actively shapes aquatic environments. A few beavers were also spotted opportunistically in 2022 during field surveys in the biophysical RSA (BBA, 2022).

Mustelids are well represented, with the American marten (*Martes americana*), the ermine (*Mustela erminea*), the least weasel (*Mustela nivalis*), and the American mink (*Neovison vison*), which use a wide variety of microhabitats, from mature forests to wooded banks and aquatic environments. The river otter (*Lontra canadensis*) is also associated with watercourses and lakes.

The coyote (*Canis latrans*), the Canadian lynx (*Lynx canadensis*), the red fox (*Vulpes vulpes*), and the Arctic fox (*Vulpes lagopus*) are likely to occupy open and forested areas, while the striped skunk (*Mephitis mephitis*) may be found in riparian areas and disturbed environments.

Among rodents, the red squirrel, the northern flying squirrel (*Glaucomys sabrinus*), and the groundhog (*Marmota monax*) are species likely to be present in the biophysical LSA. These species are found in undergrowth, forest edges, and open areas.

Although not all of these species were directly inventoried as part of this study, their presence is considered plausible. It should be noted that none of these species currently has a special conservation status in Quebec. They are all considered common or widespread in boreal environments and are not designated as threatened, vulnerable, or likely to be designated as such according to the Quebec government's official lists. These species are also not listed as being at risk by COSEWIC.

Issues for First Nations

The project is located on Cree Nation territory in the Eeyou Istchee region, where local communities have a close relationship with wildlife rooted in hunting, trapping, and gathering practices passed down from generation to generation. These practices are protected by the hunting, fishing, and trapping regime established by the JBNQA which recognizes Cree rights to harvest wildlife for subsistence and cultural purposes.

Among the small and medium-sized mammal species whose range overlaps with that of the project, several are historically and culturally important to Indigenous communities. In particular, the snowshoe hare is a species widely consumed for its meat and frequently hunted in boreal forests. The American porcupine, although rarely seen, is also used for its meat and quills, which can be used for craft purposes.

The muskrat is a semi-aquatic species whose fur is traditionally harvested, particularly through trapping. Mustelids such as the American marten, least weasel, and American mink are also of interest for trapping, due to the quality of their fur and their economic value in Cree communities.

Although these species do not have special conservation status, they play an important role in First Nations traditional practices and ways of life. Their presence in the biophysical LSA must be considered when assessing the project's impacts, particularly with regard to habitat preservation, the continuity of subsistence activities, and respect for Indigenous rights.

6.3.8 Plant and wildlife species of special status

6.3.8.1 Reference state

The various species of special status present or potentially present in the biophysical LSA, as well as the components to which they relate in the previous sections, are presented in Table 6-36.

Table 6-36 List of plant and wildlife species of special status present or potentially present in the biophysical LSA

Common name	Scientific name	Status		Confirmed presence in the local study area (Yes/No)
		Quebec[1]	Canada[2]	
Brown-edged pussytoes	*Antennaria rosea subsp. confinis*	LDTV	–	No
Modest aster	*Canadanthus modestus*	LDTV	–	No
Spatulate moonwort	*Botrychium spathulatum*	LDTV	–	No
Botrychium ascendens	*Botrychium ascendens*	LDTV	–	No
Ojibway waterwort	*Elatine ojibwayensis*	LDTV	–	No
Rocky Mountain willowherb	*Epilobium saximontanum*	LDTV	–	No
Limestone swamp bedstraw	*Galium brevipes*	LDTV	–	No
Nahanni oak fern	*Gymnocarpium continentale*	LDTV	–	No
Purple meadow-rue	*Thalictrum dasycarpum*	LDTV	–	No
McCall willow	*Salix maccalliana*	LDTV	–	No
Golden eagle	*Aquila chrysaetos*	V	NAR	Yes
Harlequin duck	*Histrionicus histrionicus*	V	SC	No
Short-billed dowitcher	*Limnodromus griseus*	-	TH	No
Red crossbill (*percna* subspecies)	*Loxia curvirostra percna*	-	TH	Uncertain[3]
Common nighthawk	*Chordeiles minor*	LDTV	SC	Yes
Peregrine falcon	*Falco peregrinus*	LDTV	NAR	Yes
Evening grosbeak	Coccothraustes vespertinus	–	SC	Yes
Barrow's goldeneye	Bucephala islandica	V	SC	No
Short-eared owl	*Asio flammeus*	LDTV	SC (COSEWIC: TH)	Yes
Bank swallow	*Riparia riparia*	–	TH	Yes
Olive-sided flycatcher	*Contopus cooperi*	V	SC	Yes

Common name	Scientific name	Status		Confirmed presence in the local study area (Yes/No)
		Quebec[1]	Canada[2]	
Lesser yellowlegs	*Tringa flavipes*	–	TH	Yes
Bald eagle	*Haliaeetus leucocephalus*	V	NAR	Yes
Rusty blackbird	*Euphagus carolinus*	LDTV	SC	Yes
Yellow rail	*Coturnicops noveboracensis*	TH	SC	No
Woodland caribou (forest)	*Rangifer tarandus caribou*	V	TH	Yes
Little brown bat	*Myotis lucifugus*	TH	ES	Yes
Northern long-eared bat	*Myotis septentrionalis*	TH	ES	Yes
Silver-haired bat	*Lasionycteris noctivagans*	LDTV	– (COSEWIC: ES)	Yes
Hoary bat	*Lasiurus cinereus*	LDTV	– (COSEWIC: ES)	Yes
Red bat (eastern)	*Lasiurus borealis*	V	– (COSEWIC: ES)	Yes
Southern bog lemming	*Synaptomys cooperi*	LDTV	-	Yes
Rock vole	*Microtus chrotorrhinus*	LDTV	-	No

Note: Species potentially present in the local study area were identified through a literature review as part of the impact assessment conducted in 2025–26. This documentary research consisted of conducting a literature review and consulting geospatial databases within a 50 km radius of the mine site's centroid.

1: Species status in Quebec (July 2025): LDTV: Likely to be designated as threatened or vulnerable; V: Vulnerable; TH: Threatened.

2: Species status in Canada (SARA) (July 2025): SC: Special concern, Th Threatened, ES: Endangered species, NAR: Not at risk

3: Six red crossbills were observed, but only some of them were confirmed as type 1, while the others remain uncertain. Although it is unlikely that they belong to the *percna* subspecies, this possibility could not be completely ruled out.

6.4 Human environment

The project is located in Québec in the Nord-du-Québec administrative region (number 10), which is divided into two territories: Eeyou Istchee James Bay and Nunavik (Kativik Regional Government). Located north of the 49th parallel, entirely on the Canadian Shield, the region covers just over half of Québec's total area and is the province's largest administrative region, covering 860,553 km² (MAMH, 2023).

More specifically, the project is located in the territory of the Eeyou Istchee James Bay Regional Government (EIJBRG), which replaced the municipality of James Bay in 2014. This territory, located between the 49th and 55th parallels, corresponds to Category III lands under the James Bay and Northern Quebec Agreement (JBNQA), where the Cree have exclusive rights to trap fur-bearing animals and fish certain species). The EIJBRG exercises the powers, functions, and authorities conferred on a regional county municipality (RCM). It is a joint Cree-Jamesian regional government, with 11 Indigenous representatives and 11 non-Indigenous representatives). It also includes one representative from the Government of Québec, but without voting rights.

The territory of Eeyou Istchee, represented by the Cree Nation Government, consists of 10 Cree First Nations[4], and the territory of Jamésie consists of four local municipalities and three non-Indigenous communities. The list is presented in Table 6-37.

The local human environment study area includes the traditional territory of three Cree communities: Chisasibi (whose village is located 330 km to the west), Wemindji (330 km southwest) and Mistissini (350 km south) (Map 6-18). However, all the infrastructure planned for the project is located on the traditional territory of the Cree Nation of Chisasibi.

The regional human environment study area is crossed by the Trans-Taiga Road and Billy-Diamond Highway, which will be used to transport materials and equipment during construction and for transporting ore concentrate during project operations. Thus, in addition to the territories mentioned above, the regional study area includes the territories of the Cree communities of Eastmain, Waskaganish, Nemaska, and Waswanipi, as well as the municipality of Matagami.

The lands governed by the JBNQA are divided into traplines by community, each of which is under the responsibility of a tallyman, who is considered the steward, guardian, and custodian of the territory (CTA, 2009). The trapline directly affected by the Shaakichiuwaanaan Project is CH39 (formerly VC7), which forms part of the traditional territory of Chisasibi. The local study area also touches on the M02A trapline held by Mistissini and the VC26 trapline held by Wemindji (Map 6-19).

The information in the following sections is based on documentary research, extensive work experience in the region, and a series of group meetings, individual interviews, and discussions with members of the affected communities and project stakeholders conducted by PMET and WSP. The results of these interviews are detailed in Chapter 3.

[4] Only nine of them are currently included in the JBNQA. The First Nation of Washaw Sibi is in the process of creating its own community, which is expected to be established in the Matagami area.

Table 6-37 Indigenous and non-Indigenous communities in the Eeyou Istchee James Bay territory, and distance from the local human environment study area

Location	Population (2021)	Road distance from the community to the planned project infrastructure site (km)[a]	Straight-line distance between the traditional territory and the planned project infrastructure (km)	Planned ore transport through traditional territory
Cree communities				
Chisasibi	4,985	420	0	Yes
Wemindji	1,562	395	< 15	Yes
Mistissini	3,731	940	< 1	Yes
Eastmain	924	570	130	Yes
Waskaganish	2,536	680	230	Yes
Nemaska	832	590	195	Yes
Waswanipi	1,836[b]	1,000	305	Yes
Oujé-Bougoumou	797	895	330	No
Whapmagoostui	1,022	NA	125	No
Total population in Cree communities in the regional study area	*16,406*			
Jamesian municipalities (M) and localities (L)				
Chapais (M)	1,468	935	N/A	N/A
Chibougamau (M)	7,233	890	N/A	N/A
Lebel-sur-Quévillon (M)	2,091	920	N/A	N/A
Matagami (M)	1,402	815	N/A	N/A
Radisson (L)	203	350	N/A	N/A
Valcanton[c] (L)	339	1,020	N/A	N/A
Villebois (L)	173	1,020	N/A	N/A
Total population in the localities/municipalities of the regional study area	*1,605*			

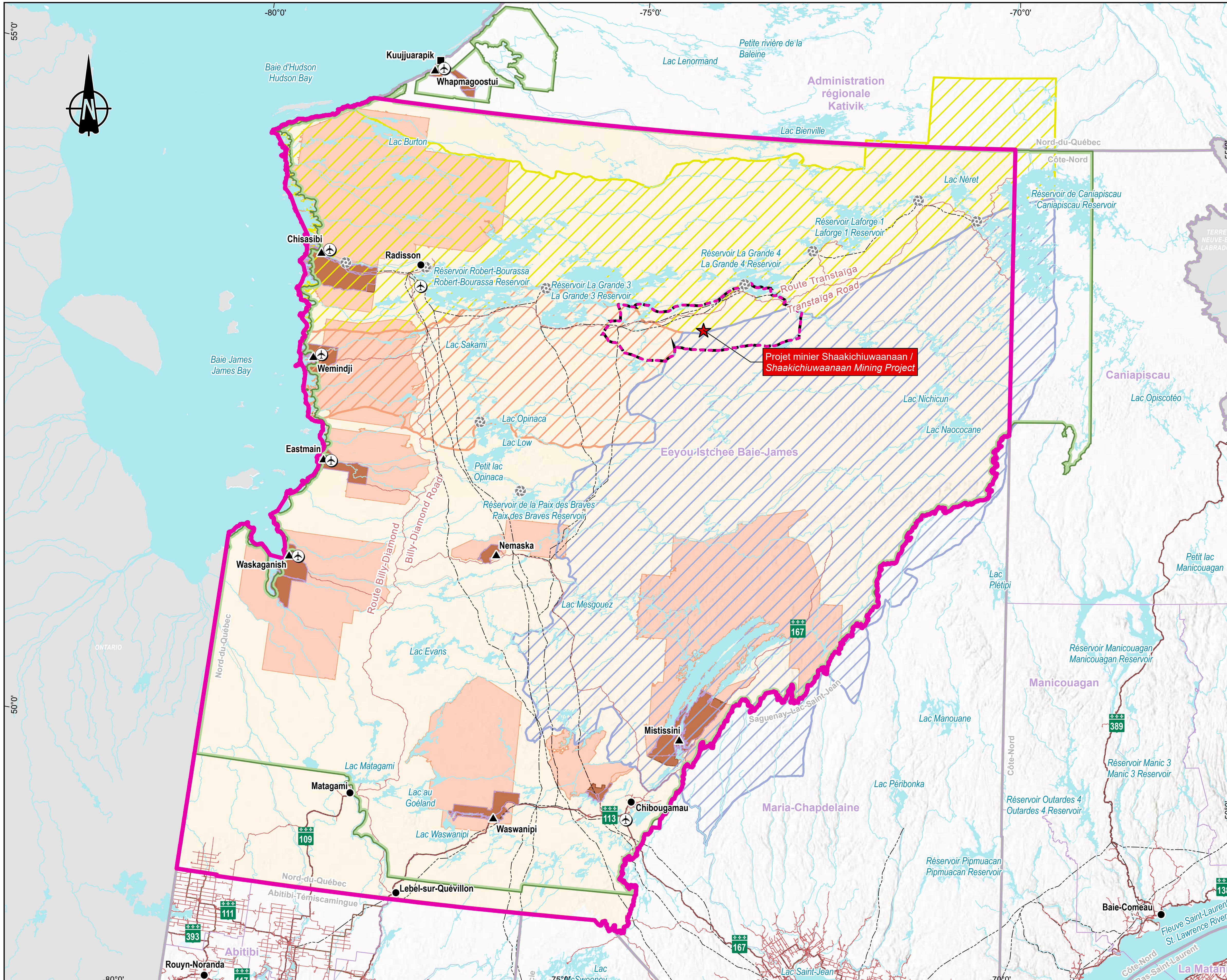
a: Up to the intersection of Trans-Taiga Road (kilometer 270) and the road leading to the project. Add approximately 20 km to the proposed mining site.

b: Data revised by Statistics Canada in December 2023.

c: Merger of Beaucanton (153 residents) and Val-Paradis (186 residents).

Note: Locations appearing in grayed out lines are not included in the regional study area.

Source: Statistics Canada, 2025.



Projet / *Project*

- ★ Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Zones d'étude / *Study Areas*

- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Repères géographiques / *Geographical Landmarks*

- ▲ Communauté crie / *Cree community*
- ■ Village inuit / *Inuit village*
- ● Municipalité / *Municipality*

Terrains de trappage des communautés cries / *Cree Communities Traplines*

- Chisasibi
- Mistissini
- Wemindji

Infrastructures / *Infrastructure*

- Aéroport / *Airport*
- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route nationale / *National road*
- Route régionale / *Regional road*
- Autre / *Other*

Limites / *Boundaries*

- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*
- Territoire d'application du régime de protection de l'environnement et du milieu social (chap. 22, CBJNQ) / *Territory covered by the environmental and social protection regime (chap. 22, JBNQA)*

Terres de catégorie (CBJNQ) / *Category Lands (JBNQA)*

- Terres de catégorie I / *Category I lands*
- Terres de catégorie II / *Category II lands*
- Terres de catégorie III / *Category III lands*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact environnementale /
Environmental Impact Assessment

Carte 6-18 / *Map 6-18*
Inventaire du milieu humain dans la zone d'étude régionale / *Inventory of the Human Environment in the Regional Study Area*

Sources
SDA, 1/20 000, MRNF, 2024-02
RNCan, Frontières géopolitiques, 2002 / CBJNQ, Chap. 22, 1975
Canvec, 1/250 000, 1/5 000 000 et 1/15 000 000, RNCan, 2019
BDGA, 1/1 000 000, MRN Québec, 2014 / BDGA, 1/5 000 000, MRNF Québec, 2010
AQréseau+, réseau routier, MERN, 2024-03-01 / Bail de villégiature, MERN, mars 2021
FTGQ, MRNF Québec, 2010 / Réseau aéroportuaire, MTQ, 2024
Cree Trappers Association, 2018 / Contraintes et restrictions, GESTIM, 2022

0 32,5 65 km
NAD 1983 Quebec Lambert

2026-03-30

Préparation / Prepared by : M. Lachance
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Occupation du territoire cri / *Cree Territory Occupation*

- Terrain de trappage / *Trapline*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Camps et installations / *Camps and Facilities*

- Camp cri permanent / *Cree permanent Camp*
- Campement cri temporaire / *Cree temporary camp or campsite*
- Aire de camps et de campements / *Camps and campsites area*
- Autre type de camp / *Other camp type*
- Site de chasse / *Hunting site*
- Prélèvement d'eau potable / *Drinking water withdrawal*

Infrastructures / *Infrastructure*

- Aérodrome / *Aerodrome*
- Hydroaérodrome / *Hydroaerodrome*
- Héliport / *Heliport*
- Site d'extraction ouvert / *Open extraction site*
- Bâtiment industriel / *Industrial building*
- Tour de télécommunication / *Telecommunication tour*
- Centrale hydroélectrique / *Hydroelectric power plant*
- Poste électrique / *Electrical substation*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Contamination des sols / *Soil contamination*

- Site listé au Répertoire des terrains contaminés (RTC) du MELCCFP / *Site listed in the Contaminated Sites Directory (RTC) of the MELCCFP*

Baux de location / *Leases*

- Fins de villégiature / *Leisure purpose*
- Fins commerciales / *Commercial purpose*
- Fins industrielles / *Industrial purpose*
- Fins municipales / *Municipal purpose*

Parcs et aires protégées / *Parks and Protected Areas*

- Projet d'aire protégée / *Proposed protected area*

Feux de forêt / *Forest Fires*

- Feux 2023 / *2023 fires*

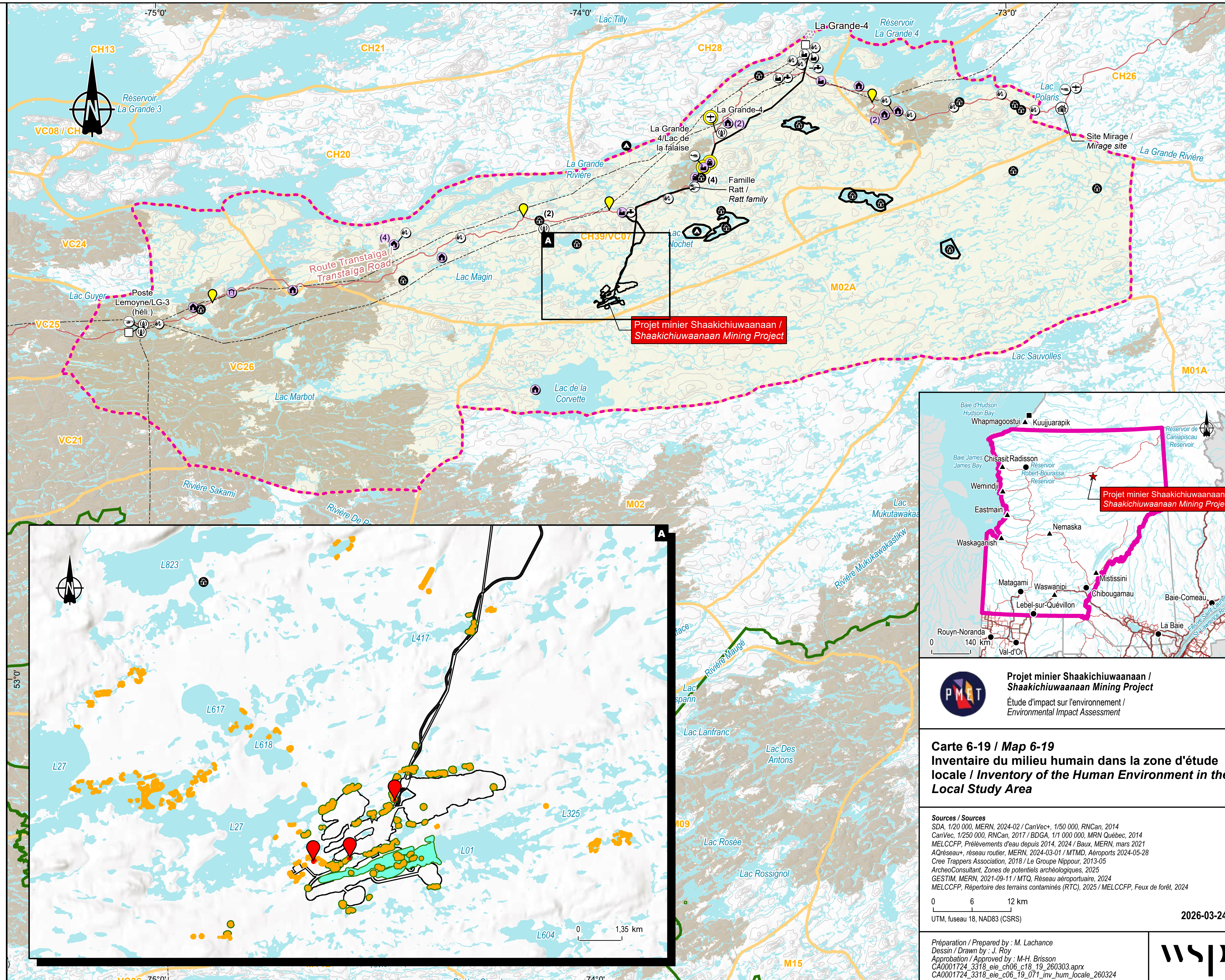
Archéologie / *Archaeology*

Zones de potentiel archéologique / *Areas of Archaeological Potential*

- Fort / *High*
- Moyen / *Medium*
- Subaquatique / *Underwater*
- Zone de l'inventaire 2025 / *2025 field inventory area*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*



Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 6-19 / *Map 6-19*
Inventaire du milieu humain dans la zone d'étude locale / *Inventory of the Human Environment in the Local Study Area*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
MELCCFP, Prélèvements d'eau depuis 2014, 2024 / Baux, MERN, mars 2021
AQréseau+, réseau routier, MERN, 2024-03-01 / MTMD, Aéroports 2024-05-28
Cree Trappers Association, 2018 / Le Groupe Nippour, 2013-05
ArcheoConsultant, Zones de potentiels archéologiques, 2025
GESTIM, MERN, 2021-09-11 / MTQ, Réseau aéroportuaire, 2024
MELCCFP, Répertoire des terrains contaminés (RTC), 2025 / MELCCFP, Feux de forêt, 2024

0 6 12 km

UTM, fuseau 18, NAD83 (CSRS)

2026-03-24

Préparation / Prepared by : M. Lachance
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CA0001724_3318_eie_ch06_c18_19_260303.aprx
CA0001724_3318_eie_c06_19_071_inv_hum_locale_260324

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6.4.1 Land tenure and governance

Land tenure of the James Bay and Northern Quebec Agreement (JBNQA)

The project is located within the territory covered by the JBNQA, on Category III lands. The environmental and social protection regime applicable in the James Bay region is established under Chapter 22 of the JBNQA and is governed by the provisions of Title II of the *Environment Quality Act* (EQA).

The land regime established by the JBNQA is a key factor in land use and ensures Cree participation in forestry, mining, and hydroelectric development across the territory. It divides the territory into Category I, II, and III lands. Under this regime, Category II and III lands form part of the public domain of the Government of Québec. The government may grant land rights for various projects while ensuring a diversity of land uses, compliance with applicable laws and regulations, and proper land use planning.

Category III lands represent all lands in the treaty territory that are not included in Category I and II lands. On these lands, the Cree have exclusive rights to trap fur-bearing animals and certain advantages in the outfitting industry without exclusive rights. They may establish any camp necessary for hunting, fishing, and trapping without requiring title from the Québec government. Non cree people are also permitted to hunt and fish on Category III lands. Mining rights, however, belong to the provincial government.

The hunting, fishing, and trapping regime established by the JBNQA applies to land mammals, freshwater and anadromous fish, migratory birds, and marine mammals, and grants Cree and Inuit beneficiaries the right to harvest any wildlife species at any time and in any place within the territory to meet their subsistence needs. Beneficiaries also have exclusive rights to harvest certain species such as beaver, bear, polar bear, and sturgeon (CNG, 2025).

Eeyou Istchee James Bay Regional Government (EIJBRG)

In addition to the JBNQA, the legislative and legal context of Nord-du-Québec is also governed by the Agreement Concerning a New Relationship Between the Government of Québec and the Crees of Québec, also known as the “Paix des Braves”. Based on the values of trust and mutual respect, the agreement aims to promote respect for the traditional Cree way of life and to foster greater autonomy for the Cree in the development of their own communities. Following this agreement, the Agreement on Governance in the Eeyou Istchee James Bay Territory was signed by the Cree of Eeyou Istchee and the Government of Québec in July 2012, with the objective of modernizing the governance regime and establishing a joint Cree–Jamesian regional government.

The EIJBRG is governed by Québec law and exercises the same powers, functions, and authorities over Category III lands located in the Eeyou Istchee James Bay territory as those that were, until 2014, assigned to the Municipality of James Bay. The regional government has the option of declaring its jurisdiction as a regional county municipality (RCM). It also acts as a regional conference of elected officials (CRÉ) with respect to the territory and resources (EIJBRG, 2025a).

The EIJBRG has adopted urban planning regulations applicable to its territory of intervention, i.e., the territory outside of Category I and II lands as designated by the *Act respecting the land regime in the James Bay and New Québec territories* (chapter R-13.1). These regulations designate the preferred uses for the various parts of Category III lands, such as housing, vacation homes, businesses and services, leisure and recreation, public and institutional, agriculture, forestry, resources, and conservation. With its application, the preferred uses for each of these zones are defined, along with the standards to be considered for these uses (EIJBRG, 2020). The project is located in zone 53-12-R, with resource exploitation (R) as the dominant use.

The issuance of resort leases has been subject to an administrative suspension throughout the Eeyou Istchee James Bay territory since the signing of the new governance agreement for the territory in 2012 (MRNF, personal communication, January 2023, in WSP, 2023).

6.4.2 Land use planning and development

The Ministère des Ressources naturelles et des Forêts (MRNF) usually plays a management role regarding Québec's territory and resources. However, the territory of Nord-du-Québec is governed by specific agreements, such as the JBNQA, which provide for management and planning mechanisms that are distinct from those in the rest of Québec. As a result, the EIJBRG manages land use planning on Category III lands under the JBNQA. The Cree Nation Government manages planning for Category II lands, and each First Nation, through its council, manages planning for its Category I lands.

Local integrated resource and land management tables

Under the *Sustainable Forest Development Act*, the EIJBRG establishes and coordinates local integrated resource and land management tables (ILRM). The role of these tables is to ensure that the interests and concerns of individuals and organizations involved in integrated forest management activities are taken into account (EIJBRG, 2025b).

These tables, which are linked to activities in forest management units (FMU), cover the southern section of the regional study area, namely the Cree communities of Waskaganish, Nemaska, Waswanipi, and Mistissini, as well as the municipality of Matagami. The project infrastructure is therefore not affected by these local round tables, which instead cover part of the territory where ore transportation is planned (EIJBRG, 2025b).

Eeyou Planning Commission

A land use planning body, the Eeyou Planning Commission (EPC), was established by the Cree Nation Government to fulfill its responsibilities for land and resource planning in Eeyou Istchee (primarily on Category II lands). The Land and Resource Use Planning in Eeyou Istchee initiative was introduced following the signing of the 2012 Agreement on Governance in Eeyou Istchee. This initiative aims to balance economic development with environmental protection while taking into account the social, cultural, environmental, and economic interests of all stakeholders. Its objective is to define a shared vision for the future of Eeyou Istchee while enabling communities to express their concerns and priorities regarding land management. Consultations were held in each Cree community for this purpose in 2017 (EPC, 2025).

Land and Resource Planning is an essential tool for protecting the lands, wildlife, and way of life of the Cree (Eeyou Eetun). It is also a strategic lever for the development of a strong and sustainable Cree economy. Regional Land and Resource Use Plan (RLRUP), which focuses primarily on the development and management of Category II lands.

On Category III lands, the EPC works in collaboration with regional partners to ensure the harmonization of the various land use plans throughout the Eeyou Istchee territory. These partnerships include Cree First Nations councils, the EIJBRG Natural Resources Committee, which is responsible for Category III land planning, and the Eeyou Marine Region Planning Commission, which is responsible for offshore marine area planning. The goal of this collaboration is to ensure that the various land use plans are harmonized and reflect the collective vision of the Cree people as closely as possible, while respecting their aspirations and priorities. This process also aims to strengthen inter-community relations and establish common goals based on the principles of sustainable development and environmental preservation, while ensuring the autonomy of Cree communities.

Land and Resource Planning is a strategic tool for managing the Eeyou Istchee territory and protecting the cultural and environmental values of Cree communities. It provides a framework for coordinating development and land-use activities in a way that meets the needs of the Cree while respecting the principles of sustainable development. This process is essential to ensure that land management decisions align with the communities' goals and expectations, while also guaranteeing their active participation at every stage of the planning process.

Regional infrastructure

The project is located south of the Trans-Taiga Road, about 20 km from kilometer 270. Built in 1979, the Trans-Taiga Road extends approximately 666 km in an east–west direction, providing access to Caniapiscau and several facilities within the La Grande hydroelectric complex. The road is administered by Hydro-Québec but maintained by the Société de développement de la Baie-James (SDBJ) and is primarily gravel (James Bay Road, undated).

The main road in the regional study area is the Billy-Diamond Highway, formerly known as James Bay Road. Running north–south through the regional study area, the 620-km highway was built in the 1970s to provide access to the James Bay hydroelectric projects. The Trans-Taiga Road begins at kilometer 544 of the Billy-Diamond Highway. The highway, which connects Matagami to Radisson, features a roadside service point at kilometer 381 (the only service station along the route) as well as six emergency telephones. It has a special classification that allows for the transport of heavy and oversized loads. The highway is administered and maintained by the SDBJ, which has been mandated by the Québec government to carry out rehabilitation work on the road. Section 6.4.6 – Traffic presents the traffic conditions for the roads affected by the project, namely the Billy-Diamond Highway and the Trans-Taiga Road.

Various types of leases are located less than 300 meters from the Trans-Taiga Road and Billy-Diamond Highway, between the project site and Matagami. There are 13 leases for telecommunications towers, 9 municipal leases, 4 industrial leases, 3 community leases—including one for camping—as well as 2 public utility leases and 2 for billboards.

The Cree communities are also served by access roads, either from the Billy-Diamond Highway (for Waskaganish, Eastmain, Wemindji, and Chisasibi), the Northern Road (Nemaska), Route 167 (Mistissini), and Route 113 (Waswanipi). It should also be noted that most Cree communities are served by an airport, owned by Transport Canada and operated by the communities themselves. In the Cree community of Chisasibi, Robert Kanatewat Airport welcomes Air Creebec flights and also provides medical transportation services for the James Bay Cree Board of Health and Social Services (CBHSSJB) (Cree Nation of Chisasibi, 2024).

The region is also served by other airports and aerodromes. La Grande 4 aerodrome is located approximately 30 km northeast of the project. This facility serves the La Grande 4 hydroelectric facilities and is owned by Hydro-Québec, although operation of the facilities has been gradually transferred to the SDBJ. Reserved for Hydro-Québec's use, discussions are underway to allow PMET to use the La Grande 4 aerodrome facilities. In addition, the La Grande-Rivière regional airport is located in the municipality of Radisson (see section 6.4.4). It is operated by the SDBJ (SDBJ, 2024). According to the Executive Director of the Baie-James Regional Administration (ARBJ), during discussions with PMET on the project, the region is working to improve airport infrastructure in Jamésie, in particular to enable air transportation for workers in the region. In addition, a landing strip is available at Camp Mirage Aventure, about 40 kilometers east of the local study area. This airfield is used by workers at the PMET exploration camp, with one flight per week carrying 10 to 20 passengers.

The regional study area includes various hydroelectric facilities, particularly those related to the La Grande and Eastmain-Sarcelle-Rupert hydroelectric complexes. It is therefore crossed by several power transmission lines and includes various substations and power plants.

The local study area is crossed by nearly 290 km of power lines, including a 735 kV line connecting the Tilly and Le Moyne substations. The project will be supplied by the Tilly substation with the planned construction of a new transmission line approximately 50 km long.

Territorial development outlook

On February 17, 2020, the Cree Nation Government and the Government of Québec signed the Memorandum of Understanding on the Cree-Québec Sustainable Infrastructure Development Program in the Eeyou Istchee James Bay region. with the relevant Québec government ministries in order to connect, develop, and protect the territory of the Eeyou Istchee James Bay region over a 30-year horizon.

La Grande Alliance's main objective is to develop transportation infrastructure in the Eeyou Istchee James Bay region, particularly in response to growth in the industrial and mining sectors.

Among the projects envisaged by La Grande Alliance are the paving of access roads to the communities of Waskaganish, Eastmain, Wemindji, and Nemaska, as well as the construction of a railway line along the Billy-Diamond Highway to reduce truck traffic and increase transportation efficiency. La Grande Alliance also plans to reopen the Grevet-Chapais railway, extend the Billy-Diamond Highway to the Cree and Inuit community of Whapmagoostui/Kuujjuarapik, extend Route 167 from the Renard Mine to Trans-Taiga Road, and build an airport in Mistissini. These various projects under consideration would strengthen connectivity and facilitate access to the different regions of Eeyou Istchee-James Bay (VEI and WSP, 2024).

6.4.3 Cree communities of Eeyou Istchee

Eeyou Istchee, the traditional territory of the Cree, covering an area of over 400,000 km^2, comprises nine communities located on the shores of James Bay (Waskaganish, Eastmain, Wemindji, and Chisasibi), Hudson Bay (Whapmagoostui), and inland (Nemaska, Waswanipi, Mistissini, and Oujé-Bougoumou) (CNG, 2024). Since 2003, Washaw Sibi[5] has been the tenth community of the Cree Nation, with 350 members. The Cree Nation Government has also recognized MoCreebec Eeyoud, located on the Ontario shore of James Bay, as the eleventh community for its members residing or having previously resided in Moose Factory or Moosonee (Ontario).

[5] Washaw Sibi, which did not previously have a designated territorial base, is currently being established near Matagami and will eventually be integrated into the JBNQA (Guindon, 2023).

The traditional Cree territory, Eeyou Istchee, includes more than 300 traplines, which can be described as traditional family hunting and trapping grounds (Cree Nation Government, 2023). Each Cree community is administered by an independent local government (band council), whose elected chief sits on the board of directors of the Grand Council of the Crees (Eeyou Istchee) (GCC) and the board of the Cree Nation Government.

The Cree are among the most populous Indigenous nations in the province and make up more than one-third (35%) of the population of Nord-du-Québec. The total population of the nine communities included in the 2021 census was 18,225[6]. Chisasibi and Mistissini are the two most populous communities, together accounting for nearly half of the population of the nine communities of Eeyou Istchee. The largest community is Chisasibi, with a population of 4,985 (Statistics Canada, 2023a). In contrast, the communities of Nemaska and Oujé-Bougoumou are the least populated, with respective populations of less than 850 (Statistics Canada, 2023a).

Between 2016 and 2021, the population of Cree communities grew at a faster rate than that of Québec (6.1% versus 4.1%). Population growth in these communities has been notable for several years. For example, the Cree population more than tripled between 1971 and 2011, while in Québec, the increase was around 30% (Hydro-Québec, 2024). Nearly 50% of the Cree population living in communities was under the age of 25 in 2021.

All Cree communities are administered by two regional political and administrative organizations: the Grand Council of the Crees (GCC) and the Cree Nation Government. Although legally distinct entities, they have identical membership and are managed as a single organization by the Cree Nation (Cree Nation Government, 2024).

The GCC, headquartered in Nemaska, is responsible for representing the interests of the Cree of Quebec at the provincial, national, and international levels and ensuring the proper implementation of the JBNQA. The Cree Nation Government may hold municipal authority (local or regional) over all or part of Category II lands. It is also responsible for establishing, administering, and coordinating services or programs on Category I lands at the request of Cree communities and for promoting the development and well-being of these communities. The Cree Nation Government represents the Cree in areas covered by the JBNQA, including the environment, hunting, fishing, and trapping, as well as economic and community development (Cree Nation Government, 2024). It comprises seven departments: Administrative Services, Traditional Activities, Cree Human Resources Development, Community Services, Culture and Language, Environment, and Trade and Industry.

Each community also includes representatives from regional or government organizations such as the Cree Trapper Association (CTA), the Cree Nation Youth Council, the Cree Hunters and Trappers Income Security Board (CHTISB), and the Cree Health and Social Services Council.

Cree individuals wishing to maintain a traditional lifestyle may benefit from the Cree Hunters Economic Security Program (ESP) (formerly the Cree Hunters and Trappers Income Security Program [ISP]), established in 1976 under the JBNQA. This program provides a guaranteed income for participants engaged in hunting, fishing, or trapping for more than 120 days per year. For the period 2020-2021, the highest participation rates were in Whapmagoostui, Chisasibi, and Waswanipi (between 21% and 15%) and the lowest in Nemaska, Waskaganish, Wemindji, and Mistissini (between 5% and 9%) (Hydro-Québec, 2024).

The director of the James Bay Cree Health and Social Services Board (CBHSSJB), who was consulted by PMET, indicated that the nine Cree communities offer a total of nine clinics, one hospital (under expansion), and one birthing center. Furthermore, nursing homes and psychiatric care centers are either under construction or in the

6 Compiled with WSP based on Statistics Canada data (2021 census) for the nine communities.

planning stages. In total, the current facilities and the management of the public health system employ more than 3,000 people. Working in collaboration with the CBHSSJB, the Public Health Department – James Bay Cree Lands provides prevention and health promotion services. According to a representative from this department who was consulted as part of the project, it also has expertise in assessing risks related to contaminants. The department can conduct risk assessments and, particularly in the mining sector, carry out emergency environmental health interventions, for example in the event of spills into water bodies.

Community health and well-being

A detailed picture of the health of Cree communities can be found in the human health assessment report (Appendix 6-24).

The social determinants of health among the Cree of Eeyou Istchee are rooted in a historical context marked by colonialism, residential schools, and forced displacements such as the relocation of Fort George. These events have caused intergenerational trauma, disrupted cultural transmission, and led to lasting mistrust of public institutions, which continues to influence relationships with health services and psychosocial well-being today.

At the systemic level, the organization of health services remains a major factor. The burden of travel required to access specialized care is very high, health human resources are limited, and local infrastructure is under pressure. Despite the self-determination reinforced by the James Bay and Northern Quebec Agreement and the creation of the CBHSSJB, inequities in access to care persist. These challenges are compounded by difficult socioeconomic conditions, including a cost of living significantly higher than the average, lower incomes, housing that is often overcrowded or in need of repairs, and lower graduation rates that limit access to skilled employment.

Immediate determinants also contribute significantly to the observed health disparities. Food insecurity remains high due to the cost of store-bought foods and unequal access to traditional foods, which are essential to cultural, economic, and nutritional well-being. Working conditions—particularly fly-in/fly-out or commuting arrangements in the mining sector— affect lifestyle habits, increase fatigue, undermine nutrition, and place additional pressure on families, particularly on women who often bear a heavy domestic and parental workload.

Finally, from the Cree perspective, cultural continuity is a key determinant of health. However, it is threatened by cumulative impacts on the territory, including development projects, forest fires, and climate change, which complicate the practice of traditional activities and compromise the transmission of knowledge. Taken together, these determinants highlight that community health is closely linked to social, economic, territorial, and cultural conditions.

As a result, several indicators show significant differences compared with the rest of Quebec. Life expectancy at birth remains lower, and premature mortality is high, including for causes that are theoretically preventable or treatable. Chronic diseases are more prevalent, particularly type 2 diabetes—whose prevalence is several times higher than the provincial average—as well as hypertension and various respiratory and cardiovascular diseases. Hospitalization rates are higher for all causes, and sexually transmitted infections remain common despite a recent downward trend. Teenage pregnancies are much more frequent than in the rest of Quebec, and while suicide rates remain comparable to the provincial average, hospitalizations for suicide attempts are significantly higher.

The sections below describe some of the characteristics of the communities of Chisasibi, Wemindji, and Mistissini, as these three communities are most likely to be affected by the project (see Table 6-37). However, because the project is located on Chisasibi territory, this community is described in greater detail. According to the Cree Nation Government, Chisasibi remains the community with the potential to be most directly affected by the project, since all planned project infrastructure is located within its traditional territory[7].

Chisasibi

Chisasibi, which means *Big River* in Cree, is the northernmost community in Eeyou Istchee accessible by road. It is connected to the Billy-Diamond Highway by a 90-km paved east–west road that begins at kilometer 600 of the highway. In February 2025, the First Nation had 4,822 registered members, the vast majority of whom (4,510) lived in Chisasibi. The remaining members lived off-reserve (203 members) or in another reserve (109 members) (CIRNAC, 2025).

Formerly located on Fort George Island, the community of Chisasibi was relocated to the mainland at the mouth of La Grande Rivière on the east coast of James Bay in 1981. This new location was designated following negotiations with the provincial government and Hydro-Québec, as the community was threatened by hydroelectric developments planned on the river (Commission de toponymie du Québec, 2016).

The community's territory consists of 37 traplines extending between the mouth of La Grande Rivière and the Caniapiscau Reservoir. The community covers an area of 1,305 km², including 825 km² of Category IA land and 480 km² of Category IB land. The traditional territory, including Category II and III lands, covers 81,199.56 km². Chisasibi is the largest Cree community in terms of both population (4,985 residents in 2021) and territorial area.

Socioeconomic conditions

Population

The population of Chisasibi was 4,985 in the 2021 Census (Statistics Canada, 2023), compared with 4,872 in 2016, representing an increase of 2.3% over this period. The difference in the proportion of men and women is minimal, with 50.5% men and 49.5% women. Young people aged 0 to 14 account for 31.1% of the population in Chisasibi (1,550 people) (Table 6-38). Only 7.4% of the community's population is aged 65 and over, compared with 20.6% at the provincial level. The average age in Chisasibi (30 years) is considerably lower than that of the province (42.8 years). The median age in the Cree community is 26.6 years, compared with 43.2 years in Québec.

The population density of the Chisasibi community was six residents per square kilometer in 2021, comparable to the provincial average of 6.5 for the same year.

[7] It should be noted that a dispute exists regarding the boundaries of the traplines between CH39 and M02A, stemming from differing interpretations of agreements reached between former tallymen, particularly in the 1980s following hydroelectric developments on La Grande River. According to the tallyman for trapline M02A (Mistissini), the project area falls within that trapline. However, the tallyman for CH39 maintains that the boundary of the trapline should extend farther south than the boundary shown on the official maps of the Cree Nation Government, which are used in this project.

Table 6-38 Gender and age groups in Chisasibi

Age group	Chisasibi					
	Male		Women		Total	
	Number	%	Number	%	Number	%
0 to 14 years	785	31.2	765	31.0	1550	31.1
15 to 24	460	18.3	395	16	845	16.9
25 to 44	630	25.2	655	26.6	1,300	26.0
45 to 64	460	18.4	470	19.0	925	18.5
65 and over	180	7.2	190	7.7	370	7.4
Total	**2,515**	**100.0**	**2470**	**100.0**	**4985**	**100.0**

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023a.

According to projections studied by the Institut de la statistique du Québec (ISQ), Chisasibi is expected to become the largest community in the Nord-du-Québec region by 2041, with 6,215 residents, surpassing Chibougamau in terms of population (ISQ, 2024a).

Languages and identity

In addition to the main mother tongue, Cree (*iiyiyuu aymuun*), spoken by 81.3% of the population of Chisasibi, in the last census, 70.1% of Chisasibi residents (3,485 people) reported knowing English, and 24.7% reported knowing both English and French. Only 0.6% of the population (175 people) reported knowing only French as an official language, and 4.6% of the population of Chisasibi (220 people) spoke neither English nor French. The language most often spoken at home remains Cree (71.2% of the population) (Statistics Canada, 2023a).

Of the total population of the community, almost all (4,755 people) identified as Indigenous in the last census (Statistics Canada, 2023a).

According to Statistics Canada (2023a), approximately twenty Inuit were residing in Chisasibi at the time of the most recent census, whereas the gouvernement du Québec (2025) estimated this population at close to one hundred in 2025.

Housing

The community had 1,281 private[8] dwellings in 2021. Of these, 1,056 were occupied by households[9], resulting in a vacancy rate of 17.6%. The vast majority of households (735) lived in housing provided by the First Nation (local government). As in other Cree communities in Eeyou Istchee, households in Chisasibi predominantly occupy housing allocated by their Council (First Nation) (Table 6-39). Only 160 households were homeowners, and the same number (160) were tenant households.

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8 According to Statistics Canada, a dwelling is considered private if it has its own private entrance. This entrance may be located outside the building or inside, accessed from a common hall, vestibule, or staircase (Statistics Canada, 2022)

9 Sample data: 25%.

It should be noted that more than half of the occupied dwellings had four or more bedrooms (56.4%). The average size of private households in Chisasibi was 4.7 persons in 2021, compared with 2.2 for the province as a whole (Statistics Canada, 2023a).

Of the 1,055 occupied dwellings, 16.6% required major repairs. This proportion is lower than that observed for occupied dwellings across Cree communities as a whole, but higher than the provincial average (6.3%).

In 2021, a critical need for more than 2,000 affordable housing units was identified across the Cree communities of Eeyou Istchee. To help address this need, the Canada Mortgage and Housing Corporation announced a $17.4 million investment to build 55 modular homes in the nine Cree communities. Of these, about ten homes were planned for construction in Chisasibi (CMHC, 2021).

It should also be noted that multigenerational households are generally more common in Cree communities than in the rest of the province. In Chisasibi, they represented 26.1% (275) of total households (1,055) in 2021. By comparison, multigenerational households accounted for only 1.4% province-wide.

Table 6-39 Housing occupancy patterns and rates for Chisasibi and the Cree communities of Eeyou Istchee, 2021

Community	Proportion of private households by type of occupancy (%)			Private housing occupancy rates (%)
	Owner	Renter	Housing provided by local government	
Chisasibi	15.2	15.2	69.7	82.4
Cree communities of Eeyou Istchee	13.8	14.6	71.5	83

Source: Statistics Canada, 2023a and WSP compilation

Education

According to the most recent census in 2021, 39.7% of people aged 15 and over, or 1,360 people, reported having at least a high school diploma or equivalent. This proportion is higher for women (47.1%) than for men (32.7%). Women are also more numerous, nearly double, in having attained a bachelor’s degree or higher (140 women and 75 men) (Table 6-40). Men are more numerous in having, as their highest degree, a certificate or diploma from an apprenticeship or trade school (240 men, compared to 120 women).

Table 6-40 Highest level of education attained in Chisasibi in 2021

Level of education	Chisasibi					
	Total		Men		Women	
	Number	%	Number	%	Number	%
No certificate, diploma, or degree	1,745	50.9	980	56.8	765	45.1
High school diploma or equivalent	545	15.9	225	13	315	18.6
Apprenticeship or vocational school diploma/certificate (vocational training)	360	10.5	240	13.9	120	7.1
College diploma or certificate, or some university studies below the bachelor’s level	560	15.3	205	11.9	355	20.9
Bachelor’s degree or higher	220	6.4	75	4.3	140	8.3
Total	**3,430**	**100.0**	**1725**	**100.0**	**1695**	**100.0**

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023a

According to the classification of educational programs, the three main areas of postsecondary study were, in ascending order: Business, management, and public administration (for 240 people, including 265 women); Architecture, Engineering, and Related Trades (for 220 individuals, including 190 men in construction and mechanical trades); and Personal, Protective, and Transportation Services (for 160 individuals, including 105 men, mainly in transportation and security, and 55 women, mainly in culinary and personal services).

The Cree School Board provides services to four schools in the community of Chisasibi. Uupichinaasiun Elementary School (newly built and opened in 2024) offers preschool and kindergarten in Cree and grades1and 2 in Cree, English, and French. Waapinichikush Elementary School offers grades 3 through 6 in Cree, English, and French. Big River High School (formerly known as James Bay Eeyou High School), which opened in 2024, also offers education in all three languages. In addition, the community has the Sabtuan Adult Education Center, a learning and vocational training center for adults. It also has three daycare centers for preschool-aged children.

The director of the adult training center, when interviewed as part of this project, indicated that the center is run by the Cree School Board and has agreements with other trade schools in the province (Montreal, Abitibi, Charlesbourg). Before the center was created, adults had to travel to Waswanipi to receive training in trades in a Cree environment. He mentioned that training is offered in various fields, including water treatment, carpentry, heavy equipment operation (11 people recently trained), accounting, home care, and medical secretarial work. In addition, new training programs are also planned, including heavy equipment mechanics (to begin in fall 2025), Class 3 trucking, and cooking.

According to the director, the fact that students do not always meet the prerequisites to begin vocational training (Secondary III) represents a significant challenge. For this reason, a pre-vocational training program has been established for candidates who do not hold a high school diploma.

The Sabtuan Adult Education Center can also offer customized job-focused training with cohorts of 15 people. In addition, an official from the Chisasibi Eeyou Research and Resource Institute (CERRI) who was interviewed as part of the project indicated that many young people wanted to be trained in the environmental field in Chisasibi, but lacked the funds to complete these training programs.

Income

In 2020, the median gross annual income in Chisasibi was $43,200 for the population aged 15 and over. The average income reached $48,800 before taxes. Both figures were slightly lower than those recorded in Nord-du-Québec ($43,600 and $50,600, respectively).

Within the community, median and average annual incomes were higher for women ($50,000 and $54,100, respectively) than for men ($37,200 and $43,240, respectively). This difference may be related to the higher level of education among women in the community (Table 6-40).

Across Québec, the median gross annual income was $40,800 in 2020 and was higher for men than for women. The average annual income before taxes was $51,160.

In Chisasibi, 215 people (4.2% of men and 4.4% of women) were living in low-income[10] situations, based on the low-income measure, after-tax. Unlike the situation in Nord-du-Québec as a whole (where 9.3% of the population lives in low income), women aged 65 and over were the least affected by low income in Chisasibi (2.5% of women, compared with 16.6% in Nord-du-Québec).

Employment

Among the working-age population[11], the labor force participation rate was 60.2% in Chisasibi in 2021, while the employment rate was 55.4% and the unemployment rate was 8% (see Table 6-41). Labour force participation and employment were higher among women than among men, resulting in a higher unemployment rate among men in the community. The unemployment rate in Chisasibi is also higher than that of Nord-du-Québec as a whole (7.3%), but comparable to that of Québec overall (see Table 6-46 in Section 6.4.5).

Table 6-41 Key labor market indicators for Chisasibi and all Cree communities, 2021

	Activity status			
	Chisasibi			All Cree communities
	Total	Men	Women	
Population aged 15 and over (number)	3,430	1,725	1,695	11,625
Employed persons (number)	1,900	925	975	6,510
Unemployed (number)	165	100	65	560
Inactive (number)	1,360	700	665	4,555
Activity rate (%)	60.2	59.4	61.4	61.0
Employment rate (%)	55.4	53.6	57.5	56.0
Unemployment rate (%)	8.0	9.8	6.3	8

Source: Statistics Canada (2023a) and WSP compilation.

Approximately 36% of the total working-age population (3,430) worked full-time throughout the year, while 20% worked part of the year and/or part-time. The largest occupational category within the community is sales and services, which employs the most people (515). The second largest category is education, law, and social, community, and government services (405 people, including 290 women). This is followed by business, finance, and administration (365 people, including 300 women) and trades, transportation, machinery, and related fields (355 people, including 330 men).

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10 Based on the low-income measure, after-tax (LIM-AT), which is defined as a fixed percentage (50%) of the median adjusted after-tax income of private households. “Adjusted” indicates that household needs are taken into account (Statistics Canada).

11 According to Statistics Canada, the population aged 15 and over is considered to be of working age.

In terms of sectors of activity, the tertiary sector, particularly health care, public administration, education, and commerce, accounts for the largest share of workers. The primary sector (including mining and quarrying, with 1.2% of the labor force) is one of the least represented sectors of activity. The construction and manufacturing industries, in the secondary sector, employ 9.7% of the working population in Chisasibi (Statistics Canada, 2023a).

Economic structure

At the community level in Chisasibi, two local institutions contribute to the community's economic development: the Chisasibi Business and Development Group Inc. and the Chisasibi Business Service Center. These institutions help local businesses and economic initiatives to flourish.

According to the study on the socioeconomic impacts and benefits of La Grande Alliance (VEI-WSP, 2024), Chisasibi had various types of businesses, such as sole proprietorships, corporations, partnerships, non-profit organizations, and a cooperative, for a total of 67 businesses identified in 2023. The construction sector leads the economy in Chisasibi, with 19 contractors employing 631 workers. In the construction sector, the Chisasibi Business Development Corporation and Gestion CBCC Inc. stand out in terms of capacity and size, employing 300 and 200 people respectively.

Chisasibi has a single Cree wholesaler, Petronor, which supplies fuel to the entire Eeyou-Istchee-James Bay region. The community also has 15 retailers and 10 businesses in the food service and accommodation sector. Chisasibi thus has a competitive local market for essential goods (VEI-WSP, 2024). The Northern Store in Chisasibi, owned by The North West Company, offers groceries and a variety of essential products and services for residents and visitors (North West Company, 2025).Other organizations offer specialized services, such as CERRI, which conducts research projects integrating Western research methods with traditional Cree ecological knowledge, and Niigan, which offers environmental field work, site assessments and other services.

The land-based economy is also a significant sector for the Cree economy. A total of 974 members of Chisasibi (representing 574 family units) have joined the Cree Hunters Economic Security Program (formerly the Income Security Program) to ensure their livelihood, sometimes in combination with other casual jobs, in 2021-2022 (see section on Current use of land and resources).

Services, Infrastructure, and Equipment

Health services

The Chisasibi Regional Hospital provides primary and secondary health care services to the population of Eeyou Istchee, and the Cree Board of Health and Social Services has its headquarters there. A detailed overview of health services is provided in the sectoral report on health impacts.

Public safety

Chisasibi has a public safety service (Eeyou Eenou Police Force detachment) and a fire department, available at all times. The police service works closely with the Sûreté du Québec and Chisasibi emergency services.

In Chisasibi, the possibility of one of the dams on La Grande Rivière breaking and flooding the community remains a concern among the population. For this reason, a large parking lot has been built on high ground in the forest, eight kilometers from the community's center. There are plans to build infrastructure there to accommodate people in the event of an evacuation of the community.

Waste and water management

According to a public health official in Chisasibi, who was interviewed as part of the project, waste and water management is an issue in Chisasibi and the surrounding area, as landfills are at maximum capacity, as is the water treatment process, and the population is growing. However, the community has had a new water treatment plant since 2023.

The Land and Environment Department oversees land and resource management to maintain ecological balance with a view to sustainable development. The department's mandate includes raising public awareness of the community's collection service for recycling household and hazardous waste.

Traditional Land Use

General land use

Among the most important values that emerged from the 2017 report of the Chisasibi Eeeyou Planning Commission (EPC Chisasibi, 2017) was the land, gathering together on the land, and the transmission of Cree culture, knowledge, and values.

The Big River (La Grande Rivière) represent a large part of the identity of Chisasibi members. It has played a crucial role in the history of the community as a route of travel, a site for gatherings, and for food and cultural activities, before being heavily impacted by the hydroelectric development mentioned above. In addition to the construction of four reservoirs along its course, the current flow of the river in front of the Chisasibi community is about three times what it was under natural conditions, a result of numerous watersheds being diverted within the La Grande complex. It remains a highly significant place in the eyes of community members (EPC Chisasibi, 2017, cited in WSP, 2024).

Camps and cultural sites on the territory are highly valued, and their protection is essential to maintaining the connection to the land and to identity. Indeed, the dramatic changes that the Cree way of life has undergone over recent decades have made the preservation of cultural identity a challenge, which the Cree Nation of Chisasibi seeks to meet with determination for future generations (EPC Chisasibi, 2017, cited in WSP, 2024).

In their vision of the future, the Chisasibi community members who participated in the 2017 EPC survey intend to do everything possible to protect the territory that has not yet been altered and which is valued as a land use area including sites of cultural significance. They wish to be involved in decisions regarding the territory so that development occurs according to the values and wishes of the community. They also believe that programs and other opportunities could facilitate travel and the presence of members on the territory. Finally, the trapline system should be reviewed to ensure that its implementation respects Cree values (EPC Chisasibi, 2017, cited in WSP, 2024).

Among Cree communities, the Cree Nation of Chisasibi had the highest participation in the Economic Security Program (ESP) in 2022-2023. Seventeen percent of residents were enrolled in the program to ensure their livelihood, sometimes in combination with other casual jobs. This represents 519 family units, or 664 adults and 223 children. The previous year, this number was slightly higher (574 family units) (Table 6-42). overall, the number of people enrolled in the ESP has tended to decline over the years in Cree communities.

Table 6-42 Chisasibi – Economic Security Program (ESP) recipients, 2021-2022

Chisasibi – family units (number)	Total (adults and children)	Total days spent in the woods (number)	Average per family unit (days paid)	Average allowance per family unit ($)
519	887	101,290	199	$18,597
574	974	115,548	201	$17,893

Source: CHESB compilation, 2021–2022 and 2022–2023 annual reports.

A total of 101,290 days spent on the land were paid to land users in that same year, for an average of $18,597 per family unit (see Table 6-42). More than ten years earlier (2011–2012), the number of registered individuals was slightly higher (976), representing 24% of the population, but the number of registered family units was lower (496) (CHESB, 2012, 2022, and 2023). Fluctuations in participation in the ESP can be explained by several factors, such as the economic climate, employment opportunities, and adjustments to eligibility criteria.

Many Chisasibi community members who are not enrolled in the ESP spend time on the territory whenever possible. For example, more than 100 land users were identified on a single trapline near James Bay (VEI-WSP, 2024). Other, less accessible traplines are reached by helicopter or snowmobile for goose, moose, or caribou hunting, as well as fishing. Some users also engage in trapping (beaver and wolf).

The administrator of the Chisasibi CTA, who was consulted for this project, indicated that changes in ice cover have restricted snowmobile use in certain areas. In particular, community members no longer use snowmobiles for subsistence activities in the LG2 reservoir area as they did in the past, because there is no longer any ice cover.

Land use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on trapline CH39 (Map 6-19), which is frequented by many Cree people. This land is also crossed by the Trans-Taiga Road, which will be used for transportation as part of the project. This section describes the camps used on trapline CH39, as well as the movements and activities carried out there, as shared with PMET over the past several years. The following information reflects PMET's current understanding, is included to provide context and may require further validation and confirmation by land users.

The tallyman and his family most often and preferably like to visit the study area from March to November, except in July, which is considered too hot and prone to mosquitoes. In 2023, the tallyman and his family were unable to access the study area due to forest fires. He notes that exploration activities in the area do not affect his use of the land, although noise from work, particularly helicopters, can occasionally scare away local wildlife.

Camps

Several camps are used by the tallyman’s extended family, which includes many siblings. These camps are mainly located in the northern section of the trapline, along the Trans-Taiga Road or La Grande Rivière. Two camps are located at kilometer 258 of the Trans-Taiga Road, and three others are located at two sites in the Katatipawasakakamaw Lake area (also known as Cladonia Lake), on the northern edge of the Trans-Taiga Road. The main infrastructure of a former outfitter (Nouchimi) was dismantled in 2022 in this area at kilometer 286 of the Trans-Taiga Road (COMEV, 2025). Four additional camps are located along the Trans-Taiga Road, east of this sector. In total, nine camps have been identified along the Trans-Taiga Road, including the tallyman’s camp at kilometer 341.

Other camps are located inland along the shores of lakes such as Camoy and Mihiiwaayaapaakw, east of the trapline, and closer to the proposed mining site in the Lake Nochet sector, approximately 10 km east of the proposed site. Some of these camps are used by Mistissini Cree or by non-Indigenous users. One camp, built in 2024 by PMET for the tallyman’s family, is located 11 km from the proposed mine site, near an area valued for goose hunting.

The tallyman and his family regularly visit the area, but do not systematically visit all of the camps.

Water supply

The tallyman’s extended family collects water from different sources depending on the location of their camp and the time of year. In winter, they use melted snow. Water from certain lakes does not need to be boiled. Three drinking water collection sites have been identified: one near the camps at kilometer 258 (although water levels there are very low), another south of kilometer 230, and a third at the new camp built in 2024 (Lake Shambo), northwest of the project site. In addition, the water at kilometer 286 (at the former Nouchimi camp) has been tested and is still considered safe.

Some family members also drink water from lakes where they hunt or alternatively bring bottled water that they purchase. They do not use water found under existing power lines, in accordance with the former tallyman’s recommendations. A drinking water collection site, including a small shack (see Map 6-19), is located within the planned right-of-way of the new power line that will supply the project facilities.

Access and transportation

Before the Trans-Taiga Road was built in 1979, users traveled to their camps by seaplane. Landing sites have been identified along La Grande Rivière, Lake Magin, and Lake Mihiiwaayaapaakw. The Trans-Taiga Road is now the main access route to the area and is particularly busy from March to November. Users hunt by driving along the road and stopping when they spot an animal.

Snowmobile trails have also been identified by users to reach goose hunting and fishing sites on various lakes and near La Grande Rivière. Users also travel by boat.

Regarding navigability, all the lakes within the biophysical LSA are considered navigable, although only Lake L27 is currently used for navigation by land users. Some lakes are hydrologically interconnected, allowing for continuous navigation, while others remain isolated. A limited number of watercourses near the mining area are considered navigable based on their physical characteristics (navigable in fact). Lakes L01, L05, L07 and L10, as well as watercourses CE8, CE11 and CE15, would be the most suitable for navigation within the project area.

Fishing activities

Various species are fished on the trapline, notably sturgeon, brook trout, and whitefish. Fishing takes place in La Grande Rivière and in certain lakes on the trapline, which users prefer not to name. They avoid fishing in the reservoirs, believing that the taste of the fish there is inferior. The tallyman and his family, however, frequent the area around the LG2 dam for fishing and may spend up to a full month there.

They are cautious about the quality of fish in Lake Mihiiwaayaapaakw, even though large trout are present, due to mercury contamination and the activities of seaplanes from the former Nouchimi outfitter. In addition, the 2023 forest fire may have affected fish populations, as one elder in the family noted that it can take about six years for fish to repopulate lakes in areas affected by fires.

Lake Shaakichiuwaanaan (identified as Lake L01) is virtually untouched by fishing, although whitefish, lake trout, and speckled trout, among others, are found there.

Goose hunting

This traditional and culturally important activity for the Cree takes place in spring, mainly between late April and late May, during the northward migration of geese. It is an occasion for family gatherings, sharing, and cultural transmission, and includes all generations in Cree communities. On trapline CH39, families also gather for the annual “Goose Break.” The area around the new camp is valued for goose hunting, and having a camp there now makes hunting easier. Before this, hunting was mainly practiced along the Trans-Taiga Road, which was easily accessible without snowmobiles or ATVs. Other areas, including the location of the tallyman’s main camp, continue to be used.

Moose and caribou hunting

Moose hunting takes place in various locations on the trapline, particularly in the fall by the tallyman. He notes that he does not need to hunt every year because of the amount of meat a single moose provides. However, he is concerned about intensive hunting by users coming from other traplines via the Trans-Taiga Road. Moose move around and can be found in different locations.

As for caribou, users are seeing fewer and fewer of them in the territory, but community members continue to hunt them in some years. Some believe that caribou meat has changed in taste, which could indicate a decline in the animals’ health.

Other species

Ptarmigan are also hunted on the trapline. Some users have noted that traffic affects the quality of their meat, as birds from disturbed areas do not taste the same as those from more remote areas.

Bears can be hunted or trapped in the fall or early spring, and the meat is shared with elders. It was noted that in fall 2023, bears were hungry due to the previous summer's forest fires.

Beavers, porcupines (which are believed to have healing properties), and hares are also harvested. However, some users have reported that construction and infrastructure on the territory (such as hydroelectric developments, power lines, the Trans-Taiga Road, and borrow pits) have affected the environment, so small mammals are now scarce.

Users have also observed bird species coming from the south that were not previously seen on the trapline. Other species, such as the arctic fox, are now more prevalent.

A hunting site used by tallyman CH39 and his family is located within the planned right-of-way of the project's future power line.

Gathering activities

Users also harvest berries in the area, including blueberries, blackberries, gooseberries, cloudberries, and cranberries, away from the mining exploration site. A favorite picking spot is located at km 310, because it is easily accessible.

Historical and cultural heritage, and sites and elements of significance

The *General land use* section discusses the connection to the land, identity, and the importance of preserving cultural sites and former camps for the Cree of Chisasibi. Despite the changes it has undergone, La Grande Rivière also remains a very significant place for the community (EPC Chisasibi, 2017).

Every year, community members gather on Fort George Island, at the mouth of La Grande Rivière near Chisasibi. The community lived there until it was forcibly relocated to Chisasibi in 1981 due to hydroelectric developments that threatened the island with significant erosion. In addition to the community's relocation, Chisasibi's traplines were impacted by flooding, resulting in major environmental changes and impacts on the land users' way of life. Land users have shared that the fish tastes differently in the reservoirs. La Grand Riviere doesn't freeze anymore and there is often a mist over it, which is a point of stress for community members. This period caused trauma for the Chisasibi Cree, and the annual gathering on the island remains important for healing and for passing on this history. The Chisasibi Cultural Center includes a museum that traces the community's history and also provides a space for cultural events.

More specifically within the study area, stakeholders interviewed by PMET indicated that some family members were born on or near the trapline (north bank of La Grande Rivière). These birthplaces are valued by family members. Burial sites and sacred sites were also identified by family members interviewed by PMET. Of the sites identified, the closest are more than 5 km from the project components: one burial site east of Magin Lake and another north of Lake Corvette. These sites are kept confidential but are identified as protected zones within PMET to ensure they are not disturbed by any project activities.

Archaeological sites and the archaeological potential in the study area are discussed in Section 6.4.7.

The following sections provide a description of the social context at two communities with territories adjacent to the project. Wemindji and Mistissini are not considered primary communities of interest to the project since none of the project development or infrastructure will be located on their traditional territories or traplines.

Wemindji

Wemindji, which means "painted hills" or "red ochre mountain" (depending on the source), is located at the mouth of the Maquatua River on the coast of James Bay. In February 2025, the First Nation had 1,665 registered members, the vast majority of whom (1,467) lived in Wemindji (CIRNAC, 2025).

The Wemindji territory consists of 21 traplines on either side of the Maquatua River. It includes Boyd and Sakami lakes, which were affected by hydroelectric development in 1980 (Phase 1 of the La Grande complex).

The community can be reached from the Billy-Diamond Highway via an access road built in the early 1990s. The nearest town by road is Radisson, located 203 km away. By air or water, the communities of Eastmain (to the south) and Chisasibi (to the north) are both approximately 100 km away as the crow flies, but 366 km and 264 km away by road, respectively.

Socioeconomic conditions

Population

The population of Wemindji was 1,562 in 2021, compared to 1,444 in 2016, representing an increase over five years (8.2%). By comparison, the increase for Québec as a whole was 4.1% (Statistics Canada, 2023a).

Young people aged 0 to 14 represent 29.1% of the population in Wemindji (455 people). The number of boys and girls is approximately the same. Only 6.7% of the community's population is aged 65 and over, while province-wide, this segment of the population represents 20.6%. There are more women in this age group (65, compared to 40 men). In Wemindji, the average age (31) and median age (28.6) are considerably lower than those of the province (42.8 and 43.2, respectively).

Language and identity

The vast majority of Wemindji's population speaks Cree as their mother tongue (78.8%). The first official language spoken is English (94.9% of the population), although the language most spoken at home is Cree (53.8%) (Statistics Canada, 2023a). Of the total population of the community, almost all (1,510 people) identified as Indigenous in the last census (Statistics Canada, 2023a).

Housing

Of the 400 occupied dwellings in Wemindji, the vast majority (75.0%) are provided by the band council, while nearly 8.8% of households are renters and 16.3% are homeowners. In 2021, nearly one-third of dwellings (31.1%) in Wemindji required major repairs (Statistics Canada, 2023a), which is significantly higher than the data for Québec as a whole (6.3%) and other Cree communities (24%).

Education

In 2021, more than one-third of the population of Wemindji aged 15 and over had a certificate, diploma, or degree as their highest level of postsecondary education (36.7% of men and 38.1% of women). Approximately half of the population aged 15 and over, or 52.8% of men and 46% of women, did not have a high school diploma or equivalent, which is a higher proportion than for Québec as a whole (men 22.6% and women 18.6%) (Statistics Canada, 2023a).

Overall, 12.6% of the population (including 20.2% of men) had an apprenticeship or trade school certificate or diploma as their highest level of education. Only a small proportion of women had this level of education (7.1%); however, more women had obtained a certificate or diploma from a college, CEGEP, or other institution (non-university or below the bachelor's level) (22.2% of women compared to 11.9% of men).

Wemindji has an elementary school (Joy Ottereyes Rainbow Memorial) and a high school (Maquatua Eeyou).

Income

In 2020, the median total income among beneficiaries aged 15 and over in Wemindji was $42,800 ($37,200 for men and $50,000 for women), while the average total income was $46,000 ($41,000 for men and $50,600 for women) (Statistics Canada, 2023a).

Employment

The participation and employment rates in Wemindji (62.6% and 58.1% respectively in 2021) are higher than the Cree averages (61% and 56% respectively) and lower than the Québec averages (64% and 59% respectively). The unemployment rate was quite high in Wemindji for men (10.9%), while it was lower for women (6.8%). For Québec as a whole, the unemployment rate is 7.7% for men and 7.4% for women.

The participation and employment rates have increased relatively steadily over the past 20 years. Several economic sectors have experienced growth during this period, with education and the "agriculture, forestry, and mining" category recording the most significant increases. The public administration sector and the health and education sectors employ the largest share of the population, representing approximately 62% of the working-age population (VEI-WSP, 2024).

Economic structure

The community has nearly 30 businesses, institutions, or public agencies. The Tawich Holdings Corporation, owned by the First Nation Council, has several subsidiaries (notably in construction, mining exploration, transportation, and mining camp services), employing a total of 621 people from Wemindji and elsewhere in 2021. A total of 455 people (more than 30%) are officially employed in the community by 28 businesses and public institutions or agencies. The other main employers in Wemindji were the clinic and the elementary school. (TDC, 2021 and VEI-WSP, 2024).

According to an article (Décarie, 2019), Tawich's portfolio is diverse, but the nation's basic objective, through its numerous holdings, is to play an active role in the development of Nord-du-Québec. The Tawich Development Corporation has set up a company that drills for the many prospectors searching for gold or diamond deposits in the territory. It has also launched a trucking company (Kepa) in partnership with the Cree Nation of Chisasibi, which supplies the northern territory with essential goods from terminals in Montreal. In addition, one division is responsible for maintaining Hydro-Québec's transmission lines, and another distributes petroleum products, natural gas, and diesel fuel to Radisson. The Tawich Construction Inc. division carries out infrastructure and civil engineering work for companies operating north of the 50th parallel, including Hydro-Québec and the Éléonore Mine. Another division, Wolf Camp Corporation, provides janitorial and cafeteria services for the Éléonore mining complex (Décarie, 2019).

The construction sector is well developed in Wemindji. According to a study conducted as part of La Grande Alliance, VCC General Contractor Inc. is the leading company, employing approximately 50 people on a permanent basis. Pavage Wemindji, with 26 permanent employees, has also developed significant expertise through its involvement in Hydro-Québec projects in the region, while Tawich Construction reportedly employs three permanent staff. Wemindji also has several small businesses offering hospitality services, cultural products, and professional services specializing in consulting, construction, and transportation (VEI-WSP, 2024).

La Grande Alliance study also highlights the interest of Wemindji members in business development, mainly related to activities in the territory (e.g., resource harvesting, management, ecotourism). The importance of unity and collaboration among the communities of Eeyou Istchee was emphasized as a driver of economic, political, and cultural development in Eeyou Istchee (VEI-WSP, 2024).

Finally, it should be noted that in 2011, the Cree Nation of Wemindji, the GCC, and the CRA entered into a cooperation agreement concerning the Éléonore Mine (formerly owned by Goldcorp). The agreement includes provisions on Cree participation (employment and business opportunities) as well as training and education initiatives. For the 2012-2014 period, 80% of 467,000 hours of employment were allocated to Indigenous people (Desfor, 2014). In 2024, the mine employed a total of 700 people. It has one of its three administrative offices in Wemindji (Guindon, 2024).

Services, infrastructure, and facilities

The Cree Nation of Wemindji is served by the Wemindji Community Miyupimaatisiiun Centre (CMC). The CMC is a health center that provides front-line services and represents the local presence of the CBHSSJB. The Wemindji CMC includes a walk-in clinic and community health clinics for different age groups. The Wemindji CMC has five permanent employees and two additional employees for the home and community care program. The Awash (children aged 0 to 9 and pregnant women) and Uschinîchisû (youth aged 10 to 29) teams are understaffed; two of the three Awash nurse positions remained vacant throughout 2022, as did the school-based position.

Wemindji has a public safety department that includes emergency management, search and rescue, ambulance service, firefighting, home inspections, and public health.

With regard to waste management infrastructure, the community aims to become Canada's first zero-waste First Nation. It offers waste collection, recycling, and composting services (coming soon), and also has an eco-center located outside the community that is open at all times. In addition, a recovery and repair center is in the works. It would create jobs while processing and recycling various materials and objects on site (Cree Nation of Wemindji, 2023a).

The community garage works closely with the roads department to carry out necessary repairs. It also maintains the entire fleet of vehicles and equipment of the Cree Nation of Wemindji for all services, including the airport and Transport Canada equipment. In total, there are 62 vehicles, 39 pieces of equipment, plus accessories and small engines that require maintenance (Cree Nation of Wemindji, 2023b).

Traditional land use

General land use

Like other Cree communities, the people of Wemindji maintain a strong connection to the land and regularly return to their camps and traplines. As noted in the 2017 Wemindji EPC report, what matters most to community members in this regard is continuing to be able to hunt, trap, fish, and spend time on the land.

For many community members, even if they do not spend extended periods on the land during the year, they go whenever possible, even if only for short stays. For example, as part of consultations conducted for La Grande Alliance, more than 100 people were identified as frequenting a single trapline (WSP, 2024). On another trapline, several areas were reported to be used for hunting (moose, goose, ptarmigan), trapping (beaver, porcupine, marten, hare), and fishing (sturgeon, walleye, whitefish, trout). Some practice trapping for the sale of fur, while others trap beavers for meat and use the fur for craft purposes (VEI-WSP, 2024).

According to the First Nation's website, traditional activities and events, such as spring and fall goose hunting and first steps ceremonies, remain essential parts of community life. Today, one-third of the population still lives on the land year-round, while others return to family traplines on weekends or during their free time (Cree Nation of Wemindji, 2023c).

The Wemindji territory is characterized by an abundance of wetlands and protected areas. In addition, a large-scale biodiversity reserve is planned, as the community wishes to conserve the watersheds of the Vieux-Comptoir and Peuplier rivers. The Maquatua River estuary, located across from the community, is heavily used by community members for various activities. The Billy-Diamond Highway and the Trans-Taiga Road are also important corridors used to access traplines, including neighboring areas for which there is no other road access.

In the late 1970s, the development of the La Grande Complex impacted some of Wemindji's traplines. The creation of the Opinaca reservoir, the construction of the La Sarcelle power station, and the change in water levels in Boyd and Sakami lakes caused by the operation of the hydroelectric development altered the availability and quality of resources and travel on the territory and on these bodies of water. Subsequent developments (ESR complex) and climate change have amplified these disruptions, forcing users to find new ways to adapt[12] (WSP, 2024).

In addition to hydroelectric developments, Wemindji has seen the development of mining activities on its territory, such as the Éléonore underground gold mine, located on the east shore of the Opinaca reservoir. During a consultation conducted as part of the 2017 EPC, Wemindji members described their concerns about the impacts of industrial development, particularly the multiple mining explorations and projects whose activities are beginning even though studies have not been completed. Others are also concerned that traditional wildlife monitoring methods no longer seem adequate for assessing pressure on wildlife due to overexploitation by community members, particularly during fishing competitions (EPC Wemindji, 2017).

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12 For more information on this subject, readers may refer to the *Monitoring of Cree Land Use – Eastmain-Sarcelle-Rupert Complex* (Consortium Genivar-Waska, 2020).

Finally, it should be noted that for the year 2022-2023, 162 members of Wemindji (146 adults and 16 children) were enrolled in the Cree Hunters and Trappers Income Security Program, representing 10% of the population, and received income for the days spent on the territory (CHTISB, 2021). This number has remained proportionally stable compared to a few years earlier (2014-2015), when there were 147 registrants (134 adults and 13 children), also representing 10% of the population (CHESB, 2024 and CHTISB, 2016).

Specific use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on a Chisasibi trapline (CH39), adjacent to the Wemindji trapline VC26 (Map 6-19). The traplines are accessed by the Trans-Taiga Road, which is the only public access road leading to the project. Other traplines are also crossed by the Trans-Taiga Road and Billy Diamond Highway that will be used for transportation of project materials and spodumene concentrate, namely traplines VC26, VC25, VC24, VC20, and VC16 along the Trans-Taiga Road, and traplines VC12, VC13, VC17, VC18, VC19, and VC23 along the Billy-Diamond Highway.

Consultations conducted by PMET provide an overview of land use on trapline VC26, particularly in its eastern portion, which is located not far from the proposed mine site.

Camps, users, water sources, and access

Trapline VC26 from Wemindji community has two co-tallymen, who are brothers. One of their camps is located along the Trans-Taiga Road, which they use to access it, in the northwestern part of the trapline. They use nearby water bodies as a source of drinking water.

The condition of the Trans-Taiga Road varies and is poor at kilometer 184 due to the presence of large rocks. On the trapline, there are old trails used by the co-tallymen’s grandparents. Some of these access routes have been used by exploration company machinery, and cut trees and logs now obstruct hare trails, according to interviews with the tallymen.

Fishing activities

Lake trout, walleye, whitefish, and sturgeon are fished by users of this trapline. Fishing takes place in rivers (the Pontois and Corvette) and in certain lakes. Users report that walleye spawn at a culvert along the Trans-Taiga Road and that sturgeon feed on these eggs. Sturgeon is an important species for users, who consume it in the spring and fall while taking care not to overfish. They do not use nets in spawning areas and avoid fishing during the spawning period. Every two years, they set a net overnight. The co-tallymen believe that a spawning site near the Trans-Taiga should be improved, as water levels are sometimes very low.

Moose hunting

Members of the co-tallymen’s family hunt in the fall and winter. They do not hunt calves or females.

A high-quality moose habitat has been identified, and the co-tallymen indicate that no one should hunt there, in accordance with a customary right recognized by the coastal Cree communities (including Chisasibi and Wemindji). However, they note that other users are not aware of this customary right, and concerns about overhunting have been raised by land users during discussions with PMET.

Goose hunting

Users interviewed hunt geese and ducks on the trapline in the spring and fall. Goose Break is a centuries old tradition practiced by Cree in northern Quebec, where communities all but close down for a few weeks each Spring, usually in May. During Goose Break, people head out on the land to hunt geese and spend time with family and friends.

Bears (hunting or trapping)

Bears are hunted in the spring and fall, in accordance with Cree customs. They are then brought back to the community and provide an opportunity to share a large meal (feast).

Historical and cultural heritage, and sites and elements of significance

The Cree Nation of Wemindji seeks to strengthen Cree culture through traditional skills, language, and values. The cultural and wellness department offers Cree language classes, traditional cooking workshops, a wild berry festival, and other cultural activities throughout the year (VEI-WSP, 2024).

CBA results indicate that culture and values are central to the Wemindji Cree, particularly in supporting the continuation of hunting, trapping, fishing, and maintaining a presence on the land. In this context, knowledge sharing is essential, as is environmental quality. Respect for animals and the protection of water are also key considerations. Respondents emphasized that development should be carried out in accordance with values and practices associated with the land and through an inclusive approach (EPC Wemindji, 2017, in VEI-WSP, 2024).

To support the continuity of Wemindji's culture and history, an annual gathering is held at the traditional Old Factory site, located on an island approximately 45 km south of Wemindji. This gathering highlights the importance of the site, where families historically stayed during the summer after spending the winter inland.

More specifically, within the project's local study area, the two tallymen did not identify any specific cultural or historical sites on trapline VC26 that could be affected by the project.

Mistissini

Mistissini, meaning "big rock" in Cree, is an inland Cree community located approximately 350 km south of the proposed mining project, on the shores of Lake Mistassini. As of April 2025, the First Nation had 4,256 registered members, the vast majority of whom (3,857) resided in Mistissini (CIRNAC, 2025).

The Mistissini territory is composed of 77 traplines covering 117,844 km², extending from the southern part of Lake Mistassini to the northern part of the Caniapiscau Reservoir. It is the largest territory, and includes the greatest number of traplines, among the Cree communities of Eeyou Istchee.

The community is accessible via a 15 km paved access road completed in the early 1970s, connecting to Route 167 at kilometre point (KP) 304. The nearest Cree community is Oujé-Bougoumou, located approximately 150 km away by road. Mistissini is also located less than 90 km from Chibougamau, where the nearest airport is situated. The construction of an airport in Mistissini is currently being considered as part of the La Grande Alliance feasibility studies.

Socioeconomic conditions

Population

In 2021, Mistissini had a population of 3,731, up from 3,523 in 2016, representing an increase of 5.9%, which is higher than the increase for Québec as a whole (4.1%) (Statistics Canada, 2023a).

With a young population, Mistissini's demographic profile is proportionally similar to other Cree communities. In Mistissini, young people aged 0 to 14 represent 28.0% of the population, or 1,045 people, with approximately equal numbers of boys and girls. Only 7.2% of the community's population is aged 65 and over, while province-wide, this segment of the population represents 20.6%. In Mistissini, the average age (31.3 years) and median age (29 years) are considerably lower than those of the province (42.8 years and 43.2 years), but relatively similar to those of Wemindji and Chisasibi.

Language and identity

The vast majority of Mistissini residents have Cree as their mother tongue (74.5%). The first official language spoken is English (82.3%), although Cree remains the language most commonly spoken at home (62.1%) (Statistics Canada, 2023a). Nearly all residents (3,445 people) identified as Indigenous in the most recent census (Statistics Canada, 2023a).

Housing

Of the 1,020 occupied dwellings in Mistissini, most (60.3%) are provided by the band council. In addition, 20.6% of households are renters, while a similar proportion are homeowners (19.6%). In 2021, 21.1% of dwellings required major repairs. This is comparable to the Cree average (24%), but significantly higher than the rate for Québec as a whole (6.3%) (Statistics Canada, 2023a; VEI-WSP, 2024).

Education

In 2021, one-third of the population aged 15 and over held a certificate, diploma, or postsecondary degree as their highest level of education (30.7% of men and 36.5% of women). More than half of the population in Mistissini did not have a high school diploma or equivalent (59.7% of men and 57.4% of women), a proportion nearly three times higher than the Québec average (22.6% for men and 18.6% for women) (Statistics Canada, 2023a).

Voyageur Memorial School is located in the centre of the Cree community of Mistissini and consists of three buildings (a high school, an elementary school, and a preschool building). There are also two adult education centers, known as *sabtuans*, located next to the high school, which offer courses in Cree culture, as well as a new vocational training centre that meets the growing training needs of the Cree communities of Eeyou Istchee. In 2024, training programs in accounting, carpentry, and automotive mechanics were offered (Compétences Québec, 2025). Apatisiiwin Skills Development also provides skills development and job readiness programs, and its coordination office for Cree communities is located in Mistissini.

Income

In 2020, the median total income among beneficiaries aged 15 and over in Mistissini was $43,200 ($40,800 for men and $46,000 for women), while the average total income was $51,200 ($49,900 for men and $52,400 for women) (Statistics Canada, 2023a).

Employment

Mistissini's labour force participation rate (60.4%) and employment rate (56.4%) in 2021 are comparable to the Cree averages (61% and 56%, respectively) and lower than the Québec averages (64% and 59%). The unemployment rate was lower for women (5.5%) than for men (6.3%). Across Québec, unemployment rates are higher (7.7% for men and 7.4% for women).

According to the census, approximately 1,540 people have worked in the community since 2016. Labour force participation and employment rates have increased slightly over the past 20 years. Several economic sectors have grown during this period, with education, retail trade and services, and construction experiencing the most significant increases. Public administration, as well as the health care and education sectors, employ the largest share of the population, representing approximately 63% of the working-age population (VEI-WSP, 2024).

Economic structure

A study conducted as part of La Grande Alliance indicates that, as the second most populous Cree community after Chisasibi, Mistissini has a well-diversified economy, with 91 businesses and organizations covering nearly all sectors. The public sector includes approximately 14 institutions employing a total of 504 workers, representing about 34% of the workforce. Most of these employees work in health care and social assistance or in education. The majority of workers are employed in the private sector, across 77 businesses, representing approximately 66% of the workforce. This is by far the highest proportion of private sector employment among the Cree (VEI-WSP, 2024).

Services, infrastructure, and facilities

The Cree Nation of Mistissini is served by the Mistissini Community Miyupimaatisiiun Centre (CMC), which provides medical services (including cancer screening, occupational therapy, speech therapy, and physiotherapy) as well as more specialized services for children, youth, and adults. A detailed overview of health services is provided in the sectoral study on health impacts.

The community includes a hardware store, a shopping centre, a family resource centre, a fire station, a hotel, a transitional home for seniors, a municipal garage, a post office (in the former police station), and a youth centre. Public services in Mistissini include road maintenance and snow removal, waste collection and recycling, water treatment, and wastewater treatment (Cree Nation of Mistissini, 2020a).

Traditional land use

General land use

Lake Mistassini plays a central role in the history and culture of the community. Its shores have long served as gathering places (well before the establishment of a trading post in 1821), its waters have sustained Cree families for generations, and it remains an important travel route for accessing other parts of the territory (Mistissini PLE, 2017). Located on the shores of Québec's largest natural lake, the First Nation has developed strong traditions and expertise in canoe travel (Cree Nation of Mistissini, 2020).

The EPC Mistissini report indicates that community members greatly value the opportunities the lake provides for traditional activities. In addition to its abundant resources, Lake Mistassini offers relatively easy access to numerous traplines.

Over the years, Mistissini has been affected by mining, forestry, and hydroelectric development. While these developments have had various impacts on the territory and on the families who use it, they have been limited to certain areas. In terms of hydroelectric development, the flooding of the Caniapiscau Reservoir in the late 1970s affected the northeastern part of the territory. Later, the creation of the Paix des Braves Reservoir in 2007 and the Rupert diversion bays in 2009, in the southwestern part of the territory, affected other families by flooding some of their land use areas. These developments also led to the construction of new access routes, such as the Trans-Taiga Road, which provides access to traplines in the northern part of the Mistissini territory. Finally, the former diamond mine (Stornoway's Renard Mine[13]) and the construction of the road leading to it have also altered land use. Several main camps are now located along this road, where hunting (moose and goose), fishing, and trapping activities take place. According to land users consulted as part of La Grande Alliance studies, noise and vibrations from the mine, when it was in operation, drove animals away from the area (WSP, 2024).

The EPC report also highlights opposition to forestry activities because of the irreversible damage they cause to the land and the disruption they cause to traditional activities. A general impression of non-compliance with rules and disregard for communities by forestry companies emerged from the consultations conducted as part of the EPC in Mistissini (EPC Mistissini, 2017).

As noted in the EPC Mistissini report, the land occupies a central place in the lives of community members. Activities on the land are "the focal point of traditional Cree cultural life. (…) The land is thought of and cared for as part of the family, one of which Crees knowingly depend for subsistence" (EPC Mistissini, 2017, in VEI-WSP, 2024).

In 2022-2023, 8% of Mistissini members were recipients of the Economic Security Program (ESP). This represents 191 family units, or 278 adults and 71 children, who received income for days spent on the territory. The previous year, this number was slightly higher, with 197 family units. As mentioned above, the number of people enrolled in the ESP has generally tended to decrease over time in Cree communities, although fluctuations occur depending on economic conditions, employment opportunities, or changes in eligibility criteria.

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13 This mine ceased operations in 2023, and Winsome Resources has filed a purchase option to assess the potential for using its processing infrastructure for the Adina lithium project, located approximately 60 kilometres north of the site (Arsenault, 2025).

Many Mistissini members take advantage of the opportunities offered by Mistassini Lake for short trips or stays on the land. However, the proportion of those who remain for extended periods and live off the land tends to be decreasing.

Land use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on a Chisasibi trapline (CH39) bordering the Mistissini trapline M02A (Map 6-19). Some members of the Mistissini community use the Trans-Taiga Road to access traplines in the northern portion of their territory.

Consultations conducted by PMET provide an overview of land use by the tallyman of trapline M02A and his family members, particularly near the proposed mine site. A dispute exists regarding the boundary between traplines CH39 and M02A, due in part to differing interpretations of agreements made by previous tallymen.

Camps, users, water sources

The tallyman and users of this land come from several Cree communities. They use the area in spring for goose hunting and in fall for hunting, fishing, and trapping. A camp located along the Trans-Taiga Road (on CH39) consisted of four buildings that were destroyed during the 2023 forest fires; reconstruction was underway in 2025. A water source is located nearby, east of the camp and the Trans-Taiga Road.

Other camps belonging to the tallyman and his extended family are also located on traplines CH39 and M02A, though their use varies annually due to accessibility constraints (cost and travel time). A goose hunting camp on trapline CH39, about 20 km east of the project site, was destroyed in the 2023 forest fires. Another camp, approximately 10 km east of the project, burned down in 2019. Three additional camps, including two used for goose hunting, are located further east within the traplines. Three former campsites used by family members, including the tallyman’s grandfather, have been identified within a 10 km radius to the south and west of the site, on CH39 and M02A.

Access and means of transportation

The tallyman’s family uses the Trans-Taiga Road to reach their camp at kilometre 281. They hunt and carry out activities on traplines CH39 and M02A.

A snowmobile trail runs from this camp (km 281) to the Lake Corvette area, and another leads to the goose hunting camp that may have burned in 2023 (approximately 20 km east of the project site). Goose hunting camps east of the site are also connected to the Trans-Taiga Road by snowmobile trails. Users generally park along the Trans-Taiga Road, near the former Mirage outfitter, and continue by snowmobile. From the hunting camps, additional trails lead to hunting areas around nearby lakes.

Before the Trans-Taiga Road was built, users accessed the territory by floatplane, including landing on Lake Corvette. Users interviewed indicated that there was no other human presence in the area at that time, but once the road was built, more people began visiting, likely to hunt ptarmigan.

The tallyman's family plans to use the road constructed by PMET to access the Lake Corvette area. The tallyman intends to build a camp there, though they still occasionally travel by floatplane.

Fishing activities

Lake Corvette is a valued fishing area, in particular, and users fish for various species there. According to them, the water is of very good quality. This area is registered as a protected area with the Cree Nation Government.

Hunting activities - birdlife

Users frequent various goose hunting areas. They also hunt ptarmigan and grouse. The tallyman indicated that exploration work in the area sometimes disturbs wildlife, particularly due to helicopter noise.

Hunting activities – large wildlife and beaver

Users hunt moose, especially in December and March. Several areas with prime moose habitat have been identified on traplines M02A and CH39, including around Lake Corvette. In March 2025, the family harvested caribou and moose. Before mining exploration began, many moose were observed in the southeastern project area, but helicopter use and drilling activities may have affected moose presence. Bears and beavers are also harvested by users.

Historical and cultural heritage, and sites and elements of significance

According to the EPC Mistissini report, ease of access to the land is highly valued in Mistissini and is closely linked to cultural vitality. However, some community members have observed a decline in the transmission of language and culture, particularly in relation to land use, as fewer people spend extended periods on the land to support themselves. Cultural programs and community events held on the land aim to help offset this decline (EPC Mistissini, 2017, in VEI-WSP, 2024).

In Mistissini, cultural programs and development are overseen by the health and social services department, reflecting the strong connection between wellness and culture. For example, the wellness journey provides an opportunity to reconnect with culture as part of the healing process; it consists of a snowshoe excursion that brings participants to traditional camps and sites on the land. Other initiatives offered by the department include evening cultural workshops at the *Sabtuaan*, Cree language classes, the annual traditional gathering, the tallyman camp program, and the remote tallyman program. Cultural recreational activities (canoeing, snowshoeing, traditional Cree games) are also offered by the Recreation Department, while the canoe brigade is organized by the Youth Department (Cree Nation of Mistissini, 2020b).

These activities are considered important opportunities for the transmission and acquisition of Cree knowledge. One of the community's objectives is to build on and expand these programs to ensure their continued transmission (EPC Mistissini, 2017).

More specifically within the project area, it should be noted that Lake Corvette, located south of the proposed mining site, has long been a valued area for the tallyman's family. The lake and its surrounding area are registered as a protected area with the Cree Nation Government.

6.4.4 Jamesian localities and municipalities

Jamésie includes four municipalities (Chapais, Chibougamau, Lebel-sur-Quévillon, and Matagami) and three localities (Radisson, Valcanton, and Villebois) (Table 6-37). Each municipality and locality is administered by a municipal council. The population of Jamésie was 13,448 in 2023 (Institut de la statistique du Québec, 2024b). This section focuses on Radisson and Matagami, and for certain aspects, on the broader regions of Nord-du-Québec and Québec as a whole. Radisson is the Jamesian community located closest to the project (approximately 350 km by road), while Matagami is the location where mineral transshipment to rail is planned. Accordingly, the sections below present key characteristics of these two communities, as they are the most likely to be affected by the project. More general considerations are provided in Sections 6.4.1 (Land tenure and governance), 6.4.2 (Land use planning and development), and 6.4.5 (Regional economy).

Locality of Radisson

Radisson is located approximately 250 km west of the project and is the only non-Indigenous community in Québec north of the 53rd parallel.

It was established in 1974 to serve as a regional hub for the James Bay hydroelectric development led by Hydro-Québec. This development consisted of a series of hydroelectric facilities, primarily within the La Grande River watershed. Over the course of these development phases, the village experienced rapid population growth and was equipped with infrastructure capable of supporting several thousand residents. Formerly administered by the Société de développement de la Baie-James, Radisson obtained official locality status in 1994 (Localité de Radisson, 2024).

Municipality of Matagami

Matagami, located at the 50th parallel in the southwestern section of the Eeyou Istchee James Bay territory, is one of four municipalities that make up Jamésie.

Situated at the confluence of the Bell, Allard, and Waswanipi rivers, Matagami (meaning “meeting of waters” in Cree) was founded in 1963 following the arrival of mining explorers and the establishment of Camp Matagami. The Québec government’s plan to build a modern mining town was realized shortly thereafter. In the early 1970s, Matagami experienced significant economic growth linked to the James Bay hydroelectric developments. Its population increased rapidly, and businesses expanded. Today, Matagami has modern infrastructure, and its local economy is based on mining and forestry (Matagami, 2024).

Matagami is the administrative seat of the Eeyou Istchee James Bay Regional Government and marks the starting point of the Billy-Diamond Highway, as well as the junction with the railway. The municipality includes a transshipment centre, a strategic hub for intermodal freight transport between Eeyou Istchee James Bay and the rest of the province.

Socioeconomic conditions

Much of the socioeconomic data presented in this section is based on the 2021 Statistics Canada census. However, due to the small population of Radisson, most gender-disaggregated data are not available.

Population

In 2021, Radisson had a population of 203, while Matagami had a population of 1,402. In both communities, men significantly outnumbered women (Table 6-43). The 25 to 65 age group is the largest, representing 70.8% of the population in Radisson and 54.9% in Matagami, both higher than in Nord-du-Québec as a whole (47.9%). As a result, Radisson has a relatively low proportion of youth aged 0 to 14 (9.8%), compared with Nord-du-Québec (27.9%) and, to a lesser extent, Matagami (16.7%).

Overall, the population of Radisson is older than that of Matagami and Nord-du-Québec. In 2021, the median age in Radisson was 50.4 years (with an average age of 46), which is eight years higher than in Matagami (and five years higher for the average age). The gap is even greater compared with Nord-du-Québec, where the median age is close to 30 (and the average age is 32.6).

Since 2016, both Radisson and Matagami have experienced population decline. This decrease is particularly pronounced in Radisson, where the population dropped from 468 to 203 residents over five years (-56.6%). Matagami's population declined by 3.5% over the same period. In contrast, Nord-du-Québec and Québec as a whole experienced population growth of 2.6% and 4.1%, respectively (Statistics Canada, 2023b).

According to staff at the Radisson Health Centre, this population decline has been accelerated by the increasing use of fly-in/fly-out work arrangements by regional employers. These observations are supported by a survey commissioned by the James Bay Regional Administration (ARBJ), which found that 56% of former residents left the region within three years of settling there. Most respondents were not originally from Jamésie and had intended their stay to be temporary, primarily for employment. Workers engaged in fly-in/fly-out arrangements reported seeing little advantage in relocating permanently to the region when they could work there without leaving their home communities (Groupe DDM, 2024). According to the same source, difficulties in retaining workers and the gradual decline of local communities are interrelated issues that are being exacerbated by the growing reliance on fly-in/fly-out practices.

Table 6-43 Genders and age groups in Radisson and Matagami

Age groups	Radisson				Matagami				Nord-du-Québec	
	Total		Men	Women	Total		Men	Women	Total	
	Number	%	Number	Number	Number	%	Number	Number	Number	%
0 to 14 years	20	9.8	10	10	235	16.7	130	105	12,780	27.9
15 to 24	15	7.3	10	5	165	11.7	75	90	6895	15.1
25 to 44	55	26.9	30	15	360	25.6	180	165	12,000	26.2
45 to 64	90	43.9	55	25	410	29.3	215	195	9910	21.7
65 and over	30	14.6	15	10	235	16.7	125	105	4155	9.1
Total	**205**	**100**	**120**	**80**	**1405**	**100**	**730**	**670**	**45,740**	**100**

Note: Due to rounding to the nearest 5, totals may not add up exactly.
Source: Statistics Canada, 2023b.

Nord-du-Québec has recorded a negative interregional migration balance for several years. In 2023, 279 residents left the administrative region, including 138 who had been living in Jamésie prior to their departure. However, the population of Nord-du-Québec is projected to grow by 16.9% between 2021 and 2051. It is expected to be the only administrative region where births will outnumber deaths; elsewhere in Québec, the opposite trend is projected to begin in 2039 (ISQ, 2024b). In Matagami, however—as in other non-Indigenous communities in Nord-du-Québec—the population is expected to decline. According to ISQ projections, it is expected to decrease from 1,407 to 1,233 residents by 2041 (-12.4%) (ISQ, 2024a). No projections are available for the locality of Radisson.

Population density in 2021 was 42.1 residents/km² in Radisson and 18.7 residents/km² in Matagami, both significantly higher than the provincial average of 6.5 residents/km².

Language and identity

In Radisson, nearly all residents (97.6%) reported speaking French at home, compared with 93.6% in Matagami. Approximately one-third of residents in both communities reported knowledge of both French and English (29.6% in Matagami and 36.6% in Radisson). Only in Matagami did a small proportion of residents report speaking English only (0.7%).

Fifty individuals (3.6%) in Matagami and approximately 10 individuals (5.9%) in Radisson reported an Indigenous identity (First Nations or Métis).

Housing

At the time of the last census, 61.9% of households in Radisson were single-person households, a proportion significantly higher than in Matagami (31.5%), Nord-du-Québec (23.2%), and Québec overall (35.1%).

The occupancy rate of private dwellings in Radisson was 44.7% in 2021, substantially lower than in Matagami and Nord-du-Québec (both close to 84%) (Table 6-44). Between 2016 and 2021, this rate declined by 16.6% in Radisson, reflecting the population outflow observed in the community (Statistics Canada, 2023b; 2017). While the homeownership rate in Matagami exceeds the rental rate, the opposite is true in Radisson, where more than half of households (55%) are renters. By comparison, this proportion is 30.9% across Québec (Statistics Canada, 2023b). However, according to the Director General of Radisson, the community faces a housing shortage, as many private dwellings are used to accommodate seasonal or fly-in/fly-out workers. Housing needs are estimated at approximately 200 units.

Table 6-44 Dwelling tenure and occupancy rates

		Radisson	Matagami	Nord-du-Québec	Québec
Private households by tenure (%)	Owner	45.0	78.5	35.6	59.9
	Renter	55.0	21.5	44.4	39.9
Occupancy rate of private housing[a]		44.7	83.8	83.9	92.6

a: The occupancy rate of private dwellings was calculated as follows: number of private dwellings occupied by usual residents divided by the total number of private dwellings.

Source: Statistics Canada, 2023b.

Access to housing has been identified as a barrier to the settlement of new households in Jamésie in a study on labour issues, commuting, and tax incentives in the James Bay region commissioned by the James Bay Regional Administration (Raymond Chabot Grant Thornton, 2022). In addition to availability, housing quality is also a concern, as the housing stock in some municipalities is aging. In Radisson (80%) and Matagami (76%), most dwellings were built between 1961 and 1980. In Radisson, 20% of homeowner households reported core housing[14] needs, a much higher proportion than in Matagami (4.3%). However, no dwellings in Radisson required major repairs, compared with 5% in Matagami. By comparison, this proportion is 16.9% in Nord-du-Québec and 6.3% in Québec overall (Statistics Canada, 2023b).

The average value of dwellings was $84,000 in Radisson and $98,000 in Matagami, both significantly lower than the Québec average of $143,000 (Statistics Canada, 2023b). Construction costs can sometimes exceed market values, and in some Jamésie communities—where the economy is based on natural resource development—housing prices may fluctuate with economic activity. In this context, the closure of the Matagami mine in 2022 likely contributed to a decline in housing prices in the municipality.

According to a representative from Centraide Abitibi-Témiscamingue and Nord-du-Québec consulted as part of the project, household composition is changing in the region. She noted that 30% of people aged 60 and over now live alone in Nord-du-Québec, contributing to increased demand for housing and raising concerns related to social isolation.

Education

In 2021, the proportion of the population with at least a high school diploma in Radisson (83.3%) was similar to that of Québec (79.4%). By comparison, this proportion was lower in Matagami (67.4%) and in Nord-du-Québec (50.2%).

Radisson stands out for its relatively high proportion of individuals with a trade or vocational diploma (or apprenticeship certificate), a type of qualification that remains more common among men (Table 6-45). Like Matagami (11.7%) and Nord-du-Québec (7.4%), Radisson (10.0%) had a lower proportion of individuals holding a bachelor's degree or higher than Québec as a whole (23.5%) (Statistics Canada, 2023b).

Table 6-45 Highest level of education attained by the population aged 15 and over, 2021

Level of education	Radisson			Matagami			Nord-du-Québec	Québec
	Total (%)	Men (number)	Women (number)	Total (	Men (number)	Women (number)	Total (%)	Total (%)
No certificate, diploma, or degree	16.7	15	10	28.3	160	165	44.0	18.2
High school diploma or equivalent	20.0	20	10	20	90	140	18.7	21.4
Apprenticeship or vocational school diploma/certificate (vocational training)	33.3	30	15	22.6	200	65	14.6	15.8
College diploma or certificate, or some university studies below the bachelor's level	20.0	10	10	17	85	105	15.3	21.1
Bachelor's degree or higher	10.0	0	15	11.7	65	70	7.4	23.5

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023b.

14 A household is considered to be in core housing need if it lives in a dwelling that does not meet one or more standards of adequacy, suitability, or affordability, and if it would have to spend at least 30% of its pre-tax income to obtain alternative housing in the community that meets all three standards.

Under the responsibility of the James Bay School Service Centre, Jacques-Rousseau School is located in the locality of Radisson. The school provides educational services from preschool through Secondary V (Grade 11) (CSSBJ, 2023). Although the locality has relatively few school-aged children, the Coordinator of Sports, Recreation, Culture, Tourism, and Community Life indicated that the James Bay School Service Centre is working on the construction of a new school in Radisson. The nearest CEGEP is in Abitibi-Témiscamingue, with campuses in Rouyn-Noranda, Amos, and Val-d'Or, all located approximately 600 km south of Radisson as the crow flies (or about 800 to 900 km by road).

In Matagami, Galinée Elementary School and Delta High School each serve approximately 100 students. A childcare centre (CPE) can accommodate up to 39 children on-site and coordinates an additional 15 home-based childcare spaces. In addition, an adult general education centre provides a range of services and resources to the population (Matagami, 2024).

At the regional level, the James Bay Vocational Training Centre (CFP Baie-James), located in Chibougamau, offers a wide range of training programs across several sectors, including mining, forestry, construction, mechanics, welding, health, and administration. To ensure alignment between training and regional labour market needs, program offerings are developed in collaboration with the Commission de la construction du Québec, the regional agency, and Emploi-Québec. CFP Baie-James operates two service points, one in Matagami and the other in Lebel-sur-Quévillon. Since 2007, it has entered into agreements with mining companies operating in Nord-du-Québec to deliver the mineral extraction program at their facilities. The centre also offers training in ore processing equipment operation, drilling, and blasting. Since 2025, new programs have been introduced, including Electric and Hybrid andConstruction Equipment Mechanics and Electrical and Telecommunications Line Installation (CSSBJ, 2025; CFPBJ, 2025).

Income

In Matagami, the median gross income for the working-age population (15 years and over) was $48,800 in 2020. The average pre-tax income reached $56,800. These figures are higher than those for the Nord-du-Québec region, where the median gross income was $43,600 and the average total income was $51,080. However, it should be noted that in Matagami, men's incomes are nearly double those of women. Median total income was $64,500 for men compared with $34,800 for women, while average total income was $72,800 for men and $39,000 for women. Gender disparities are much less pronounced across Nord-du-Québec and Québec as a whole, although women's incomes remain generally lower.

In Matagami, 75 individuals (6.2% of women and 4.4% of men) were living in low income, based on the after-tax low-income measure. In the Nord-du-Québec region, a larger share of the population is in a low-income situation (9.6% of women and 9% of men). In both areas, women aged 65 and over are the most affected (20% in Matagami and 16.6% in Nord-du-Québec).

For confidentiality reasons, Statistics Canada does not publish income data for Radisson. However, according to stakeholders from the Radisson Health Centre consulted as part of this project, the locality has a very high level of social deprivation.

Employment situation

In Radisson, the labour force participation rate (86.7%) was significantly higher than in Matagami and Nord-du-Québec (Table 6-46). However, the participation rate among women (83.3%) was lower than that of men (94.1%). This gender gap is much wider in Radisson than in Matagami and Québec as a whole (5.9 and 6.5 percentage points, respectively). By contrast, for Nord-du-Québec overall, the gap is minimal (0.8 percentage points) (Statistics Canada, 2023b).

Overall, both the participation rate and the employment rate in Nord-du-Québec were lower than those observed for Québec as a whole, while unemployment rates were similar (see Table 6-10).

Table 6-46 Labour force participation, employment, and unemployment rates, 2021

	Radisson			Matagami			Nord-du-Québec	Québec
	Total	Men	Women	Total	Men	Women	Total	Total
Working-age population aged 15 and over (number)	130	80	50	720	400	325	20,615	4,435,465
Employed persons (number)	115	80	45	680	385	295	19,115	4,100,450
Unemployed (number)	10	10	10	35	10	30	1,500	335,015
Participation rate (%)	86.7	94.1	83.3	62.6	66.1	60.2	63.1	64.1
Employment rate (%)	76.7	94.1	75.0	59.1	63.6	54.6	58.5	59.3
Unemployment rate (%)[a]	7.7	12.5	20.0	4.9	2.5	9.2	7.3	7.6

a: At least one Statistics Canada data point for unemployment rates in Radisson appears to be inconsistent.
Source: Statistics Canada, 2023b.

In Radisson, no one was employed in the primary sector, unlike in Matagami, where about one-quarter of the labour force, primarily men, worked in this sector (Table 6-47). Although most jobs in both Matagami and Radisson were in the tertiary sector, the proportion was lower than in Nord-du-Québec and Québec as a whole.

Table 6-47 Distribution of the labour force by sector of activity, 2021

	Primary sector	Secondary sector	Tertiary sector	Not applicable
Radisson (%)	0	8.0	68.8	0
Matagami (%)	25.7	9.8	60.6	1.4
Nord-du-Québec (%)	6.9	9.9	80.7	2.4
Québec (%)	2.4	16.8	78.7	2.0

Source: Statistics Canada 2023b, WSP compilation.

Economic structure

The economies of the Jamésie municipalities are largely dependent on the energy, mining, and forestry sectors. In 2021, the share of employment in the primary sector was higher in Jamésie municipalities (10.6%) than in Nord-du-Québec (7.1%) (see previous section – Employment situation).

More specifically, Radisson’s economy is centred on hydroelectric power, which employs more than one-third of the workforce. In the late 1970s, Radisson had a population of approximately 2,500, consisting mainly of workers involved in the construction of the Hydro-Québec dam and generating station and their families. Today, the locality is home primarily to the families of Hydro-Québec employees responsible for maintaining the James Bay hydroelectric complexes. In addition to Hydro-Québec, the Director General of Radisson identified Transport Taïga, Air Inuit, CBJ Mécanique, Construction Paradox Inc., and Distribu-Nord as major local employers. A portion of the population is also employed in the growing tourism sector, which represents an avenue for diversifying the local economy (Grand Québec, 2025).

Matagami, for its part, originated as a mining town. According to the municipality, the closure of Matagami Mine in June 2022, after 59 years of operation, has contributed to local economic diversification and to the community taking greater control over its future (Matagami, 2025). A significant share of current economic activity is tied to the development of mining projects located near and north of the town. In this context, the Director General of Matagami, interviewed as part of this study, indicated that the municipality aims to position itself as a regional transportation hub, particularly in connection with the development of the critical and strategic minerals sector. These projects are expected to generate substantial traffic at the Matagami transshipment yard for decades to come. More broadly, the exploitation of natural resources in the region continues to play a key role in the town's economic vitality (Matagami, 2025). Following the acquisition of facilities by Chantiers Chibougamau in January 2025, operations at the Matagami sawmill are expected to resume. In addition, the municipality is developing its cultural sector through an urban revitalization program that includes a community greenhouse, public art installations, and an art gallery (Matagami, 2025).

The expansion of transportation infrastructure being studied as part of La Grande Alliance could stimulate the local economy by creating jobs in the transportation, construction, and logistics sectors, particularly through the presence of temporary workers assigned to industrial and mining projects. These improvements could also support the development of services and businesses in Radisson, Matagami, and Cree communities to meet the growing needs of workers and residents.

Community well-being and human health

The James Bay Regional Health and Social Services Centre (CRSSSBJ) is the sole institution providing health and social services to the Jamésie population. It operates as a general and specialized hospital, a local community service centre (CLSC), a residential and long-term care centre, and a rehabilitation centre. It maintains health centres in five Jamésie communities: Chapais, Chibougamau, Lebel-sur-Quévillon, Matagami, and Radisson.

In terms of social well-being, Centraide Abitibi-Témiscamingue and Nord-du-Québec plays an important role as a sustainable driver of development aimed at improving collective well-being and reducing social inequalities. Its actions focus on four areas: youth success, meeting basic needs, inclusion of vulnerable and marginalized individuals, and the development of inclusive living environments. One of the organization's representatives, interviewed as part of this study, identified several key challenges facing Jamésie residents, including housing shortages, social isolation, access to services, and food security (quality, variety, and freshness), particularly given the vastness of the territory. She noted that Centraide relies primarily on private partners rather than government funding. The organization is also working to establish a social development committee for Nord-du-Québec, with a coordinated approach to social investment that prioritizes structured rather than sporadic funding for community initiatives. In addition, it is involved in implementing the Mining Industry Social Investment Fund (FISIM), which is funded by mining sector stakeholders and aims to support both social and environmental restoration in communities hosting mining projects.

The 2020-2021 Québec Population Health Survey provides insight into the health status of the population and its determinants. In Nord-du-Québec, four indicators (self-perceived poor health, unintentional injury, psychological distress, and serious thoughts of suicide) have remained relatively stable since the 2014-2015 survey (Marleau, 2024). In 2020-2021, the proportion of Jamésie residents experiencing high psychological distress was significantly lower than elsewhere in Québec (34% compared with 39%). A similar trend is observed for generalized anxiety (8% compared with 11%). This may be explained by lower dissatisfaction with social life (i.e., less perceived isolation), stronger family support, a greater sense of belonging to the community, and a better balance between work and personal or family responsibilities. Overall, while most health indicators are similar to those observed across Québec, Nord-du-Québec presents a more favourable mental health profile (Marleau, 2024).

A representative from the CRSSSBJ Public Health Department interviewed for this study identified child development, educational success, youth mental health (particularly among adolescents), substance use (drugs and alcohol), social cohesion, access to early childhood education services, and food insecurity as priority health and social issues in Jamésie. With respect to food security, he noted that the region is not self-sufficient. Food prices are high and quality can vary. For many residents and stakeholders, this situation highlights the need to develop greater local food expertise. The representative also identified seniors and individuals with chronic illnesses as the most vulnerable groups and emphasized the challenges faced by residents of remote communities in accessing specialized health care.

Radisson

The Radisson Health Centre provides services similar to those of a local community service centre (CLSC), with the addition of emergency care. According to the centre's manager, interviewed in 2025 as part of this project, the staff includes a family physician (available almost at all times), two nurses, an administrative assistant, and a team leader. The centre primarily serves the approximately 150 residents of Radisson, as well as temporary workers, particularly those employed by Hydro-Québec and Air Inuit. No patients are hospitalized at the Radisson Health Centre; instead, they are transferred to facilities in Abitibi-Témiscamingue. The centre also deploys two pre-hospital emergency response teams along the Billy-Diamond Highway. It operates in partnership with the Chisasibi Hospital Centre, where residents can access specialist consultations, radiological examinations, and other clinical and medical services.

According to health centre staff interviewed, the main health and social issues in Radisson are mental health and substance use (drugs and alcohol). Oral health is also a recurring concern, as residents only have access to a dental hygienist twice a year and no dentist visits the community. In addition, residents with chronic illnesses cannot be treated locally and must leave the community to receive care. Access to specialized health services is therefore limited, increasing the vulnerability of those who require such care due to the community's isolation.

With regard to community well-being, stakeholders noted that businesses in the region are increasingly relying on fly-in/fly-out (FIFO) work arrangements. This trend has contributed to the gradual departure of permanent residents and, consequently, to a weakening of the community's social fabric. Radisson is also characterized by a very high social deprivation index. In addition, according to a local stakeholder interviewed as part of this study, the presence of transient populations, such as commuting workers, seasonal workers, and residents of nearby Indigenous communities, can raise public safety concerns.

Environmental factors also affect the well-being of Radisson residents. Stakeholders emphasized the impacts of climate change on public health, particularly forest fires such as the 2023 event, which significantly affected air quality and led to the evacuation of the community. Extreme weather events can also restrict access to the territory, especially when they result in the closure of the Billy-Diamond Highway, Route du Nord, or Trans-Taiga *Road*. Such closures can in turn disrupt supply chains and food security, as Radisson relies on truck deliveries to supply its grocery store.

Stakeholders also noted that some FIFO workers prefer to bring their own supplies rather than shop locally. Many residents rely in part on "country foods," but this practice has become increasingly difficult to maintain since the moratorium on caribou hunting and the introduction of restrictions on moose hunting. According to those interviewed, fishing appears to be relatively uncommon. However, other stakeholders raised concerns about poaching and non-compliance with hunting and fishing quotas, noting that the local wildlife office has limited resources to educate commuting workers about regulatory requirements.

Matagami

The Isle-Dieu Health Centre in Matagami, which is part of the James Bay Regional Health and Social Services Centre, provides family medicine services through a team of five family physicians, supported by associate and locum physicians. The emergency department has a low patient volume and functions both as a walk-in clinic and as a trauma stabilization centre. CLSC-type services by appointment are also available, along with short-term hospitalization (four beds) and long-term care and accommodation services (also four beds). Teleconsultation, teleradiology, and other technology-based services are offered to address the region's remoteness from major urban centres (CRSSSBJ, undated).

Land use and infrastructure

Radisson

Infrastructure

Radisson is located at the northern end of the Billy-Diamond Highway, the only road link connecting the town—and the Cree communities of Waskaganish, Eastmain, Wemindji, Nemaska, and Chisasibi—to the rest of Québec.

The town also has an airport that primarily serves air transportation related to the hydroelectric industry (see Section 6.4.2). Radisson lies at the heart of the La Grande hydroelectric complex, which includes the Robert-Bourassa and La Grande-2-A generating stations, the La Grande-2 and Radisson substations, and various related technical facilities and transmission infrastructure. This energy infrastructure is the cornerstone of the local economy. Although limited, the commercial sector includes essential services such as grocery stores, retail outlets, and administrative services. However, some stakeholders reported a decline in local services in recent years. For example, Société de l'assurance automobile du Québec (SAAQ) offices are now located in Chisasibi, and the local credit union has closed. Residents now rely on ATMs, which charge higher service fees.

In terms of water supply and sanitation, Radisson has systems adapted to the needs of its population, although they are modest compared to those of larger urban centres. The community also handles wastewater and domestic waste from the Shaakichiuwaanaan exploration camp and supplies it with drinking water.

Vacationing, recreational activities, and existing and planned recreational facilities

Residents and visitors can enjoy a variety of outdoor activities, including fishing, hunting, hiking, and water sports on La Grande Rivière and the Robert-Bourassa reservoir. In winter, the region is well suited to cross-country skiing and snowmobiling. The 2.5-km Radisson Linear Park provides access to a lookout with views of La Grande Rivière and the Robert-Bourassa hydroelectric facilities.

The lands along the Trans-Taiga Road are popular moose hunting areas for local residents. Stakeholders noted that Radisson previously had an outfitter, which closed following the moratorium on sport hunting of caribou. This outfitter had offered rentals of recreational equipment such as snowmobiles, ATVs, boats, and hunting and fishing gear. No such rental services are currently available.

The town also has a sports complex with an arena and a soccer field, as well as a community centre for social and cultural events (Localité de Radisson, 2024). Radisson maintains local snowmobile trails and three heated shelters, one of which follows the Billy-Diamond Highway to Duncan Lake (FCMQ, 2024). However, according to the Coordinator of Sports, Recreation, Culture, Tourism, and Community Life, the organization relies on only two active volunteers, making it difficult to maintain the trails and shelters. The local trail network is not part of a structured regional system and must comply with rights of way on Cree lands. The community hopes to collaborate on the development of a snowmobile trail network along the Trans-Taiga Road.

Radisson has three hotels serving both workers and tourists, as well as a campground with 40 sites. Visitors can tour the La Grande-1 and Robert-Bourassa hydroelectric facilities. Notably, Radisson is home to the last restaurant and gas station along the Billy-Diamond Highway beyond the kilometre 381 truck stop, located more than 200 km away.

Matagami

Infrastructure

The Town of Matagami owns the transshipment yard located near the junction of Highway 109 and the Billy-Diamond Highway. It has a local rail network of more than 3 km used for rail transshipment and also provides supply management, bulk materials handling, and indoor and outdoor storage services.

The Société de développement de la Baie-James (SDBJ) manages the Matagami aerodrome, which is owned by the Ministère des Transports et de la Mobilité durable (MTMD). Flights operate to destinations including the Éléonore Mine and Rouyn-Noranda.

Vacationing, recreational activities, and existing and planned recreational facilities

Residents and visitors can take part in a variety of recreational and tourism activities, such as hunting and fishing. The municipality also features a network of hiking trails totalling 67 km. Lake Matagami is well suited to water sports.

Most socio-cultural and sporting activities take place at the Matagami civic centre. The facility includes a swimming pool, a library, a bowling alley, and a multipurpose hall. It also houses a seniors' centre and a youth centre. Matagami also has an arena, which is converted into a skate park for roller sports during the summer. The arena also hosts playground activities and various special events, such as the Nord-du-Québec Youth Gathering, the Seniors' Gathering, and Family Week. Near the arena, there is a tennis court and a multi-sport field with surfaces for hockey, basketball, and badminton. The municipality also has a golf course.

Regional snowmobile trail 396, which connects Lebel-sur-Quévillon to Saint-Dominique-du-Rosaire, is accessible from Matagami. It also provides access to Trans-Québec trail 93, which crosses the administrative regions of Abitibi-Témiscamingue, Saguenay–Lac-Saint-Jean, and Côte-Nord. Several local snowmobile trails also originate at the junction with regional trail 396. One follows Highway 109, while others provide access to Nottaway and Bell streets, as well as Matagami Boulevard, the Bell River, and Lake Matagami (FCMQ, 2024).

The municipality offers a range of accommodations, including a hotel, a motel, and bed-and-breakfast establishments. During the summer season, a campground with 85 sites is available to visitors.

Local study area

Infrastructure

Infrastructure within the local study area is described in Section 6.4.2.

Resort, recreational facilities, and hunting and fishing activities

The project site is located in hunting zone 22 North and overlaps fur-bearing animal management units (UGAF) 91 and 94 (Government of Québec, 2022a, 2022b). Fishing for lake trout and walleye is also a popular activity. As noted, the Shaakichiuwaanaan mining project is located on Category III lands. These lands are open to all; however, the Cree retain exclusive hunting and trapping rights for fur-bearing species, as well as fishing rights for certain aquatic species, including lake whitefish, yellow sturgeon, burbot, and sucker species.

There are no active outfitters in the local study area. The former Mirage Aventure outfitter, located approximately 75 km east of the project at kilometre 358 of the Trans-Taiga Road, was transferred to the Chisasibi First Nation in 2024 (Sections 6.4.2 and 6.4.3). It should also be noted that the infrastructure of the former Nouchimi outfitter, located at kilometre 286 of the Trans-Taiga Road, along with some of its satellite camps, was dismantled in 2022 (COMEV, 2025). Since the ban on sport hunting of caribou—introduced in 2018 for the Rivière aux Feuilles herd and in 2011 for the Rivière George herd—several outfitters have ceased operations (Lecavalier, 2017).

According to the Executive Director of Tourisme Baie-James, the local study area may be visited for recreational tourism purposes by adventure tourism enthusiasts and vanlife travellers. However, no recreational tourism projects are currently under development in the area.

The nearest recreational lease is located approximately 18 km southwest of the project site, on the west shore of Lake Corvette (Map 6-19). Eleven (11) additional recreational leases are located within the local human environment study area.

Mining titles and extraction areas

The local study area includes, in whole or in part, 10,032 active exclusive exploration rights (formerly mining claims) held by 70 companies or individuals. PMET holds 463 of these, representing 4.6% of all identified claims. Other major holders include Azimut Exploration Inc. (1,692), Glenn Griesbach (740), SOQUEM Inc. (735), Qi Énergétique Québec Ltée (660), Midland Exploration Inc. (499), NQC Lithium Corp. (473), and Rio Tinto Exploration Canada Inc. (417).

The local study area also includes 15 active extraction sites, most of which are located along the Trans-Taiga Road (Map 6-19). These surface mineral extraction sites include four gravel pits, nine sand pits, and two crushed stone quarries, which are generally operated under certain conditions. They are owned in particular by the Société d’énergie de la Baie-James, the Société de la Baie-James, Hydro-Québec, and the former Mirage outfitter.

In 2023, in the exceptional context of forest fires that prevented certain mineral exploration work from being carried out during the summer, the Ministère des Ressources naturelles et des Forêts announced a one-year suspension of the validity period of certain mining claims (effective August 14, 2023), particularly in the Eeyou Istchee James Bay region (MRNF, 2023). It should also be noted that the *Act to amend the Mining Act and other provisions* (2024, chapter 36), adopted in November 2024, introduced several changes to Québec’s mining regime. In particular, the method for granting claims, now referred to as “exclusive exploration right”, as well as certain conditions governing their exercise, were revised.

6.4.5 Regional economy

In 2022, the gross domestic product (GDP) of the Nord-du-Québec administrative region totalled $5.844 billion, representing 1% of Québec's overall GDP of $505.160 billion. Between 2014 and 2022, the region recorded an average annual GDP growth rate of 6.7%, the highest among Québec's administrative regions during this period (ISQ, 2024b). Based on 2022 GDP, the region's main economic sectors were mining, quarrying, and oil and gas extraction (45.9%); construction (13.3%); public utilities (8.9%); public administration (7.3%); and health care and social assistance (6.3%) (ISQ, 2024b).

The mineral resource extraction sector accounted for 18.1% of Nord-du-Québec's GDP. Investment expenditures by mining companies in the region represented 1.8% of total investment spending in this sector across Québec. The Nord-du-Québec administrative region had 4,075 direct jobs related to mining, representing 26.1% of all mining jobs in the province—the second-largest share after Abitibi-Témiscamingue among Québec's administrative regions (EcoTec Consultants, 2024).

Mining sector workforce

In 2023, the Nord-du-Québec region had 6,059 jobs in the mining industry (CSMO Mines, 2024), more than half of which (52.3%) were in mining operations. According to forecasts by the Comité sectoriel de main-d'œuvre de l'industrie des mines (CSMO Mines), the mining workforce in Nord-du-Québec is expected to reach 6,886 workers in 2028 and 6,979 in 2033, representing a 12% increase compared to 2022. Between 2023 and 2028, the region will need to fill 5,938 mining jobs, accounting for 41% of all mining positions to be filled in Québec (CSMO Mines, 2024). CSMO Mines estimates that 56% of mining jobs to be filled in Québec by 2033 will require a vocational diploma. In Nord-du-Québec, the main occupations in demand are expected to include miners (1,095 positions); drillers and diamond drill assistants (819); heavy equipment mechanics, hydraulic mechanics, and mobile heavy equipment mechanics (511); ore processing machine operators (479); heavy equipment operators (464); cooks and assistant cooks (158); and industrial mechanics (152). In addition to positions requiring vocational training, openings are also expected for geologists (179), which require university education, as well as for metalworking labourers (166) and exploration labourers (145), which do not require specific training. Greater participation by underrepresented groups in the mining industry, particularly Indigenous workers, could help address part of the labour demand (CSMO Mines, 2024).

Use of commuting

According to a study on labour issues, commuting, and tax incentives specific to the James Bay territory conducted by Raymond Chabot Grant Thornton (2022), slightly more than one in four jobs in Eeyou Istchee–James Bay[15] is filled by a commuting worker, excluding jobs in Cree communities. The study indicates that between 2017 and 2021, the number of job vacancies[16] in the Nord-du-Québec–Côte-Nord region increased by an average of 9.7% (4,585 vacant positions)[17]. In the health and social services sector specifically, vacancies rose by an average of 16.9% per year. Although the vacancy rate in the Nord-du-Québec–Côte-Nord region is expected to decline in 2024, it will likely remain among the highest in Québec, at 4.5%, with 3,235 positions to be filled (ISQ, 2025).

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15 Data are based on all companies surveyed (16) for the study. Statistics Canada reported that 17.6% of workers in the region were commuters in 2016 (Raymond Chabot Grant Thornton, 2022).

16 The job vacancy rate measures unmet labour demand and indicates how easily companies are able to fill their workforce needs.

17 These data exclude industries with headquarters located outside the region. As a result, the actual number of job vacancies may be underestimated.

Employers in the region identify the lack of qualified, skilled, and experienced candidates, as well as the remote and isolated nature of the workplace, as the main factors contributing to recruitment difficulties. Salary conditions are also cited as a barrier. In recent years, widespread wage increases across Québec in response to labour shortages have reduced the gap with the salary incentives that once distinguished the James Bay region. In Côte-Nord and Nord-du-Québec, only the trades, transportation and equipment sector and the manufacturing and utilities sector offer average wages above the Québec average (by 13.3% and 28.1%, respectively). As a result, recruitment challenges at the regional level are prompting companies to rely more heavily on commuting to fill vacant positions (Raymond Chabot Grant Thornton, 2022).

Certain sectors related to natural resource development find it easier to recruit commuting workers, as they offer more attractive salary conditions than those available in workers' home regions (Tremblay, 2020). Mining companies in particular rely on commuting to meet their labour needs. According to a 2022 study on the economic impact of Québec's mining industry, only 13.5% of workers employed in mines in Nord-du-Québec resided in the region, while 32.1% came from Abitibi-Témiscamingue (EcoTec Consultants, 2024).

In 2022, the mining sector offered an average annual salary of $117,916—more than twice the median employment income in Québec, which stood at $54,328 (EcoTec Consultants, 2024).

6.4.6 Traffic

Existing traffic volumes on the Trans-Taiga Road were determined through two camera-based counting campaigns conducted over seven consecutive days, from March 15 to 21, 2025, and from May 1 to 7, 2025. Counts were carried out near the current mining camp, approximately 268 km east of the Billy-Diamond Highway and about 40 km west of the La Grande-4 (LG-4) dam.

Between March 15 and 21, 2025, a total of 181 vehicles were recorded in both directions, including 74 heavy vehicles (41% of all vehicles counted). Of these, 141 vehicles (78%) travelled on weekdays. Heavy vehicles also predominantly travelled on weekdays, with 63 recorded (85% of all heavy vehicles). Wednesday was the busiest day, with 48 vehicles, including 23 heavy vehicles. Eastbound traffic accounted for 101 vehicles (55% of total traffic), with heavy vehicles representing 43% of eastbound traffic. This period is considered representative of typical traffic conditions on the Trans-Taiga Road. Overall, traffic volumes were low, with peak flows of fewer than 10 vehicles per hour in both directions combined and fewer than 40 vehicles over a 24-hour period.

Between May 1 and 7, 2025, a total of 374 vehicles were recorded in both directions, including 64 heavy vehicles (15% of all vehicles counted). As in March, most traffic occurred on weekdays, with 242 vehicles (64.7% of total traffic). Heavy vehicles also travelled mainly on weekdays, with 53 recorded (82.8% of all heavy vehicles). Weekend traffic increased, with 132 vehicles recorded—an increase of 13.3% compared to the March period—although heavy vehicle traffic remained unchanged. Eastbound traffic remained predominant, with 244 vehicles (65.2% of total traffic).

Sunday was the busiest day, with 70 vehicles recorded, followed closely by Wednesday with 68 vehicles. This period corresponds to increased traffic associated with the "Goose Break," when members of Cree communities travel to the territory for goose hunting. Although overall traffic volumes were higher, the increase is mainly attributable to weekend travel, with vehicle counts rising from 40 to 132. Despite this increase, traffic volumes remain relatively low. There are therefore no current traffic-related issues on the Trans-Taiga Road, which has a theoretical capacity of several hundred vehicles per hour in each direction.

6.4.7 Archeology

An archaeological potential study was conducted by Archéoconsultant (2024) to cover the area surrounding the mining sector (Appendix 6-26). Following this analysis, an archaeological inventory was carried out in 2025 to identify areas with archaeological potential within the sector targeted by the work (Appendix 6-27).

6.4.7.1 Known archaeological sites

Four archaeological sites have been identified along the shores of Hammerhead Lake (Lake Katatipawasakakamaw), located approximately 30 km northeast of the project site, along the Trans-Taiga Road. No other known sites are located near the project site (Archéoconsultant, 2024).

6.4.7.2 Archaeological and cultural potential of the area

The study area is bordered by several watercourses and bodies of water: Lake Corvette to the south, La Grande Rivière to the north, Lake Magin to the west, and Lake Nochet to the east (Archéoconsultant, 2024). Although secondary, the local hydrographic network may have served as a travel corridor between the Lake Corvette basin and La Grande Rivière, used by the Eeyouch and their ancestors.

It should also be noted that birth sites, burial sites, and former camps identified by land users consulted as part of this project are discussed for each community in the sections on historical and cultural heritage and on sites and features of significance.

Paleohistoric sites in Eeyou Istchee typically consist of camp remains buried at shallow depths, often less than 30 cm. Earlier paleohistoric sites are primarily composed of lithic debris and roughly shaped tools, reflecting occupation by small nomadic groups making short stays at strategic locations.

Later paleohistoric sites show a similar lithic composition but with increased use of materials sourced within the territory—notably grey chert from the Labrador Trough and Mistissini quartzite—suggesting stronger exchanges between groups and a more sustained occupation of inland areas.

During the colonial period, marked by the expansion of the fur trade, archaeological sites are characterized by the presence of goods of European origin, and trading posts became structuring hubs in seasonal movements. In the 20th century, residential schools, forced relocations, and the creation of reserves profoundly transformed patterns of land use, although occupation remained active during the second half of the century (Archéoconsultant, 2024). The study area is remote from the main non-Indigenous developments, with the nearest former trading posts (Neoskweskau, Nichikun, Kaniapiskau, and Kanaaupscow) located more than 150 km from the project site. However, former camps of explorers, surveyors, or prospectors may be found near lakes and waterways within the study area (Archéoconsultant, 2024).

6.4.7.3 Archaeological potential study and inventory

Covering an area of 74 km², the archaeological potential study area was subdivided into 354 sectors with Indigenous archaeological potential, including 273 sectors with medium potential (3.42 km²) and 81 with high potential (0.21 km²). The remainder of the area was assessed as having low to no archaeological potential (Appendix 6-21).

In 2025, Archéoconsultant conducted an archaeological inventory to verify the presence of remains in 131 of the areas identified as having potential. In the event of a discovery, the objective was to assess its heritage value, evaluate potential project impacts, and recommend appropriate mitigation measures (Appendix 6-22).

Archaeological remains were identified in four areas: zones 72 (25-FG-2), 96 (25-FG-3), and 126 (25-FG-1), as well as an additional area identified during fieldwork. Two sites were assigned Borden codes: FjFI-3 (zone 72) and FjFI-2 (zone 126). All remains are associated with Indigenous occupation of the area during the Paleohistoric and Colonial periods. The sites are concentrated along the corridor linking Lake Shaakichiuwaanaan to its outlet and extending to the unnamed lake into which it flows to the northwest. This concentration suggests the presence of a travel corridor between Lake Corvette and La Grande Rivière during these periods.

A multifunctional Ramah quartzite tool, approximately 5 cm in length, was discovered in zone 72. Despite surrounding disturbances caused by drilling, its immediate context remained intact. The artifact was found a few metres from a rocky bank approximately 1 m high overlooking Lake Shaakichiuwaanaan. Two non-exclusive hypotheses may explain its presence: it may represent the remains of an ancient Indigenous camp or a ritual deposit. Given this potential spiritual dimension, site FjFI-3 is considered to have significant heritage value. However, no other evidence of occupation was identified during the survey, suggesting the site contains only this single artifact, which has since been removed for conservation. Consequently, the risk of impact from the proposed project remains low, and no additional protective measures are considered necessary.

A tin teapot lid, likely dating from the first half of the 20th century, was discovered in zone 96. It was likely lost during a stopover, possibly by an Indigenous occupant. No other artifacts were identified, either during subsurface testing or on the surface.

Zone 126 yielded seven quartz flakes clustered within an area of approximately 10 to 20 m². Site FjFI-2, located near a small bay at the mouth of the river draining Lake Shaakichiuwaanaan, may correspond to a small Paleohistoric Indigenous camp. The site is not threatened by the current project, as the planned footprint does not encroach on it. However, if the project design were to change to include this area, the site's heritage value would warrant the implementation of additional mitigation measures. This is also the only area considered likely to contain additional remains.

Following a recommendation from a Cree worker involved in the drilling program, a site located outside the inventory area was subject to an unplanned visual inspection. A small grouping of flat stones arranged vertically and partially resting on moss was observed. The presence of stones resting on moss suggests a relatively recent arrangement, although a natural origin cannot be ruled out. An inspection within a 300 m radius of this presumed structure revealed no additional evidence of occupation.

In the event of a chance discovery of archaeological remains during the work, those responsible will immediately notify the appropriate authority and follow the prescribed procedures. Any discoveries related to First Nations heritage will be reported to the relevant Indigenous authorities, including the local council and the Cree Nation Government.

An action plan for accidental discoveries, included in the technical documentation of the archaeological potential study, may be consulted if required. As the archaeological inventory focused exclusively on terrestrial areas, the portion of Lake Shaakichiuwaanaan that will be dewatered during the work will be subject to the chance discovery procedure.

6.4.8 Landscape

The landscape analysis related to the project was carried out in accordance with standard approaches, including a review of existing documentation, analysis of aerial photographs, and a field visit during which photographs of surrounding landscapes and key viewpoints were taken. This section summarizes the main findings of the sectoral report presented in Appendix 6-28.

6.4.8.1 Regional landscape

The human environment study area overlaps the eastern portion of the La Grande Rivière Hills natural province (Li and Ducruc, 2019). This province is characterized by a very cold, dry climate with a short growing season, except in its southeastern tip, where the climate is more humid and the growing season is of average length. The terrain consists of an undulating plain dotted with abundant exposed bedrock, particularly near the coasts of James Bay and Hudson Bay and in the central portion of the territory. To the east, small buttes and hills appear in a dense spatial pattern. Elevation ranges from sea level to approximately 400 m in the eastern part of the province and reaches up to 600 m at the foothills of the Otish Mountains in the southeast. Two major tectonic depressions structure the territory: the La Grande Rivière depression, which includes the Robert-Bourassa and La Grande 3 reservoirs, and the Lac Guillaume-Delisle graben. The hydrographic network is dense, nearly parallel, and generally oriented east–west, clearly reflecting the structural pattern of the bedrock. It includes the lower reaches of the Sakami River, La Grande Rivière, the Great Whale River, and the Little Whale River. A defining feature of this network is the presence of the large Robert-Bourassa and La Grande 4 hydroelectric reservoirs. Vegetation cover is predominantly coniferous, consisting mainly of open coniferous forests and sparse woodlands. Lichen heaths, wooded heaths, and burn areas cover nearly 40% of the territory. The population is concentrated in Radisson and Kuujjuarapik, and the regional economy is based primarily on hydroelectric development.

6.4.8.2 Landscape of the study area

The landscape of the study area is an uninhabited natural environment. In its northern portion, the study area includes part of the La Grande Rivière depression, which contains the river of the same name. La Grande Rivière crosses the area from east to west, linking the La Grande 3 and La Grande 4 reservoirs. The Trans-Taiga Road, along with two energy transmission corridors, also follows this axis, strongly structuring the landscape in this sector.

The central portion of the study area is characterized by numerous lakes nestled between hills. To the south, Lake Corvette stands out due to its larger surface area compared to other water bodies in the area. The lake is bordered by hills to the north, east, and south, from which it receives runoff. Undulating plains, which gradually widen toward the west, form a transition between the lake and the surrounding hills.

Vegetation cover in the study area consists mainly of low-density forests, generally spruce stands with lichens and mosses, along with areas of lichen heath. In addition, as wildfires have occurred in the region over the past 20 years, several areas of forest regeneration are present.

6.4.8.3 Specific landscape components

Tourist route

On its official tourism website, the Eeyou Istchee James Bay Regional Government highlights the Trans-Taiga Road as a tourist route renowned[18] for its remarkable landscapes (Map 6-20). It can therefore be considered a scenic route.

Areas of visual interest

The Cree communities of Eeyou Istchee value La Grande Rivière, Lake Corvette, and their surrounding areas. These features can be considered areas of visual interest (Map 6-20). The communities also place importance on areas of the territory that remain undisturbed.

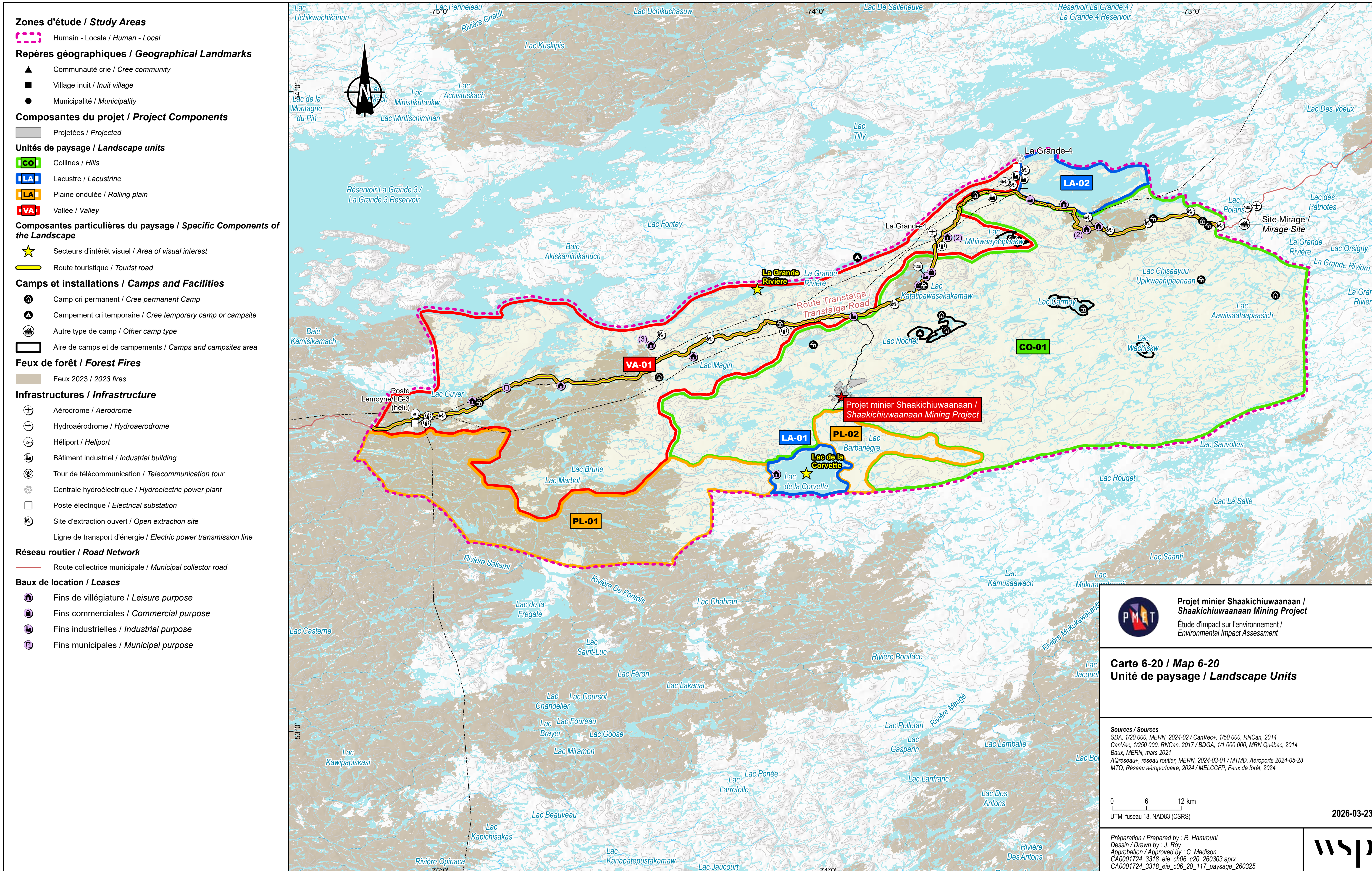
6.4.8.4 Landscape units

The study area has been divided into a number of landscape units, grouped into four types based on the homogeneity of permanent landscape features and prevailing visual characteristics, as follows:

- valley landscape (Va);
- hilly landscape (Co);
- undulating plain landscape (Pl);
- lake landscape (La).

These landscape units are illustrated in Map 6-20 and described in Tables 6-48 to 6-50. Photos 6-1 to 6-5 present representative views of each landscape unit.

18 Eeyou Istchee Baie-James. 2025. Motorcycle Touring. https://www.eeyouistcheebaiejames.com/fr/quoi-faire/mototourisme/



La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Valley landscape unit (VA-01)

Photo 6-1 Aerial view from the top of a hill looking southeast (landscape unit VA-01)

Photo 6-2 Deep perspective along the La Grande Rivière axis looking southwest (landscape unit VA-01)[19]

Table 6-48 Valley landscape unit (VA-01)

Components	Description
Boundaries and specific land use	– The main visible features are La Grande Rivière and its slopes, which are covered by coniferous forest of varying density. – There is a single valley landscape unit (VA-01), located in the northwest of the study area, representing approximately one-third of its total area. – Unit VA-01 includes permanent Cree camps.
Traffic routes and transportation corridors	– Trans-Taiga Road – La Grande Rivière – Four energy transmission corridors are connected to the Lemoyne substation. Two long corridors link the substation to the LG-4 reservoir, crossing the unit along an east–west axis. Two shorter corridor segments extend westward from the substation, crossing the western portion of the unit along north–south and west-oriented axes. – A few forest roads connect to the Trans-Taiga Road and, in some cases, to the energy transmission corridors.
Land use elements	– Vacation lease – Traplines also used for hunting and fishing activities – La Grande Rivière
Special landscape features	– La Grande Rivière – Natural landscape – Trans-Taiga Road (tourist route)
Relief	– The relief of the unit is characterized by a large valley with gentle slopes that stretches from east to west. Isolated hills, rising to an altitude of 485 m, dot the southern portion of La Grande Rivière in particular. – The unit is characterized by a broad valley with gentle slopes extending along an east-west axis. Isolated hills, reaching elevations of up to 485 m, are found mainly south of La Grande Rivière.
Hydrography	– La Grande Rivière, along with streams, lakes, and wetlands, is present within this valley landscape unit.
Vegetation	– Coniferous forest covers most of the unit, except within the energy transmission corridors. In some areas, regenerating conifer stands are present, resulting from past disturbances, often forest fires dating back several decades.

[19] Toolforge. 2025. *Wikimap* [carte interactive]. https://wikimap.toolforge.org/?wp=false&cluster=false&zoom=16&lat=053.620310&lon=-074.387484

Components	Description
Spatial organization	– Landscape unit VA-01 is organized around linear elements oriented along an east–west axis within a predominantly natural setting. – La Grande Rivière forms the northern boundary of the unit and reaches widths of up to approximately 1.5 km, acting as a key structuring feature of the territory. – The winding alignment of the Trans-Taiga Road follows the irregular topography, skirting isolated hills. – The energy transmission corridors (approximately 100 to 150 m wide) are characterized by low vegetation that contrasts with the surrounding, variably dense forest cover. – The irregular terrain and continuous forest cover create visual screening from transportation routes. – Numerous lakes are scattered throughout the unit, providing areas of visual openness proportional to their surface area. – Vacation leases and permanent Cree camps are located relatively close to the Trans-Taiga Road..
Observers	– Occupants of permanent Cree camps and vacation leases (temporary fixed observers) – Community members engaged in traditional activities (mobile or temporary fixed observers) – Users of transportation routes, as well as helicopter or airplane passengers and boaters (mobile observers)
Field of view	– The field of view is generally limited or filtered by terrain and forest cover. However, it can be extensive along the La Grande Rivière axis and along energy transmission corridors. Along the Trans-Taiga Road, visibility varies depending on the curvature of the route.
Pictorial qualities and visual perspectives	– The visual quality of the valley landscape unit is based on its natural character and the contrast between water bodies and adjacent wooded hills. – La Grande Rivière, the larger lakes, and the energy transmission corridors provide long, open sightlines.

Landscape unit VA-01 has moderate sensitivity, due to its natural character and the presence of La Grande Rivière, which is highly valued by the Cree communities of Eeyou Istchee. Overall visual accessibility is low because of forest cover and the limited number of observers, except along the Trans-Taiga Road and La Grande Rivière corridors.

Hills landscape unit (CO-01)

Photo 6-3 Aerial view from a helicopter looking east (landscape unit CO-01)

Table 6-49 Hills landscape unit (CO-01)

Components	Description
Boundaries and specific land use	– The main visible features of the unit consist of a succession of hills with coniferous forest cover of varying density, along with numerous lakes of different sizes and shapes. – There is a single hills landscape unit (CO-01), occupying approximately half of the study area. – The unit includes permanent Cree camps as well as one temporary Cree camp. – The Project infrastructure will be located within unit CO-01.
Traffic routes and transportation corridors	– Trans-Taiga Road – A few forest roads connected to the Trans-Taiga Road. – Hydroairport
Land use elements	– Vacation leases – Traplines that also host hunting and fishing activities
Special landscape features	– Natural landscape – Trans-Taiga Road
Relief	– The relief is characterized by a succession of small hills, some reaching elevations of over 535 m.
Hydrography	– The unit includes several watercourses, numerous lakes—many elongated along an east-west axis—and wetlands.
Vegetation	– Coniferous forest covers about half of the unit. The remainder consists of regenerating conifer stands resulting from natural disturbances and, in many cases, forest fires that occurred several decades ago.
Spatial organization	– The hills landscape unit forms a mosaic of numerous lakes surrounded by hills. These lakes create areas of visual openness and contrast strongly with the surrounding wooded hills. – The irregular terrain and forest cover create visual screening from transportation routes. – The winding alignment of the Trans-Taiga Road follows the irregular topography, skirting isolated hills and water bodies in the northern portion of the unit. – Some permanent Cree camps are located relatively close to the Trans-Taiga Road, while others—along with the temporary camp—are situated farther away, near water bodies.
Observers	– Occupants of permanent Cree camps, the temporary Cree camp, and vacation leases (temporary fixed observers) – Community members engaged in traditional activities and mine workers (mobile or temporary fixed observers) – Users of transportation routes, as well as helicopter or airplane passengers and boaters (mobile observers)
Field of view	– The field of view is typically limited or filtered by terrain or forest cover. However, it can be extensive from the highest elevations and in areas without dense vegetation. It may also be open and far-reaching where a lake is present in the foreground. Visibility along the Trans-Taiga Road varies depending on the curvature of the route.
Pictorial qualities and visual perspectives	– The visual quality of the hills landscape unit is based on its natural character and the contrast between water bodies and adjacent wooded hills. – Larger lakes provide long, open sightlines.

The CO landscape unit has moderate sensitivity, due to its natural character, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is generally low because of forest cover and the limited number of observers, except along the Trans-Taiga Road, from the highest elevations, and where medium-sized lakes occur in the foreground.

Rolling plain landscape unit (PL-01 and PL-02)

Photo 6-4 Aerial view from a helicopter looking southeast (landscape unit PL-01)

Table 6-50 Undulating plain landscape units (PL-01 and PL-02)

Components	Description
Boundaries and specific land use	– The main visible features are undulating plains with coniferous forest cover of varying density. – There are two undulating plain landscape units: PL-01, located west of Lake Corvette, and PL-02, located east of the lake.
Traffic routes and transportation corridors	– An energy transmission corridor is located at the western end of unit PL-01. It runs along a north–south axis from the Lemoyne substation near the Trans-Taiga Road..
Land use elements	– Traplines also used for hunting and fishing activities
Special landscape features	– Natural landscape
Relief	– The terrain consists of a plain dotted with a few low hills, some reaching elevations of up to 460 m.
Hydrography	– Watercourses, lakes, and wetlands are present in these landscape units.

Components	Description
Vegetation	– PL-01: primarily composed of regenerating conifer stands – PL-02: primarily composed of coniferous forest
Spatial organization	– The spatial structure of units PL-01 and PL-02 is characterized by a broad plain where rivers and lakes are interspersed among low rolling hills.
Observers	– Community members engaged in traditional activities (mobile or temporary fixed observers) – Helicopter and airplane passengers (mobile observers)
Field of view	– The field of view is generally limited or filtered by terrain or forest cover. It may extend to varying degrees along watercourses depending on their sinuosity, and is more open along the energy transmission corridor.
Pictorial qualities and visual perspectives	– The visual quality of the undulating plain landscape units is based on their natural character and the contrast between water bodies and surrounding wooded hills. – Watercourses and the energy transmission corridor provide long, open sightlines.

Landscape units PL-01 and PL-02 have moderate sensitivity, due to their natural character, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is generally low because of forest cover and the limited number of observers.

Lake landscape units (LA-01 and LA-02)

There are two distinct lake landscape units within the study area:

- LA-01, centered on Lake Corvette;
- LA-02, covering a portion of the La Grande 4 reservoir.

Photo 6-5 Aerial view from a helicopter looking southeast (landscape unit LA-01)

Table 6-51 Lake landscape units

Components	Description
Boundaries and specific land use	– Two distinct lake landscape units are present in the study area: LA-01 and LA-02. – Landscape unit LA-01 is centred on Lake Corvette, located in the south-central part of the study area. The main visible features include the large lake, a few wooded islands, and coniferous forest cover of varying density surrounding the lake. – Landscape unit LA-02, located in the northeast of the study area, covers the southern portion of the LG-4 reservoir. Its main visible features include the large reservoir, wooded islands, and coniferous forest cover of varying density along the shoreline.
Traffic routes and transportation corridors	– LA-01: No transportation routes or energy transmission corridors. – LA-02: The Trans-Taiga Road and an energy transmission corridor run along part of the southern boundary of the unit. A few access roads associated with Hydro-Québec facilities are also present along the western boundary.
Land use elements	– LA-01: Lake Corvette, a vacation lease, and traplines also used for hunting and fishing activities. – LA-02: The LG-4 reservoir (whose infrastructure is not accessible to the public) and traplines also used for hunting and fishing activities.
Special landscape features	– – LA-01: Lake Corvette, natural landscape. – – LA-02: LG-4 reservoir, altered natural landscape.
Relief	– LA-01: The flat surface of Lake Corvette contrasts with the surrounding terrain. – LA-02: The flat surface of the LG-4 reservoir contrasts with the surrounding relief.

Components	Description
Hydrography	– In addition to Lake Corvette, unit LA-01 includes watercourses and wetlands along the lakeshore. – In addition to the LG-4 reservoir, which dominates unit LA-02, small lakes and watercourses are present along its shores.
Vegetation	– LA-01: Coniferous forest is present in the eastern part of the unit, while regenerating conifer stands occupy the western part. – LA-02: Coniferous forest cover is present along the shoreline and on the few islands within the unit.
Spatial organization	– LA-01: The unit is structured around Lake Corvette, a large central feature that contrasts with the surrounding terrain and forest cover. A vacation lease is located on the western shore of the lake. – LA-02: The unit is organized around the southern portion of the LG-4 reservoir and its intersecting islands. The presence of a dike, the main dam, the LG-4 generating station, and associated buildings also marks the western end of the unit.
Observers	– LA-01: – Occupants of the vacation lease (temporary fixed observers) – Community members engaged in traditional activities (mobile or temporary fixed observers) – Helicopter or airplane passengers and boaters (mobile observers) – LA-02: – Community members engaged in traditional activities and workers at the LG-4 facilities (mobile or temporary fixed observers) – Road users, helicopter or airplane passengers, and boaters (mobile observers)
Field of view	– LA-01 and LA-02: The field of view is generally open when a large body of water is present in the foreground.
Pictorial qualities and visual perspectives	– LA-01: The visual quality of this unit is based on its natural character and the contrast between Lake Corvette and the surrounding wooded hills. The lake provides long, open sightlines. – LA-02: The visual quality is based on the contrast between the reservoir, wooded islands, and surrounding hills. The presence of Hydro-Québec’s LG-4 facilities alters the natural landscape at the western edge of the unit. The reservoir provides long, open sightlines.

Landscape unit LA-01 has high sensitivity, due to its natural character and the presence of Lake Corvette, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is high because of the lake. The proposed mining site will be invisible or barely visible from this unit.

Landscape unit LA-02 has low sensitivity, due to its mixed character—both anthropogenic (Hydro-Québec facilities) and natural (LG-4 reservoir and forest cover). While the Cree communities of Eeyou Istchee place high value on natural environments, they place less value on Hydro-Québec facilities. Visual accessibility is high due to the dominance of the reservoir within the unit.

7 Identification of issues

7.1 Issues identified by the regulators during consultations

The Impact Assessment Agency of Canada (IAAC) held a public consultation on the project description summary from February 19 to March 16, 2025. A summary of the questions received was sent to the proponent (Summary of Issues: https://iaac-aeic.gc.ca/050/evaluations/document/161673). These concerned the potential effects of the project on:

- the physical, psychological, and social health and safety of Indigenous Peoples;
- navigation;
- the use of land and resources for traditional purposes by Indigenous Peoples;
- the release of contaminants into the environment (groundwater and surface water, air, soil, traditional food);
- the natural and cultural heritage of Indigenous Peoples;
- road safety;
- hydrology and hydrogeology;
- fish and fish habitat;
- species that are culturally significant to Indigenous Peoples, including boreal caribou, migratory caribou, lake sturgeon, moose, bear, beaver, and Canada goose.

In addition, the following valued components are included in the federal government guidelines sent to the proponent:

- migratory birds;
- job creation and economic partnerships;
- clean energy transition.

On October 22 and 23, 2025, IAAC held a consultation in the community of Chisasibi, and a summary of concerns heard to date were shared with participants, including:

- water quality;
- air quality;
- food security;
- women’s safety;
- community health and well-being;
- cumulative impacts.

The guidelines, stakeholder questions, and the list of concerns presented by IAAC were taken into consideration in the process of identifying issues. With regard to COMEX, the consultation process will begin once the impact assessment has been reviewed and deemed complete.

7.2 Issues raised during information sessions and consultations

Recognizing the importance of involving Indigenous groups, local communities and regulators, interest groups, and land users in the design, planning, and development of the Project, PMET organized information sessions beginning in 2022, which intensified throughout 2023, 2024, and 2025.

As part of these efforts, the complete list of issues raised was presented to several key bodies. It was discussed with the MELCCFP during a meeting held at their offices on July 18, 2025, and then shared with IAAC and CNG during a joint meeting on September 29, 2025. This same list was also presented to the tallyman and his family (CH39 trapline) , as well as to the public, during an information session held in the community of Chisasibi on October 22 and 23, 2025, organized by IAAC.

Various communication channels have been used since 2022 to establish and maintain dialogue with the regulators, stakeholders, and Indigenous groups.

The concerns identified during the various engagement activities are detailed in Chapter 3 (sections 3.3.4 and 3.4.3). These concerns have been taken into account in the project planning, and PMET will continue to consider them in the further design and development of its project.

7.3 Issues selected

An issue is defined as a major concern for the government, the scientific community, or the public, including affected Indigenous communities, the assessment of which could influence the government’s decision to approve or reject the project. Valued ecosystem components (VECs) can be defined as all significant elements and relevant components of the natural and social environments that are likely to be affected by project activities.

Table 7-1 presents the seven issues selected and the VECs selected or not selected for the impact assessment. The reasons for selecting these issues and VECs are explained in the table, and the sections of the EIA report where they are addressed are also indicated. It should be noted that the issues are numbered arbitrarily, not in order of priority.

Furthermore, although some VECs may be included under more than one issue, they are only addressed under one issue to avoid redundancy.

Table 7-1 List of issues arising from the project and associated valued ecosystem components, selected or not selected for the impact assessment

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	Selected for the impact assessment (Y/N)	Component name	Selected for the impact assessment (Y/N)		
Preservation of aquatic habitat quality	Y (Issue No. 1)	Hydrodynamic and hydro-sedimentary conditions	Y	The project will result in a change in flow patterns due to the construction of dikes, the partial draining of Lake L01, and the development of a diversion channel. The project could lead to potential changes in flow rates and sediment dynamics in the watercourse receiving the industrial effluent.	Appendix 6-6
		Surface water quality	Y	Maintaining surface water quality is a major concern for several stakeholders. The project could lead to a change in the quality of surface water downstream from the industrial effluent discharge point, which will contain surface water from the waste rock stockpiles.	Appendices 5-10 and 6-7
		Sediment quality	N	The anticipated concentrations of contaminants in industrial effluent water, which will comply with the requirements of Directive 019, are considered too low to have a long-term effect on sediments.	Appendices 5-10 and 6-7
		Fish and habitat	Y	Losses of local fish habitat cannot be avoided in the development of the project's infrastructure, but regional improvements are planned through various habitat compensation projects identified by stakeholders.	Appendices 6-16 and 6-17
Preservation of soil and groundwater quality	Y (Issue No. 2)	Soil quality	Y	The project involves soil disturbance and temporary loss of fertile soil. Furthermore, the storage of fuels on site poses a risk of soil contamination in the event of an accidental spill.	Appendices 6-4 and 6-5
		Groundwater quality	Y	Since the project involves deep excavation work, the industrial zone could potentially come into contact with groundwater. The accumulation of mine waste poses a risk of leaching at one of the waste rock and tailings stockpiles (stockpile no. 2).	Appendices 6-10 to 6-12
Preservation of wetlands and habitats of interest to terrestrial fauna and flora	Y (Issue No. 3)	Wetlands and water environments	Y	Losses of local wetlands and water bodies cannot be avoided in the development of infrastructure, but regional improvements are planned through various compensation projects identified by stakeholders.	Appendices 6-13 and 6-14
		Wildlife species of special status	Y	The project could impact the habitats of bird, bat, and small mammal species with special status that have been observed at the project site. The woodland caribou, although present regionally, will not be significantly affected by the project since the project site does not provide quality habitat for this species.	Appendices 6-19, 6-20, 6-21, 6-22 and 6-23
		Plant species of special status	N	Searches on the CDPNQ (Quebec Natural Heritage Data Centre) databases showed no occurrences of plants with special status within a 15 km radius of the project site. Furthermore, out of a list of 95 status species present in the Nord-du-Québec region, only ten species were likely to be present in the biophysical LSA. Specific field surveys carried out within the biophysical LSA did not identify any plant species with special status.	Appendices 6-13 and 6-14
		Invasive alien plant and wildlife species	N	Neither the research conducted using the MELCCFP's online tool for invasive alien species nor the field surveys carried out identified the presence of invasive alien plants or wildlife.	Chapter 6, section 6.3
		Terrestrial wildlife (large animals, avifauna including migratory birds)	Y	The project will have an impact on terrestrial wildlife as it will result in habitat loss, cause disturbances (noise, dust, light), and increase the risk of collisions on the various roads used by haul trucks and transport trucks.	Appendices 6-19, 6-20, 6-21, 6-22 and 6-23
		Forest cover	Y	The project will have an impact on forest cover as the development footprint must be cleared. This forest cover consists mainly of conifers and regenerating forests with low density.	Appendices 6-13 and 6-14

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	**Selected for the impact assessment (Y/N)**	**Component name**	**Selected for the impact assessment (Y/N)**		
Preserving the quality of life of the local population	Y (Issue No. 4)	Air quality	Y	Potential project impacts on air quality are assessed during the operations phases of the project. Dust and exhaust fumes from mining machinery and trucks, in particular, could affect air quality on a local scale.	Appendix 6-1
		Sound environment and vibrations	N	The project will not have a significant impact on the sound environment as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-2 presents the modelling results for the projected conditions. However, it should be noted that the sound environment will be taken into account in the analysis of the Terrestrial wildlife VEC as a nuisance that may affect terrestrial wildlife.	Appendix 6-2
		Ambient light	N	The project will not have a significant impact on ambient light as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-3 presents the modelling results for the projected conditions. However, it should be noted that ambient light will be taken into account in the analysis of the Terrestrial wildlife VEC as a nuisance that may affect terrestrial wildlife.	Appendix 6-3
		Landscape	N	The project will not have a significant impact on the landscape as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-28 presents the landscape assessment. However, it should be noted that landscape will be taken into account in the analysis of the Well-being on the land VEC as an element that may affect the overall perception of well-being.	Appendix 6-28
Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples)	Y (Issue No. 5)	Physical, psychological, and social health	Y	A potential impact on the social climate in the community can be anticipated given the tensions caused by the construction of the LG-4 hydroelectric power plant, which could be reignited by this new development project. The arrival of a large number of workers raises certain concerns about the negative impact this could have on certain social issues (e.g., drugs, prostitution, violence). In addition, the influx of workers could, to some extent, increase pressure on certain public services. However, these impacts will be limited by the relative remoteness of the camp from local communities in the region. Furthermore, since workers would be housed in a camp set up on the mining site, the project will not result in increased pressure on housing. The health of project workers is also a concern (exposure to contaminants, dust, drug and alcohol use, lifestyle habits, impact of commuting on families), and more specifically for the Cree (cultural safety, racism, impact on families, lifestyle habits).	Appendix 6-24
		Economic benefits (job creation, economic partnerships)	Y	The project will bring employment and business opportunities to communities in the region.	Appendix 5-13
		Road safety	Y	The increase in heavy traffic on the road network surrounding the project (Billy-Diamond Highway, Trans-Taiga Road, access road to the mining site) during the project’s construction phase (transport of materials) and operations phase (ore transport by trucks) will be accompanied by an increase in road safety risks.	Appendix 6-25
Preservation of the traditional activities and practices of the Indigenous population and the activities and practices of the non-Indigenous population (Current use of lands and resources for traditional purposes)	Y (Issue No. 6)	Hunting and trapping of terrestrial wildlife and waterfowl	Y	The project offers the potential to improve access to hunting and trapping grounds. This could be accompanied by increased pressure on wildlife resources. Furthermore, changes in ambient sound and light around the project site could drive game species away from areas they traditionally frequent. Lastly, some concerns raised by land users regarding the project involve the risk of contaminants accumulating in the flesh of the animals they consume.	Appendices 6-2 and 6-3
		Harvesting of valued plant species	Y	Some concerns expressed by land users about the project involve the risk of contaminant accumulation in plants they consume (e.g., blueberries, Labrador tea).	Appendix 6-15
		Fishing	Y	The body of water downstream from the effluent is used for fishing. Lastly, some concerns raised by land users about the project involve the risk of contaminants accumulating in fish flesh.	Appendix 6-18

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	Selected for the impact assessment (Y/N)	Component name	Selected for the impact assessment (Y/N)		
		Well-being on the land	Y	General concerns were raised about the deterioration of environmental quality and cumulative impacts on the land, which are likely to influence the continuation of the Cree way of life. In fact, time spent on the land is associated with various aspects of Cree culture and well-being, such as the transmission of Cree values and language, mental health and healing, memory, etc.	Chapter 6, sections 6.4.3 and 6.4.4
		Navigation	N	The watercourses and water bodies on the project site are not navigable waterways of interest to local communities, which do not engage in fishing activities on those directly impacted by the project (L01, L05, CE8, L07, CE11, L10, and CE15). Fishing sometimes takes place on Lake L27, but this will not affect its navigability.	Chapter 6, sections 6.4.3 and 6.4.4
		Archaeological remains, natural and cultural heritage	N	The project involves soil disturbance that could potentially damage archaeological remains that are as yet unknown. An archaeological survey and an archaeological potential study were therefore carried out to minimize this risk. They revealed the existence of several sites with archaeological potential in the project area, and four of the areas surveyed yielded remains of archaeological interest. However, none of the four areas will be affected by the facilities and works planned for the project. However, it should be noted that a procedure for chance discoveries will be put in place before work begins.	Appendices 6-26 et 6-27
Consideration of climate change	Y (Issue No. 7)	Adapting infrastructure to climate change	N	An assessment of climate change resilience is planned as part of the project. Throughout the entire useful life of the project, PMET would like to ensure the resilience of all its components and the receiving environment. Therefore, this component will be the subject of a separate section in the impact assessment (Chapter 11). Measures to adapt to climate change will be proposed based on the identified climate hazards and the risks they pose. Adaptation to climate change is therefore considered a project issue at the design stage, but not in the context of the impact assessment.	Appendix 11-1
		Climate change mitigation (GHG emissions) (Energy transition)	Y	Construction, operations, and closure activities will involve machinery traffic and equipment use powered by fossil fuels. These will generate GHG emissions.	Appendix 5-12