



CREE
DEVELOPMENT
CORPORATION



LA GRANDE ALLIANCE

PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

REPORT NO.4 - PERFORMANCE ANALYSIS

Final Version





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WSP
SUITE 200
3 PRINCIPALE STREET NORTH
AMOS, QC, CANADA J9T 2K5

T: +1 819 732-0457

F: +1 819 732-0458

WSP.COM

SIGNATURES

WRITTEN BY		SIGNATURE
First Name, Last Name	Julie Roy, OAQ, OAA	
Title	Senior Project Manager	
VERIFIED AND APPROVED BY		SIGNATURE
First Name, Last Name	Francis Boivin, ing., M.Sc.	
Title	Project Director	
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STUDY TEAM

CLIENT	
President and Chief Executive Officer CREE DEVELOPMENT CORPORATION (CDC)	Clarke Shecapio

WSP	
Study Lead	Francis Boivin, ing., M.Sc.
Senior Study Manager	Julie Roy, OAQ, OAA
Technical Study Director	Jean-Pierre Blondin, P. Eng., M. Eng
Discipline Lead	Razi Chagla, BBA, MBA
Senior Financial Advisor	Mark-Anthony Sagaria, P.Eng., M.Eng., MFin, LL.M.
Senior Economist	Ha Dao, Ph.D.

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1 INTRODUCTION & CONTEXT

1.1 LA GRANDE ALLIANCE

La Grande Alliance refers to the *Memorandum of Understanding (MOU) on the Cree-Québec Sustainable Infrastructure Program in Eeyou Istchee Baie-James*, signed between the Cree Nation Government (CNG) and the Government of Québec on February 17, 2020. The purpose of the MOU is to provide a framework for Cree local and regional entities to work closely with relevant Québec government ministries to connect, develop and protect the territory of the Eeyou Istchee Baie-James region of northern Québec in an inclusive and participatory manner. The main objective of La Grande Alliance is to build a promising program for the strategic, predictable, and sustainable development of the territory over a 30-year time horizon.

La Grande Alliance consists of four avenues of future development – transportation infrastructure, communication, electrification, and protection – to devise a roadmap that takes into consideration innovative economic and technical opportunities and/or constraints, as defined by communities, land users and other relevant groups.

The Eeyou Istchee Baie-James region is rich in natural resources. However, historical development of these resources has resulted in projects often thrust upon Indigenous and non-Indigenous communities alike, for whom the only option was to react. This scenario makes land use planning very challenging for communities and government officials, strategic transportation or energy infrastructure planning ambiguous for public services and government ministries, and investment by promoters of development projects risky and uncertain.

The link between transportation, communication and energy infrastructure and the potential for development is undeniable. The key, however, is to ensure that such infrastructure does not occur in environmentally or culturally sensitive areas. This is essential to avoid potential conflicts between development and the communities where this infrastructure is proposed to be built. Conversely, providing communities with the opportunity to contribute to the conception, planning, deliberation and evaluation of infrastructure, hand in hand with protection of some natural areas, has the potential for shaping the territory in an empowering way that brings long-term predictability to the region. In turn, this allows communities to plan their growth more easily, resources for protecting environment and wildlife to be deployed more efficiently, land use planners to work with more certainty, and investment by promoters and developers to be more secure.

The following report deals specifically with the transportation infrastructure component envisioned through the MOU.

1.1.1 THE CLIENT – CREE DEVELOPMENT CORPORATION

In conformity with the MOU, the CNG has mandated the Cree Development Corporation (CDC) to conduct a series of studies to examine the economic, technical, and socio-environmental aspects of a series of proposed large transportation infrastructures envisioned over three phases spread over 30 years.

The CDC is the modernization of the James Bay Native Development Corporation, created through the *James Bay and Northern Québec Agreement (JBNQA)* to “assist, promote and encourage the creation, diversification or development of businesses, resources, properties and industries within the territory with a view to stimulating maximum economic opportunities for Cree people and contributing to their general economic well-being”. Following the signature of La Grande Alliance MOU, the CNG mandated the CDC to carry out the Infrastructure Studies, part of which are the subject of this report.

1.1.2 PRECURSORS TO LA GRANDE ALLIANCE

The Agreements presented below allow the reader to better situate the MOU within the current legal framework in place in the region.

THE JAMES BAY AND NORTHERN QUÉBEC AGREEMENT

The JBNQA was signed on November 11, 1975, by the Government of Québec, the Government of Canada, Hydro-Québec, the Grand Council of the Crees of Québec and the Northern Québec Inuit Association. Described by many as the “first modern treaty”, the JBNQA created a new legal and, eventually, constitutional framework for, among other things, local self-governance, land management, protection of the traditional Cree way of life as well as for the relationship between Québec and the Indigenous peoples of the James Bay and Northern Québec region. It was the foundation on which Crees laid over 80 subsequent agreements, regarding Cree rights, communities’ self-governance and subsequent development of the territory.

THE PAIX DES BRAVES

The *Agreement respecting a new relationship between the Cree Nation and the Government of Québec* (better known and herein referred to as *Paix des Braves*), signed in February 2002 is a Nation-to-Nation Agreement between the Government of Québec and the Crees of Québec. The Agreement is not meant to replace the JBNQA, but rather to build a “development model based on the principles of sustainable development, partnership and respect for the traditional way of life of the Crees, as well as on a long-term economic development strategy, principles which are in conformity with (its) provisions.” The Agreement includes specific modalities with regards to mining, forestry, and hydroelectric development on the territory, seen as the three sectors driving the regional economy at the time of signing. Furthermore, the Agreement is meant to provide greater autonomy to the Crees in the manner in which communities will develop in the future. Henceforth, development occurring on Cree traditional lands requires meaningful participation of the Crees at multiple levels, as well as benefit sharing frameworks that see Crees as more than simple stakeholders.

OTHER GOVERNMENT POLICIES

In addition to the Agreements presented above, the Northern Action Plan, proposed by the Government of Québec in May 2011, is a 25-year economic development program for the northern regions of Québec based on “sustainable development” which is intended to focus on the construction of transportation infrastructure, mining, and the development of renewable energy projects.

1.2 TRANSPORTATION INFRASTRUCTURE STUDY

The following components were the initial transportation infrastructures considered as part of the studies:

PHASE I (1-5 YEARS)¹ (THE PHASE I IS STUDIED BY OTHERS)

- **Roadway: Upgrading and paving of the community access roads** for Waskaganish, Eastmain, Wemindji and Nemaska.
- **Railway: Matagami to Rupert**
A proposed railway line following, as much as possible, the Billy-Diamond Highway (BDH) starting from the town of Matagami to the km 257 of the BDH (Rupert River Bridge).
- **Railway: Grevet to Chapais**
A return to service for the decommissioned railway line between Grevet (Lebel-sur-Quévillon) and Chapais (approximate distance of 147 km).

¹ All dates indicated herein are hypothetical and would begin as of the start of the construction period. This therefore does not include all pre-project phases, most notably the Environmental and Social Impact Assessment that would be required if the infrastructures are pursued.

PHASE II (6-15 YEARS)

– **Railway: Rupert to La Grande**

A proposed railway alignment following, as much as possible, that of the Billy-Diamond Highway (BDH) starting at km 257 (after the Rupert River Bridge, which is the junction point with the railway alignment developed by the Phase I consultant) all the way to La Grande River. The Phase II railway alignment extends over an approximate distance of 340 km.

– **Route 167: upgrading & extension to the Trans-Taiga Road**

Upgrading and paving of the section from the Mistissini community access road to the Stornoway Renard Mine access road over an approximate distance of 204 km;

Extension towards north to connect with the Trans-Taiga Road near km 408, over an approximate distance of 172 km.

– **Road: La Grande to Whapmagoostui/Kuujjuarapik**

A proposed road corridor connecting Chisasibi community access road and Whapmagoostui/Kuujjuarapik, over an approximate distance of 207 km.

PHASE III (16-30 YEARS)

– **Railway: La Grande to Whapmagoostui/Kuujjuarapik**

A railway which follows, as much as possible, the projected road leading to Whapmagoostui/Kuujjuarapik (from the junction with the Phase II railway alignment).. The Phase III railway alignment extends over an approximate distance of 219 km.

– **Port: at Whapmagoostui/Kuujjuarapik**

A deep-water port along the Kuujjuarapik coastline between the Great Whale River's mouth and the entrance of the Manitounuk Strait.

1.2.1 STUDY VISION AND APPROACH

The studies found herein have put **local communities at the centre of the transportation infrastructure development process. This way of working, initially proposed by the CDC, strives to shift the dominant paradigm away from natural resources as the main lever of development, towards community development. Natural resource development remains a vital element to this equation but is no longer the sole driver. In this sense, La Grande Alliance goes beyond a standard regional transportation plan but rather proposes a new model** for how the Cree and the Jamesian populations can work together to sustainably develop the existing network, thereby allowing the movement of natural resources in a manner that promotes the betterment of all.

The Feasibility Studies attempt to seek out and understand ways in which the proposed transportation infrastructures can improve the communities' quality of life. Transportation corridors are explored with the utmost respect for the land, its inhabitants, and Cree heritage. In this sense, the study fully embraces the concept of sustainable development, such that the infrastructures under study can only proceed if they are feasible from a technical, environmental, and economic perspective. Furthermore, it is understood that, to proceed, the proposed infrastructures will require the social acceptability of all communities in the region.

The Client's requirement to involve Cree and Jamesian communities at such an early stage of development reflects their requirement that local stakeholders be actively involved in the planning and management of land and economic development in Eeyou Istchee. The organization understands that Eeyou Istchee is extremely rich in natural resources, but firmly believes that it must not be seen simply as a source of raw materials for resource exploitation. The CDC is clear that development of the territory must be in accordance with traditional customs and founded on values of respect and gratitude to the land. Finally, it rejects the idea that infrastructure development and environmental protection are opposing, but rather are both key to harmonious development of a territory and its people.

1.2.2 STUDY OBJECTIVES

Understanding the value created through the development of an inclusive and comprehensive infrastructure program will generate stability and allow communities to better access opportunities associated with various aspects of regional development. The challenges and uncertainty created by climate change and geopolitical instability make community participation even more critical.

Therefore, several study objectives have been developed:

- 1 To better understand the implications, risks, and opportunities related to the various infrastructures contemplated in the study;
- 2 To maximize connections between communities and the main drivers of economic development in the region, throughout the territory;
- 3 To identify transportation corridors that concentrate the development footprint, so as to limit environmental impacts elsewhere, in a manner that is in harmony with other land use activities on the territory;
- 4 To minimize the emission of harmful greenhouse gases in the construction, operation and use of future infrastructure developments on the territory;
- 5 To identify opportunities to create meaningful jobs for the inhabitants;
- 6 To understand how to balance infrastructure development with environmental protection as well as the preservation and enhancement of Cree culture for the benefit of future generations.

Although an Opportunity Study was not previously carried out, CDC has included, as part of this mandate, the need to better define the purpose of the studied infrastructures in the three phases of La Grande Alliance Study.

1.2.3 CONTEXT OF THE STUDY

For thousands of years, the Crees of Eeyou Istchee have lived off the land through hunting, fishing, and trapping. This large territory of 450,000 km² is now inhabited by around 22,000 people divided mostly in ten² Cree communities, five of which are located along the east coast of James and Hudson Bays: Waskaganish, Eastmain, Wemindji, Chisasibi and Whapmagoostui. The remaining five are inland communities: Waswanipi, Nemaska, Oujé-Bougoumou, Mistissini, and Washaw Sibi. Whapmagoostui is currently the only community not yet accessible by road.

The gap between the social and economic conditions of Indigenous and non-Indigenous people in Québec continues to be a major social problem. Issues continue to be insufficient housing, chronic unemployment and underemployment, low formal education levels and a flawed and heavily biased justice system. To combat these problems, many communities are implementing strategies that emphasize self-governance, autonomy, history, culture, spirituality, and identity. In this sense, many Crees believe that true economic development must grow from these elements and cannot be in opposition to them.

Changing climatic conditions, rapid demographic growth, and a growing interest in the resource potential in northern territories are all exerting pressure on Cree communities. Today's choices will no doubt influence the lives of future generations.

The Feasibility Studies are carried out in each community within the study area utilizing a network of Grande Alliance Community Information Officers (CIO). CIOs have been appointed by their communities to act as the local antennas of La Grande Alliance, to ensure participation and engagement in the studies, and to confirm that issues and concerns raised by Cree communities are heard and addressed in the studies. These positions are funded through the CDC.

² An eleventh community, known as "MoCreebec" is composed of JBNQA Cree beneficiaries who live on the west side of James Bay, mostly in Moose Factory and Moosonee, Ontario.

Jamesian communities, for their part, are relatively newcomers to the territory. However, recent governance agreements signed between them and the Crees show that they form an integral part of the territory and have an important voice in its future development. Although La Grande Alliance Transportation Infrastructure Feasibility Studies are a Cree initiative, the CDC has made it clear that any discussions about future programs need to include Jamesian communities and their concerns. The study therefore assumes that a successful program will require the active support of these communities as well. To this end, communications have been established with each of the Jamesian communities within the broad study area through their respective municipal administrations.

1.2.4 PHASES II AND III PRE-FEASIBILITY STUDY MANDATE

The CDC has mandated WSP in May 2021 to study the Whapmagoostui/Kuujuarapik proposed road, the Route 167 upgrade and extension as well as the railway to be located along the Billy-Diamond Highway, from KM 257 to KM 544, then on to Whapmagoostui/Kuujuarapik, following, as much as possible the same alignment of these roads. WSP and its Cree partners, Maamuu Consultants, Mishtuk Corporation and EnviroCree, share the vision of La Grande Alliance as the promise of a future shaped by the Crees for the Crees of the Eeyou Istchee Baie-James region.

This study aims to:

- 1 Consult previous analyses on the territory;
- 2 Document the current market conditions and forecast market for La Grande Alliance infrastructure program;
- 3 Initiate a sustained effort of communication, collaboration, and engagement;
- 4 Document the existing social and environmental aspects that could benefit and/or be impacted;
- 5 Developed proposed infrastructures in accordance with social and environmental aspects;
- 6 Assess the technical feasibility of the proposed infrastructure;
- 7 Assess the risks and the financial viability of the proposed infrastructure;
- 8 Report and provide recommendations in a final report.

This Study will examine the possibility of implementing the specified transportation infrastructures to meet the needs of Cree and non-Indigenous residents in the short, medium, and long-term in the Eeyou Istchee territory.

1.2.5 STUDY AREA

As shown on Figure 1-1, the study area is located within the territory of the Eeyou Istchee Baie-James region of northern Québec. The study area is divided in three zones:

- Study Area 1 (SA1): Billy-Diamond Highway Railway – Rupert – La Grande;
- Study Area 2 (SA2): Road & Rail Extension, and Harbour – La Grande – Whapmagoostui/Kuujuarapik;
- Study Area 3 (SA3): Route 167 - Renard Mine – Trans-Taiga Road.

It is to be noted that these study areas are slightly different that the ones described in La Grande Alliance MOU, thus, to suit the proposed infrastructures scope.

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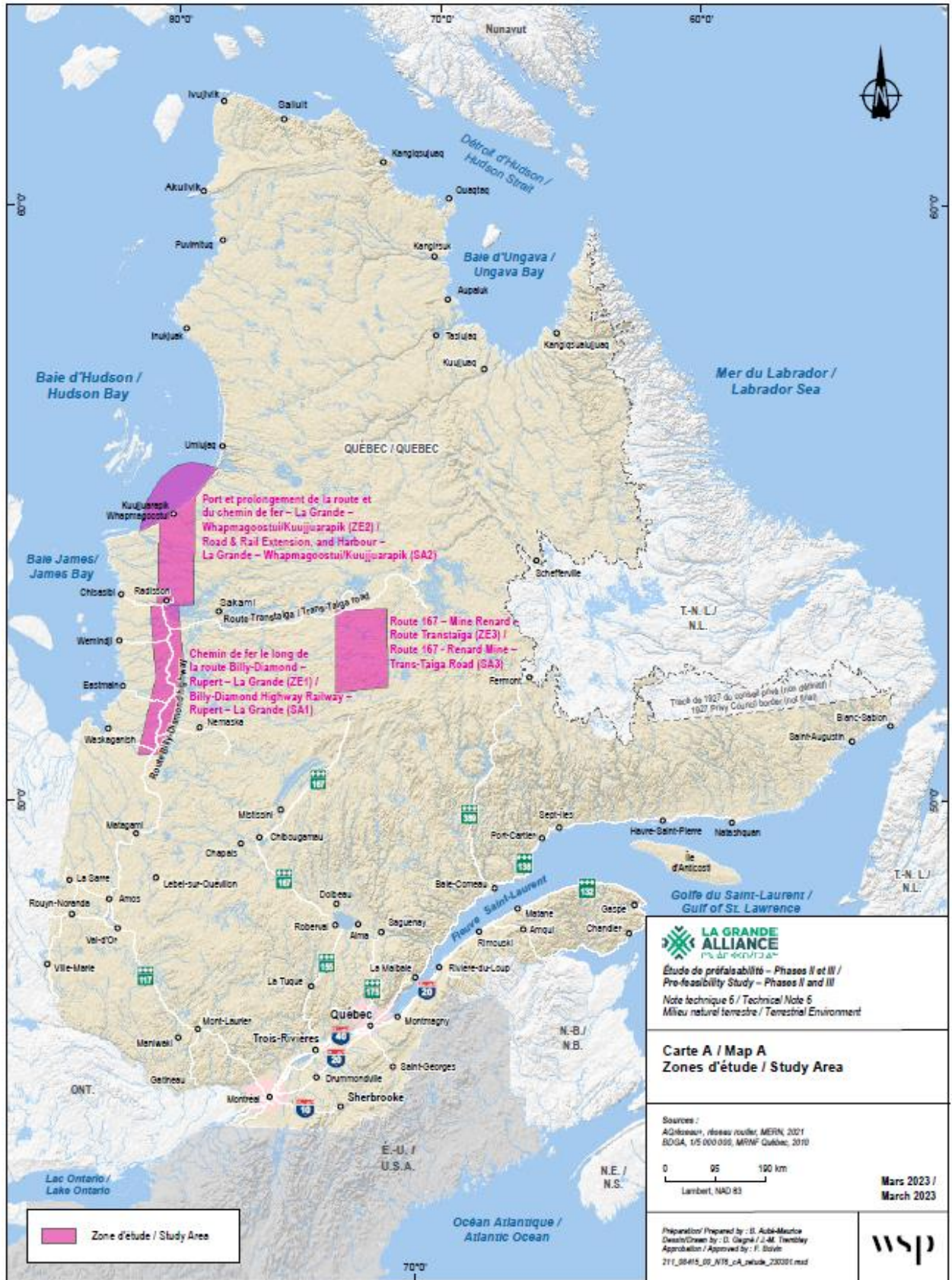


Figure 1-1 Study Area

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1.3 REPORT NO.4 - OBJECTIVES

Following the issuance of reports 1, 2 and 3, namely Market Survey, Socio-Environmental Survey and Technical Survey, the purpose of this Report 4 is to determine whether the proposed La Grande Alliance infrastructure components proposed consist of a net gain for society when compared to the status quo, both from the perspective of the Northern Québec economy as well as that of Québec as a whole

Different parameters were analysed to determine whether the proposed La Grande Alliance infrastructure components bring a real plus-value to the community. These analyses provide different indicators to guide the client decision process. Those parameters include:

- 1 Social-Environmental Review:
 - Communities' feedbacks towards the proposed infrastructures alignments, including proposed optimizations;
 - Proposed infrastructures alignments environmental impacts on the territory, including proposed optimizations;
 - Concerns for the preservation of the Cree culture.
- 2 Risks and Mitigation measures:
 - Overall risks and mitigation measures towards the potential implementation of the proposed infrastructures, as well as opportunities that can be generated.
- 3 Financial Review:
 - Cost-benefit analysis (CBA);
 - Economic Impact Analysis;
 - Financial Sustainability Analysis.

Given the multidisciplinary nature of the information, this current report has been conceived and presented to provide two levels of information:

- The report itself is a summary of the pertinent points and issues raised during each Study stage;
- The technical notes in the appendices provide a detailed methodology according to each discipline, the results of data collection, details, calculations, regulatory references, etc., necessary for a thorough understanding of each of the subjects addressed in the report.

2 MAIN FINDINGS – MARKET SURVEY

The Market Study was a joint exercise between WSP and phase I external consultant. The purpose of this Report 1 is to:

- 1 Document presents the market analysis;
- 2 Forecast market conditions for all components of La Grande Alliance proposed infrastructure program.

The more specific goals of the market study include:

- To assess the economic needs of the region relating to the proposed infrastructure, detailing regional economic sectors that could use the new infrastructure to foster economic growth;
- To provide a detailed socioeconomic profile of the Eeyou Istchee Baie-James region, including Cree and Jamesian communities, economic sectors, projects and outlook;
- To assess market potential and forecast freight, passenger traffic and revenue for the different transport infrastructures;
- To consult and interview potential users and communities to determine their current and future needs;
- To assess and propose means to enhance regional impacts given the expected demographic, social and economic growths with and without La Grande Alliance infrastructure program:
 - Analyze the strategic development opportunities related to La Grande Alliance infrastructure program, considering Protected Areas, culture, communications, energy, human resources;
 - Project population and economic growth on the territory over a given time horizon;
 - Project vehicle traffic of the status quo without La Grande Alliance proposed infrastructure, as well as the traffic of La Grande Alliance proposed infrastructure components.

The study area is a remote area in Northern Quebec. The territory of Eeyou Istchee Baie-James is vast, the climate is harsh and the distances between communities are significant, making the cost of transportation and therefore the cost of living very high.

Overall, most stakeholders have expressed the view that the existing transportation infrastructure is obsolete and needs to be upgraded, and that future socio-economic development in the Northern Quebec region relies greatly on the efficiency of the transportation infrastructure.

TRANSPORT NETWORK

In terms of road transportation, the Billy Diamond Highway and the Route du Nord constitute the road networks' backbone. From this backbone, the access roads are vital linkd that connect all communities except the northernmost communities in the study area (Whapmagoostui and Kuujjuarapik). These roads are used to provide supplies to the people living and working in the Eeyou Istchee James Bay region, to transport equipment and materials to Hydro-Québec power stations and to mining sites as well as to ship harvested lumber and exploited mining concentrates to the south.

Air transportation, for its part, plays an important role in serving the northernmost communities, particularly regarding perishable foodstuffs, as well as for emergency evacuation for patients requiring medical care, either to the hospital in Chisasibi or to the large urban centers in the south (Val d'Or or Montreal). Air transportation services to the region are mainly provided by Air Creebec and Air Inuit, but airfares for personal travel remain prohibitively high. Seven Cree communities currently have an airport nearby, but the lack of air support services coupled with limited length runways make the further development of air transportation difficult. Helicopters are usually used for activities related to exploration and development of forestry, mining, and hydroelectric resources, while a combination of helicopters and small seaplanes (beavers) are now used for the transportation of trappers to their trapping grounds, and of hunters and fishermen to the outfitters of the region.

Regarding rail transportation, Canadian National Railway (CN) provides services to Matagami and Chibougamau, but the quantity shipped by rail is relatively low compared to road, due in large part to higher cost of transportation.

The multimodal transshipment recently built next to the town of Matagami is currently expanding, and another one is currently planned next to Chibougamau. Both are expected to increase volume of goods transported by rail and from the region.

Maritime transportation is fundamental for supplying Nunavik communities further. Freight is transported to all of the ports in James Bay and Hudson Bay as much as four times per year from a base located in Moosonee. Full warehousing facilities located in Wemindji and Chisasibi facilitate connexions with various smaller-scale community port infrastructures located in the study area.

SOCIO-DEMOGRAPHY AND COMMUNITIES

The study area is home to approximately 32,000 inhabitants, more than half of which are Cree. The Cree population can be characterized as young and rapidly growing, in comparison with the non-Cree population that is significantly older and decreasing. It is believed that this trend will continue to hold over the next decades. The education level amongst Cree-aged 15 and over has improved considerably over the last few decades, with 49 % now holding a high-school diploma.

The creation of the Cree Board of Health and Social Services of James Bay (CBHSSJB) in 1978, as per Section 14 of the JBNQA, has led to a full range of healthcare services available to the Cree population, which has greatly increased their quality of life. Although full-time hunting and trapping remains a very important economic sector for a proportion of the Cree population, the overall participation of the active population in the labour market has risen significantly since the signing of the JBNQA. Today, most working Crees are employed in the public services sector. As the economy of Northern Quebec relies mainly on the extraction of resources, whether these be hydroelectric production, mining or forestry, many Cree companies and entrepreneurs have been established to support these sectors, resulting in a Cree workforce that is more skilled today compared to 20 years ago. However, the cyclical nature of mining and the boom-bust nature of hydroelectricity (i.e. many jobs in construction and comparably little in operations) have had undesirable negative impacts on the sustainability of Cree businesses in these sectors.

The lack of housing development projects is probably the greatest economic issue facing both Cree and Non-Cree communities in the study area. On the one hand, this has resulted in overcrowding in many Cree homes, while on the other hand it has been a clear constraint to attracting new residents to the region. Insufficient funding and high transportation costs, particularly for the northernmost communities, are the key factors limiting housing developments in the region.

With a young, growing and more skilled labour force, it is expected that over the next few years the Crees will have an increasing impact on the economic dynamics of the region. In particular, the strong development of capacity in the construction and transportation sectors, will result in their playing a major role in future infrastructure development projects.

ECONOMY

Hydroelectricity, mining and forestry form the backbone of the Eeyou Istchee economy. These sectors create a significant number of jobs and economic opportunities for both Cree and Non-Cree communities in the study area. The demand for increased and improved transportation infrastructure will therefore continue to grow in the future. Hydro-Quebec's existing infrastructure, most notably their power-generating turbines, are expected to reach the end of their useful life in the coming decades, resulting in a need to ensure that the existing network, built largely for this sector, is able to accommodate the resulting increase in demand.

The region is also rich in mineral deposits, of which several are currently at the project appraisal phase, with a large number of exploration projects that has grown significantly in recent years, and this more specifically related to lithium deposits.

Finally, the forestry sector is an export-oriented manufacturing industry, with many companies located in the southern part of the study area. Exploitation activities are expected to remain relatively low but stable due to numerous factors such as travel costs, difficult environmental conditions and existing regulations.

Construction is a very important and stable sector for the local economy in all communities in the region, and tends to grow in periods of high growth from the mining and electricity sectors, in terms of labour, equipment and materials. Housing development remains important in communities but small relative to the regional economy. Access roads prevent local housing economy to be integrated with regional projects. Cree workers, entrepreneurs and companies have a strong and proven record in the construction sector.

In particular, the Cree Construction and Development Corporation (CCDC) has a strong reputation in numerous fields such as civil engineering, roads, and buildings. However, the Eeyou Istchee territory is large and communities remain far apart and poorly served by the existing network. This severely limits economic integration, limiting the number of companies providing goods and services crucial for procurement for this industry, resulting in a large amount of financial capital leaving the region. Nevertheless, some important exceptions include Gestion ADC, which provides food services and logistics to many businesses operating in the region, Kepa Transport, which provides transportation services of goods, equipment and materials and Petronor, which specializes in the transport of petroleum products. Goods procurement for the communities of Whapmagoostui and Kuujjuarapik is coordinated by Fédération des coopératives du Nouveau-Québec.

The tourism sector in the study area is small but growing. For many years, Hydro-Québec's LG-1 and LG-2 power stations located near Chisasibi have attracted many visitors in the summer. Cree cultural tourism is a growing sector, with each community offering visitors a wide range of unique traditional activities to experience. Nevertheless, this sector continues to be limited due to the poor transportation network and the high price of flying up from the south.

TRAFFIC AND REVENUE FORECASTS

The demographic projections indicate that a sustained increase in local travel needs for both passenger and freight demand will be substantial over the next 20 years and beyond. The results of the Market Survey reveal that the medium-term development of several lithium-related mining sites within the study area, the intensity of passenger and freight transportation related to several Hydro-Québec installations as part of La Grande Complex would justify upgrading the transportation infrastructures.

Traffic forecasts tend to show that the freight traffic would amount realistically to a bracket between 600,000 and 900,000 Metric Tonnes Per Annum (MTPA). If the Duncan Lake major iron ore project came on line, potential traffic on the Billy-Diamond Highway along the Phase II corridor (Rupert-La-Grande) and the Phase I corridor (Matagami-Rupert River) will increase nearly ten-fold. Furthermore, such a large project would greatly affect the economics of the potential road (Phase I) and rail (Phase III) corridor northwards to Whapmagoostui/Kuujjuarapik, as well as the potential seaport in that community (Phase III).

Future traffic forecasts on the proposed infrastructure are subject to uncertainty and unpredictability, notably because of the difficulty to predict future international economic conditions. For sectors such as mining and, to a lesser extent, forestry, regional and national actors have little to no control over these conditions which tend to determine the financial feasibility of major projects. The feasibility of these projects are therefore both influenced by and can be an influence to the justification for infrastructure such as a railway or a deep-sea port in the region.

LA GRANDE ALLIANCE OPPORTUNITY

The demand for transportation can take the form of individuals' need to travel for school, work, leisure, or services. It also takes the form of businesses and companies offering services or goods in the region. Infrastructure improvements will likely stimulate activity and induce demand by increasing an area's attractiveness as well as improving connectivity between communities. This, in turn, induces investment that subsequently stimulates increased productivity.

The proposed infrastructures are an opportunity to position the Cree population by creating targeted programs to ensure the growing population has access to job opportunities these would create. These opportunities will originate firstly from the construction of La Grande Alliance infrastructure and then from the induced construction projects associated with the augmented attractiveness of the area. Secondly, opportunities will be associated with the operations and maintenance of the infrastructure as well as the other induced developed activities. Lastly, benefits will come from secondary induced activities associated with the increased attractiveness of an area better serviced by an improved transportation network. Both employees and employers can develop highly skilled competencies through increased economic integration and hence a cumulative causation effect.

Hence, La Grande Alliance program with its multiple components will not only address the current issues related to transportation such as decreased greenhouse gas emissions, improved road safety and accessibility as well as a reduction in transportation costs but can also induce many latent opportunities for both the population living in the area and the companies offering goods and services. Clearly, the proposed La Grande Alliance program will increase the supply side of transportation to a great extent.

Although the evaluation of potential demand as part of this study was found to be weak relative to the foreseen costs of such infrastructure, La Grande Alliance the development could be seen as a strategic investment to position the Cree population in the management of their land and the resources they hold.

If a proposed infrastructure is approved to be developed, the key will no doubt be for it to be done in a manner that closely involves local communities, entities, entrepreneurs and companies, in conformity with the JBNQA, thus making the proposed infrastructures socially, economically, and culturally viable both during the construction and operation phases.

3 MAIN FINDINGS – SOCIO-ENVIRONMENTAL SURVEY

In addition to presenting a wide variety of social and environmental parameters that will influence the design as well as being potentially impacted by the project, La Grande Alliance Phases II and III Pre-Feasibility includes a very *innovative approach* of consulting and engaging with the territory users prior to the technical design phase of the proposed infrastructures. This allows their input into the project as early as possible, whilst benefiting from their tremendous knowledge of the territory, its resources, and additional environmental considerations.

The purpose of the Socio-Environmental Survey is:

- 1 To initiate a sustained effort of communication, collaboration, engagement and responsiveness to the concerns and expectations of the population;
- 2 To document the existing social and environmental aspects that could influence, benefit and/or be impacted by the development of the proposed transportation infrastructures by:
 - Compiling and validating existing data with stakeholders through direct engagement with the Community Information Officers (CIOs). Information is systematically reviewed to evaluate both their veracity and relevance to the current context;
 - Identifying all areas for which there is currently insufficient data and published information to inform recommendations for additional site sampling campaign and future community engagement strategies.

These objectives need to specifically take into consideration protected areas on the territory (Figure 3-1).

The assessment of social acceptability is a fundamental objective of La Grande Alliance. Previous developments in the territory of Eeyou Istchee Bay James have all given rise to debates that have led to some divisions within or between Cree and Jamesian communities. That division has left its mark, both physically on the territory and emotionally in the collective memory of individuals and communities, as well as cumulative impacts that interact with each other at various scales. Before contemplating new projects, people are anxious to learn from the past, and to avoid past errors. It is this concern to do things differently that is sought in the framework of this study, the importance of documenting and considering the social, cultural, and historical context of the communities with regard to the developments envisaged in the framework of La Grande Alliance.

The notion of social acceptability must consider the idea that building consensus takes time, and is unlikely to be achieved. Rather, the goal must be a sustained effort of communication, collaboration, engagement and responsiveness to the concerns and expectations of the population. It requires privileging dialogue to build a relationship of trust and mutual respect between all stakeholders. The Community Information Officers (CIOs) of the Cree communities, the resource persons in each Jamesian municipality or locality, the study Liaison Officers, and the rest of the WSP/Maamuu consulting team are key to the assessment of social acceptability which, it should be noted, is in constant evolution.

The Pre-Feasibility Study is a preliminary stage and therefore represents a crucial opportunity to lay the foundations of this relationship, as well as a recognition that the population can influence the design decisions in a positive manner, through the process of sharing their local reality (needs, knowledge, opportunities, concerns, etc.).

WSP and its Liaison Officer implemented the following processes as part of the study:

- Sustained communication and coordination with Cree communities, via the CIO, as well as engagement in each Jamesian municipality or locality;
- Engagement that is politically neutral, impartial and transparent at all stages (e.g., data collection tools, data compilation, data analysis, data validation and sharing of results);
- Participation of local experts in discussions and integration of shared knowledge in the development of recommendations and measures, which in turn was shared with technical teams;

- Consideration and integration of concerns and expectations in the development of possible mitigation measures as well as modifications to proposed corridors;
- Communications between the client and stakeholders based on mechanisms of neutrality, impartiality and transparency throughout the studies, in plain and accessible language to meet public expectations of being informed and listened to without judgement;
- Validation and feedback on information shared and its incorporation into project design;
- Rigorous record keeping for all exchanges and incorporation of comments from Cree experts and CIOs in an effort to strengthen the relationship of trust with communities.

The methodology implemented by the WSP social team and the Liaison Officer consisted of a literature review and data collection with Cree and Jamesian residents of the region.

Regarding data collection with Cree communities, three subgroups were targeted:

- Cree land users (tallymen and other Cree experts) of the traplines located within the corridors under study;
- Specific groups or associations, both locally and regionally, such as the Elders' Council, the Youth Council and the Cree Trappers' Association;
- The general public.

In the Jamesian municipalities or localities, two subgroups were targeted:

- The public;
- Stakeholder groups and associations.

The WSP social team and the liaison officer implemented specific engagement and consultation activities for the different groups engaged. WSP would like to acknowledge and thank the outstanding collaboration of the CIOs who greatly contributed to the successful completion of engagement activities listed below, as well as the various Maamuu Cree associates mobilized in each of the Cree communities visited. Representatives of the Jamesian municipalities or localities also greatly contributed to the successful completion of engagement activities.

REPORT NO.4 – PERFORMANCE ANALYSIS

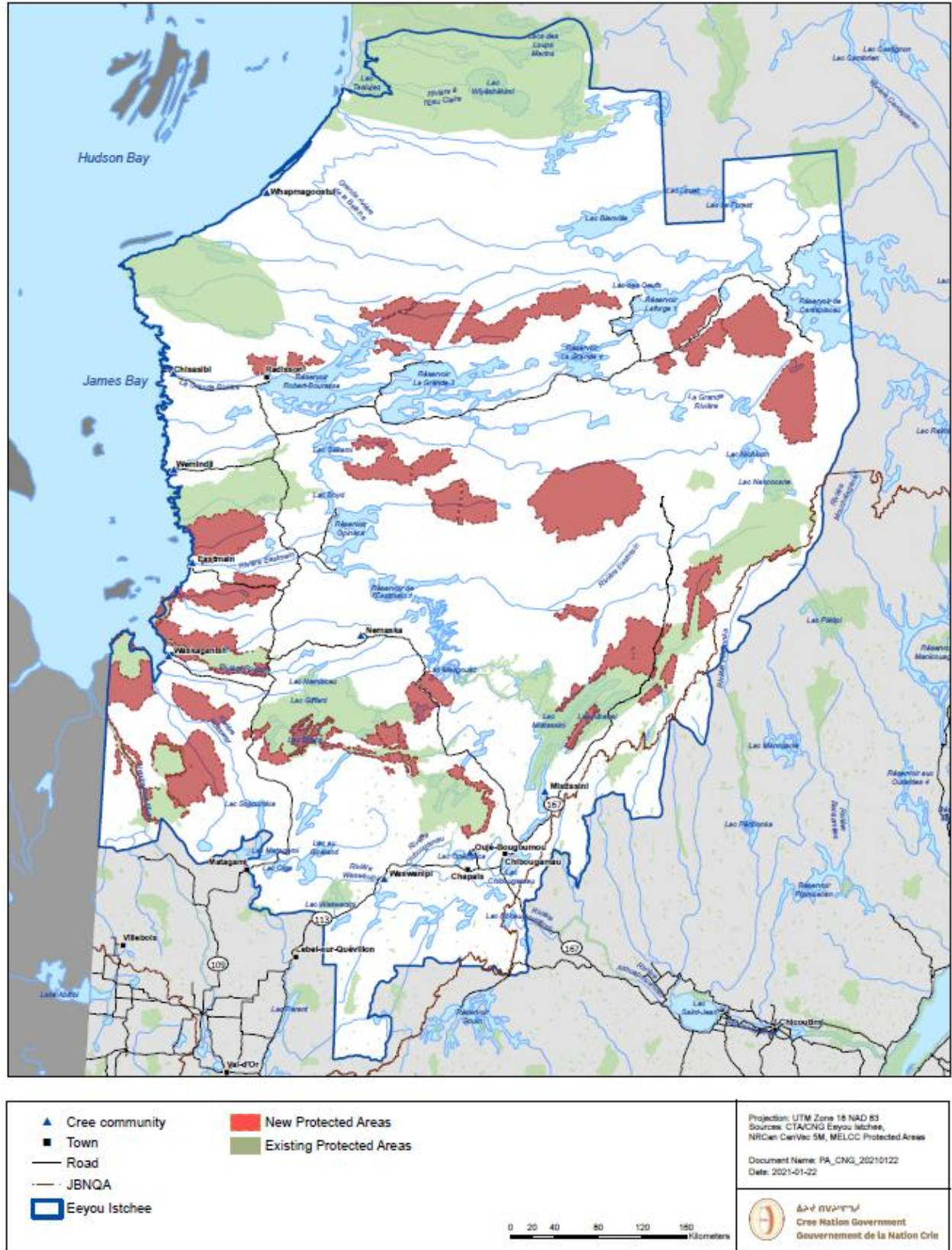


Figure 3-1 Protected Areas

3.1 EXISTING SOCIAL AND ENVIRONMENTAL ASPECTS

As mentioned in the introduction, La Grande Alliance Phases II and III Pre-Feasibility includes a very *innovative approach* of consulting and engaging with the territory users prior to the technical design phase of the proposed infrastructures. This allows their input into the project as early as possible, whilst benefiting from their tremendous knowledge of the territory, its resources, and additional environmental considerations. The figure below described the collected social and environmental data information pertaining to the Study Area:

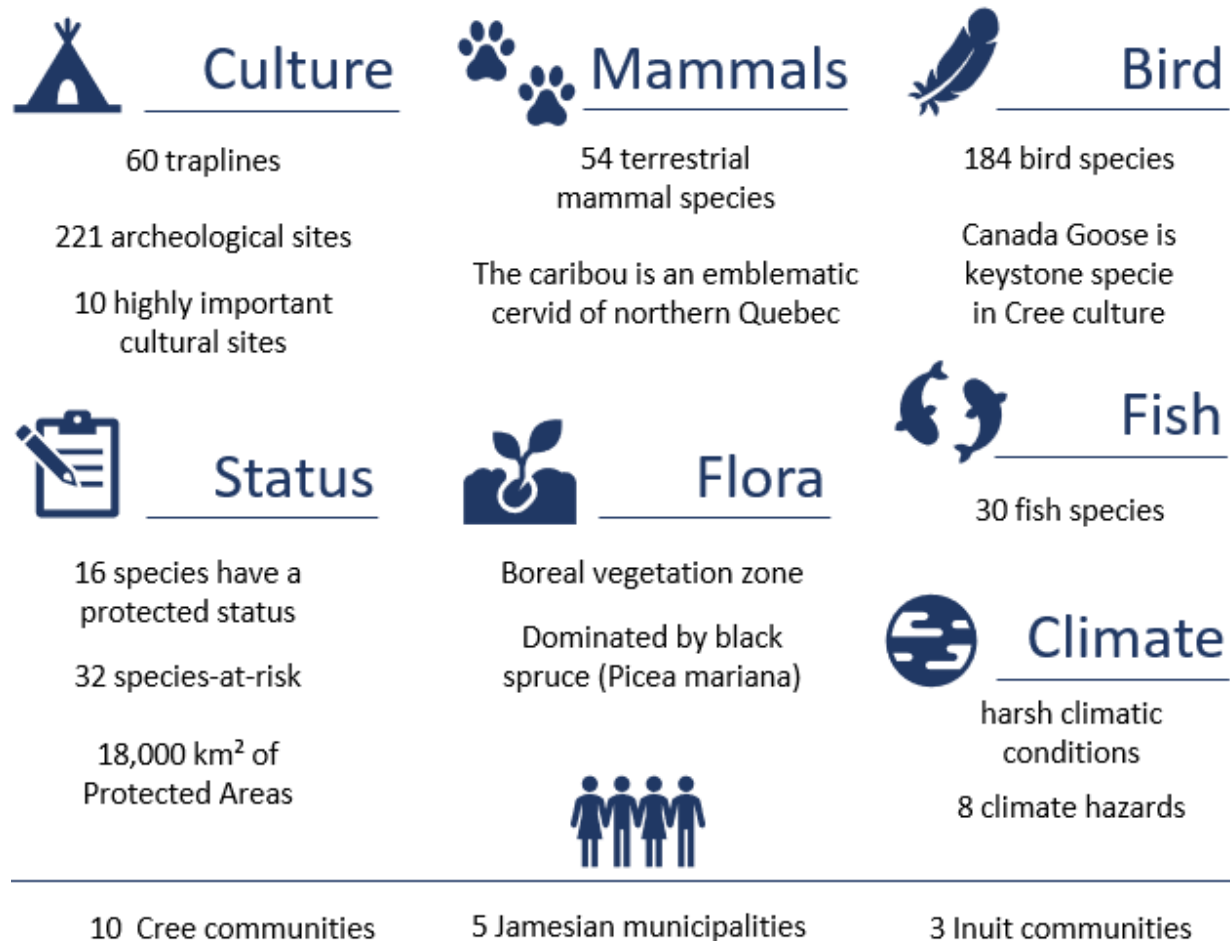


Figure 3-2 Phase II and III Overall Study Area Collected Data Results

4 MAIN FINDINGS – TECHNICAL SURVEY

The objective of Report 3 is to assess the technical feasibility of the proposed infrastructure applying a concept engineering design based on applicable laws, regulations, technical parameters and specific parameters designed at the outset by the client in the spirit of the overall approach of La Grande Alliance studies, outlined in the introductory sections of this report. Most notably, the concept design must fully consider significant socio-environmental data, compiled in Report 2, including knowledge and perspectives gathered directly from Cree land users engaged prior to the design stage.

It is important to note that an important proportion of the infrastructures proposed in Phases II and III are planned in undeveloped areas. For these areas, we have identified additional processes to limit environmental impacts, with a view of accounting for the sensitivity of planning new corridors in previously inaccessible areas (and entire regions), in line with the main sustainable development objectives of the overall program. Thus, for these areas the goal of the Pre-Feasibility Study is to identify and propose alignments that present the least risk.

Based on our results, we have determined that it is possible to develop the proposed transportation infrastructures in a manner that co-exists with and respects community concerns and traditional activities, such that achieving social acceptability is possible.

Below is the summary of the proposed phase II and III La Grande Alliance infrastructures components (refer to Figure 4-1 for concept alignments).

Table 4-1 La Grande Alliance’s Phase II and III Infrastructures Summary Description

PHASE II & III INFRASTRUCTURE		SCHEDULE	SCOPE	COST ESTIMATE		COST RANGE
Route 167	Upgrading MTQ section from Mistissini to km 411	2035-2040	106 km	\$271M	\$1,053M	\$1.5M-\$2.5M per km
	Maintaining MTQ unpaved section from km 411 to km 553		141 km	-		
	Upgrading Mine road from km 553 to Stornoway Renard mine		97 km	\$100M		
	Extension Stornoway Renard mine to Trans-Taiga Road		172 km	\$685M		
Roadway: La Grande to Whapmagoostui/Kuujuuarapik		2035-2040	207 km	\$1,428M		\$6M to \$8M per km
Railway: Rupert to La Grande		2035-2040	340 km	\$3,958M		\$10M to \$14M per km
Railway: La Grande to Whapmagoostui/Kuujuuarapik		2040-2045	219 km	\$4,899M		\$20M to \$25M per km
Harbour at Whapmagoostui/Kuujuuarapik		2040-2045	20 vessels	\$57M		-

Note 1: To simplify the presentation, each item amount has been rounded

Note 2: Class D Estimate -20% to +100% margin of error.

REPORT NO.4 – PERFORMANCE ANALYSIS

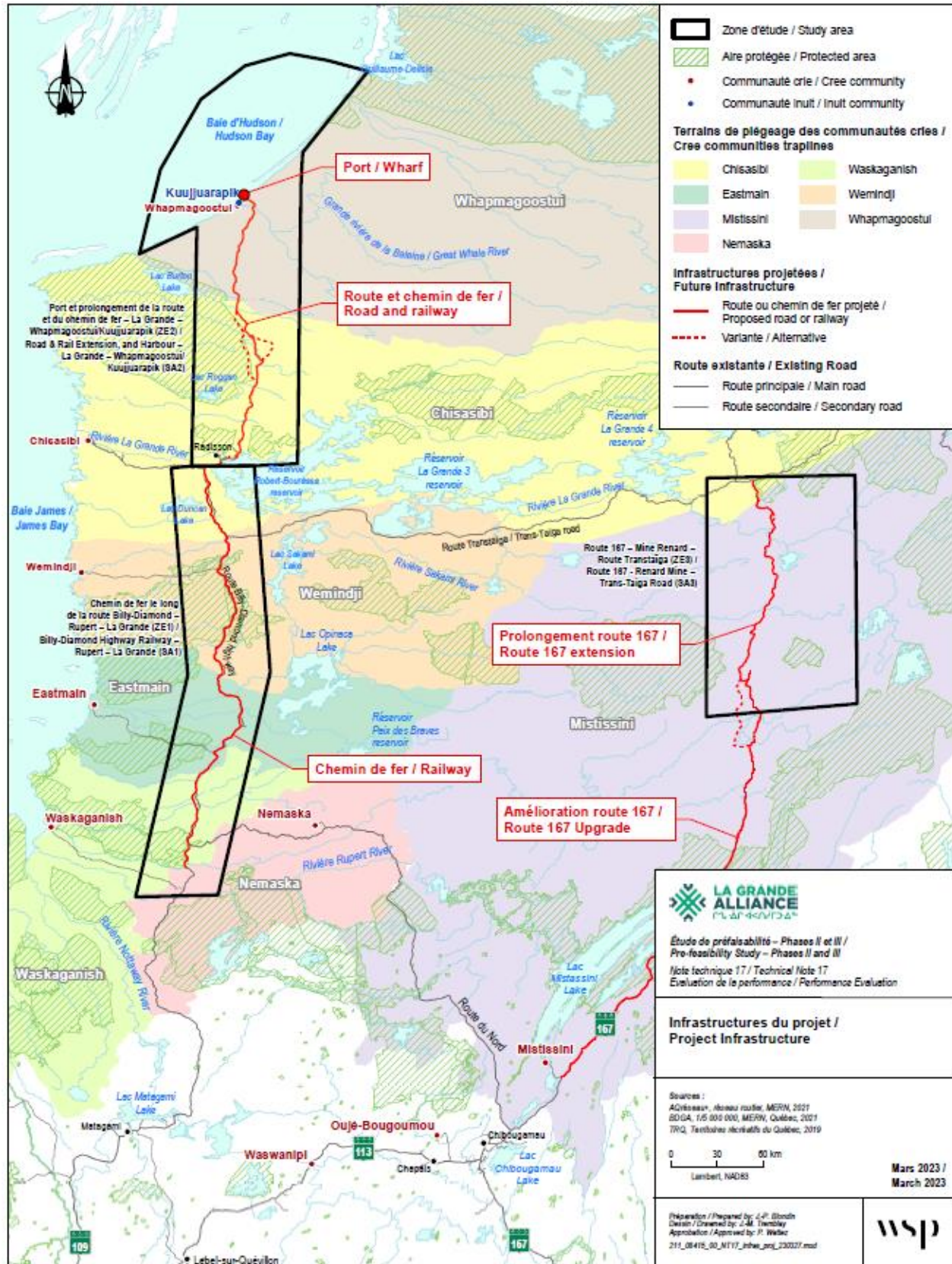


Figure 4-1 Map of La Grande Alliance Phases II and III Proposed Infrastructures

5 SOCIAL-ENVIRONMENTAL PERFORMANCE REVIEW

As stated earlier, an objective of this Report 4 is to determine, from different analyses, whether the proposed La Grande Alliance infrastructure components (refer to Figure 4-1 in section 4) bring a real plus-value to the community.

One of these indicators is the Social-Environmental Review which main objective is to present the adequacy of the alignments under study in the human and natural environment based on the environmental and human constraints identified at the initial stages.

Considering new information gathered and to be gathered in the next stages, work will be required to refine and reconcile the proposed alignments with Cree land use, environmental and cultural concerns.

The proposed alignments are shown in Figure 5 1 to Figure 5 4, which also illustrate the boundaries of the traplines.

During validation, land users suggested certain optimizations or changes, which should be taken into account in future project development and, if necessary, identify and include mitigation measures. The environmental and social impact studies will require new rounds of interviews with land users and their participation in the development of compensation or other types of measures, if necessary (e.g., prevention, enhancement, or mitigation measures).

5.1 ROUTE 167: UPGRADE & EXTENSION TO TRANS-TAIGA

Users are generally satisfied with the proposed route, which would allow them to access the territory more easily. Some are planning to build camps along the proposed road. The overexploitation of resources in connection with the opening of the territory remains a concern. Users expect to benefit from economic opportunities and that the environment will be preserved as much as possible.

The great sinuosity of the preliminary route reflects the effort devoted to avoid the many on lakes the territory. The presence of a projected Biodiversity Reserve and two Land Reserves as Protected Areas are other elements avoided by the designed route. Finally, due to the presence of three herds of woodland caribou, the alignment is in the western half of the Study Area to minimize the impact on this species.

Six heritage sites are reported for SA3, on Chisasibi hunting grounds. They are limited to its north-western corner, on lac Des Voeux, 6 km north of the Trans-Taiga Road. All date back to the 20th century. This territory has been the object of very limited research, hence this low number of sites. No Area of Heritage Interest (AHI) was identified within that area.

5.2 RAILWAY: RUPERT TO LA GRANDE

Some of the users met did suggest minor or major variants to the proposed alignment. Some wanted to be better informed of the potential impacts, and had concerns about wildlife, water, the pursuit of their harvesting activities and their health. They would be more inclined to support the project if there were tangible benefits. Others are against the proposed infrastructure.

To minimize the impacts on the territory (avoiding as much as possible the large rivers, spawning grounds, abundant wetlands, numerous protected areas, as well as caribou herds (woodland to the south and migratory to the north), it was a mandatory requirement that the proposed railroad alignment shall be as close as possible to the Billy-Diamond Highway (BDH). As described in Technical Note 12, this was achieved for most of the overall length (70%). The

remaining 30% which is not within 100 meters from the BDH is due to the railway design criteria that do not allow the railway to follow the highway curves.

La Grande Alliance proposed Railway Corridor for Phase II counts with 35 Heritage Sites, out of which 28 have moderate to high value. All sites are affiliated to the Crees and their ancestors. They are located on Wemindji hunting grounds, except for three sites pertaining to Eastmain, Waskaganish, and Nemaska territories. Four Areas of Heritage Interest (AHI) of small superficies have been defined. All are associated to Wemindji hunting territories.

5.3 ROAD & RAILWAY EXTENSION: LA GRANDE TO WHAPMAGOOSTUI/KUUJJUARAPIK

In Whapmagoostui, the users of the traplines met are in favour of the project, although some concerns were raised. In Chisasibi, some objections were expressed, and alternatives were suggested.

The presence of several very elongated lakes is a particularity of this study area, implying a relatively sinuous projected road alignment. In addition, due to the large number of wetlands, encroachments are inevitable. Protected Areas are avoided. Only migratory caribous, which are less vulnerable to the project than woodland caribou, frequent the Study Area. However, concerns have been raised regarding the disturbance of migratory species' migration routes by the infrastructures.

The corridor of the proposed extension of the Railway and Roadway is heritage-rich, with 102 sites out of which 87 have a moderate to high heritage value. All sites attest to the Indigenous occupation of the territory, including Inuit, Paleoindian, Crees and their ancestors. Many sites have only been cursorily investigated so that their exact cultural affiliation remains uncertain. Sixty-six are located within Whapmagoostui hunting territories and 36 are on Chisasibi hunting grounds. Six Areas of Heritage Interest (AHI) have been defined within SA2. CHI01 is the only AHI within the Chisasibi territory, with two neighbouring paleohistorical sites (0.1 km²). The other five are in Whapmagoostui territory.

From a general perspective, the study area bears considerable interest regarding Indigenous occupation, with the Crees and their ancestors having occupied the whole study area, and the Inuit and Paleoindian its northern end. Traces of their presence concentrate along main rivers and lakes, and close to travelling routes and resources that could sustain their way of life, such as game, fish, plants, minerals, and stones.

5.4 HARBOUR IN WHAPMAGOOSTUI/KUUJJUARAPIK

The preferred option for the port was defined following interviews with the land users, who generally felt that the more northerly options were the most appropriate, although goose hunting and other harvesting are practised in the spring and fall. Additional consultations with the Crees and Inuit would allow for a better definition of the harvesting and specificities of this sector.

According to the available information, the selected site is outside of the important zones, in particular zones for belugas, polar bears, and migratory birds. No Conservation or Protected Areas are located nearby. Despite the presence of some valued natural components, the selected site seems to offer several advantages from a technical and environmental point of view.

Available data regarding possible maritime heritage are scant. Since maritime heritage sites can be expected near areas of higher traffic where two major trade posts were established and where human groups gathered, the Great Whale and Little Whale rivers estuaries are areas of high potential. Special care for documenting possible underwater and maritime heritage should thus be taken there if the development of the proposed harbour is deemed valuable by the communities.

5.5 ADDITIONAL CONSIDERATION – PRESERVATION OF CREE CULTURE

This subject, which represents a major concern for the Crees, was frequently addressed during the engagement of the communities within the framework of La Grande Alliance studies, since the territory, the culture and the Cree traditional knowledge are intrinsically linked. A specific engagement on this subject, involving the participation of Cree experts, is recommended to identify the right means the preservation of Cree culture.

Please refer to Technical Note 17 for more detailed information.

REPORT NO.4 – PERFORMANCE ANALYSIS

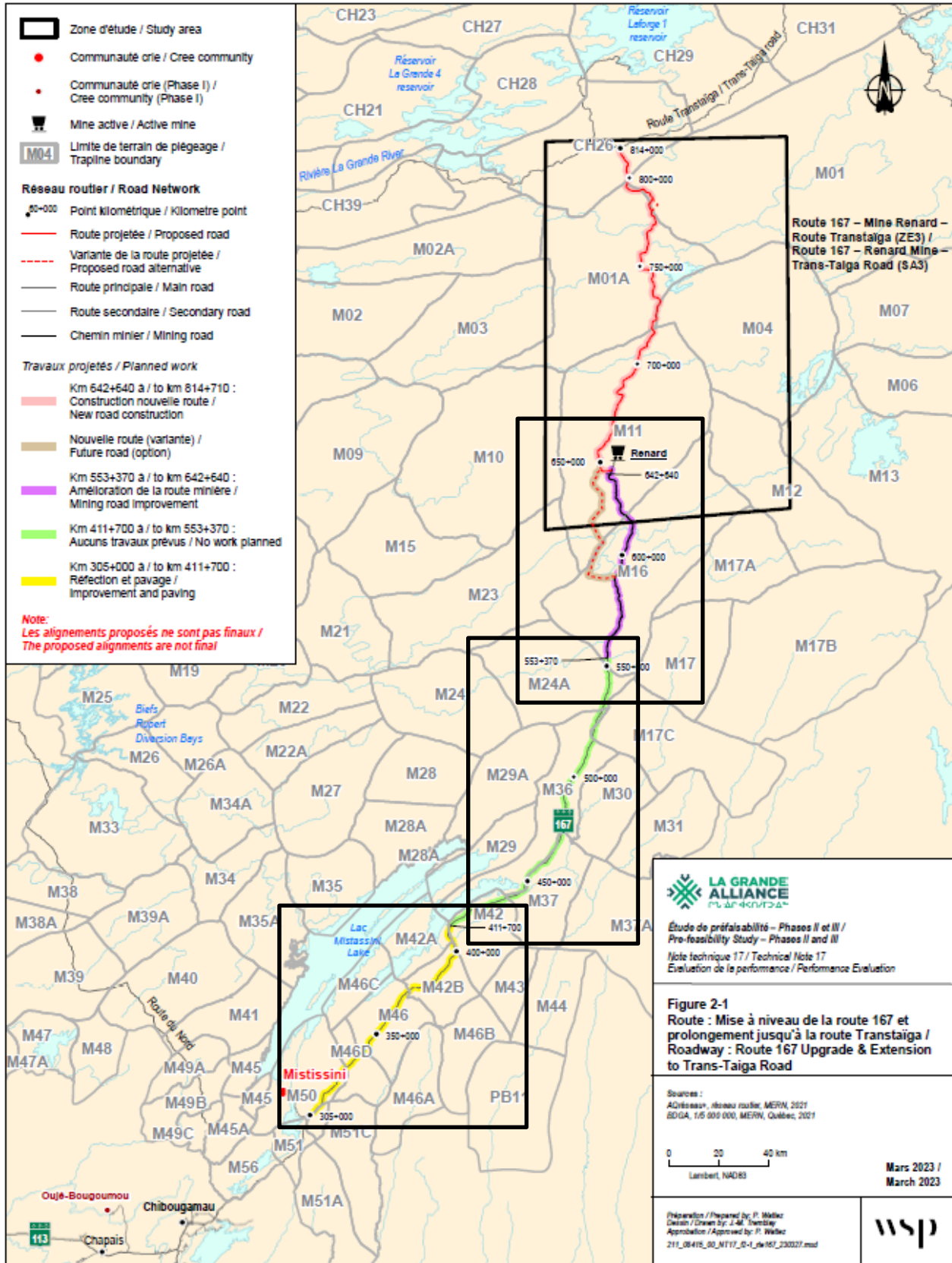


Figure 5-1 Roadway: Route 167 Upgrade & Extension to Trans-Taiga

REPORT NO.4 – PERFORMANCE ANALYSIS

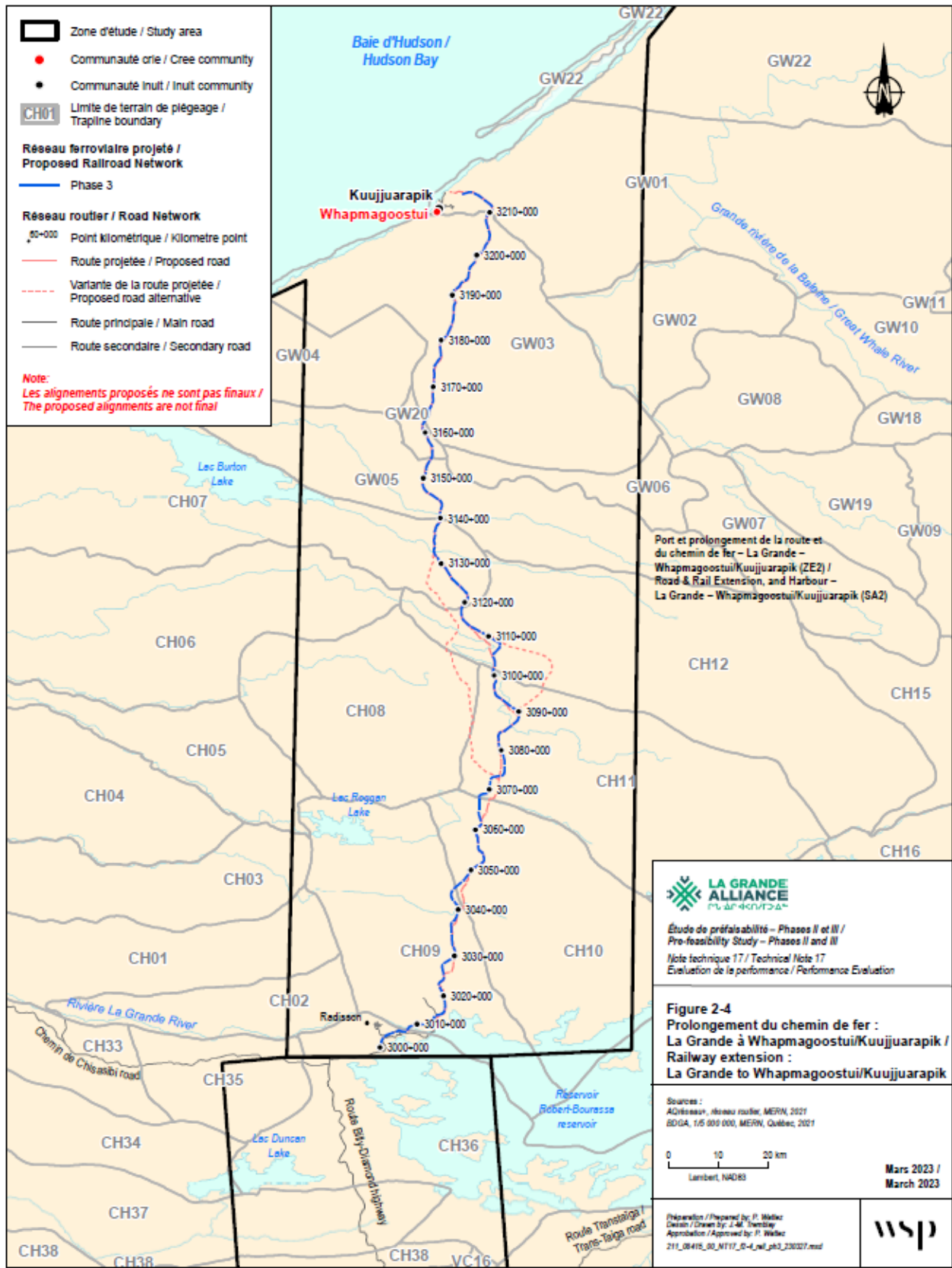


Figure 5-4 Railway extension: La Grande to Whapmagoostui/Kuujuarapik

6 RISK AND MITIGATION MEASURES

This section focuses on conducting a qualitative analysis to identify key risks and mitigation measures based on the current stage of development. The quantitative risk analysis will need to be completed with additional information (procurement models) in a subsequent stage.

The analysis is based on the approach developed in the context of the planning and implementation of major public infrastructure projects in Quebec. It allows to highlight the most important risks among those that have been identified in order to allow their consideration upstream of the proposed infrastructures development process.

A Risk Analysis Workshop was held in November 2022 between the WSP team and members of the study's Technical Committee. The purpose of the workshop was to allow the experts to discuss the risks associated with the proposed infrastructure and to develop hypotheses regarding the probability and impact of the identified risks as well as to propose mitigation measures. During this stage, a non-restrictive approach was favored in order to identify as many risks as possible and cover all aspects of the Study. The discussions also focused on identifying opportunities or possibilities to be seized in the context of the future development of the proposed infrastructures.

A total of 56 risks were identified of which 3, or 5.4%, were rated as “very low” or “low”, 24 or 42.9%, were rated as “moderate” and 29 or 51.8%, were rated as “high” or “very high”. Of the 53 risks with severity levels above the tolerance threshold, 29 require immediate attention due to their “high” or “very high” severity.

Table 6-1 Distribution of the Proposed infrastructures Risks

RISK CATEGORIES	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH	TOTAL
Planning phase	0	0	3	5	1	9
Design phase	0	1	4	1	0	6
Site conditions - Environment	1	0	1	3	0	5
Construction & Commissioning	0	0	8	5	0	13
Operation & Maintenance	0	0	3	3	0	6
Social & Political	0	0	3	5	0	8
Finance & Economy	0	0	0	3	1	4
Legal	0	1	2	2	0	5
Total	1	2	24	27	2	56

Among the general mitigation measures to be considered to minimize the risks of the proposed infrastructures, it is essential to continue to communicate and work in concert with the stakeholders and government authorities throughout the development of this proposed infrastructures in order to obtain agreement on the scope of work and the support of the stakeholders, and more particularly the Cree community.

The proposed alignments optimized solutions retained for the projected infrastructures will have to avoid or reduce the risks associated with the protected areas and the environment in conformity with cultural values of the Cree Nation, notably by maintaining the involvement of the Cree population in the decision-making process leading to the choice of the infrastructures to be built in full knowledge of their impacts on the territory.

It is also important to mention that this study, with its engagement approach, is a mitigation measure in itself to reduce the risk of social acceptability. The fact that this study is conducted by the Cree Nation for the Cree population is an innovative way of doing things in Cree territory since the population is informed well in advance of potential future work and adjustments can be made to meet the expectations of the Cree population. This is a completely different approach from what was done in the past.

Please refer to Technical Note 18 for more detailed information.

7 BENEFIT-COST ANALYSIS

This analysis monetizes the social and community-level benefits and disbenefits of the built infrastructure proposed by Phase II and Phase III of La Grande Alliance. Social and community-level benefits and disbenefits are the positive and negative externalities to economic agents who will not be directly involved in the construction and the operation of La Grande Alliance infrastructure. The externalities generated by transportation infrastructure come in the form of travel time savings, reduced transportation costs, better environment and improved safety for the entire population, firms, and governments in the Northern region of Quebec.

As the study area is situated in a remote area with abundant natural resources, lack of transportation infrastructure makes all forms of economic development, namely mining but also community economic development, extremely difficult. The study area is well known for its Hydro-Québec landmarks and infrastructure which will reach their end of life soon, and therefore will require replacement and, quite possibly, upgrading. Demand for transportation of goods and people is expected to grow over the next decades. Based on our forecasted demand for transportation, social and community-level benefits were assessed and monetized using the MTQ's 2016 Benefit-Cost Analysis Guidance.

Several traditional benefits were quantified, and a number of non-quantifiable benefits were discussed qualitatively. For quantifiable benefits, seven categories were quantified, namely:

- 1 Freight shipping costs;
- 2 Passenger transportation costs;
- 3 Travel time for passengers and drivers;
- 4 Users' vehicle operating expenses;
- 5 GHG emissions;
- 6 Air contaminants emissions;
- 7 Road accidents.

Table 7-1 summarizes the Benefit Cost Analysis results monetized over the entire 2027-2074 period. This 48-year period of analysis includes 13 years of construction in Phase II from 2027 to 2039, 13 years of construction in Phase III from 2032 to 2044, and 30 years of operations starting from 2040 and 2045 for Phase II and Phase III respectively.

The present Benefit Cost Analysis uses the net present value (NPV) and the Benefit-to-Cost Ratio (BCR) as two common benefit-cost evaluation measures. Both the NPV and the BCR express the relation of discounted benefits to discounted costs as a measure of the extent to which a Project's benefits either exceed or fall short of the costs. The NPV is the difference between the Project total benefits and the Project costs, while the BCR is the ratio between the former over the latter.

In sum, Phase II is expected to generate a NPV of \$2.3 billion and a BCR of 1.36 when no discount rate was used. Phase III is expected to create a loss for the society with a NPV of - \$3.1 billion and a BCR of 0.37. On a discounted standpoint, Phase II returns a negative NPV of - \$1.6 billion, with a BCR of 0.20. For Phase III, the discounted NPV and discounted BCR are both negative, with - \$1.0 billion and -0.01. The interpretation of a negative BCR is that for every dollar investing in La Grande Alliance's Phase III, the associated discounted economic loss for the society would be equivalent to an amount of \$0.01. If both phases II & III were combined, the BCR becomes 0.93 when using no discount rate, and 0.13 when using a discount rate of 2.37%.

The most important benefit brought by the proposed La Grande Alliance infrastructure is users' vehicle operating cost savings (\$4.0 billion), followed by travel time savings (\$1.5 billion), both generated mostly by Phase II. To a lesser extent, the benefits of reduced GHG emission, air contaminant emissions, and road accidents are all significant. However, the operating and maintenance of La Grande Alliance infrastructure is expected to be costly, with \$2.3 billion to be spent over the 2040-2074 period.

REPORT NO.4 – PERFORMANCE ANALYSIS

Table 7-1 Benefit Cost Analysis Results, 2027-2074 (Million of 2023 Dollars)

#	Benefit & Cost Item	Undiscounted Value (M\$)			Discounted Value (M\$) at 2.37%		
		Phase II	Phase III	Total	Phase II	Phase III	Total
1	Freight shipping cost savings (Whapmagoostui only)	14	4.1	18	1	0.2	1
2	Passenger transportation cost savings (Whapmagoostui only)	57	0.9	57	4	0.0	4
3	Travel time savings (road & rail transportation)	1,469	5.6	1,475	100	0.2	101
4	Users' vehicle operating expenses (road transportation)	3,996	5.3	4,002	273	0.2	273
5	GHG emissions (road & rail transportation)	669	0.7	670	40	0.0	40
6	Air contaminant emissions (road & rail transportation)	310	0.2	310	21	0.0	21
7	Accident Cost Savings (including Fatalities, Injuries and PDO) - (road transportation)	379	2.0	381	26	0.1	26
8	Infrastructure Operating and Maintenance Costs (road & rail transportation)	(1,484)	(766)	(2,250)	(98)	(31)	(129)
9	Residual Value	3,327	2,560	5,888	41	20	61
10	Total Benefits	8,737	1,813	10,550	409	(11)	399
11	Total Costs (CAPEX)	6,439	4,956	11,395	2,031	1,014	3,045
12	NPV	2,297	(3,143)	(845)	(1,621)	(1,025)	(2,646)
13	BCR	1.36	0.37	0.93	0.20	(0.01)	0.13

Please refer to Technical Note 19 for more detailed information.

8 ECONOMIC IMPACT ANALYSIS

This section analyzes the economic impacts during the construction periods and the operation periods of Phases II and Phase III of the proposed La Grande Alliance infrastructure. It also reports the economic impact results from the construction of the La Grande Alliance's Phase I infrastructure, carried out by the VEI consultant team.

Economic impacts are different from economic benefits. Economic benefits generated by transportation infrastructure come in the form of travel time savings and reduced transportation costs for the entire population, firms, and governments in the Nord-du-Québec region. Economic impacts are understood as the number of jobs created for the workers and the value added to the economy by the entrepreneurs, firms and governments involved in the construction and the operation of the proposed La Grande Alliance infrastructure.

By combining Statistics Canada provincial input-output multipliers with the cost estimate figures presented in Technical Note 16, and the projects' schedule presented in Technical Note 15, we arrive at the following results.

PHASE II

- The economic impacts of the proposed infrastructure will create 41,730 full-time jobs measured in persons-years over the 2027-2039 construction period, 12,031 jobs in persons-years between 2040 and 2069;
- The construction phase will contribute \$4.3 billion to the Quebec's GDP, and generate \$2.91 billion in labour income, while the operation phase will contribute \$1.32 billion to the GDP, and \$0.93 billion in labour income;
- Tax revenues collected by all-level governments are estimated to be \$214 million in taxes on production and \$205 million in taxes on products during the construction phase. The operating phase would generate fiscal revenues of \$68 million in taxes on production, and \$74 million in taxes on products.

PHASE III

- An equivalent of 32,120 full-time jobs will be created over the 2032-2044 construction period, additional 6,214 full-time jobs will be created between 2045 and 2074 for operating the infrastructure;
- The construction phase will contribute \$3.31 billion to the provincial GDP, and require \$2.24 billion in labour income, while the operation phase will add \$0.68 billion to the GDP and \$0.48 billion in labour income;
- Tax revenues collected by all-level governments are estimated to be \$165 million in taxes on production and \$158 million in taxes on products during the construction phase. The operating phase would generate \$35 million in taxes on production and \$38 million in taxes on products.

Given the strong capacity and experience of Cree workers and entrepreneurs in the construction sector, in particular for major infrastructure projects such as the construction of Hydro-Quebec power stations in the Nord-du-Québec region, it is expected that the economic impacts for the 10 Cree communities will be significant.

Please refer to Technical Note 20 for more detailed information.

9 FINANCIAL ANALYSIS

The infrastructure program of La Grande Alliance represents strategically significant assets aimed at enhancing long-term economic growth and regional competitiveness by more efficiently moving passengers and goods via the new and upgraded infrastructure. Recognizing the importance of this infrastructure program, the analyses and conclusions developed throughout have been developed diligently and iteratively through engagement with key stakeholders. In particular the development of the financial analysis at the portfolio level (i.e., Phase I, II and III) was assisted by the Phase I consulting team. It should be noted that both consulting firms hired by CDC have produced independent analysis using different financial models and assumptions. WSP has not verified the Phase I analysis and taken the output results “as is”.

In order to inform the procurement and financing strategy for the infrastructure program, an ecosystem scan of major passenger rail projects was performed, and international freight rail project examples were reviewed, including the Inland Rail project in Australia. This overview provides an understanding of the financial structure, procurement approach and key issues faced by existing projects; it also points to some key lessons that can inform the decision-making regarding risk allocation and thus procurement options for La Grande Alliance. The key overarching conclusions include:

- Freight and passenger rail projects are increasingly being delivered through a range of PPP models;
- Few PPP rail projects transfer full revenue risk to the private partner; the tendency is to structure these deals with availability payments or to provide minimum revenue guarantees;
- Governments play a significant role in funding rail projects, including PPPs. Public funds account for a more significant portion of total capital costs. The private sector’s contributions on rail projects are normally low;
- For this project to be deemed commercially viable by lenders, a significant level of public sector support in the form of minimum revenue guarantees, direct capital contributions and/or risk guarantees will likely be required to cover the private sectors annual financing and operating expenditures during the debt tenor.

As noted above, WSP completed two financial assessments, one specific for Phases II and III and a second one reflecting the entire La Grande Alliance proposed infrastructures, which includes Phase I and its key outputs. The overall financial model combines the proposed Project’s cost assumptions, forecasted revenue for the corridor, and a series of assumptions regarding the proposed Project financing. It is built to evaluate the three main phases of La Grande Alliance project independently and on an overall portfolio basis. However, the majority of the analysis focused mainly on Phases II and III which is the subject of WSP’s scope and effort.

The base case scenarios for each phase were calibrated based on various inputs including estimates for revenue (freight tonnage and passenger volume), capital and operating costs and various financing inputs. The base case was modelled without any government support to understand the proposed Project’s performance based on the project costs and revenues. The NPV of Phase II and Phase III are \$(2,494) million and \$(3,299) million respectively for a total NPV of \$(5,793) million at the start of 2027. The total infrastructure asset valuation generates an NPV of \$(8,592) million for Phase I, II and III combined, at the start of 2023. This points to the need for government support to offset the large capital costs and fairly low forecast tonnages.

In order to strengthen the reliability of the financial analysis a sensitivity analysis was undertaken to test the impact of different base case inputs assumptions on the project’s financial results. The sensitivities tested included +50% to +80% capital contributions, +10% to +30% increases in revenue and -10% to -30% decreases in operating costs. The overarching takeaways from the sensitivity analyses are as follows:

- The base case tariff would need to be increased to \$76.62/tonne (real \$2023) for equity holders to earn a minimum IRR of 12%.
- The minimum subsidy required for equity holders to earn a minimum IRR of 12% is 70.8% which would return a Phase II Project NPV of \$911.7 million and a minimum DSCR of 1.47x.

- Given the size and high capital cost of the proposed Project, the model is not very sensitive to a normal level of optimal sensitivities for the main model drivers, namely tonnage volume increases (+10%, +20%, +30%) and reduction in operating costs (-10%, -20% and -30%). The proposed Project NPV in all cases remains highly negative.
- It should be noted that the Phase I outputs indicate that even with an 80% subsidy the project is not feasible (i.e., negative NPV). Accepting these results as is would weigh down the overall financial feasibility at the global portfolio level.

Based on the project's objectives and constraints, review of precedent PPP passenger and freight rail projects and comprehensive financial analysis, it was determined that the project is not financially feasible and should be further assessed to meet the requirements of the project. While understanding the financial feasibility is considered foremost in advancing the project's development it is not the only consideration. The project creates social and economic benefits which are worth considering to make the project more attractive to investors and more convincing to funding partners.

Additionally, from a strategic point of view, greater market growth for rail infrastructure in northern Quebec could result from increasing demand (from increased shipped throughput tonnage or increased selling price per tonne) for "green resources" that are deposited in this resource-rich area. The growing demand and supply constraints for these commodities which include cobalt, lithium, graphene, copper, nickel, etc. can make the project more compelling. Prior to making Capex decisions to increase production, mining companies will ensure appropriate rail service capacity exists that is cost-effective, reliable, and safe. As the viability of the infrastructure relies heavily on the mining sector, their rate of growth is of central importance. Faster growth would incrementally increase additional net economic and social benefits, supporting the rationale for both capital and operating funding.

Please refer to Technical Note 21 for more detailed information.