LA GRANDE ALLIANCE

CREE DEVELOPMENT CORPORATION
Respect · Collaboration · Strength

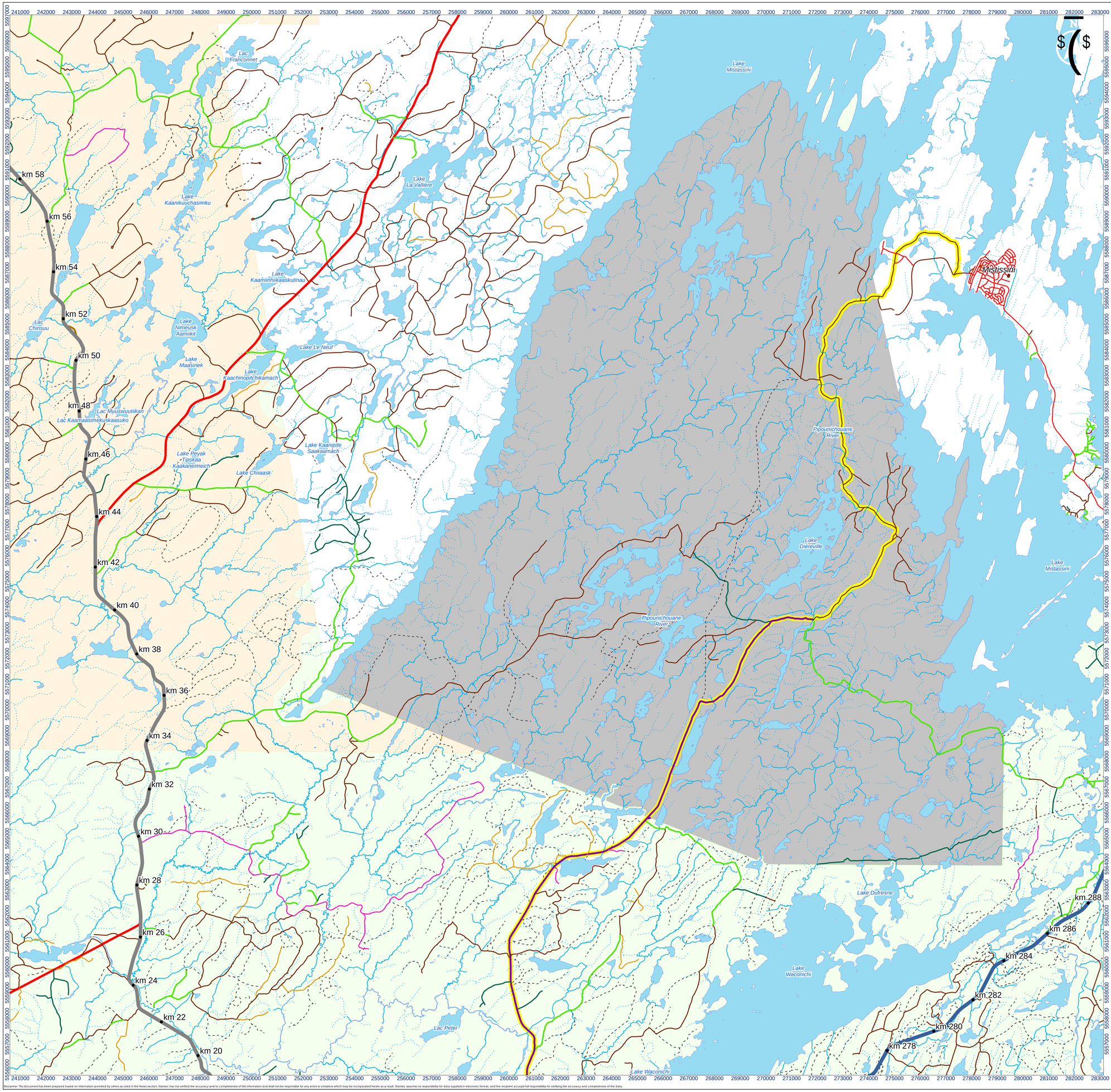
# ENGINEERING CONSULTING SERVICES
## VOLUME 6 - APPENDIX
## SECTION 6.17 – MISTISSINI ROAD PACKAGE
## Feasibility Study Final Report Phase I



**Consultant Reference: LGA-1-GN-F-FRN-RT-0001_00_Section6.17**
**2023-04-03**

Vision Eeyou Istchee
• Connect • Develop • Protect

Stantec ▪ DESFOR ▪ SYSTRA
*with subconsultant* KPMG




LE GROUPE DESFOR 25 ANS

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- Kilometer marks
- Route 167 Nord
- Route du Nord
- Snowmobile trail

**Road classification**

- Winter roads
- Unknown
- Non-compliant roads
- Non-forest roads
- Outsized roads
- Class 01
- Class 02
- Class 03
- Class 04
- Class 05

- Category I lands
- Assinica Wildlife Reserve
- Albanel-Mistassini-and-Waconichi Lakes Wildlife
- Permanent watercourse
- Intermittent watercourse
- Lakes

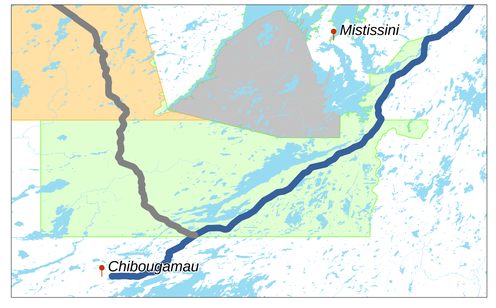
Proportion of Road Categories Within Category I Lands

| Categories | Length (m) | Proportion (%) |
|---|---|---|
| Class 02 | 11 105 | 7,1% |
| Class 03 | 13 858 | 8,9% |
| Class 04 | 12 749 | 8,2% |
| Winter roads | 40 353 | 26,0% |
| Unknown | 77 299 | 49,8% |
| **Total** | **155 364** | **100,0%** |

0 1 000 2 000 3 000
metres

1:50 000
(At original document size of 34x44)

Notes
1. Coordinate System : NAD 1983 CSRS MTM 8
2. Road Network, MRNF
3. Futur Snowmobile Trail in Possible Conflict, COTA
4. Watercourse and Waterbody, Government of Canada and MRNF
5. Protected Areas and Biological Refuges, MRNF
6. Forest Territorial Subdivisions (Categorie I Lands), MRNF




Project Location
Mistissini

Existing Roads
Prepared by Clovis Déry on 2023-02-08
Approved by Marc-Antoine Allard, For. Eng on 2023-02-08

Client/Project
LA GRANDE ALLIANCE
Phase 1

Map No.
1

Title
Existing Roads

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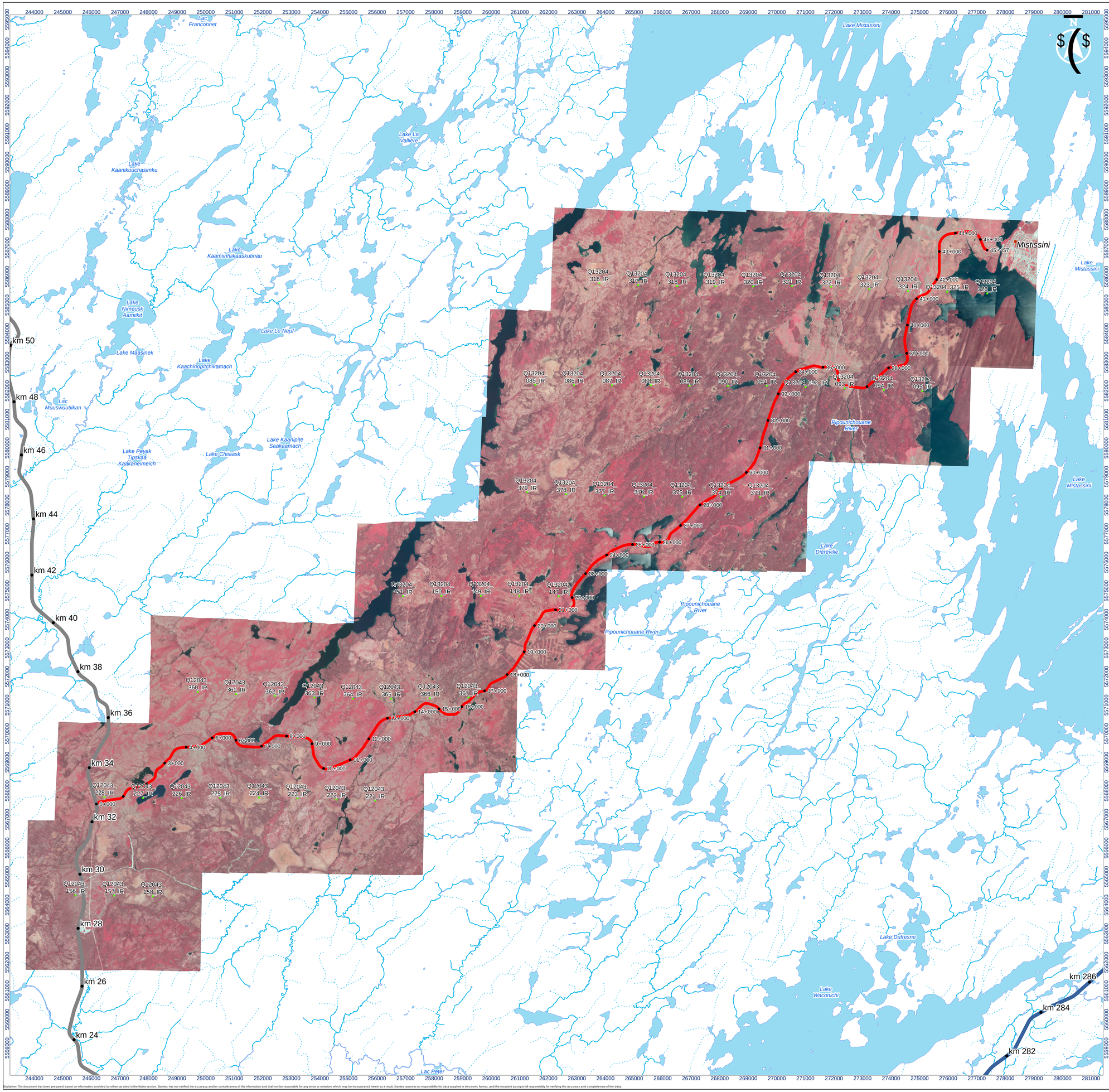


LE GROUPE DESFOR 25 ANS

Vision Eeyou Istchee
Connect • Develop • Protect
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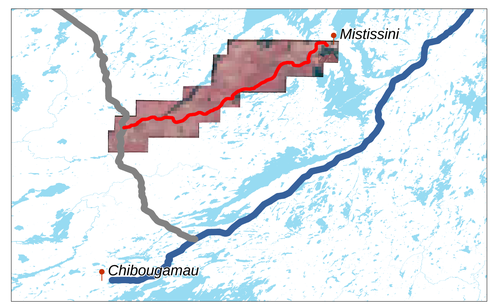
- Kilometer marks
- Aerial photographs centers
- Route 167 Nord
- Route du Nord
- Selected route
- Permanent watercourse
- Intermittent watercourse
- Lakes

0 1 000 2 000 3 000 metres

1:45 000
(At original document size of 34x44)

Notes
1. Coordinate System : NAD 1983 CSRS MTM 8
2. Road Network, MRNF
3. Watercourse and Waterbody, Government of Canada and MRNF
4. Aerials Photographs, MRNF




Project Location
Mistissini

Aerial Photographs
Prepared by Clovis Déry on 2023-02-09
Approved by Marc-Antoine Allard, For. Eng on 2023-02-09

Client/Project
LA GRANDE ALLIANCE
Phase 1

Map No.
1

Title
Aerial Photographs and Selected Route

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EEYOU PLANNING COMMISSION

# ORIENTATIONS DOCUMENT

IIYIYUU / IINUU

ASCHIIYUU KAA IISH MAMUUWEYEYIHTAKWAAUH

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# ON THE ROAD NETWORK

**DRAFT**

**December 2021**

# TABLE OF CONTENT


**Introduction** **Page 3**

**Main Guidelines** **Page 4**

**Section 1 – Governance of the Road Network** **Page 5**

→ Identified issues Page 5
→ **EPC Orientations** related to the governance of the road network Page 6

**Section 2 – Regional Planning of the Road Network** **Page 11**

→ Identified issues Page 11
→ **EPC Orientations** related to the planning of the Road Network Page 12


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# INTRODUCTION

Driven almost exclusively by natural resource extraction projects and needs, the development of the road network throughout Eeyou Istchee has played an enormous role in shaping the region. Roads have had a positive impact for many Crees as they have facilitated access to their communities and to their hunting areas across much of the territory. At the same time, they have acted as gateways for land uses and development projects that have often negatively impact Cree lands and the ability of Crees to practice their traditional way of life. The trajectories of roads define which areas are accessible to Crees as well as other users, and which remain less accessible – both with huge ramifications. In addition, while the Crees are very significant users of the road network, the planning and management of these roads rarely takes into account Cree users and uses which include not just automobile travel but also snowmobile, ATV, and even foot travel to access camps and trapping areas among others.

Despite its large impact on the Cree territory and way of life, opportunities for Crees to intervene in the planning and management of the road network has in the past been limited mainly to participation in the environment and social impact review of large-scale road projects – which itself addresses only the smallest fraction of roads that have been built in the territory since the signing of the JBNQA, and to commercial forestry consultations with Cree tallymen. However, with the land use planning powers acquired through the 2012 Cree- Quebec Governance Agreement and the discussions linked to the recent La Grande Alliance initiative, there are opportunities to consider the road network more broadly and proactively, to seek out the information, tools, powers and collaborations required to shape a road network that responds to Cree needs as much as to industry's needs

**Background and organization of document**

This document seeks to put forward orientations and recommendations that could guide Cree land use planning efforts with respect to the planning, development, and management of the road network. Many of the issues and orientations raised in the document came from a workshop held with the EPC members in April 2021 and from EPC community consultations held in 2017. In order to further develop the material for this document, the EPC secretariate staff discussed the issues with colleagues with specific expertise on different areas of the subject matter. More detailed information was obtained when needed in that way.

*Throughout the document, quotes from the workshop on the road network held with the Eeyou Planning Commission have been integrated.*

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## MAIN GUIDELINES

1 **Road network planning should enhance Cree occupation and the pursuit of traditional activities**

The planning of the road network should serve Cree needs, and work to enhance the ability of Crees to pursue traditional activities. The most sensitive and culturally significant natural areas should be avoided for any new road construction, as roads and traffic can have negative effect on wildlife, while for other areas Crees may need new road access to better occupy the territory and to facilitate their ability to the practice the Cree way of life.

*« Woodland caribou avoid forestry roads. During high traffic periods, there is no animals for a long time close to forestry roads. »*

2 **Road design should better consider cohabitation and safety for land users**

The development of roads in Eeyou Istchee should take into consideration the cohabitation of heavy industrial trucks with smaller trucks/cars and recreational vehicles (ATV, snowmobile). To access trapline areas that are not connected to the major road network, land users use the multipurpose roads developed only for the needs of industry. The design and location of roads should be more sensitive to Cree occupation, to the impacts on traditional activities and safety.

*« The roads for advanced exploration (mining) work are not wide, and the visibility is very poor and that is how we lost someone on his four-wheeler. »*

3 **Greater consideration of cumulative impacts in road project planning**

The development of the road network has impacts far beyond the footprint of individual roads, as roads act as gateways for many land uses, especially for industrial and extractive uses. The expansion of these uses, including but not limited to new vacation leases, mining exploration activities, and an increase in hunting permits, can negatively impact and constrain Cree presence, safety and activities on the land. These potential uses and their impacts need to be considered in the assessment of new road projects, and in the management of existing roads.

*« Forestry roads are problematic. New forestry roads keep being built and they do not care about wildlife. »*

4 **Implication of the Crees in the governance of the road network**

Cree Governments should seize opportunities to proactively influence and collaborate in the development and management of the road network, so that its governance is responsive to Cree objectives and needs.

*« Eastmain is heavily impacted by the road network. There is a complete road network that does not appear on a map. The are very narrow, good for one vehicle and very dangerous. »*

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# SECTION 1 – GOVERNANCE OF THE ROAD NETWORK

## Issues

**I1.1** There is a need for a better understanding of the applicable laws and regulations within the road network and who is responsible for their enforcement, as well as for the management and maintenance of the road network.

**I1.2** The roads on public lands that are considered "multi-use" roads are open to all. Other than designated highways, the Government of Québec does not take responsibility for their maintenance. This is up to the companies or individuals who use the road. This can easily lead to a lack of maintenance and create critical safety issues for users.

**I1.3** Access to public territory and the right to travel on public roads is a basic legislative principle that makes it very difficult to close certain multi-use roads. According to Quebec legislation, the decision to close a road on public land is subject to a public consultation. It is only after this consultation process that Québec will make the decision to close the road or not. However, if only one person requests to keep the road open to keep the access to an activity (e.g., outfitting, leases), the Minister will have to refuse the request for closure.

**I1.4** The environmental and social impact assessment process is triggered for road projects that fall into these categories:

- For major forestry roads:
  *any road or branch of such road of at least 25 km in length which is intended for forestry operations for a period of at least 15 years.*
- For other road projects:
  *all access roads to a locality or road network contemplated for a new development.*

However, there is a need to better control the development of smaller roads that do not fall into the categories above. The cumulative impacts of all these smaller roads as well as the access issues that they generate need to be further considered. Also, these roads and the lack of information on their condition and maintenance responsibilities leads to a lack of safety for tallymen and Cree land users.

**I1.5** The James Bay and Northern Quebec Agreement (JBNQA) category II and III land corridors along highways in proximity to the Cree communities poses unique challenges to the communities. Their continued population growth calls for expansion, and the need for development will likely extend beyond the boundaries of Category I. These corridors of category II or III lands are not under the jurisdiction of the local Cree First Nations, and this complicate the possibilities for new construction projects.

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**I1.6** During high traffic periods, there is often less wildlife around roads. Some wildlife may completely avoid the roaded areas when there is high disturbance, which can have a significant impact on Cree hunting activities.

**I1.7** Many Cree tallymen feel that the forestry consultation process under Chapter 3 of the Cree-Quebec New Relationship Agreement does not empower them to protect what they feel they need to protect to maintain the Cree way of life in forestry-affected areas. Roads are a central component of this issue. The consultation process gives them limited opportunities to speak to or have any influence over the development of the road network because, in the end, the decision rests entirely with the companies.

**I1.8** Forestry companies often build new roads when existing roads could be reused. There should be a better reflection to ensure an optimization of the existing network and thus limit the impacts resulting from the creation of new roads. The reason behind this is that work to build new roads is subsidized by the Government of Québec, and with these subsidies, building new roads become more attractive economically than working to rehabilitate existing roads for re-use.

## EPC Orientations related to the governance of the road network

### O1.1

Create a regional policy on transportation as a tool to help align the governance and development of the road network with Cree objectives

A regional policy on transportation network development could be an effective tool to communicate issues that Crees face relative to the road network. It could identify objectives that correspond to the needs of the Cree Nation, and could help reduce the impacts on Cree occupation and work towards a better cohabitation of the various users. The regional policy could formalize the Cree Nation's orientations on these issues and the objectives for addressing them. It could identify good practices for road development in Eeyou Istchee. This document could also be used to sensitize all transportation stakeholders.

Municipal entities in southern Québec all have sustainable mobility plans. A transportation policy in Eeyou Istchee could play the same role but adapted to the specific characteristics of the territory.

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O1.2

Planning of industrial transportation activities to consider Cree presence on the land during cultural breaks

Industrial transportation activities should be planned to take into account the enhanced presence of Crees on the road network and at roadside camps at certain times of the year during cultural breaks, e.g., goose and moose breaks. Measures to protect the safety of these Cree families on the road and at camps, as well as to minimize or avoid disturbance of wildlife, should be considered.

O1.3

Promote Cree culture and occupation by integrating more Cree language signage along the road network

This could be done in several ways, including:

- Regional information signs in three languages.
- Place names signs with historical context could be added along the roads to inform travellers of important cultural areas, for examples in the rest areas.
- Places names could be used to name the important KMs on Billy Diamond Highway

Research and consultations could be done with the Cree communities to identify the most significant place names and information for specific areas of the road network.

O1.4

Look for solutions to compensate for the limitations of the ESIA process vis a vis the road development projects that are not subject to impact assessment

There is a need to better control the smaller new road projects, their cumulative impacts on the territory and the way they are built.

- **The implementation of other tools**
  Some powers and tools can be explored to see how they could be implemented to ensure better consideration and control of all small road projects

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O1.5

Ensure that information related to the road network; the categories of road; the conditions; the entities responsible for maintenance and the regulation applying is clear and easily accessible

The many roads and the many authorities in charge of these can create inconsistencies especially for the network that develops in the backcountry for exploration or forestry activities. Here are some ideas of what could be implemented to ensure that information on the road network and its condition is easily accessible and clear:

- **Information based in a regional register.**
  It would be useful to establish an online GIS register identifying and providing various information for each road on the territory.
- **A way to report information about required maintenance.**
  The lack of maintenance of certain roads can create dangerous situations for land users and unexperienced travelers. Road network users should have an efficient and effective way to report these dangerous situations.
- **Monitoring of the forestry roads.**
  Monitoring is important to have updated information on the road network. Monitoring of the road network and infrastructure such as bridges should be done to ensure that the roads are safe even if they are not heavily traveled.
  According to a document of the Québec CNESST, entitled ''Déplacements en forêt'' the maintenance of the forest roads is essential for the safety of all the users, among others, it specifies this:

  ''…Employers (companies) are responsible for the signage and maintenance of public roads they use during their operations.''

  ''Road maintenance is not limited to the road surface; it also includes the maintenance of signs, drainage systems, bridges and culverts, as well as vegetation control.''

  **''At a minimum, a bridge should be inspected every four years by an engineer or forestry engineer…''**

*« Forestry roads, whenever they do tree planting, they do a lot of damages on the roads the tallymen use because they cross the road to go on each side. And land users got stock because of that. »*

*« It is one thing to put a sign not to cross on old bridge, but who's responsible? »*

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O1.6

Study the issues and limitations that Category II and III land corridors along roads may pose for community development, and propose solutions

The urban development needs of communities are growing. In some cases, the need for development will extend beyond the boundaries of Category I lands to Category II or III lands depending on the configuration of the land around individual communities. The categorization of the corridor along provincial highways is a major barrier for communities to realize development projects.

Ideally, land management of these corridors would be delegated to local communities to avoid this problem. The various powers that could lead to this delegation should be studied by the entities responsible for these corridors, and collaborative solutions should be proposed.

O1.7

The closing of multi-use roads should be discussed in the initial planning process with land users

The question of whether a road needs to stay open or not after its forestry uses needs to be addressed in the initial consultation process. In addition, the decision-making process around road closings should be more democratic. The interests of one user who wants to keep a road open should not automatically outweigh those of several other users who want to close it.

Also, it's important to note that if a non-Cree person or a company needs a road on public land to establish and access a new land use, that individual can request that the road remains open permanently. This can have major impacts on the access to the territory.

O1.8

Prioritize the use of existing forestry roads before building new ones

The Government of Québec subsidies for road construction leads to the prioritization of new road construction over the repair and maintenance of existing roads. This is impacting forestry planning in a way that is often damaging to the territory and the ability of Crees to practice their traditional activities. Even if it is cheaper to build a new road, these subsidies programs should consider the environmental impacts as well.

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O1.9

Wide load trucks should not be allowed on roads frequently used by the public

For example, the access road to Ouje-Bougoumou should not allow wide load trucks. It's very dangerous for other users. Discussions should be held with communities facing this problem. Road planning proposals should include recommendations related to use and safety features that consider the way it will be used by the Crees (i.e., maximum widths for logging trucks, staggered pull over side lanes for safety, etc.

*« The wide load truck roads and the winter roads are very dangerous, and this type of road is the access roads. They should reduce the load. »*

O1.10

The impacts of heavy trucks on the road network, especially on the Billy Diamond Highway, should be better evaluated before making it a generalized practice

One of the prioritized solutions for reducing truck traffic on Eeyou Istchee roads is the use of 90-ton trucks by mining companies.

For the EPC, it is essential to evaluate and analyze the impacts of these heavier and more dangerous trucks on regular users. The question is whether the benefits of reducing truck traffic in numbers really outweigh the impacts that heavier trucks will have on network integrity and public safety.

O1.11

The development of roads outside the context of forestry planning should be subject to consultation and approval processes

Roads developed in the backcountry and outside the context of forestry operations, such as roads related to Hydro-Quebec infrastructures or roads used by mining exploration companies, lack control and regulatory framework.

The development of these roads should be subject to consultation and approval by the Cree Nation to ensure that they are compatible with the needs of tallymen and land users, and to ensure that they are safe for recreational users.

In addition, if these roads are to be used by forestry companies, this should also be discussed.

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O1.12

The EPC Regional Land and Resource Use Plan (RLRUP) should be developed in a way to provide support in the context of the forestry planning processes

The RLRUP will be an integrated planning tool for most issues related to land use; transportation; important and sensitive areas and waterbodies; access; recreational activities; etc. It will show a global vision of the actual state of the territory and future activities.
The development of such a tool could certainly support communities, tallymen and land users in the context of the consultations between them, MFFP and the forestry companies.

## SECTION 2 - REGIONAL PLANNING OF THE ROAD NETWORK

### Issues

**I2.1** At the moment, in Eeyou Istchee, there is no integrated planning document related to transportation. Integrated planning allows all aspects of a theme to be put forward and allows solutions to be proposed that takes into consideration the complete picture. There are so many issues related to transportation that need to be addressed, and it would therefor be beneficial to take an integrated approach to improve long-term planning.

**I2.2** The ongoing construction of new roads on the territory creates new access for potential vacation leases (if/when the current moratorium on new vacation leases ends), enhances interest in mining exploration in the area around the roads, and leads to an increase in hunting and fishing pressure in the newly accessible area.

**I2.3** Land use planning tools are needed to consider the role roads play in exacerbating the impacts of vacation leases, mining exploration, and hunting pressure, and to assist in the cumulative impact assessments of all types of road development required to better understand the network's impacts on wildlife, the natural environment and by extension, the Cree way of life.

**I2.4** There exists a tension between the need for the Cree land users to have roads to access more remote areas of traplines, and wanting to limit road access at the same time.

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**I2.5** The design of the roads are often not suitable for sharing between industrial and recreational users. This creates many safety issues, such as:

- Very narrow roads shared between ATVs and industrial trucks.
- Blind hills and dust
- Missing signage and identification of trail crossings
- Dangerous speeds around Cree camps

## EPC Orientations related to planning of the road network

### O2.1

Develop a Regional Land and Resource Use Plan (RLRUP) to compile critical information, objectives, and guidelines related to the transportation network

With respect to land transportation planning, the RLRUP should:

- Describe, identify, and locate existing – and future - "significant" land transportation infrastructure and facilities: road infrastructure, rail infrastructure, all-terrain vehicle, and snowmobile networks.
- Establish links with the other activities that influence or are influenced by transportation infrastructure, and to promote cooperation between the various stakeholders (mining, forestry, tourism, outfitting, leases, etc.) and allow for a better understanding of the cumulative impacts.
- Provide an integrated planning tool to connect efficiently land, air, and marine transportation infrastructures.
- Identify guidelines/norms related to the development of the road network to ensure better planning and decision-making.

### O2.2

Enhance meaningful consultations with the land users and communities regarding road network planning

It is essential that the population be included in the planning process and implementation of the various projects. In this way the development of the road network will be able to better respond to their specific needs and use of the different sectors

*« Land users ask for winter roads more than gravel because the impacts on animals are reduced and people can less access the territory too. »*

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O2.3

Reduce the negative impacts of the road network development on Cree occupation, animals, and water by integrating sensitive wildlife and cultural areas into the RLRUP

In consultation with the communities, the development of an RLRUP should, among other things, should:

- Consolidate the information regarding the impacts of transportation infrastructure on these sensitive areas and define norms (e.g., buffers for noise, habitats, soil conditions, etc.)

*« A big bridge was built where there was a spawning area and there are barely any fish anymore. And the bridge almost collapsed. »*

*« These road networks were leading to a lot of non-native cabins. The access is so easy. The tallymen did a lot of usage of the road network within the area. They are useful for the tallymen but at the same time there is a lot of exploration. »*

O2.4

Ensure that the road network development serves the needs of Cree occupation and interests

In consultation with the communities, a RLRUP should identify, on a map, these elements:

- The most valued connections (roads or trails) with the important cultural areas, and with the communities
- Identify where enhanced access or new roads are desired by land users in order to better occupy the territory and to practice the Cree way of life
- The missing road connections to promote recreational and economic development favored by Crees.
- The valued road sections that need to be improved for safety reasons.
- The other transportation infrastructure/facilities that might be required on the long-term.
- The links that are essential for tourism development.

*« Mistissini has a project for second access road connecting to the Route du Nord. it would be good if it fits with the forestry road going to Ouje-Bougoumou, and it would also be good for the park (Assinica). »*

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## O2.5

Increase safety by improving the design, the maintenance, and the signage of the roads

The valued road sections and trails identified in (O2.4) should be high-quality, designed to ensure the safety of land users and maintained proactively. To achieve that it is important to consider the following elements when a road is built:

- Road design and maintenance should consider the full range of users and their safety, including Crees circulating by foot, ATV, skidoo, and truck.
- Planning and management of roads should consider current and future climate realities in design.
- More signage to inform of snowmobile or ATV crossings.
- Speed limits around areas of intensive Cree land use or sensitive wildlife areas
- Integrate areas to pull over (Québec Ministry of Transport or MTQ laws for roads under its jurisdiction should apply everywhere)
- Design that avoids blind hills or dangerous curves

*« The dust is a big problem and there's also blind hills. It is very important to sit down and establish recommendations to improve the safety for the land users. Imagine when the mines will be in development. »*

*« About the climate change adaptation: When you drive on Route du Nord to Billy Diamond highway, you'll see a lot of pockets of water along the road. »*

*« There are concerns about the signs. We do not have sign where the skidoo is crossing the Route du Nord. We would like to see signs for the different categories. »*

*« Barette-Chapais to Obedjiwan - The numbers to identify the routes are very difficult to understand in comparison to the route going to Nemaska. More, these roads are for wide load trucks so it's very dangerous. »*

## O2.7

Take advantage of regional land use planning powers to implement an analysis process for any new road projects to ensure they comply with the guidelines of a RLRUP
*excluding forestry roads

The development of a RLRUP can be the basis for the implementation of a project analysis system. Road projects could be analyzed under this land use planning tool that identifies objectives and guidelines. This could allow for better control of the processes, especially with respect to roads built for the mineral exploration companies.

*The forestry road planning is controlled by the forestry regime.

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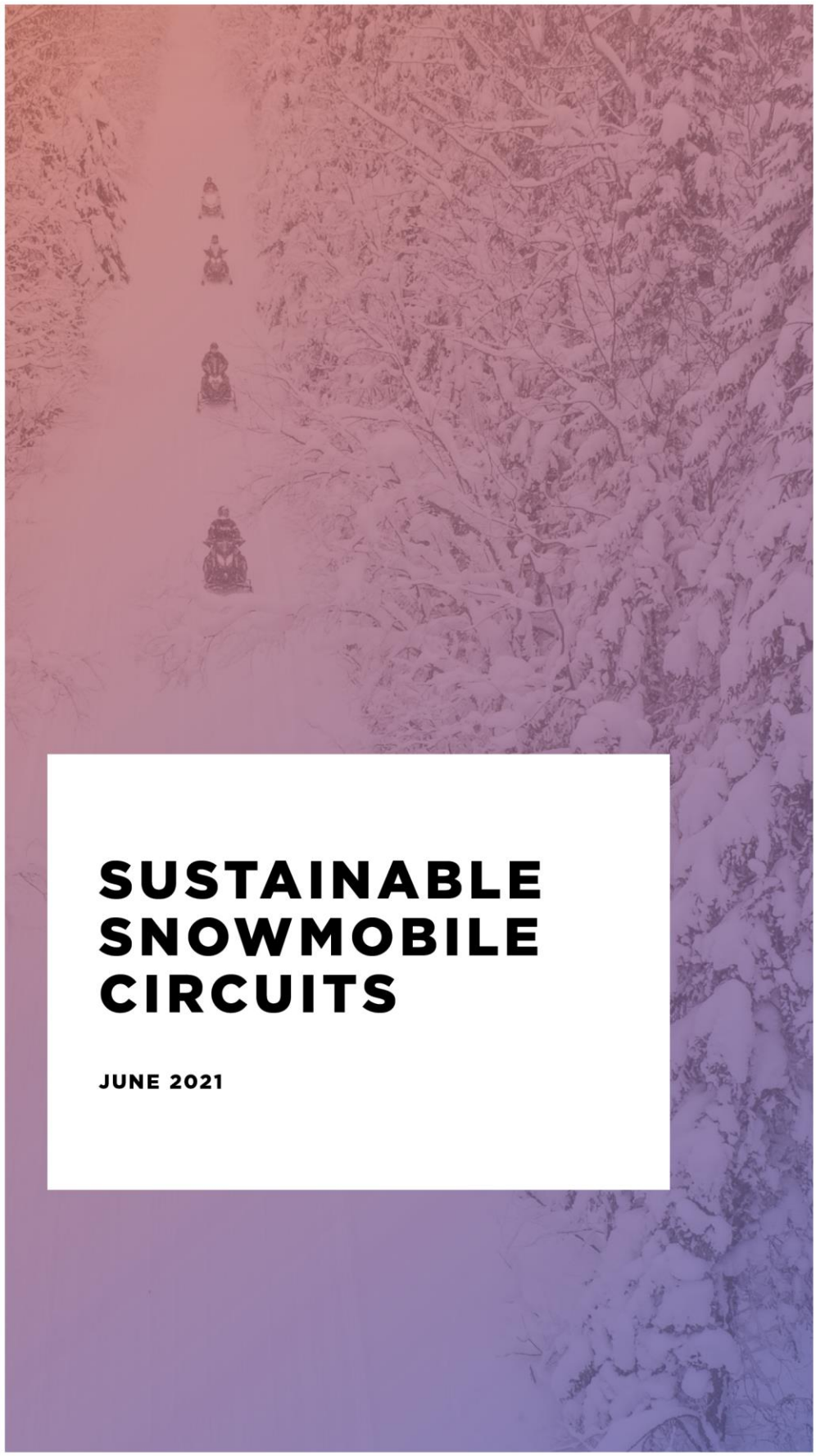
**INTER-NATION COLLABORATION**

NORTHERN
INDIGENOUS
SOUTHERN



# SUSTAINABLE SNOWMOBILE CIRCUITS

**JUNE 2021**

Oujé-Bougoumou Cree Nation

Cree Nation of Waswanipi

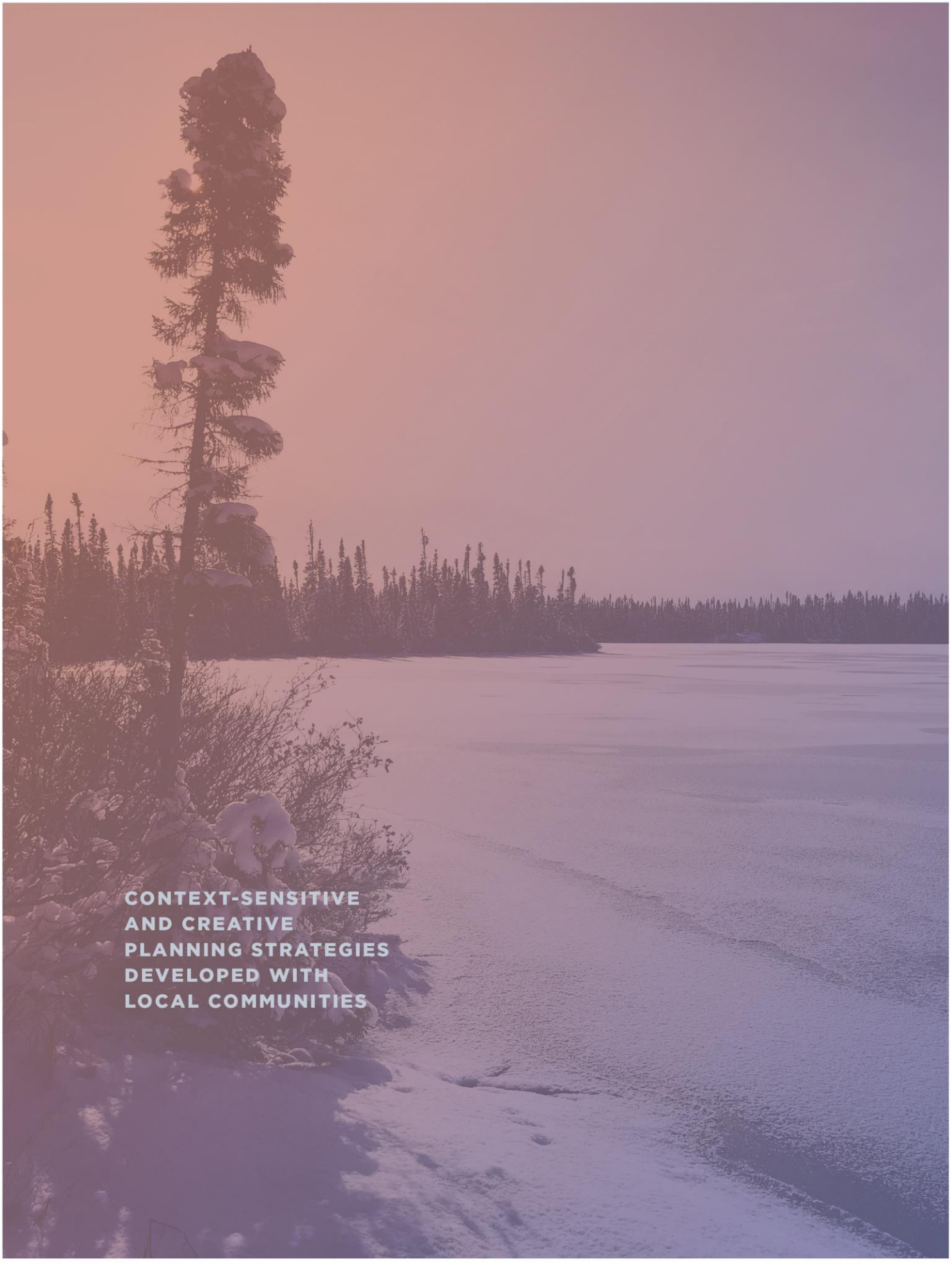
CHIBOUGAMAU

CREE OUTFITTING AND TOURISM ASSOCIATION
COTA

tourisme Baie-James

FaunENord

BC2


CONTEXT-SENSITIVE
AND CREATIVE
PLANNING STRATEGIES
DEVELOPED WITH
LOCAL COMMUNITIES

# TABLE OF CONTENTS


STRUCTURE OF THE DOCUMENT ..... 6
DISCLAIMER ..... 7
PARTNERS OF THE PROJECT ..... 8

THE PROJECT ..... 10
TRAPLINES AND CONSULTATION ..... 18
FORESTRY ACTIVITIES ..... 23
MINING ACTIVITIES ..... 25
NORDIC TOURISM: STRATEGIES AND FUNDING ..... 28
TRENDS AND POTENTIAL ECONOMIC IMPACT ..... 33
CASE STUDIES ..... 36
ELECTRIC SNOWMOBILES ..... 43
OPPORTUNITIES AND CHALLENGES OF THE SNOWMOBILING INDUSTRY IN EEYOU ISTCHEE ..... 51
RECOMMENDATIONS ..... 87
ANNEX 1 OPINION OF PROBABLE COSTS ..... 99
ANNEX 2 CONSULTATION ATTENDEES ..... 103
ANNEX 3 FIELD WORK ..... 107

## STRUCTURE OF THE DOCUMENT

Eeyou Istchee Baie-James is currently pursuing several endeavours to promote the region nationally and internationally, while increasing environmental awareness. In this regard, snowmobile tourism is promising to position the region as a Nordic destination and stimulate winter tourism and sustainable development.

This study aims to put forth the implementation of the Sustainable Snowmobile Circuits project. It is structured as follows:

- **The first section** presents an overview of the proposed trail network.
- **The second section** highlights current industry trends and related economic benefits. Three case studies reveal the success of such tourism developments and ways to bring in electric snowmobiles in Northern regions.
- **The third section** provides detailed plans, specifications, and Class D cost estimate for the proposed trail network. They result from public consultations and field work surveys that took place in 2020.
- **The final section** offers recommendations and insights to guide the next phases of planning.

## DISCLAIMER

The production of this study had to be carried out in 2020 during the COVID-19 pandemic. Therefore, the initial methodology had to be significantly modified in order to complete the project.

- The winter survey of 2020 could not be fully completed because of regional lockdowns.

- The summer survey of 2020 had to be modified. The landscape architects in Montreal could not go to the region because it was closed. The field survey had to be done with a GPS system, a drone and pictures that sent the information to Montreal. In some cases where the terrain was complex, this creates a small margin of error.

- Moreover, the communities were still in lockdown during the summer and no locals were able to guide the survey team through the territory as initially required.

- The survey team therefore faced some challenges to access the land, namely because of wetlands, beaver dams and dense vegetation. Some parts were completely inaccessible to the team and could not be surveyed.

- The above-mentioned situations create a need for more studies for some parts of the trail network. These occurrences are indicated in the specifications.

- The Taiga Motors company targeted to provide information on electric snowmobiles did not answer our attempts to contact them. However, they updated their website and added significantly more information.

- The universities with which we wanted to organize meetings to talk about sustainable snowmobile opportunities were also all closed due to lockdowns for most of the year and did not answer our attempts to contact them.

### Photography

Pictures of the federated trails currently located in Eeyou Istchee Baie-James are provided by Neils K. Jensen and Mathieu Dupuis for Eeyou Istchee Tourism.

## PARTNERS OF THE PROJECT

### Cree Outfitting and Tourism Association

The Cree Outfitting and Tourism Association (COTA) is an organization promoting Cree tourism. It stems from sections 28.4 and 28.6 of the James Bay and Northern Québec Agreement (1975). Created in 2000, it has been active in the development of the tourism industry in Eeyou Istchee Baie-James. By promoting tourism, it aims to enhance this region's vast potential for economic, employment, and other growth opportunities.

The association provides marketing, booking, and promotion services for Cree outfitting operations. It also provides business, management, accounting, and professional services for Cree outfitters, and conducts feasibility studies related to the establishment of individual outfitting or a network of outfitting facilities.[1]

### Eeyou Istchee Tourism

Eeyou Istchee Tourism (EIT) is the Regional Tourism Association (RTA) that is responsible for Eeyou Istchee. It was created by COTA in 2007 to be eligible to receive provincial support while allowing COTA to remain a distinct Cree entity.

As defined in the agreement between EIT and the Government of Québec, the RTA's role focuses on marketing the region and tourism operators, supporting the development of the tourism offer in the region, improving the availability of tourism information, and coordinating with other RTAs to help shape the province's tourism policy.[2]

### Tourisme Baie-James

Tourisme Baie-James is also an RTA. It is formally recognized by the Government of Québec as the regional partner in tourism and all connected activities in the James Bay Region. Tourisme Baie-James works in collaboration with COTA and EIT, as well as the Jamesian Regional Government and the Eeyou Istchee Baie-James Regional Government.

### Cree First Nations and City of Chibougamau

The Cree First Nations of Ouje-Bougoumou, Mistissini and Waswanipi as well as the City of Chibougamau are also partners of the project as the trail will reach their respective territories. The communities and the City of Chibougamau will have to choose whether they want to undertake the maintenance of the network and develop tourism products related to the project.

[1] Cree Outfitting and Tourism Association (COTA). (n.d.). Welcome to Cree Outfitting and Tourism Association/Eeyou Istchee Tourism. Retrieved from https://www.creetourism.ca/home/

[2] Cree Outfitting and Tourism Association (COTA). (n.d.). Eeyou Istchee Tourism. Retrieved from https://www.creetourism.ca/about-eit/tourisme-baie-james/



# 1. THE PROJECT

# THE PROJECT

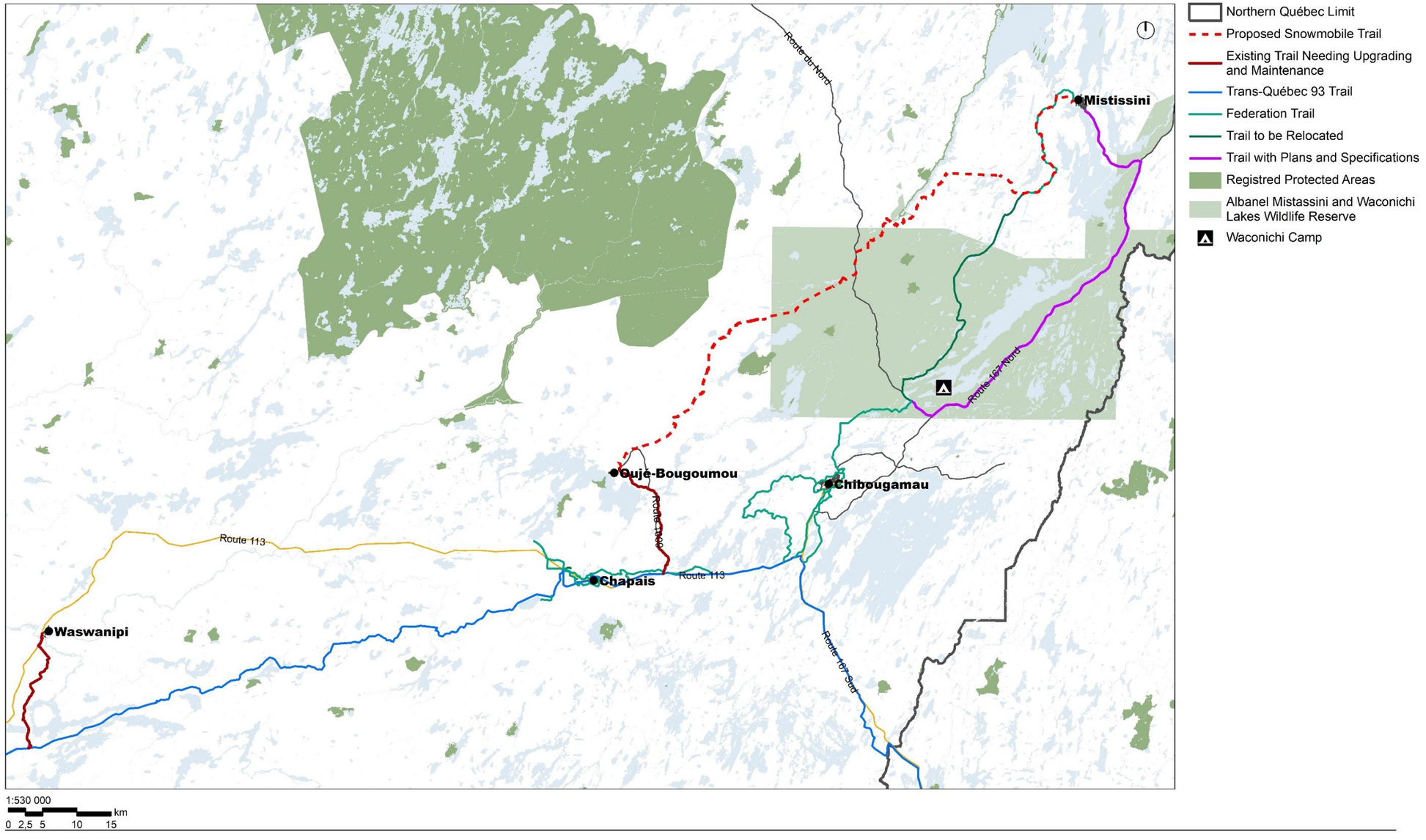
This study aims to launch Eeyou Istchee Baie-James's Sustainable Snowmobile Circuits. The goal of the project is to create a 150 km trail network that would connect three Cree communities, two Jamesian municipalities and Québec's federated or Federation Trail network. The circuit would be the northernmost snowmobile destination in the province.

A trail network already exists in the province and is managed largely by the Fédération des clubs de motoneigistes du Québec (FCMQ). Parts of the network reach Eeyou Istchee Baie-James which represents an opportunity to connect new snowmobile circuits to the national network.

In Eeyou Istchee Baie-James, the network comprises Trans-Québec trails. Those regional trails cross a minimum of three administrative regions of the FCMQ. Each club of the FCMQ manages the parts of the trail that are in its region. Trans-Québec 93 is among the major regional trails of the province as it goes from Abitibi at the border of Ontario to Tadoussac on the St. Lawrence. The Club Auto-Neige Chibougamau and the Club de Motos Neige de Chapais are responsible for the trail shown in blue on the following map.

There are also federated trails in the region, which are local trails managed by one of the FCMQ's clubs. On the map, Club Auto-Neige Chibougamau manages the trail in light green. The part of the trail in dark green, from the Route du Nord towards Mistissini, is currently closed and being relocated. This trail is more than fifteen years old. It is, however, a forestry road, which means that forestry companies use it every two or three years. It is therefore impossible for the Chibougamau snowmobile club to groom it. The trail in purple is in construction for that purpose, and will connect the Route du Nord, Route 167 Nord and Mistissini once completed.

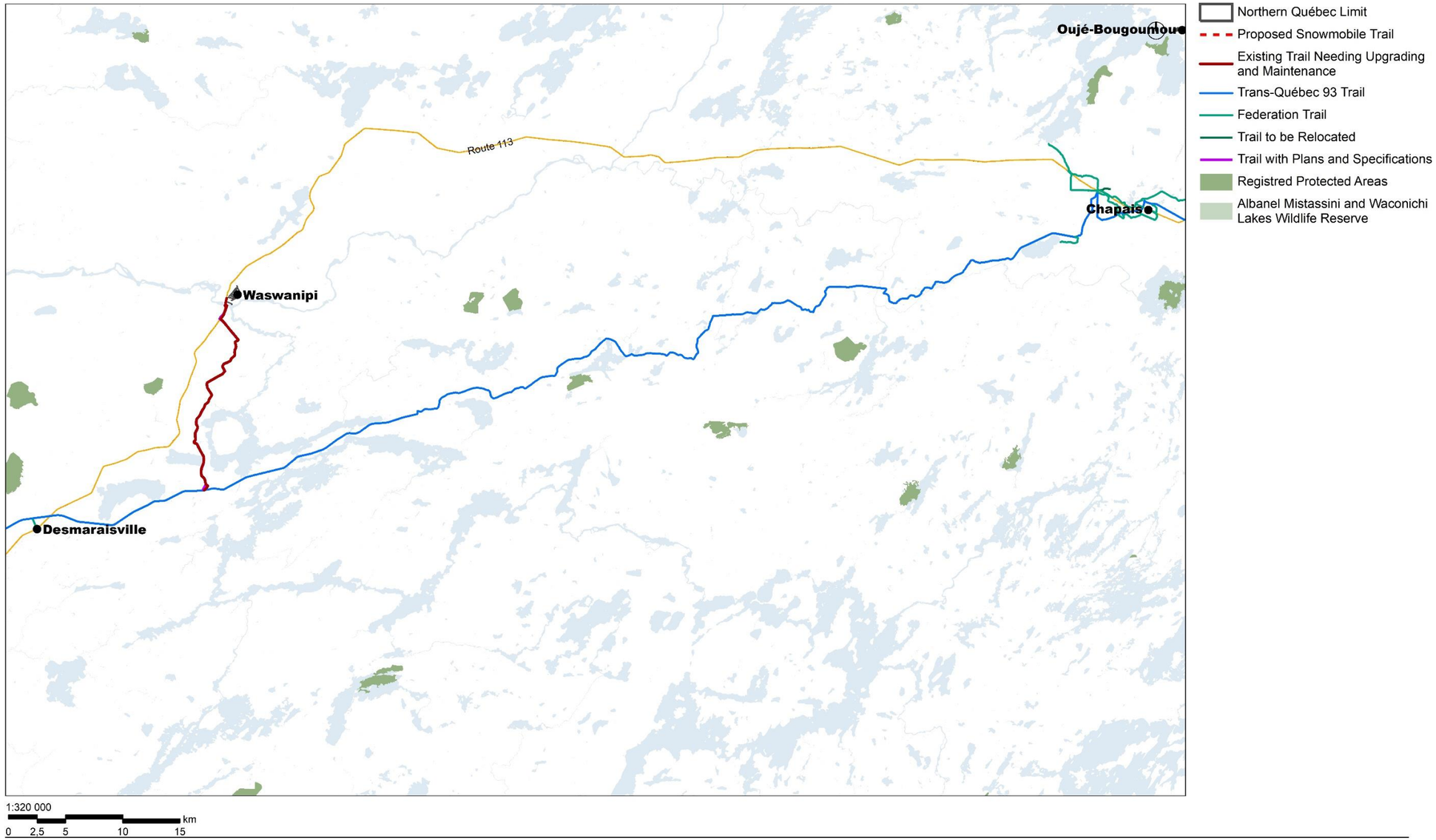
Although there is an existing trail network in the region, areas of improvements have been identified. Some trails are incomplete and/or do not optimally connect. Furthermore, some circuits face cohabitation issues with forestry industries. Connection opportunities were targeted and translated into the new Eeyou Istchee Baie-James' Sustainable Snowmobile Circuits, which is represented by the red trails on the map.


Route du Nord
Mistissini
Route 167 Nord
Oujé-Bougoumou
Chibougamau
Route 113
Route 113
Chapais
Route 113
Route 167 Sud
Waswanipi
Northern Québec Limit
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Waconichi Camp
1:530 000
0 2,5 5 10 15
km

## TRANS-QUÉBEC 93 TO WASWANIPI

The first part of the project consists of upgrading the trail that exists between Trans-Québec 93 and the community of Waswanipi. It covers 20.8 km.

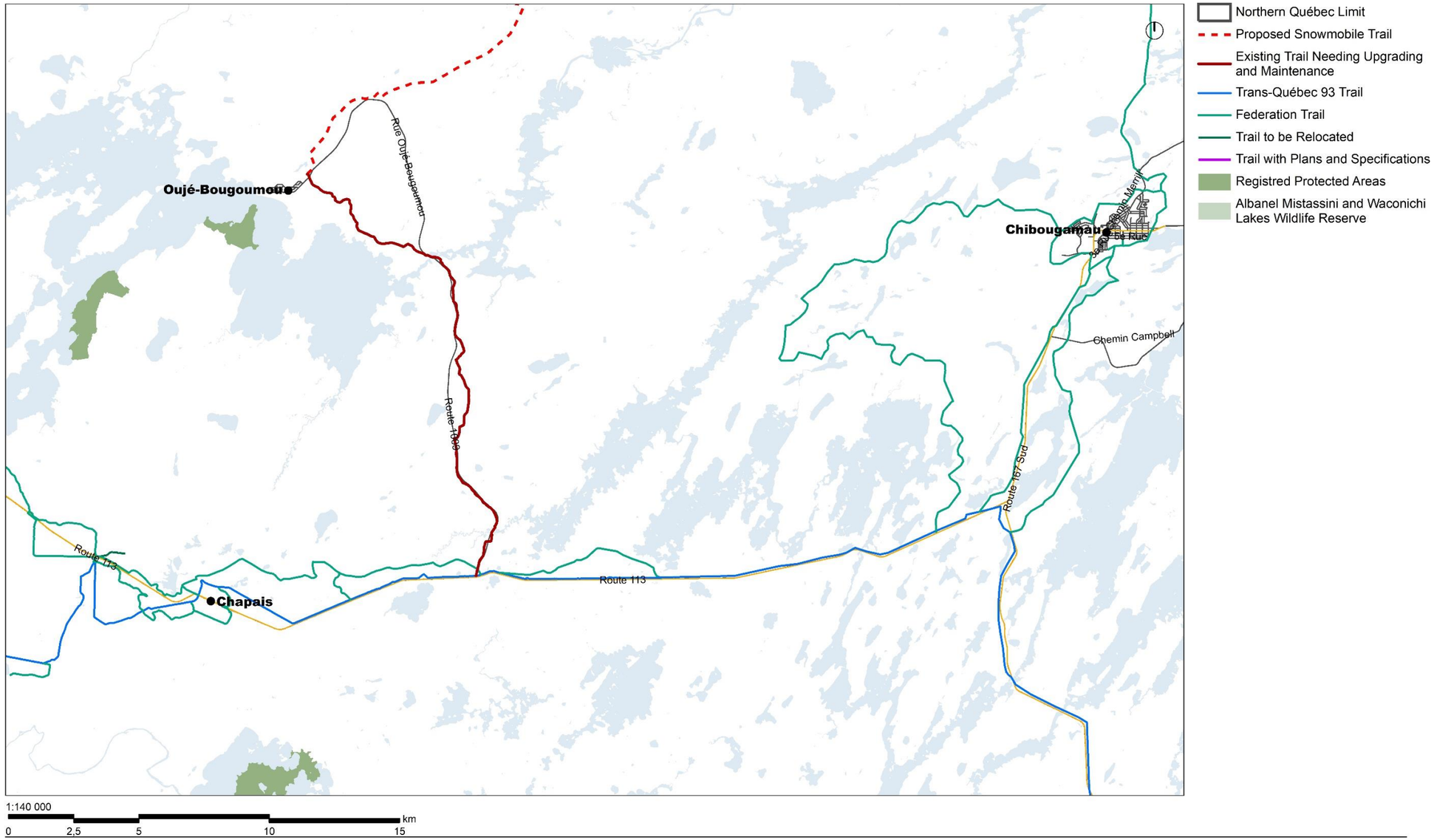
Currently, there are a few issues associated with this trail including a lack of maintenance. There are also conflicts concerning the sharing of the route with forestry companies. However, a local Waswanipi guide believes that forestry companies will no longer need to use this trail in the future. For this reason, this trail will need to be upgraded. The community of Waswanipi will also have to decide whether they want the Chapais snowmobile club to maintain it or not. If they do not wish for this club to maintain it, they will have to create a new snowmobile club to obtain the federation trail designation with the FCMQ.


Oujé-Bougoumou
Route 113
Chapais
Waswanipi
Desmaraisville
Northern Québec Limit
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
1:320 000
0 2,5 5 10 15
km

## TRANS-QUÉBEC 93 TO OUJE-BOUGOUMOU

The second part of the project connects the communities of Ouje-Bougoumou and Mistissini. The first segment is 21.2 km and links Trans-Québec 93 to Ouje-Bougoumou.

This trail has existed for more than ten years. It needs major maintenance work to comply with the FCMQ's standards. The trail is currently maintained by the community of Ouje-Bougoumou. It is not recognized as a federated trail by the FCMQ and does not appear on the maps. This trail's compliance to the FCMQ's standards would make it eligible to become a federated trail. For the trail to obtain such designation, Ouje-Bougoumou would, however, need to open a snowmobile club or cede the trail to an existing club. It is important to note that its designation as a Federation trail might restrict tallymen from having total freedom on how they use this trail.

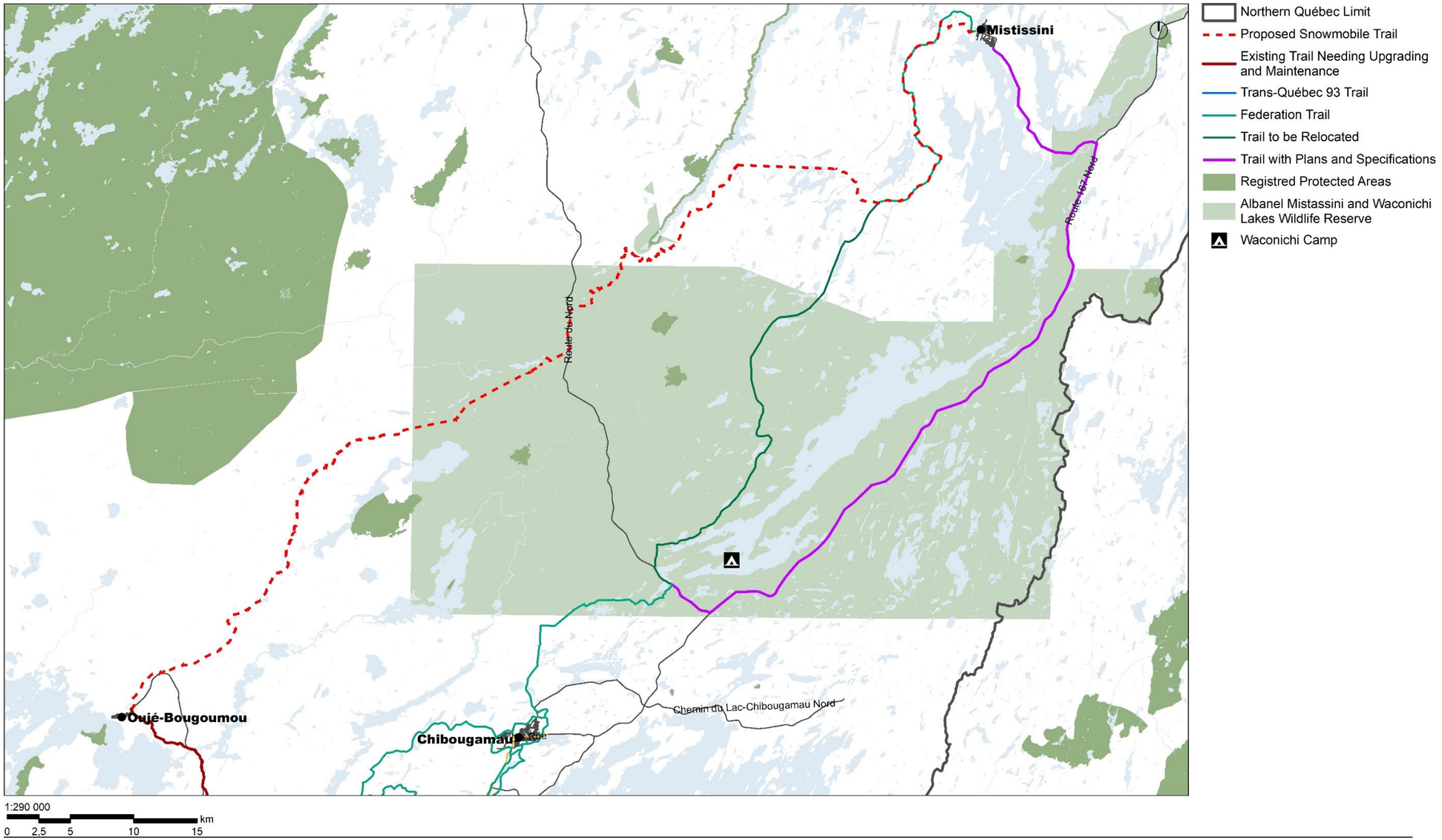

Northern Québec Limit
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Oujé-Bougoumou
Rue Oujé-Bougoumou
Route 1009
Chibougamau
Chemin Campbell
Route 167 Sud
Route 113
Chapais
1:140 000
0
2,5
5
10
15
km

## OUJE-BOUGOUMOU TO MISTISSINI

The second segment is 119 km. It starts at Ouje- Bougoumou and ends at Mistissini. This segment is a totally new trail proposed for the project. It will be connected to the federated trail that is currently under construction on Route 167 Nord (purple), ultimately creating an interesting loop and destination for tourists who would like to visit Cree communities and explore the Albanel-Mistassini-and-Waconichi Lakes (AMW) wildlife reserve.

The AMW reserve should be consulted to realize the project and, potentially, to provide services and packages to tourists. Moreover, the endorsement of the AMW reserve will carry additional weight in the approval processes of the project. The reserve is currently undertaking the conversion of the Waconichi Camp shown on the map. The objective is to upgrade the cabins to open the site during winter and provide a year-long offer of activities and accommodations. This presents an interesting opportunity to link both projects to offer various experiences to visitors.

The maintenance of this new trail must also be discussed with the communities of Ouje-Bougoumou and Mistissini, to determine if they wish to manage them locally, create FCMQ clubs or transfer maintenance to an existing club.


Mistissini
Route de Nord
Route 167 Nord
Oujé-Bougoumou
Chibougamau
Chemin du Lac-Chibougamau Nord
Northern Québec Limit
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Waconichi Camp
1:290 000
0 2,5 5 10 15
km

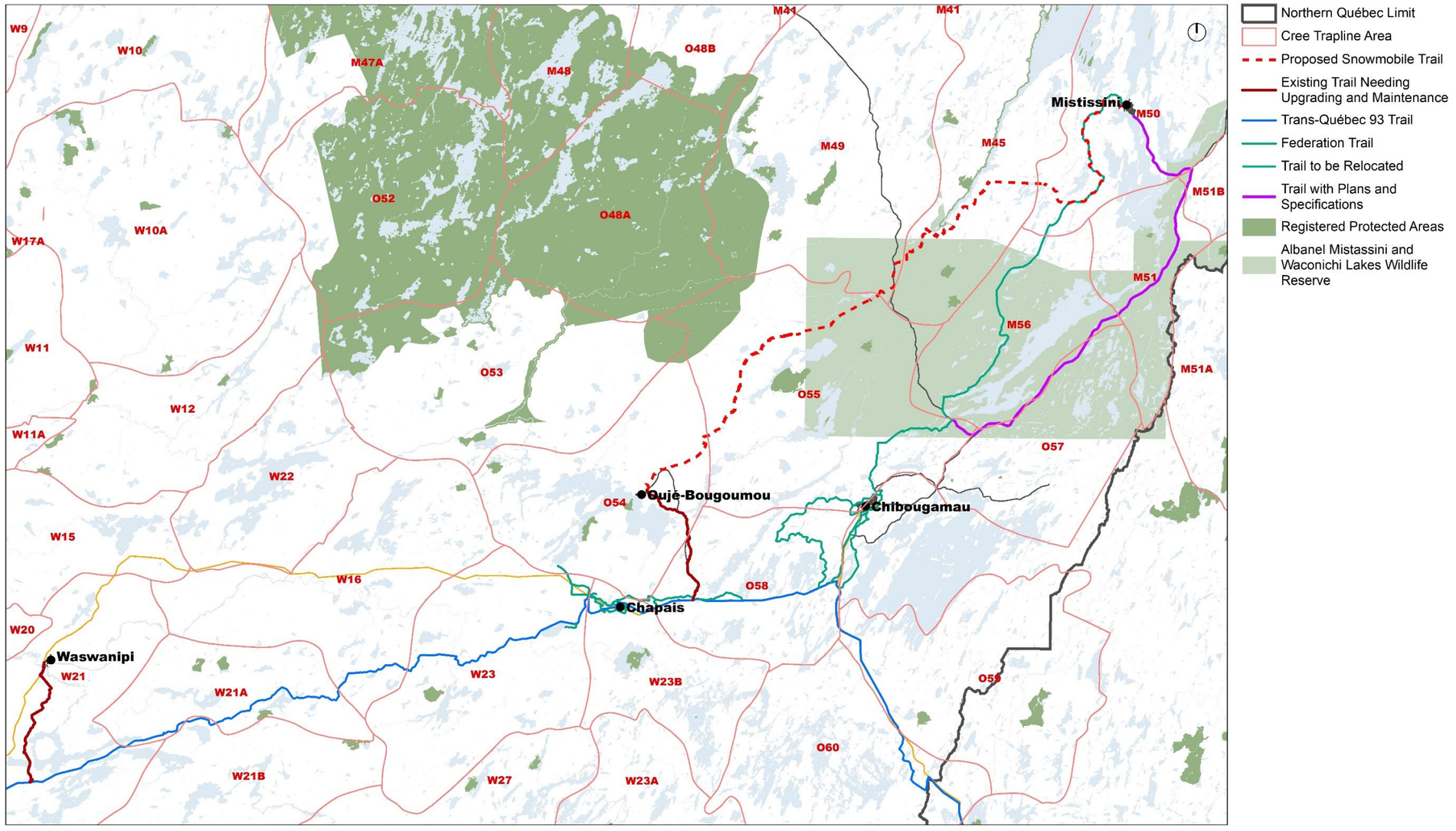
# TRAPLINES AND CONSULTATION

The new proposed trails could have impacts on the communities they will reach. While positive impacts related to the stimulation of tourism and accessibility of the region are foreseen, some negative consequences are also possible. Namely, the trails will allow more people to be present on the communities' territories, some land transformation is necessary to complete the project, and the maintenance and management of the trails must fall under the responsibility of stakeholders.

Cree territory is divided among family hunting grounds (traplines). Each trapline is under the responsibility of a tallyman, along with land users. The Tallymen and land users of each community were consulted to get their insights and approval for the project. Furthermore, their deep knowledge of the territory helped to determine the paths of the trails, identify points of interest and provide advice on possible constraints and security issues.



Source: Sabourin. 2014.


Northern Québec Limit
Cree Trapline Area
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registered Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Mistissini
Oujé-Bougoumou
Chibougamau
Chapais
Waswanipi
W9
W10
W10A
W11
W11A
W12
W15
W16
W17A
W20
W21
W21A
W21B
W22
W23
W23A
W23B
W27
M41
M45
M47A
M48
M49
M50
M51
M51A
M51B
M56
O48A
O48B
O52
O53
O54
O55
O57
O58
O59
O60
1:530 000
0
10
20
40
60
km

## SNOWMOBILE TRAIL NETWORK CONSULTATION

A consultation with each of the communities crossed by the proposed snowmobile trail network between Waswanipi and Mistissini was organized during the last two weeks of February 2020. Stakeholders of Mistissini, Chibougamau, Waswanipi and Ouje-Bougoumou were met.

At first, a presentation was made to provide general information on the project such as the context of the snowmobiling sector, the existing regional trail network, the proposed trail project, the scope of work and the timeline. Following the presentation, the consultation session encouraged the emergence of discussions concerning the project and to get the community members' approval to develop a snowmobile trail network that will go through their land and connect to their community.









**Table 1 Insights from the Community Consultations**

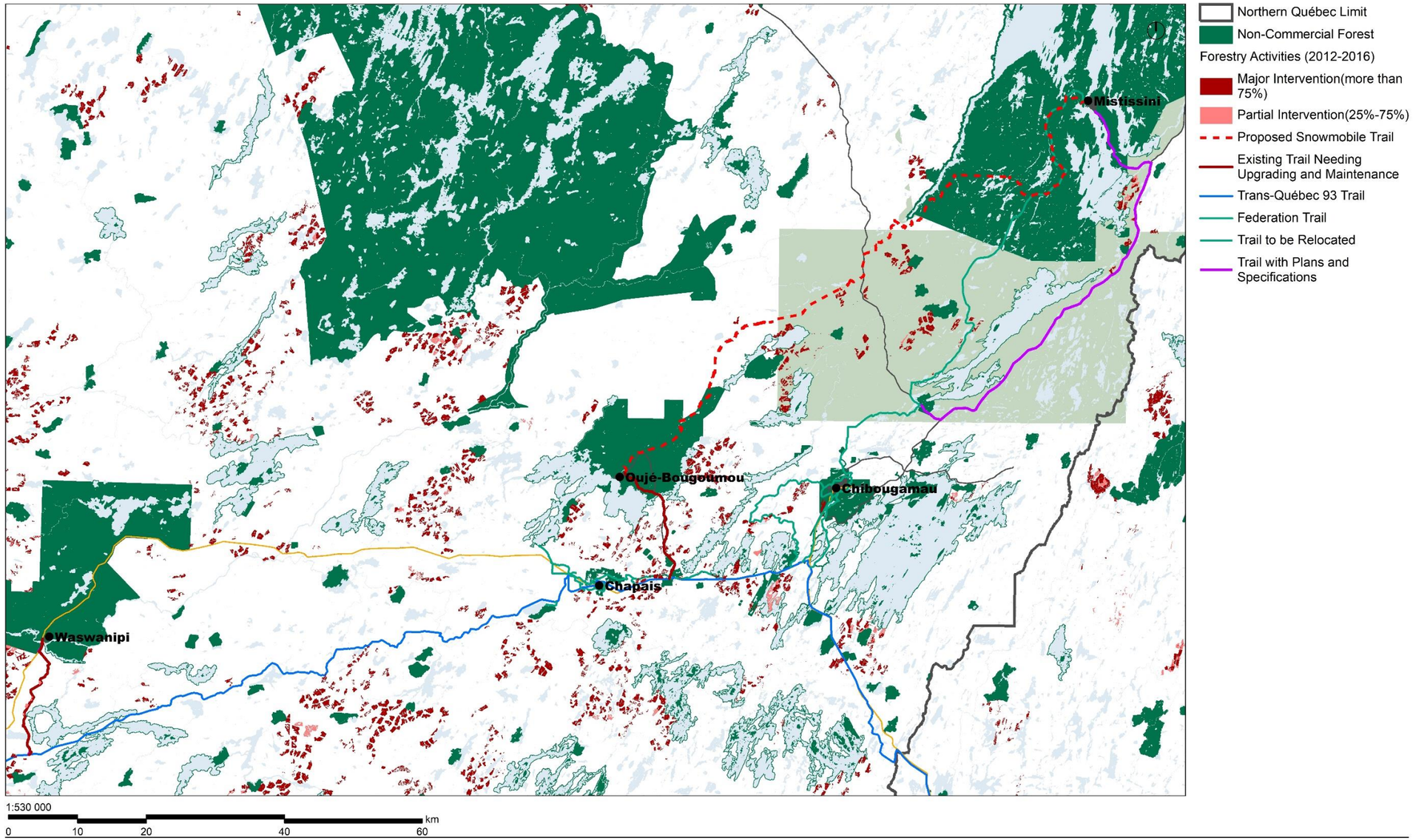
| Communities | What has been said |
|---|---|
| **Mistissini** | Most of the attendees were favourable to the project and many of them mentioned that it would help them develop tourism business opportunities on their traplines.<br><br>Many concerns were raised regarding off-trail snowmobile activities on their traplines.<br><br>Preoccupations were raised regarding their hunting rights when using the trail. They want to make sure that if the trail becomes federated, they can continue their traditional activities.<br><br>They were not aware of the planned trail along the road 167. They would like to have more information on the project.<br><br>Nibiischii Corporation members have seen opportunities for tourism development for the wildlife reserve, but they want to make sure that the trail will respect Québec regulations regarding snowmobiling in wildlife reserves.<br><br>Most of the participants were favourable to the creation of a snowmobile club for the community. |
| **Waswanipi** | A snowmobile trail project to connect the federated trail to the community was initiated 8 years ago. The community has the plans somewhere.<br><br>If the trail becomes federated, they do not want to pay the 120$ for a trail permit.<br><br>The federated trail does not pass through Waswanipi, and many travellers are not aware that there is a Cree community.<br><br>Some of the trappers that met snowmobile travellers on the federated trail have been told that they would like to visit their community.<br><br>They would like to link the winter arts festival with this new trail project. Offer packages to the snowmobile travellers.<br><br>Most snowmobile travellers are stopping in Desmaraisville to buy gas for their skidoo instead of coming to Waswanipi. They would like to see the situation reversed.<br><br>Between Desmaraisville and Waswanipi, there are 3 important creeks to cross. |

| | |
|---|---|
| | Some members mentioned that they would prefer to have the proposed trail follow the highway since the area is already impacted.<br><br>They are questioning the speed limit on the federated trail. Apparently, the users are going very fast and they are scared that this new trail will encourage the youth to speed more when riding in the community. |
| **Ouje-Bougoumou** | There is an existing trail on the trapline O55 (Wesley Mianscum under Niskamoon).<br><br>Make sure that proposed trail does not cross the lake where some members of the community are crossing. This area is very dangerous.<br><br>The majority agreed to have the federated trail connected to their community to bring more people, but they are worried that they will not be able to offer proper services on weekends such as restaurants and hotels.<br><br>It would be important to consult James Wapachee O57. |
| **Chibougamau** | The trail along the 167 up to Mistissini has been surveyed and might be under construction this coming summer if the requested funding is received.<br><br>Mireille of Nibiischii Corporation was disappointed that the Chibougamau club did not talk to the Corporation since the trail is passing through the wildlife reserve. The Corporation needs to be aware of the work that will be done this summer.<br><br>Many concerns were raised regarding the maintenance of the trail if it becomes federated. The Chibougamau Club does not want to take the full responsibility of the maintenance. They want to make sure the communities will participate. The Club is open to discuss further about trail maintenance and the possibility to share such responsibility with the community of Mistissini.<br><br>The Chibougamau Club owns two groomers. They want to make sure that the communities will share the cost ($) for the necessary repairs or mechanics (second groomer).<br><br>It has been mentioned that the services in Chibougamau such as restaurants are not ready to welcome winter tourism in the region, especially on weekends (restaurants are often closed on weekends). Participants mentioned that this problem should be fixed before the developing the trail. It is possible to predict an increase of profits for restaurants with the new circuits, which might address the issue. |

# FORESTRY ACTIVITIES

Most of the proposed trails do not cross major forestry activities; they mostly cross non-commercial forests located around communities. Only the segment from Trans-Québec 93 to Ouje-Bougoumou should encounter relatively important cohabitation issues.

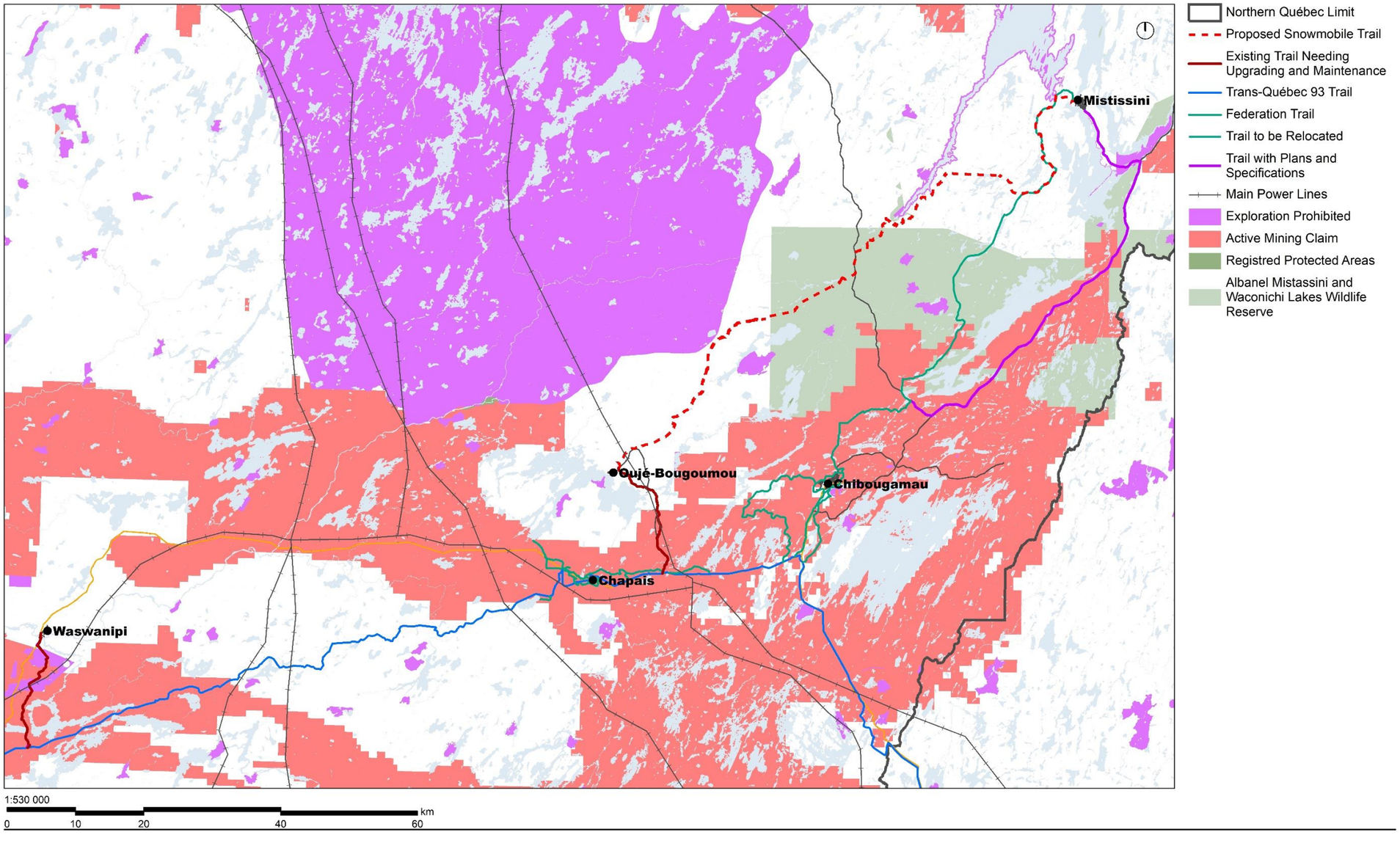
In addition to acquiring the necessary permits from the Ministère des Forêts, de la Faune et des Parcs du Québec (MFFP), meetings should be organized with stakeholders and companies involved in these forestry activities. An agreement could strengthen the proposals and allow a better cohabitation of uses.

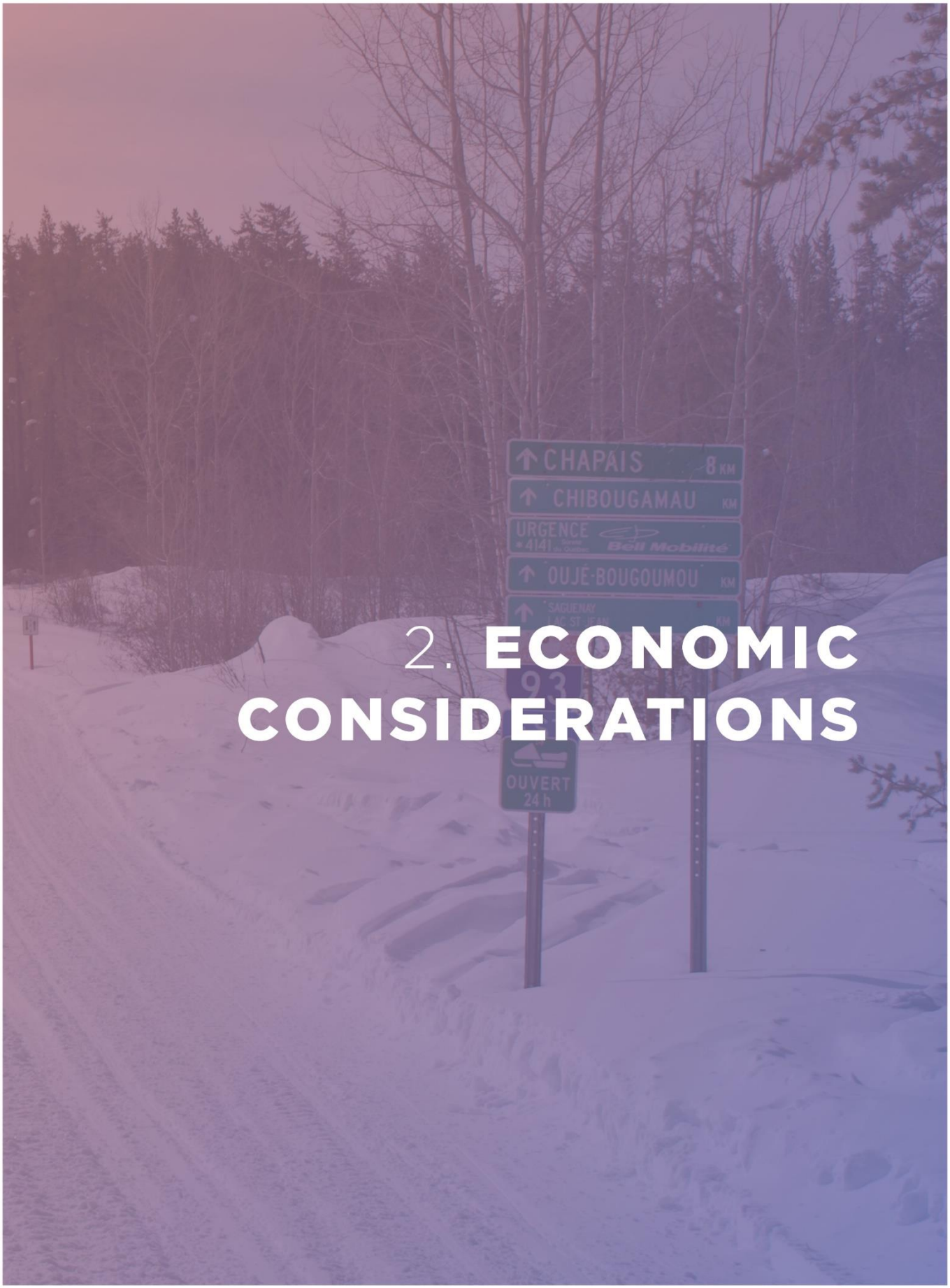

Mistissini
Oujé-Bougoumou
Chibougamau
Chapais
Waswanipi
Northern Québec Limit
Non-Commercial Forest
Forestry Activities (2012-2016)
Major Intervention(more than 75%)
Partial Intervention(25%-75%)
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
1:530 000
0 10 20 40 60
km

# MINING ACTIVITIES

The segment from Trans-Québec 93 to Waswanipi and the segment from Trans-Québec 93 to Ouje-Bougoumou cross territories with active mining claims. These segments also cross Hydro-Québec transmission lines.

As each exploration can be taken on by a different company, it will be necessary to have discussions with each of them to have a common understanding for the land covered by the trails. This process will support the application for a public land use right. Hydro-Québec should also be made aware of the project.


Mistissini
Ouje-Bougoumou
Chibougamau
Chapais
Waswanipi
Northern Québec Limit
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Main Power Lines
Exploration Prohibited
Active Mining Claim
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
1:530 000
0
10
20
40
60
km




# 2. ECONOMIC CONSIDERATIONS

# NORDIC TOURISM: STRATEGIES AND FUNDING

## STRATEGIES

### The Plan Nord

Nordic tourism is an emerging sector in Canada. In 2011, Plan Nord launched a strategy to position the *Nord-du-Québec* as an international tourist hears to maximize the economy of the regions located north of the 49th parallel. The 2011 *Plan Nord* aimed to revitalize Québec's tourism offer by developing new products and attractions to stimulate the growth of small and medium-size businesses and diversify the economy in Northern regions.

To achieve those sustainable development ambitions, the Government of Québec decided to relaunch the *Plan Nord* in 2014 and continue the previously started work through the *Plan Nord Toward 2035, 2015-2020 Action Plan*[3]*.* As this action plan is now at the end of its iteration, the government launched in 2020 the *2020-2023 Northern Action Plan (2020-2023 NAP)*[4]*.* This document aims to "establish winning conditions to enable residents to fully inhabit their northern territory." [5]

**The *2020-2023 Northern Action Plan (2020-2023 NAP)* intends to "establish winning conditions to enable residents to fully inhabit their northern territory"**
**(Gouvernement du Québec, 2020, p. 6).**

This objective will be achieved through focusing on 9 priorities themes:

- Energy.
- Corporate social responsibility.
- Local services and social infrastructure.
- Manpower and training.
- Promising economic activity sectors.
- Promotion of the territory and its culture.
- Telecommunications.
- The environment and biodiversity.
- Transportation.

[3] Gouvernement du Québec. (2017). *Plan Nord Toward 2035, 2015-2020 Action Plan.* 25 p. Retrieved from https://plannord.gouv.qc.ca/wp-content/uploads/2015/04/Long_PN_EN.pdf
[4] Gouvernement du Québec. (2020). *2020-2023 Northern Action Plan (2020-2023 NAP).* 52 p. Retrieved from https://plannord.gouv.qc.ca/en/https-plannord-gouv-qc-ca-wp-content-uploads-2020-12-northern-action-plan-2020-2023-pdf/
[5] *Ibid.*

The Sustainable Snowmobile Circuits could benefit from the *2020-2023 NAP's* economic support and from the increasing interest in northern destinations.

### Cree Tourism Strategy 2020-2025

This document contains COTA and EIT's global tourism strategy for the region of Eeyou Istchee. It also contains the strategy's orientations and activities carried on with diverse stakeholders during the year 2019. The intention is to "propose a distinctive tourism strategy and positioning designed to ensure sustainable development in all 9 Cree communities and the region's production system as a whole."[6]

The strategy includes six strategic goals:

1. Create three tourism hubs – Inland, Southern Coastal, and Northern Coastal – to facilitate mobility throughout the region, help promote distinctive offers, and entice visitors to return for repeat visits.
2. Foster Cree and Jamesian collaboration by implementing a global strategy for tourism experiences and lodging in EIBJ, including inciting the Cree Nation and Jamesian communities to co-develop a UNESCO Network Global Geopark.
3. Position Creetopia sites and Wiinipaakw boat tours as flagship products.
4. Promote tourism services and activities revolving around traditional way of life and arts and crafts.
5. Create a master plan to improve access to the region and between communities.

The development of snowmobile tourism aligns with the ambitions of the 2020-2025 Eeyou Istchee Tourism Strategy. Moreover, most of the objectives and projects developed by the associations complement each other. The snowmobile tourism industry in Eeyou Istchee Baie-James could therefore benefit from the implementation of the strategy and related allocation of human, financial, and material resources.

### Plan Marketing 2019-2022

The *Plan Marketing 2019-2022* was elaborated in 2019. It intends to continue the work of the international digital campaign, *Into the North* launched in 2018 in promoting the Eeyou Istchee Baie-James region as an exceptional tourist destination. [7]

The Plan highlights that winter in the Eeyou Istchee Baie-James region is longer than anywhere else in Québec, which allows a long season for snowmobilers and the practice of other winter activities. It also points out the quantity and quality of the snow, which is superior to elsewhere. Furthermore, it mentions that there are more than 1,100 km of very well-maintained snowmobile trails, wide and less crowded than elsewhere. It also highlights that those trails are often the first and last to be opened.

For these reasons, the Plan recognizes snowmobiling and winter activities as among one of the key tourist experiences of the region.

[6] Cree Outfitting and Tourism Association (COTA) & Eeyou Istchee Tourism (EIT). (n.d). *2020-2025 Eeyou Istchee Tourism Strategy*. 28 p.
[7] Tourisme Baie-James and Eeyou Istchee Tourism. (2019). *Plan Marketing 2019-2022*. 17 p.

## FUNDING OPPORTUNITIES

Many funds represent opportunities to financially support the Sustainable Snowmobile Circuits project:

### Programme d'aide financière - Entente de partenariat régional en tourisme (EPRT) Cree and Jamesien

This is the main funding program[8] to support tourism-related projects in the Eeyou Istchee and Baie-James regions. This program's goal is to encourage and stimulate the development, renewal, and structuring of the tourist offer in the tourist regions.

The projects supported must be structuring and need to contribute to the tourist offer renewal. They must aim to achieve the following objectives:

- Promote the development of an original and complementary tourist offer that respects sustainable development;
- Stimulate the economy of the regions through:

- Creating jobs;
- Increasing the number of visitors;
- increasing tourism revenues.

### Programme d'aide à la relance de l'industrie touristique (PARIT)

This program[9] is meant to support innovative, scalable, and sustainable tourism offer to ensure the sustainability and attractiveness of Québec's tourism industry.

Eligible entities include:

- For-profit organizations;
- Non-profit organizations;
- Cooperatives;
- Municipal entities;
- Indigenous communities and nations recognized by the National Assembly as well as Indigenous organizations and businesses;
- Any grouping of these clienteles.

Furthermore, eligible projects that may be carried out in connection with a tourist attraction or equipment are those related to:

- Construction;

[8] Tourisme Baie-James. (n.d.). Programme d'aide financière - Entente de partenariat régional en tourisme (EPRT). Retrieved from http://tourismebaiejames.com/aide-financiere/

[9] Québec government. (2021). Programme d'aide à la relance de l'industrie touristique (PARIT). Retrieved from https://www.quebec.ca/tourisme-et-loisirs/services-industrie-touristique/aide-financiere/programme-aide-relance-industrie-touristique/programme-complet.

- Reconstruction, including demolition of existing obsolete infrastructure;
- Expansion;
- Interior or exterior design;
- Adaptation or retraining;
- The acquisition or replacement of equipment;
- The deployment of a new tourist experience.

### Programme d'appui au développement des attraits touristiques (PADAT)

This program[10] support large-scale projects and has three objectives: It first intends to stimulate private investment for the benefit the tourism offer renewal in Québec. It also has a purpose to support the growth of tourism businesses in Québec. Similarly, to the PSSDT, the program finally aims to strengthen the economy of rural areas through job creation and increasing the number of visitors and tourism revenues.

To be eligible, projects must meet the following conditions:

- Be supported by an existing mature or growing business in the tourism sector;
- Have profitability potential;
- Be implemented in one of Québec's regions.

### Fonds de solidarité (FTQ)

This also funds[11] wide-raging projects. Its goal is to financially and strategically supports companies that want to develop value-creating projects and help create and maintain jobs in Québec. It sponsors the following associations:

- Québec Tourism Industry Council
- Tourism Industry Association of Canada
- Associated regional tourism associations of Québec

The website does not comprise details on project requirements to be eligible to these funds. However, it is possible to contact a tourist expert through visiting their webpage.

[10] Québec Government. (2021). Programme d'appui au développement des attraits touristiques (PADAT). Retrieved from https://www.Québec.ca/tourisme-et-loisirs/services-a-lindustrie-touristique/aide-financiere/prets-attraits-touristiques/programme-appui-au-developpement-attraits-touristiques

[11] Fonds de solidarité FTQ. (n.d.). Récréotouristique. Retrieved from https://www.fondsftq.com/fr-ca/financement/fonds-siege-social/recreotouristique.aspx

### Programme d'aide à la relance de l'industrie touristique

Similarly, to the EPRT and PARIT, this program's[12] goal is to support the development of an innovative, scalable, and sustainable tourism offer to ensure the sustainability and competitiveness of the province's tourism industry.

Eligible projects that may be carried out in connection with a tourist attraction or equipment are those related to:

- Construction;
- Reconstruction, including demolition of existing obsolete infrastructure;
- Expansion;
- Interior or exterior design;
- Adaptation or retraining;
- The acquisition or replacement of equipment;
- The deployment of a new tourist experience.

[12] Québec government. (2021). Programme d'aide à la relance de l'industrie touristique. Retrieved from https://www.Québec.ca/tourisme-et-loisirs/services-industrie-touristique/aide-financiere/programme-aide-relance-industrie-touristique

# TRENDS AND POTENTIAL ECONOMIC IMPACT

## PORTRAIT OF THE SNOWMOBILE INDUSTRY IN QUÉBEC

### Registered Snowmobiles

Many reports highlight the importance of snowmobiling in Québec, which expresses the high potential of this tourism sector.[13] In 2011, 174,500 snowmobiles were registered in Québec. This is one third of all registered snowmobiles in Canada. 25% of the 1.4 million snowmobiles registered in the United States are located close to Québec (New England, Atlantic Centre).

**IN 2015, SNOWMOBILING WAS ONE OF THE FOUR PRIORITY PRODUCTS PROMOTED BY TOURISME QUÉBEC IN THE CONTEXT OF ITS WINTER STRATEGY.**

### Industry Revenues

In 2015, snowmobiling was one of the four priority products promoted by Tourisme Québec in the context of its Winter Strategy. It is estimated that the snowmobile industry in North America generates annual outcomes of $30 billion. Snowmobiling brings annual outcomes of $2 billion in Québec. Direct outcomes (accommodation, food services, gas, etc.) generate $940 million. 30,000 visitors come from outside the province of Québec.

### Job Outcomes

There are 20 tour operators and 90 rental outlets receiving international customers. The sector has generated 14,400 jobs in Québec, most of them representing a major share of employment in remote regions. Thousands of volunteers also contribute to the activity in more than 200 snowmobile clubs.

[13] Tourisme Québec (2014). *L'hiver au Québec. Une expérience variée, un plaisir unique. État des lieux. Tourisme hivernal 2014-2020.* Final Report, 34 p. Retrieved from https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/tourisme/publications-adm/etudes-statistiques/etat-des-lieux-Hiver.pdf?1594395349

## Customers

In Québec, the main age groups for snowmobilers are 18-44 years (66%) and 45-54 years (24%). Ontario visitors are older: 37% are 55-64 years old, and 33% are 18-44 years old. More than 26% come from Toronto.

The main customers from outside of Québec are Canadians from other provinces. In 2011-2012, they represented half of the out-of-province customers. The other half is distributed among Americans and international visitors for which a high proportion comes from France.[14] Ontario and Northern Europe are the main competitors for snowmobile tourism in Québec.

In 2018, the Chaire de Tourisme Transat ESG-UQAM published a report on the best-selling products and the foreign customer expectations of Nordic destinations and products to target better promotional activities in Québec.[15] The report details the expectations of travellers as follows:

- Customers usually travel in Nordic destinations to enjoy a special but safe experience;
- Customers have important expectations related to wildlife and look for winter experiences;
- Customers have a strong interest in meeting with the local communities;
- Comfort is becoming a more and more important aspect since money is not an issue for the targeted customers.

[14] Réseau Veille Tourisme. (2013). La pratique de la motoneige au Québec : État des lieux. Retrieved from https://veilletourisme.ca/2013/02/18/la-pratique-de-la-motoneige-au-Québec-etat-des-lieux/

[15] Chaire de tourisme Transat ESG-UQAM. (2018). *Recherche qualitative auprès de voyagistes spécialistes des destinations nordiques dans les principaux marchés cibles du Québec,* 74 p. Retrieved from https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/tourisme/publications-adm/etudes-statistiques/RA-rapport-voyagistes-nordiques.pdf?1594395337

## Statistics per Trip Types

**Table 2 CANADA AS A WINTER DESTINATION – SNOWMOBILING - STATISTICS PER TRIP TYPES[16]**

| | Canadians | Americans |
|---|---|---|
| Snowmobiling (less than one day) | 919,653 (45% as a main goal)<br>33% from Ontario; 29% from Québec<br>Winter outdoor activity during a trip: snowmobiling (less than one day) (60%) | 3,219,556 (48.5% as a main goal)<br>Main states: California, Minnesota, New York, Michigan, Texas<br>Winter outdoor activity during a trip: snowmobiling (less than one day) (70%) |
| Snowmobiling (one-night or longer trip) | 344,617 (72.6% as a main goal)<br>36% from Québec and 32% from Ontario<br>Winter outdoor activities during a trip: ice fishing (23,5%0, skating (23.3%), one night/longer snowmobile trip (22.6%), Nordic skiing (11.8%) | 649,805 (69.7% as a main goal)<br>Main states: California, New York, Michigan, Texas, Minnesota<br>Other winter outdoor activities during a trip: snowboarding (20%), ice skating (15%), one night/longer snowmobile trip (14.1%) and ice fishing (12.5%) |

## Strengths, Weaknesses, Opportunities, Threats (SWOT) of the Snowmobiling Industry in Québec

**Table 3 CANADA AS A WINTER DESTINATION – SNOWMOBILING - SWOT OF THE SNOWMOBILING INDUSTRY IN QUÉBEC[17]**

| | Strengths | Weaknesses | Opportunities | Threats |
|---|---|---|---|---|
| Snowmobiling | Partnerships between tourist regions and several-day circuits<br>Network considered as the best developed in Canada with adequate integration of accommodation. | Trail network mostly maintained by volunteers: organizational and financial issues with lack of uniformity.<br>No volunteer succession<br>Lack of air access, | Shift towards green snowmobiling | Trail sustainability: some vital sections may close.<br>Environmental constraints (laws and rules) involving increasing costs.<br>Snowmobilers getting older.<br>Perception of Québec as an expensive destination<br>Lack of visibility of Québec in international markets. |

[16] Tourisme Québec (2014*). L'hiver au Québec. Une expérience variée, un Plaisir unique. État des lieux, tourisme hivernal -2014-2020.* Final report, 189 p. Retrieved from https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/tourisme/publications-adm/etudes-statistiques/etat-des-lieux-Hiver.pdf?1594395349

[17] *Ibid.*

# CASE STUDIES

Across Canada, some snowmobile destinations have developed strategies to guarantee the sustainable development of the snowmobile industry while ensuring a safe and enjoyable experience for snowmobilers.

Guidelines for the responsible management of the activity can be developed in collaboration with interested stakeholders and residents, which could include the creation of a snowmobile advisory committee in charge of ensuring that users comply with the guidelines. Alliances with local snowmobile clubs could contribute to the maintenance of the trails and allow offering snowmobile packages.

The following sections detail examples of snowmobiling destinations and tours. For each of them, information about trail management, packages and services are provided based on existing literature.



Source: Revelstoke. (n.d.). About.

## REVELSTOKE,

BRITISH COLUMBIA, CANADA

Revelstoke offers a **pristine landscape** for snowmobilers of all levels. With 12 to 18 metres of snow each winter and **hundreds of kilometres of trails and backcountry**, this destination offers all the services needed by visitors, while promoting a sustainable practice. The Revelstoke Snowmobile Club, established in 1968, is still the organization in charge of maintaining the infrastructure.[18]

| | |
|---|---|
| **Vision and Mission** | To be a global leader in sustainable snowmobile tourism, while continuing an environmental stewardship and protecting motorized backcountry access.<br><br>To offer high quality trails and trail infrastructure while fostering the **building of a strong community that respects each other as well as the environment.** |
| **Wildlife** | Club members **contribute to protecting the wildlife and especially the caribou**.<br><br>It has signed a **Stewardship Management Agreement** with the Ministry of Environment to support wildlife conservation. Furthermore, the BC Snowmobile |

[18] Government of Ontario. (2017). *Northern Ontario Snowmobile Tourism Plan*. Retrieved from https://destinationnorthernontario.ca/wp content/uploads/2018/09/Snowmobile.pdf

Federation and local snowmobile clubs have **agreed to the following practices** to reduce disturbance to mountain caribou:

- Snowmobilers will make every effort to research an area prior to snowmobile there, including looking for local maps and other information pertinent to snowmobiling in that location.
- Snowmobiles will not ride in areas where snowmobiling is prohibited.
- Snowmobilers will obey all posted signs.
- If caribou are encountered, snowmobilers will refrain from approaching. Snowmobilers will stay on their snowmobiles. Photographs will be taken from a distance.
- If caribou are encountered on a road or trail, snowmobilers will turn off the engine and remain on their sled. Snowmobilers will wait until the caribou have moved off the road or trail before continuing, making every effort to stay as far away from the caribou as safely as possible.
- If caribou are encountered in a play area, snowmobilers will not approach them. They will shut down their machines to give animals a chance to move away, then leave the area and refrain from riding within sight of the caribou.
- If caribou tracks are observed, snowmobilers will not follow the tracks.
- Snowmobilers will ride only where the snow is greater than 30 cm deep.[19]

The club and more specifically, the Conservation Officer Service patrols all snowmobile closure areas such as the Frisby Ridge caribou closure. The Club purchased, installed, and continues to maintain the closure boundary sign. The snowmobile area monitoring report form is available online and is used to record observations in the field or the results of monitoring sessions.

**Trail Management**

The Revelstoke Snowmobile Club maintains **80 km of groomed trails and 140 km of ungroomed trails**, two staging areas and some shelters. They operate within a partnership agreement with Recreation Sites and Trails BC.

[19] Directly cited from Revelstoke Snowmobile Club. (n.d.). Wildlife. Retrieved from https://sledrevelstoke.com/wildlife/

**Day Passes, Memberships, and Tours**

There are three ways to use the trails: through buying a day pass, a membership, or a tour.

**Day passes** are available for purchase online at a cost of $25 per sled. Passengers require a free pass.

**Memberships** are available online for $215 tax excluded. They are valid for one year. Members are encouraged to:

- Volunteer time for the betterment of the Club;
- Take care of all RSC facilities and trails;
- Pack in, pack out trash;
- Sweep the floor in the cabins;
- Shovel off the deck;
- Restock the wood bin & cut kindling.[20]

**For tours,** **Great Canadian Tours** is the only licensed company to offer packages in Revelstoke. It offers short- and multi-day tours as well as private guides and sled rentals:

- Short tours (2-6.5h): $199-$549 per person (includes equipment rental, guide, fuel, snacks or lunch);
- Multi-day tours (1 to 5 nights): $808- $4300 per person (includes guides, accommodation, equipment, fuel, meals);
- Private guides: All guides have Canadian Avalanche Association Operations licences, Wilderness First Responder (nationally recognized standard in wilderness medicine education), and terrain knowledge and experience within Revelstoke, B.C. They carry VHF Radios and are equipped with proper avalanche rescue equipment. The website does not provide information about pricing and rentals: from $ 290 to $ 375 per day.

Accommodation is easy in Revelstoke as many resorts are available located close to the trails. From the village, many different rides can be enjoyed. The Glacier House Hotel is particularly appreciated as it is directly connected to trails.

[20] Directly cited from Revelstoke Snowmobile Club. (n.d.). Membership. Retrieved from https://sledrevelstoke.com/membership/

**Economic Impacts**

A study conducted by MNP LLP[21] evaluates the contributions of snowmobiling to Revelstoke's economy in 2018. For that year, this industry generated:

- $ 22.5 million in direct economic output and $ 31.2 million in total economic output;
- $ 7.7 million in direct gross domestic product (GDP) and $ 12.9 million in total GDP;
- $ 1.63 million in direct revenue for all three levels of government and $ 2.75 million in total government revenue;
- 138 full-time equivalents (FTEs) of direct employment and 197 FTEs of total employment.

[21] MNP LLP. (2019). *Economic Impact Study of Snowmobiling in Revelstoke.* 25 p. Retrieved from https://sledrevelstoke.com/wp-content/uploads/2020/05/Economic-Impact-Study-of-Snowmobiling-in-Revelstoke-2019.pdf



Source: Aurora eMotion. (n.d.).

## AURORA EMOTION,

LAPLAND, FINLAND

Aurora eMotion[22] offer silent and emission-free electric snowmobile safaris in the Arctic wilderness. According to them, they are the **first and only company in the world to offer electric snowmobile safaris**.

**Vision and Mission**

Aurora Powertrains developed an electric snowmobile that resists the climatic conditions of the Arctic Circle. With the desire to make this new silent and sustainable technology accessible to all, the company started its own safaris in Lapland, Finland.

**Trail Management**

The trail network is **privately managed and maintained** by Aurora. The company also owns a cabin on the trails to warm up the visitors during their activity.

**Tours and Services**

**The trail network is only accessible through booking tours, meaning that day passes, or memberships are not available.** The tours are operated by a **local subcontractor**, the company Safartica. They are offered three to five times a week and welcome **small groups** of 16 persons (8 sleds). Children from 4 to 14 can also enjoy the ride as they are towed in a sleigh. The safaris usually last from **two to three hours** and include a ride of about 1-1.5 hours depending on the driver's skills. Once the ride is over, charging eSled's batteries to full takes less than 1 hour.

There are nine different types of tours offered in **three locations**: Rovaniemi, Levi and Ylläs.

The prices range from **$ 200 to $ 280** per person. The experiences combine snowmobile and other activities such as: Northern lights observation, wilderness observation, cultural information on Lapland and ice fishing.

[22] AuroraeMotion. (n.d.). Electric Snowmobile Safaris in Lapland. Retrieved from https://auroraemotion.com/

All tours include the winter clothing, the snowmobile, the guide, a snack (local sausages grilling, flat bread, pastries, hot drinks) and a break to warm up in the cabin.

**Sustainable Management**

Aurora eMotion intends to be a pioneer for sustainable tourism in Lapland, therefore, offering and developing sustainable tourism products are key parts of their mission. The company aims to ensure that future generations can enjoy Lapland's Arctic nature and authentic way of life through the following measures:

- The electric snowmobiles do not use gasoline. They only necessitate green energy that comes from their charging points.
- The company is committed to continue doing research on electric snowmobiles. They are currently developing a network of electric charging points in the Lapland area.
- The energy used mainly comes from local hydroelectric power plants and other renewable sources. It does not require fossil fuel-based electricity.
- The company only operates on private market trails to avoid harming the environment and fauna.
- No plastic bags or disposable plates and cutlery are used during safaris. The company instead uses washable tableware made of 50% wood and 50% recycled plastic.
- Aurora eMotion recycles, composts, and tries to reduce waste.
- The company tries to increase the environmental awareness of their guests.



Source: Wilderness Guided Tours. (n.d.).

## NORTHERN ONTARIO AND JAMES BAY,

CANADA

Ontario has a lot of snowmobiling trails. For real adventure, the trail from Hearst to Moosoonee brings you along the Missinaibi River to discover Canadian and First Nation's history in Moose Factory.

**Trail Management**

The Ontario Federation of Snowmobile Clubs manages the trail network in Ontario. Clubs are maintaining the trails for users who need to buy a permit to ride.

**Tours and Services**

This company distinguishes itself by offering tours that focus not only on riding a snowmobile, but also on culture and history.

The Wilderness Guided Tours[23] brings visitors to the James Bay for a 3-day-long journey. Visitors ride along the Missinaibi and Mosse River and end up in **Moose Factory.** They will stay there for two nights at the Eco Lodge[24], which is a **hotel founded by the local community**. During their stay, visitors can explore the surroundings, visit villages, meet the communities, and learn about the local history, including the **Moose Cree Nation.**

The three-day package is offered to groups of 6-8 people. The price for a guided tour ranges from $500 per person for a group of 8 people to $665 per person for a group of 6 people.

[23] Wilderness Guided Tours. (2021). Destination Baie James. Retrieved from https://www.wildernessguidedtours.com/snowmobile

[24] Cri Village Ecolodge. (2021). Our Tale. Retrieved from http://creevillage.com/our-tale/

# ELECTRIC SNOWMOBILES

Electric snowmobiles have recently grown in popularity with start-ups taking a great interest in manufacturing them and touring companies appreciating the sustainable approach to snowmobile tourism. The new technology provides tremendous advantages, such as reduced greenhouse gas emissions, general noise reduction and minimal maintenance. Their main obstacle to a faster spread is the infrastructure required to charge the vehicles, as for any battery-powered vehicles. The next section investigates the advantages of electric snowmobiles as well as the obstacles to their implementation. It also presents an overview existing manufacturer, the upcoming technology, as well as existing charging stations in the areas where the new snowmobile trail network is proposed.

**IN FACT, A TYPICAL COMBUSTION ENGINE SNOWMOBILE EMITS 88 GRAMS PER KM OF CARBON MONOXIDE, NITROGEN OXIDE AND HYDROCARBONS, WHICH IS THE EQUIVALENT OF 22 TIMES WHAT A CAR EMITS.**

## ADVANTAGES OF ELECTRIC SNOWMOBILES

### Greenhouse Gas Emissions

Electric snowmobiles do not produce greenhouse gas emissions after their manufacturing and throughout their usage, which represents their main advantage. In fact, a typical combustion engine snowmobile emits 88 grams per km of carbon monoxide, nitrogen oxide and hydrocarbons, which is the equivalent of 22 times what a car emits.[25] Electric snowmobiles provide an opportunity to enjoy this mode of transportation without emitting as much greenhouse gas emissions as combustion engines.

### Reduced Noise Emissions

An electric snowmobile is quieter than a combustion engine snowmobile, which will be highly beneficial for the residential communities living alongside the trail. Furthermore, a quieter vehicle is less likely to disturb the wildlife; therefore is more compatible with Cree hunting practices.

[25] Mountain Culture. (2018). Québec Company Unveils World's First Electric Snowmobile. Retrieved from https://mountainculturegroup.com/montreal-company-unveils-worlds-first-electric-snowmobile

### Reduced Maintenance

Electric snowmobiles do not necessitate oil, therefore do not require much maintenance. In addition, their mechanism is mostly related to a centralized electric mechanism that can be updated at distance, making machinery improvements easier to provide to electric snowmobiles.

## CHARGING INFRASTRUCTURE & ASSOCIATED COSTS

The main obstacle to electric snowmobile implementation is the infrastructure required and the associated cost to provide charging capacity to electric snowmobiles. Existing electric snowmobile manufacturers provide a range of 40 to 150 km. Considering the current electricity delivery systems in Eeyou Istchee, EV charging stations could be provided along the snowmobile trail network. They would need to be connected to an electricity grid and/or powered via solar panels.

**IT HAS BEEN FOUND THAT BATTERY PRODUCTION IS ASSOCIATED WITH 56 TO 494 KILOGRAMS OF CARBON DIOXIDE PER KWH OF BATTERY CAPACITY**

Those charging stations would require to be Level 3 Charging Stations or DC Fast Charging Stations. Based on existing prices, these stations cost approximately $100,000 each. These fees include the charge station hardware, electrician materials, electrician labour, other materials and labour, transformer, mobilization, permitting.

Although expensive, these stations would charge electric snowmobiles in approximately 30 minutes, making it appropriate for snowmobiling. As the cost of a transformer for a Level 3 Charging Station varies between $12,000 and $31,000, it would be less expensive to install a station on a commercial site that already comprises a compatible transformer.[26]

Some electric snowmobiles such as the one by the company Taiga follow the same charging needs as an electric vehicle. Therefore, they are compatible with Level 1, 2 or 3 charging stations at home or with a public network as long as it has a standard charging plug (SAE J1772 or Type 2 IEC).

[26] Ohm Home. (n.d.). EV Charging Station Cost. Retrieved from https://www.ohmhomenow.com/electric-vehicles/ev-charging-station-cost/

**Table 4 Cost of Charging Stations[27]**

| | Level 2 - Home | Level 2 Parking Garage | Level 2 Curbside | DC Fast Charging | Description/Key/Assumptions |
|---|---|---|---|---|---|
| **Charging Station Hardware** | $ 450 – $ 1,000 | $ 1,500 - $ 2,500 | $ 1,500 - $ 3,000 | $ 12,000 - $ 35,000 | |
| **Electrician Materials** | $ 50 – $ 150 | $ 210 - $ 510 | $ 150 - $ 300 | $ 300 - $ 600 | — 1.50 – 2.50/ft for conduit and wire, plus misc other materials<br>— $ 50 – 80/hour (per dist?)<br>— 500 – 1000 if new breaker is required<br>— Assume 2x electrical cost for level 3 |
| **Electrician Labour** | $ 100 - $ 350 | $ 1,240 - $ 2,940 | $ 800 – $ 1,500 | $ 1,600 - $ 3,000 | |
| **Other Materials** | | $ 50 - $ 100 | $ 50 - $ 150 | $ 100 - $ 400 | — 25 – 100/ft for trenching/boring – depends on the surface, soil, and underground complexity<br>— Mounting, signage, protection, and restoration also included here, but do not usually contribute more than a few hundred dollars |
| **Other Labour** | | $ 250 - $ 750 | $ 2,500 - $ 7,500 | $ 5,000 – $ 15,000 | |
| **Transformer** | N/A | N/A | N/A | $ 10,000 - $ 25,000 | — 480V transformer installed by utility |

[27] Directly cited from Ohm Home. (n.d.). EV Charging Station Cost. Retrieved from https://www.ohmhomenow.com/electric-vehicles/ev-charging-station-cost/

| | | | | | |
|---|---|---|---|---|---|
| **Mobilization** | $ 50 - $ 200 | $ 250 - $ 500 | $ 250 - $ 500 | $ 600 – $ 1,200 | — Home: 1 – 3 hours of electrician time for a home installation<br>— Public: $ 250 – 500 of time for 1 – 2 electricians and other labour. We found that the work could usually be completed in a single visit from each contractor. |
| **Permitting** | $ 0 - $ 100 | $ 50 - $ 200 | $ 50 - $ 200 | $ 50 - $ 200 | — Varies city to city, often a flat fee for one or several stations. |

## BATTERY

### Lifecycle

Lithium-ion batteries, largely used in electric vehicles, have been long ignored in terms of the environmental impact associated with their manufacturing and their disposal. In fact, it has been found that battery production is associated with 56 to 494 kilograms of carbon dioxide per kilowatt-hour of battery capacity. [28] Other studies have also found that battery production is associated with 35 g CO2e/km over the lifetime of a vehicle. [29] However, it should be mentioned that battery recycling is becoming increasingly feasible and cost efficient, making the technology more sustainable in terms of overall life-cycle greenhouse gas emissions.

**OTHER STUDIES HAVE ALSO FOUND THAT BATTERY PRODUCTION IS ASSOCIATED WITH 35 G CO2E/KM OVER THE LIFETIME OF A VEHICLE**

### Conditions Affecting the Range

Range varies according to riding conditions, riding style, and terrain. The temperature might slightly affect the range as lithium-ion batteries must be kept at a precise temperature to perform optimally. Some

[28] International Council on Clean Transportation. (2018). *Effects of battery manufacturing on electric vehicle life-cycle greenhouse gas emissions*. Retrieved from https://theicct.org/sites/default/files/publications/EV-life-cycle-GHG_ICCT-Briefing_09022018_vF.pdf

[29] Romare, M. & Dahllöf, L. The Life Cycle Energy Consumption and Greenhouse Gas Emissions from Lithium-Ion Batteries, IVL Swedish Environmental Research Institute, 2017. Retrieved from http://www.ivl.se/download/18.5922281715bdaebede9559/1496046218976/C243+The+life+cycle+energy+consumption+and+CO2+emissions+from+lithium+ion+batteries+.pdf

snowmobiles such as Taiga[30] comprises thermal management systems to cool or heat the battery pack to ensure optimal performance. Taiga snowmobiles therefore only lose 1-5% charge in extreme cold weather.

## CURRENT & UPCOMING MANUFACTURERS OF ELECTRIC SNOWMOBILES

There are currently two manufacturers of electric snowmobiles, as well as a manufacturer of combustion engines snowmobile that is planning to manufacture electric snowmobiles in the near future. The table below presents available information pertaining to the three companies:

- **Taiga Motors, Canada**
- **Aurora Powertrains, Finland**
- **Polaris**

**Table 5 Taiga Motors, Aurora Powertrains, and Polaris Offer at a Glance[31]**

| Name of Manufacturer | Taiga Motors | Aurora Powertrains | Polaris |
|---|---|---|---|
| **Location** | Montreal, QC, Canada | Rovaniemi, Finland | Medina, MN, États-Unis |
| **Availability** | Fall 2021 | 2021 | 2025 |
| **Models** | EKKO, ATLAS, NOMAD | eSled (three versions) | TBD |
| **Range (km)** | 98 - 140 | 40 | TBD |
| **Lowest Temperature (˚C)** | - 40 | | TBD |
| **EV Plugs[32] Requirements** | The Taiga snowmobile charger is compatible with standard EV plugs:<br><br>SAE J1772 for North American version, with | No specific requirements | TBD |

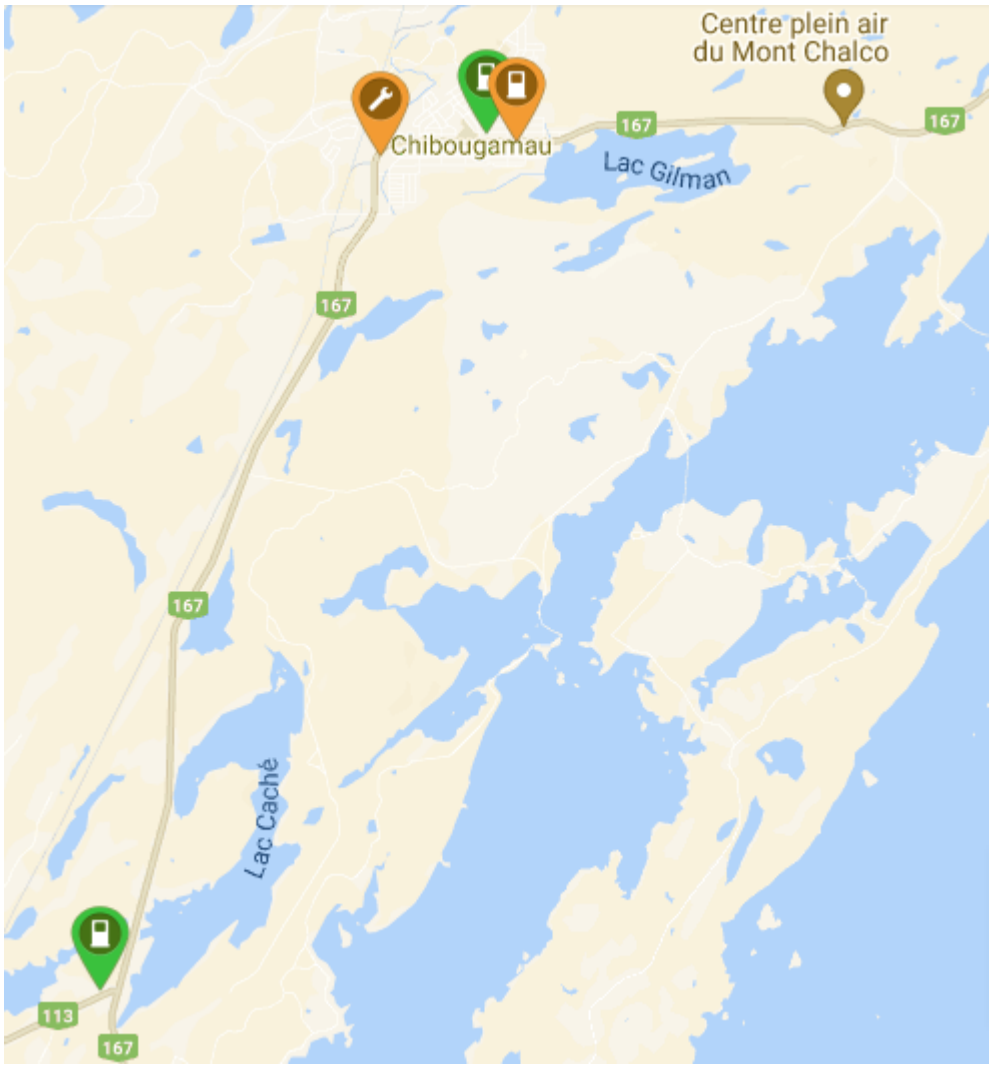
[30] Taiga Motors. (n.d.). Frequently Asked Questions (FAQ). Retrieved from https://taigamotors.ca/faq-electric-snowmobile/
[31] Taiga Motors. (n.d.). Taiga Snowmobiles. Retrieved from https://taigamotors.ca/snowmobiles/, AuroraeMotion. (n.d.). Electric Snowmobile Safaris in Lapland. Retrieved from https://auroraemotion.com/;, and Polaris Snowmobile. Introducing the 2022 Polaris Snowmobile Lineup. (n.d.), Retrieved from https://snowmobiles.polaris.com/en-ca/
[32] EV Plug is the standard plug type in North America.

| | | | |
|---|---|---|---|
| | combo for Level 3 Charging<br><br>Type 2 IEC for European version, with a combo for Level 3 Charging - available adapters for direct to outlet connections<br><br>Taiga Snowmobiles have the same charging needs as an electric vehicle therefore can benefit from Level 1, 2 or 3 charging stations at home or with a public network. | | |
| **Charging Time** | Level 1: ~14 hrs<br>Level 2: ~3 hrs<br>Level 3: ~30 min. | Level 1: ~14 hrs<br>Level 2: ~3 hrs<br>Level 3: ~30 min. | TBD |
| **Price per vehicle ($CAD)** | Starts at $ 18,400 | | |

### Existing Areas with Charging Stations

There are three existing charging stations and one upcoming station located in or near Chibougamau.

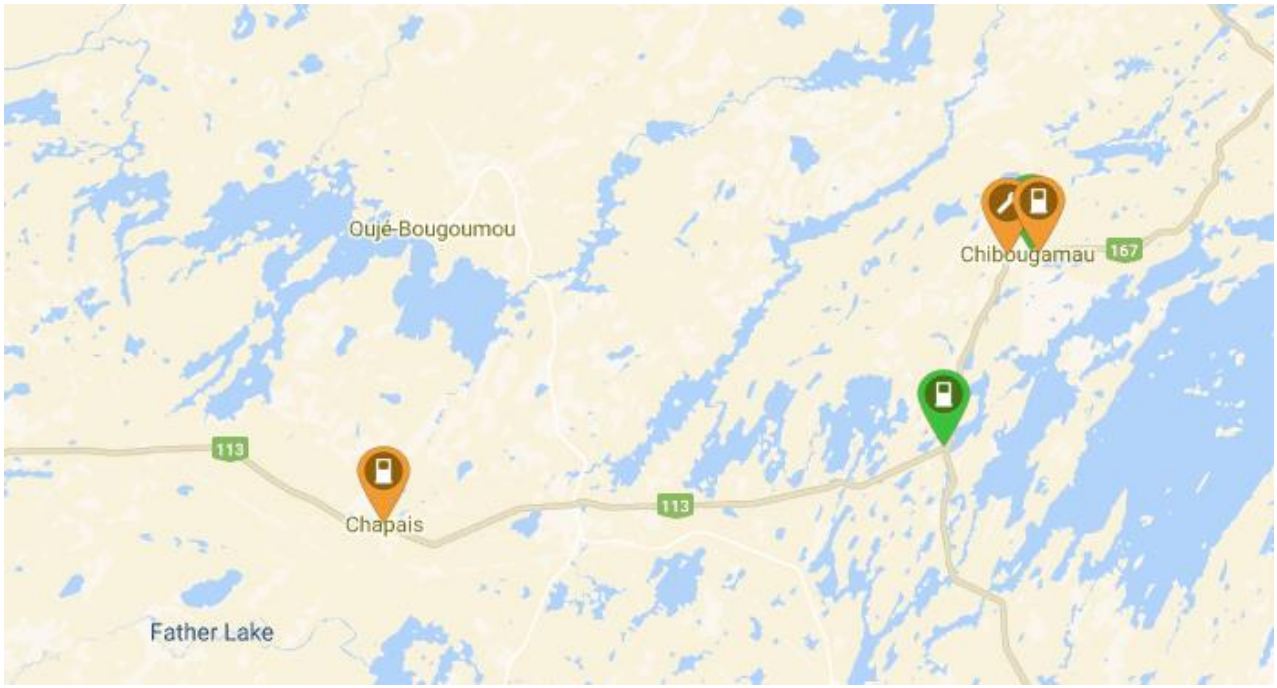
1. **MTQ**, 1240, Rte 113, Chibougamau - Existing
2. **Chibougamau Municipal Library**, 601, 3e Rue, Chibougamau, G8P 1N8 - Existing
3. **Société des Alcools du Québec (SAQ),** 402, 3e Rue, Chibougamau, G8P 2X6 - Existing
4. **Belzile Pétrole**, 902, 3e Rue, Chibougamau, G8P 1R2 - Upcoming




Source: Plugshare. n.d.

There is also one charging station in Chapais.

5. **Hôtel de Ville de Chapais,** 145 boul. Springer, Chapais, G0W 1H0




Source: Plugshare. n.d.

# OPPORTUNITIES AND CHALLENGES OF THE SNOWMOBILING INDUSTRY IN EEYOU ISTCHEE

## OPPORTUNITIES

### Current Trail Network

- The Fédération des Clubs de Motoneigistes du Québec (FCMQ) now provides an updated and interactive online map of all the existing trails in Québec. [33] Click here to access the FCMQ's interactive map.

### Customers

- There is an increasing interest for snowmobile rentals.
- Money is generally not an issue for targeted snowmobiling customers.
- Customers have a strong interest in meeting with the local communities.

### Green Snowmobiling

- There is an increasing interest for new generation snowmobiles that are quieter and less polluting such as electric snowmobiles, which are currently being developed.
- In Québec, the environmental label "EcoSentiers" has been implemented after consultations among the snowmobile industry, trails users and community organizations. The "EcoSentiers" label tags trails where prescriptive environmental requirements and ecofriendly practices have been applied. This label also tags trails where natural environment and local communities have been protected. Trails are reviewed by an independent non-profit organization, Nature-Action Québec.[34] This label is an opportunity to enhance the sustainable component of the trail network.

[33] Fédération des Clubs de Motoneigistes du Québec (FCMQ). Carte motoneige. Retrieved from http://fcmq.viaexplora.com/carte-motoneige/index.html#map

[34] Programme ÉcoSentiers. (n.d.). Accueil - Le programme écoSentier[MD] - C'est quoi ? Retrieved from https://ecosentier.ca/fr/programme-ecosentier/cest-quoi

### Upcoming Projects

- Packages that include other activities to complement snowmobile trips (ice fishing, dog sledding, snowshoeing) are popular. The conversion of the Waconichi Camp at the AMW reserve therefore represents an opportunity to propose packages that comprise snowmobile trips and complementary activities.

## CHALLENGES

### Current Trail Network and Tourism Infrastructure

- Safety and comfort are important to visitors. Yet, the existing trail network generally lacks maintenance.
- There is a lack of adequate signage to announce services and activities.
- Most installations such as accommodation and signage are needed to exploit the full potential of the snowmobiling industry.
- Forestry activities and mining projects that are ongoing on the territory may generate land use cohabitation issues.

### Access Rights System and Administration of the Trail

- The tallymen do not want to not use the access rights system, therefore, are not insured by the insurer who covers trail users with access rights.
- There is no snowmobile management structure in place.

### Sustainable Development

- There is an increasing interest for off-trail snowmobile trips. However, such snowmobiling type can disturb the wildlife and negatively impact the trapper’s lands.




# 3. PLANS AND SPECIFICATIONS

# PLANS AND SPECIFICATIONS

## METHODOLOGY AND COST ESTIMATE

The following section details the plans and specifications developed for the realization of the project. They are based on the various consultations held with the population, the field work that was carried out and guidelines from the Ministère des Transport du Québec (MTQ) regarding snowmobile trails.

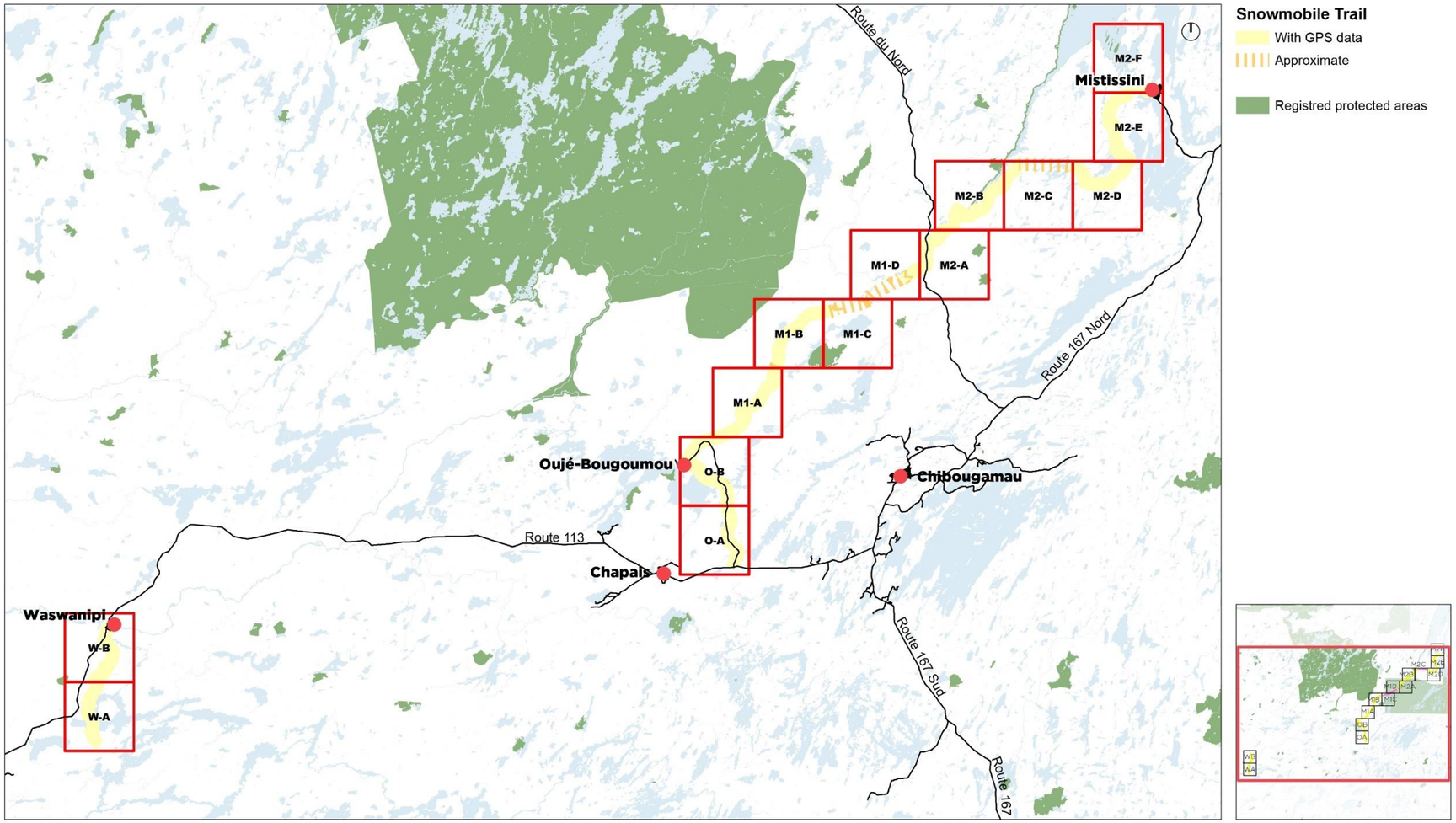
It is important to note that since the project had to be realized in 2020, during the COVID-19 pandemic, most of the winter surveys had to be cancelled due to lockdowns. The following plans thus result from a summer survey that required coordination between a survey team based in Chibougamau and landscape architects based in Montreal. Since the landscape architects were not able to go on site, some additional studies are required in the specifications tables in order to provide a full portrait of the territory, often because the technical constraints might be significant.

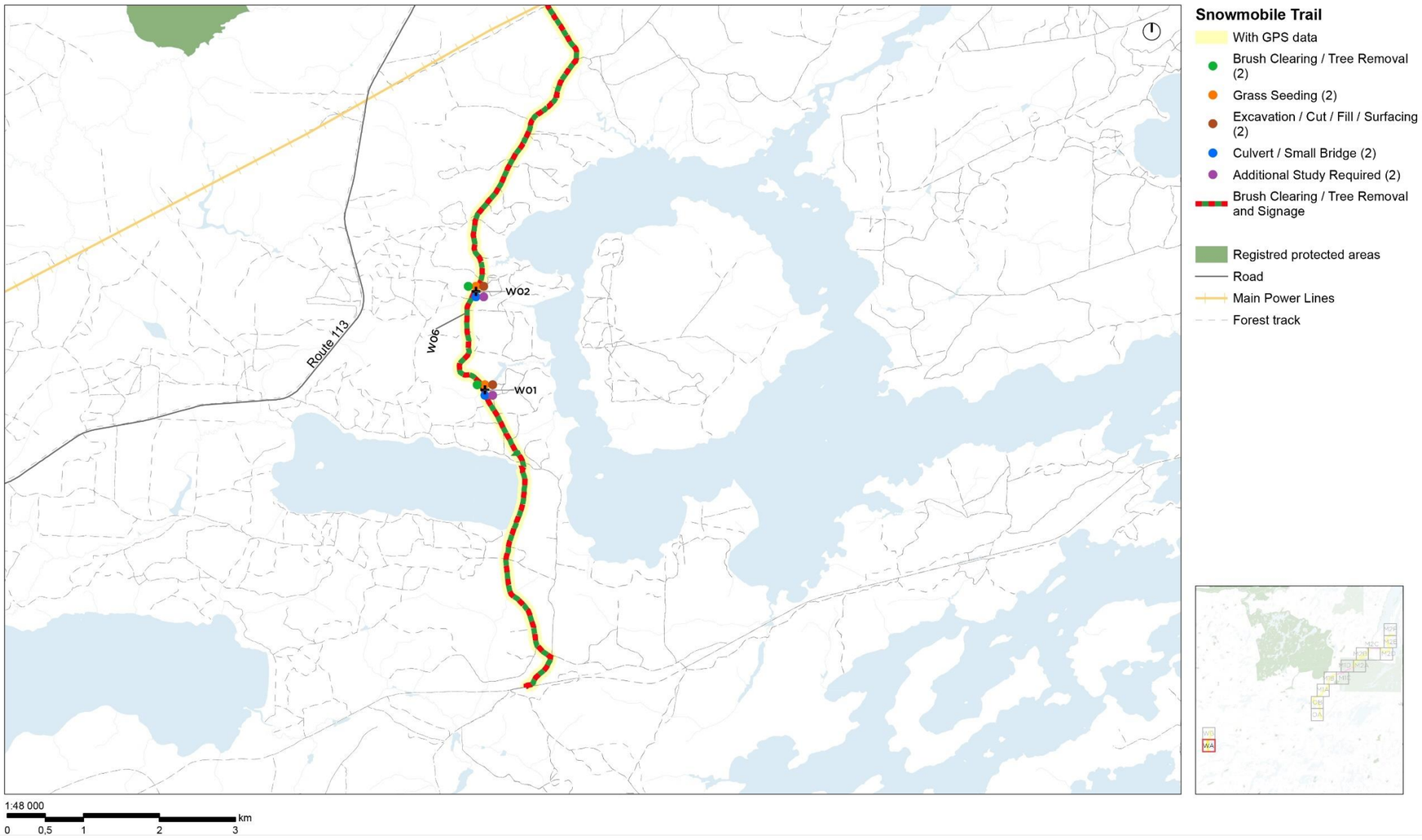
Moreover, the Class D estimate that is provided in **Annex 1** faces the same methodology issues. The estimate of probable cost is based upon professional experience with similar projects and upon understanding of the state of the market at the time of the issue of the document. A 30% contingency for works in a remote location was added on all prices, in addition to the contingency normally calculated for Class D estimates. Although some items might change or be added depending on further surveys and the construction phases, some items could also cost less if the workforce, equipment, or materials can be found locally.

## GUIDELINES

The plans and specifications provided are based on the following guidelines :

- Guide pour l'aménagement d'un sentier de vehicule hors route sur la berge d'une autoroute, produced by the MTQ in 2015
- Guide d'aménagement et d'entretien des sentiers de motoneige au Québec, produced by the FCMQ in 2011

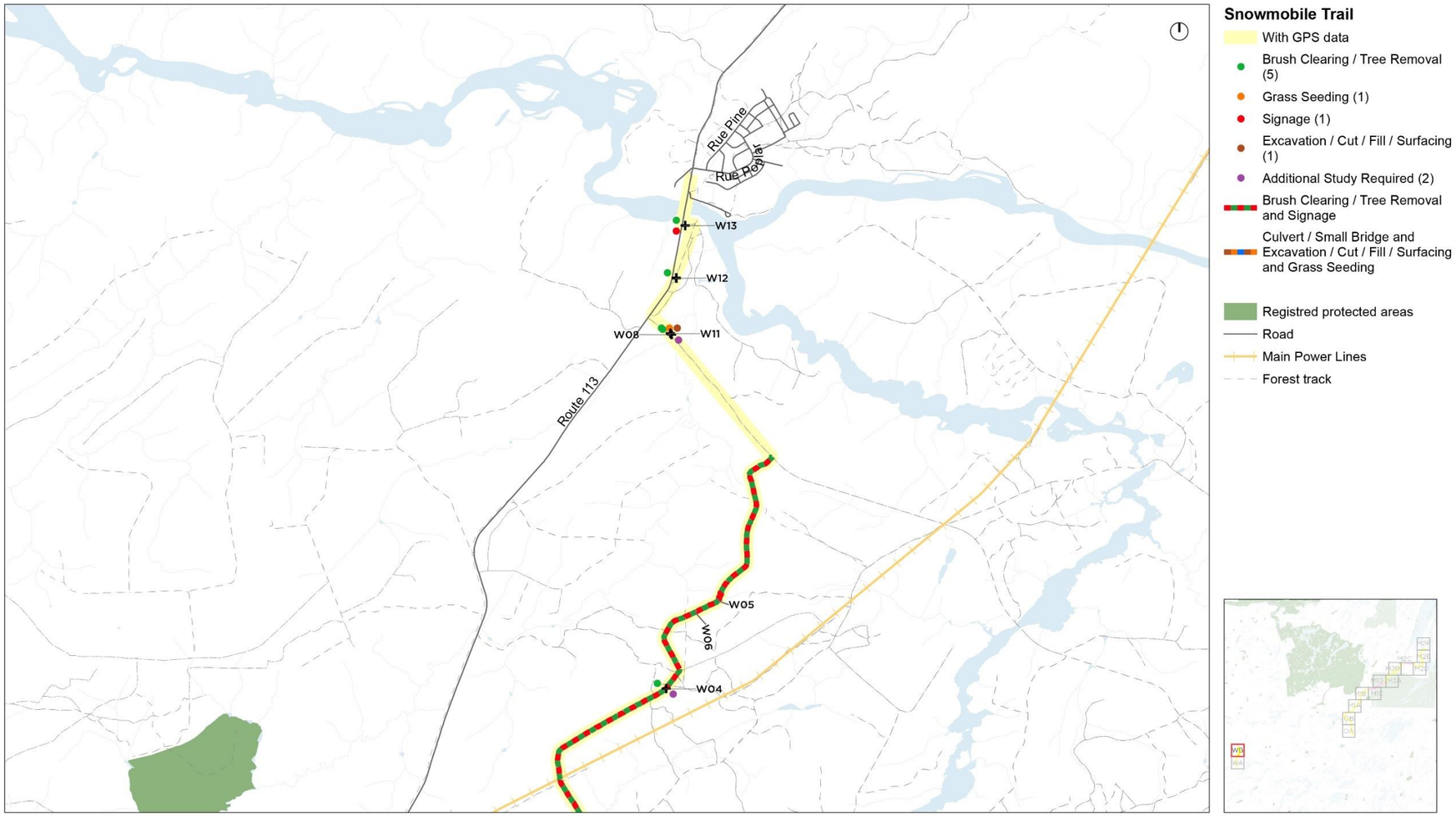

Route du Nord
M2-F
Mistissini
M2-E
M2-B
M2-C
M2-D
M1-D
M2-A
M1-B
M1-C
Route 167 Nord
M1-A
Oujé-Bougoumou
O-B
O-A
Chibougamau
Route 113
Chapais
Waswanipi
W-B
W-A
Route 167 Sud
Route 167
Snowmobile Trail
With GPS data
Approximate
Registred protected areas
1:547 000
0 5 10 20 30 km


Route 113
W06
W02
W01
Snowmobile Trail
With GPS data
Brush Clearing / Tree Removal (2)
Grass Seeding (2)
Excavation / Cut / Fill / Surfacing (2)
Culvert / Small Bridge (2)
Additional Study Required (2)
Brush Clearing / Tree Removal and Signage
Registred protected areas
Road
Main Power Lines
Forest track
1:48 000
0 0,5 1 2 3
km

## **WASWANIPI** | TRANS-QUÉBEC 93 TO WASWANIPI

| | Brush Clearing | Tree Clearing | Excavation | Cut / Fill | Culvert | Small Bridge | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Bridge Design | Wetland | |
| **W-A** | | | | | | | | | | | |
| W01 | X | | | X | | X | X | | X | X | Some water present on the trail; recommend building a small bridge according to the annual high water line; water depth to be validated; ADDITIONAL STUDY REQUIRED |
| W02 | X | | | X | | X | X | | X | X | Some water present on the trail; drainage assessement required; culvert or small bridge required; ADDITIONAL STUDY REQUIRED |

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.



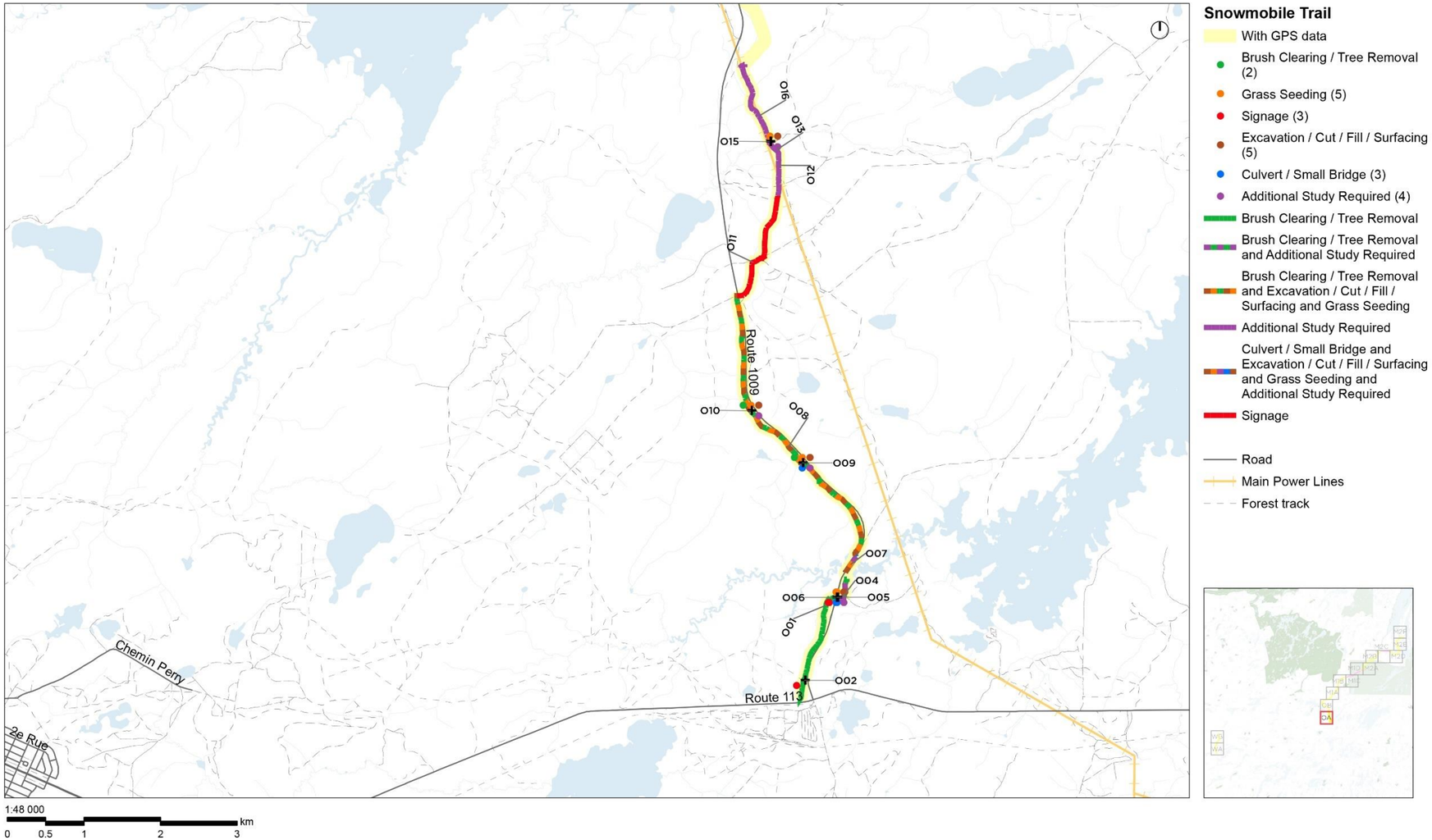

**Snowmobile Trail**

- With GPS data
- Brush Clearing / Tree Removal (5)
- Grass Seeding (1)
- Signage (1)
- Excavation / Cut / Fill / Surfacing (1)
- Additional Study Required (2)
- Brush Clearing / Tree Removal and Signage
- Culvert / Small Bridge and Excavation / Cut / Fill / Surfacing and Grass Seeding
- Registred protected areas
- Road
- Main Power Lines
- Forest track

## **WASWANIPI** | TRANS-QUÉBEC 93 TO WASWANIPI

| | Brush Clearing | Tree Clearing | Excavation | Cut / Fill | Culvert | Small Bridge | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Bridge Design | Wetland | |
| **W-B** | | | | | | | | | | | |
| W04 | X | | | | | | | | | | Trail overgrown by alders; major brush clearing required to obtain minimum 5m trail width |
| W05 | | | | X | X | | X | | | X | Passage difficult and dangerous; large beaver dam present; special regulations to be considered; ADDITIONAL STUDY REQUIRED |
| W06 | X | | | | | | | X | | | Minor brush clearing required |
| W08 | X | | | | X | | | | | X | Major brush clearing required; trail to be avoided within wetland; ADDITIONAL STUDY REQUIRED |
| W11 | X | X | X | | | | X | | | | Current use of roadway is dangerous; recommend creating a new trail through the wooded area parralel to the road; ADDITIONAL STUDY REQUIRED |
| W12 | X | X | | | | | | | | | Major brush clearing required to obtain minimum trail width of 5m |
| W13 | X | | | | | | | X | | | Minor brush clearing required |

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.


O16
O13
O15
O12
O11
Route 1009
O10
O08
O09
O07
O04
O06
O05
O01
O02
Route 113
Chemin Perry
2e Rue
1:48 000
0 0.5 1 2 3 km
Snowmobile Trail
With GPS data
Brush Clearing / Tree Removal (2)
Grass Seeding (5)
Signage (3)
Excavation / Cut / Fill / Surfacing (5)
Culvert / Small Bridge (3)
Additional Study Required (4)
Brush Clearing / Tree Removal
Brush Clearing / Tree Removal and Additional Study Required
Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding
Additional Study Required
Culvert / Small Bridge and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required
Signage
Road
Main Power Lines
Forest track

## **OUJÉ-BOUGOUMOU** | CHAPAIS TO OUJÉ-BOUGOUMOU

| | Brush Clearing | Tree Clearing | Excavation | Cut / Fill | Culvert | Small Bridge | Large Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **O-A** | | | | | | | | | | | | | | | |
| O01 | X | | | | | | | | | | | | | | Major brush clearing required |
| O02 | | | | | | | | | X | | | | | | Road crossing |
| O04 | X | X | | | | | | | | | X | | | X | Trail arrives upon a marsh (wetland); zone to be avoided; major brush clearing required; inaccessible; ADDITIONAL STUDY REQUIRED |
| O05 | | | | X | X | | | X | X | | | | | | Road crossing; culvert required to maintain drainage along road; fill required to lessen slope of roadside embankment; slope: 1.5m (long) x 1.5m (high) = 100% |
| O06 | | | | X | X | | | X | X | | | X | | | Road crossing; culvert required to maintain drainage along road; fill required to lessen slope of roadside embankment; slope: 1.5m (long) x 1.5m (high) = 100% |
| O07 | | | | X | | | X | X | | | | | X | X | River and marsh (wetland) to cross; passage recommended along the adjacent asphalt roadway, building a bridge for the snowmobilies; bridge = approx. 200m (long); specialized design and site analysis required; if bridge not possible, area to be avoided; ADDITIONAL STUDY REQUIRED |
| O08 | X | X | X | | | | | X | | | | | | | Major brush clearing required along the entire trail section = 4100m (long) |
| O09 | X | | | X | | X | | X | | | | | | X | Small bridge required to cross 10cm (deep) stream; ADDITIONAL STUDY REQUIRED |
| O10 | X | | X | X | | | | X | | | | X | | | Major brush clearing required; slope: 5m (wide) x 5m (long) x 1.1m (high) = 22%; ADDITIONAL STUDY REQUIRED |
| O11 | | | | | | | | | X | | | | | | Road crossing |
| O12 | | | | | | | | | | | | | | X | Bog (wetland) to be avoided; ADDITIONAL STUDY REQUIRED |
| O13 | | | | | | | | | | | | | | X | Bog (wetland) to be avoided; ADDITIONAL STUDY REQUIRED |
| O15 | | | | X | | X | | X | | | | | | X | Small bridge required, approx. 6m (long) x 5m (wide), to cross 1m wide stream; |
| O16 | | | | | | | | | | | X | | | X | Bog (wetland) inaccessible by quad; ADDITIONAL STUDY REQUIRED |

**ADDITIONAL STUDY REQUIRED**: Further site study is required due to either inaccessible trail sections*, steep slopes**, bridge design*** or the presence of wetlands****.

* In the case of inaccessible trail sections, additional ground or aerial studies are required to assess site conditions along the trail alignment. If site conditions prove unfavorable, a revised trail alignment may be required.

** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.

*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.

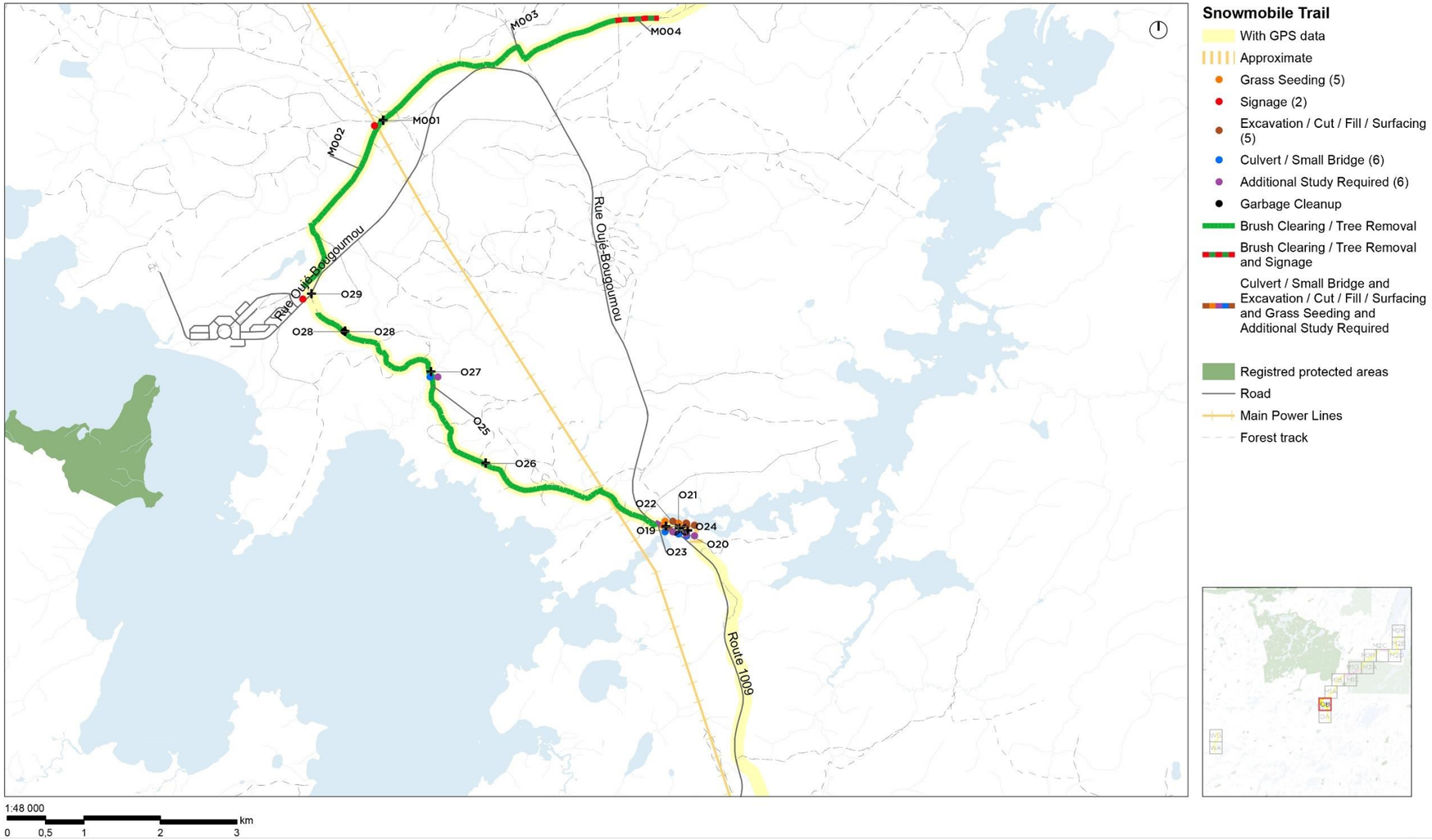
**Large Bridge:** Large or complex water crossings require specialized bridge design and site/environmental studies.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

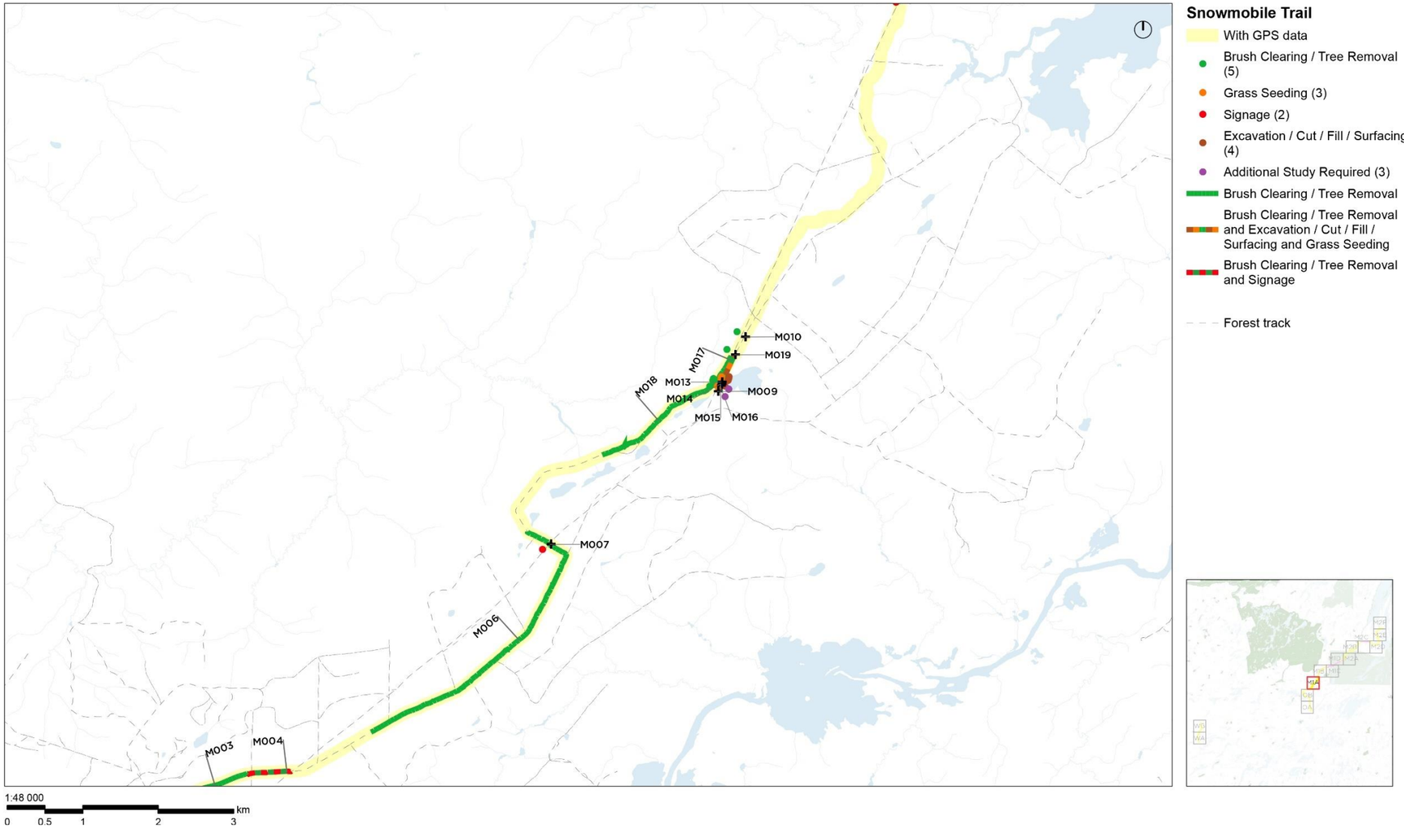
Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.


M003
M004
M001
M002
Rue Ouié-Bougoumou
Rue Ouié-Bougoumou
O29
O28
O28
O27
O25
O26
O22
O21
O19
O24
O20
O23
Route 1009
1:48 000
0 0,5 1 2 3 km
Snowmobile Trail
With GPS data
Approximate
Grass Seeding (5)
Signage (2)
Excavation / Cut / Fill / Surfacing (5)
Culvert / Small Bridge (6)
Additional Study Required (6)
Garbage Cleanup
Brush Clearing / Tree Removal
Brush Clearing / Tree Removal and Signage
Culvert / Small Bridge and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required
Registred protected areas
Road
Main Power Lines
Forest track

## OUJÉ-BOUGOUMOU | CHAPAIS TO OUJÉ-BOUGOUMOU

| | Brush Clearing | Tree Clearing | Excavation | Cut / Fill | Culvert | Small Bridge | Large Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inaccessible | Steep Slope | Bridge Design | Wetland | |
| **O-B** | | | | | | | | | | | | | | | |
| O19 | | | | X | | | X | X | | | | | X | | High water flow; new large bridge required, approx. 7m (long); specialized bridge design required; ADDITIONAL STUDY REQUIRED |
| O20 | | | | X | | | X | X | | | | | X | | Specialized bridge design required; ADDITIONAL STUDY REQUIRED |
| O21 | | | | X | | | X | X | | | | | X | | Low water measurement = 4.55m; high water measurement = 7.14m; large bridge required, approx 12m (long) x 5m (wide); specialized bridge design required; ADDITIONAL STUDY REQUIRED |
| O22 | | | | X | | | X | X | | | | | X | | Large bridge required, approx. 17m (long); specialized bridge design required; ADDITIONAL STUDY REQUIRED |
| O23 | X | | | X | | | | X | | | | | X | | Trail currently uses paved road to access bridge to cross Opémiska River; if new bridge constructed, new trail connection to add parallel to road; potential for scenic viewpoint; ADDITIONAL STUDY REQUIRED |
| O24 | | | | X | | | X | X | | | | | X | | 40m (long) water crossing; large water flow; additional large bridge required for snowmobiles; specialized design and site analysis required; ADDITIONAL STUDY REQUIRED |
| O25 | X | | | | | | | | | | | | | | Minor brush clearing required in certain areas to obtain a minimum 5m trail width |
| O26 | | | | | | | | | | | | | | X | Large beaver dam present that retains water upstream, flooding the trail; beaver dam to be managed or area to be avoided; ADDITIONAL STUDY REQUIRED |
| O27 | | | | | | X | | | | | | | X | | Existing wood bridge to be replaced; approx. 3m (wide) x 10m (long); ADDITIONAL STUDY REQUIRED |
| O28 | | | | | | | | | | X | | | | | Garbage dump to be cleaned up; good trail |
| O29 | | | | | | | | | X | | | | | | Major road crossing |
| **MISTISSINI** | | | | | | | | | | | | | | | |
| **M1-A** | | | | | | | | | | | | | | | |
| M001 | | | | | | | | | X | | | | | | Major road crossing |
| M002 | X | | | | | | | | | | | | | | Major brush clearing required |
| M003 | X | | | | | | | | | | | | | | 50% brush clearing; approx. 2006m (long) |

**ADDITIONAL STUDY REQUIRED:** Further site study is required due to either inaccessible trail sections*, steep slopes**, bridge design*** or the presence of wetlands****.
* In the case of inaccessible trail sections, additional ground or aerial studies are required to assess site conditions along the trail alignment. If site conditions prove unfavorable, a revised trail alignment may be required.
** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.
*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.
**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.
**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.
**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.
**Large Bridge:** Large or complex water crossings require specialized bridge design and site/environmental studies.
**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.
Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.
If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.
Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.




**Snowmobile Trail**

- With GPS data
- Brush Clearing / Tree Removal (5)
- Grass Seeding (3)
- Signage (2)
- Excavation / Cut / Fill / Surfacing (4)
- Additional Study Required (3)
- Brush Clearing / Tree Removal
- Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding
- Brush Clearing / Tree Removal and Signage
- Forest track

## **MISTISSINI** | OUJÉ-BOUGOUMOU TO ROUTE DU NORD

| | Brush Clearing | Tree Removal | Excava-tion | Cut / Fill | Surfacing | Culvert | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Inacces-sible | Steep Slope | Wetland | |
| **M1-A** | | | | | | | | | | | | |
| M004 | X | | | | | | | X | | | | Major brush clearing; section approx. 567m (long) |
| M006 | X | X | | | | | | | | | | Major brush clearing; section approx. 4274m (long); remove fallen trees |
| M007 | | | | | | | | X | | | | Major road crossing |
| M009 | X | X | | X | X | | X | | | X | | Slope: 8m (wide) x 10m (long) x 4.2m (high) = 42%; major brush clearing; ADDITIONAL STUDY REQUIRED |
| M010 | X | X | | | | | | | | | | Major brush clearing required; remove fallen trees |
| M013 | X | | X | X | | | X | | | | | Soil levelling required; 10m (wide) x 15m (long) |
| M014 | X | | | X | X | | X | | | X | | Slope: 5m (wide) x 6m (long) x 2,3m (high) = 38%; ADDITIONAL STUDY REQUIRED |
| M015 | | | | | | | | | | | X | Dense brush; presence of wetland; ADDITIONAL STUDY REQUIRED |
| M016 | X | | | | X | | | | | | | Large hill: 10m (wide) x 50m (long) x 1.8m (high) = 3.6% |
| M017 | X | X | X | | X | | X | | | | | Major brush clearing required; section approx. 544m (long) for new trail; excavation required |
| M018 | X | X | | | | | | | | | | Major brush clearing required; section approx. 2269m (long) |
| M019 | X | | | | | | | | | | | 50% brush clearing |

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*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

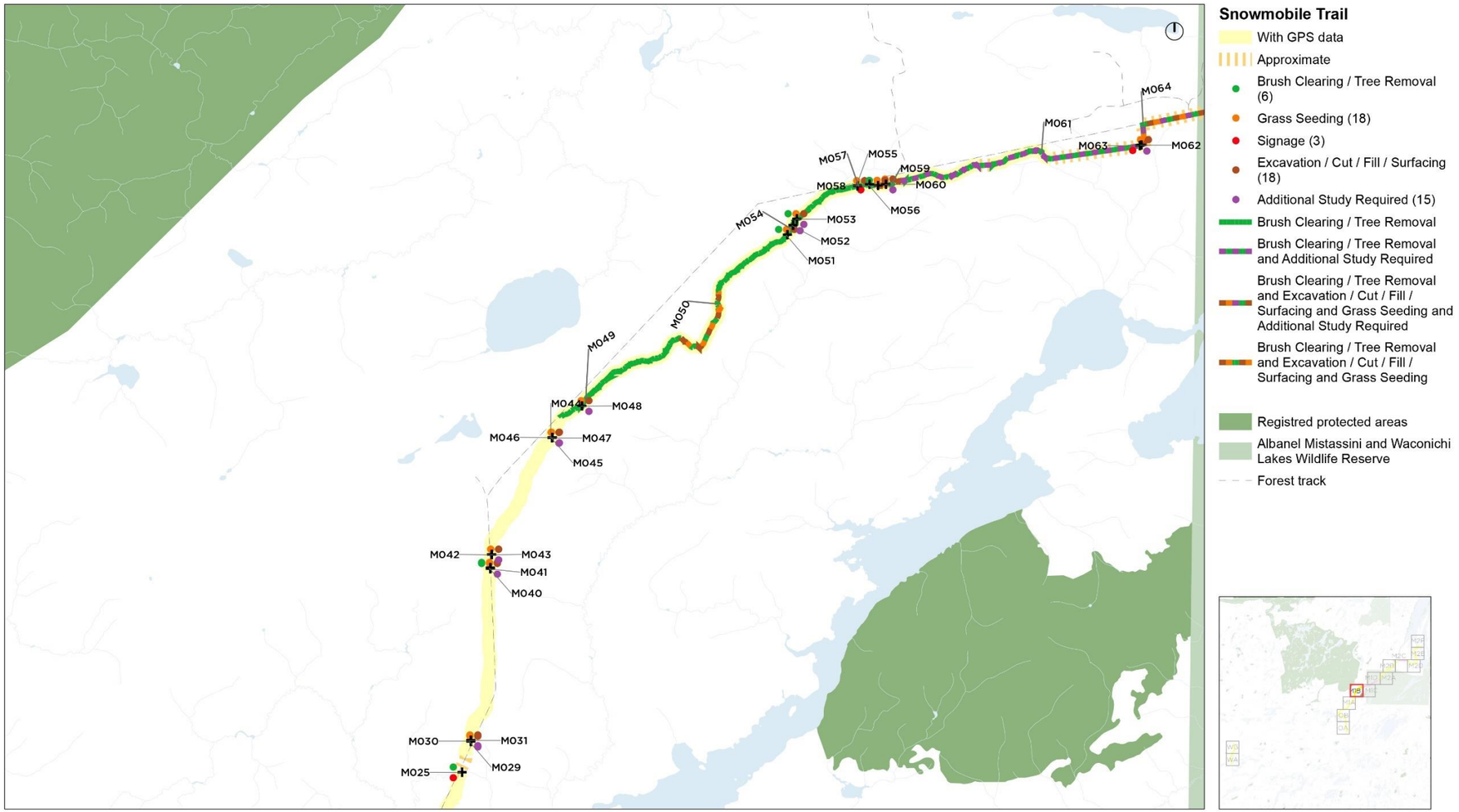
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.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Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required
Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding
Registred protected areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Forest track

## **MISTISSINI** | OUJÉ-BOUGOUMOU TO ROUTE DU NORD

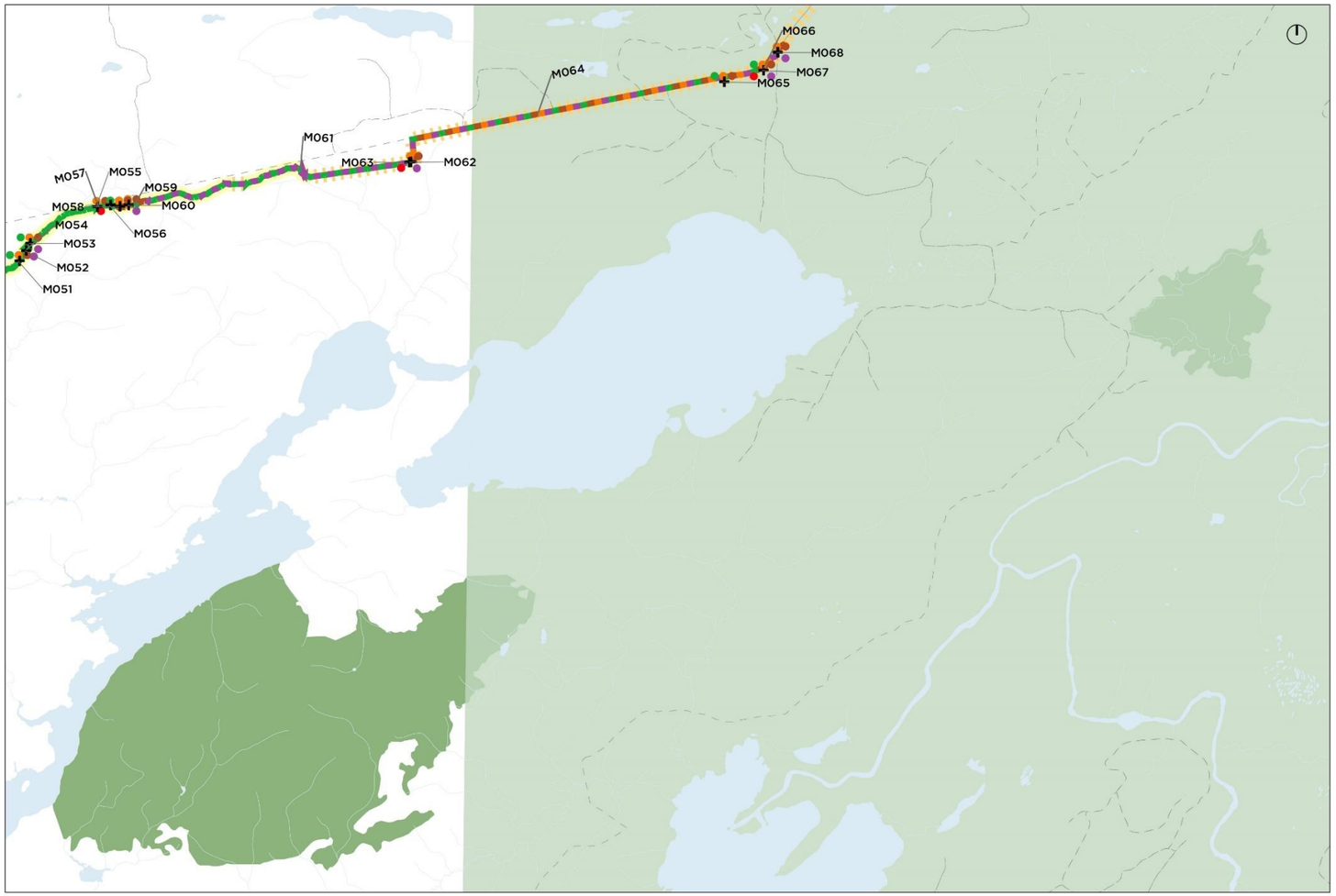
| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfacing | Culvert | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Inaccessible | Steep Slope | Wetland | |
| **M1-B** | | | | | | | | | | | | |
| M025 | X | X | | | | | | X | | | | Detour onto road to bypass and cross water channel; major brush clearing required |
| M029 | | | X | X | | | X | | | X | | Slope: 7m (long) x 2.1m (high) = 30%; ADDITIONAL STUDY REQUIRED |
| M030 | | | | X | | | X | | | X | | Slope: 7.5m (long) x 2.6m (high) = 35%; ADDITIONAL STUDY REQUIRED |
| M031 | | | X | X | | | X | | | X | | Slope 1: 4.5m (long) x 2m (high)= 44%; slope 2: 3.5m (long) x 2m (high)= 57%; excavation and major brush clearing required; ADDITIONAL STUDY REQUIRED |
| M040 | X | | X | X | | | X | | | | | Slope: 7m (long) x 0.7m (high) = 10% |
| M041 | X | | X | X | | | X | | | X | | Slope: 7.5m (long) x 2.3m (high) = 31%; ADDITIONAL STUDY REQUIRED |
| M042 | | | X | X | | | X | | | X | | Slope: 2m (long) x 1.5m (high) = 75%; ADDITIONAL STUDY REQUIRED |
| M043 | | | | | | | | | | | | |
| M044 | | | | X | | | X | | | X | | Slope: 3m (long) x 2.5m (high) = 83%; ADDITIONAL STUDY REQUIRED |
| M045 | | | | | | | | | | | | |
| M046 | | | | X | | | X | | | X | | Slope: 3m (long) x 1.5m (high) = 50%; ADDITIONAL STUDY REQUIRED |
| M047 | | | | | | | | | | | | |
| M048 | | | X | X | | | X | | | X | | Light exacavation required; slope: 8m (long) x 3.5m (high) = 44%; ADDITIONAL STUDY REQUIRED |
| M049 | X | X | | | | | | | | | | Major brush clearing; remove fallen trees; assure minimum trail width of 5m; section approx. 2006m (long) |
| M050 | X | X | X | | X | | X | | | | | New trail to be defined; section approx. 1146m (long); excavation and major brush clearing required |
| M051 | X | X | X | | X | | X | | | | | Major brush clearing required; indicate new trail |
| M052 | | | | | | | | | X | | X | Trail within wetland; section approx. 50m (long); ADDITIONAL STUDY REQUIRED |
| M053 | X | | X | | X | | X | | | X | | Slope: 5m (wide) x 10m (long) x 1.7m (high) = 17% approx.; ADDITIONAL STUDY REQUIRED |
| M054 | X | X | | | | | | | | | | Tree stumps to be cut close to ground; remove fallen trees; major brush clearing required |
| M055 | | | X | X | X | | X | | | | | Slope: 5m (wide) x 9m (long) x 2.5m (high) = 28% approx.; excavation required to widen the trail; Cut/fill required |
| M056 | | | | | | | | X | | | | Snow clearing required in winter |
| M057 | X | X | | | | | | | | | | Major brush clearing |
| M058 | X | | X | | X | | X | | | | | Ground levelling required |
| M059 | X | X | X | | | | X | | | | | Remove fallen trees; ground levelling required |
| M060 | | | X | X | X | | X | | | X | | Steep slope: 7m (wide) x 10m (long) x 3m (high) = 43% approx.; ADDITIONAL STUDY REQUIRED |
| M061 | X | X | | | | | | | X | | | Major brush clearing; remove fallen trees; trail may need to be relocated; inaccessible by quad, because too many tree stumps; if trail location maintained, cut tree stumps close to ground; ADDITIONAL STUDY REQUIRED |

**ADDITIONAL STUDY REQUIRED**: Further site study is required due to either inaccessible trail sections*, steep slopes**, bridge design*** or the presence of wetlands****.

* In the case of inaccessible trail sections, additional ground or aerial studies are required to assess site conditions along the trail alignment. If site conditions prove unfavorable, a revised trail alignment may be required.
** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.
*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

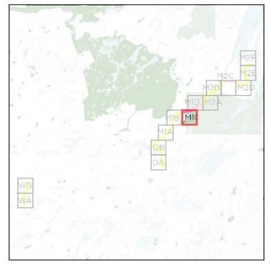
**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.
**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail. Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection. If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems. Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.




**Snowmobile Trail**

- With GPS data
- Approximate
- Brush Clearing / Tree Removal (5)
- Grass Seeding (9)
- Signage (3)
- Excavation / Cut / Fill / Surfacing (9)
- Additional Study Required (6)
- Brush Clearing / Tree Removal
- Brush Clearing / Tree Removal and Additional Study Required
- Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required
- Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding

- Registred protected areas
- Albanel Mistassini and Waconichi Lakes Wildlife Reserve
- Forest track



1:48 000

0 0,5 1 2 3 km

## **MISTISSINI** | OUJÉ-BOUGOUMOU TO ROUTE DU NORD

| | Brush Clearing | Tree Removal | Excava-tion | Cut / Fill | Surfacing | Culvert | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Inacces-sible | Steep Slope | Wetland | |
| **M1-C** | | | | | | | | | | | | |
| M062 | | | | X | | | X | X | | | | Small road crossing |
| M063 | | X | | | | | | | X | | | Impassable; Tree stumps to remove and cut close to ground and/or excavate; section approx. 2km (long) ADDITIONAL STUDY REQUIRED |
| M064 | X | X | X | | | | X | | X | | | Tree stumps to remove; trail section not inspected; major tree removal and brush clearing required; ADDITIONAL STUDY REQUIRED |
| M065 | X | X | X | | | | X | | | | | Major tree removal and brush clearing required; tree stumps to be cut close to ground |
| M066 | X | X | X | | | | X | | X | | | Major tree removal and brush clearing required; excavation likely required for entire trail section; large tree trunks to be cut close to soil; trail section not inspected; ADDITIONAL STUDY REQUIRED |
| M067 | X | X | | X | | | X | | | X | | Slope: 5m (wide) x 22m (long) x 4m (high) = 18%; ADDITIONAL STUDY REQUIRED |
| M068 | | | X | | | | X | X | | X | | Slope: 5m (wide) x 8m (long) x 1.5m (high) = 19%; excavation required; ADDITIONAL STUDY REQUIRED |

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** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.

*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

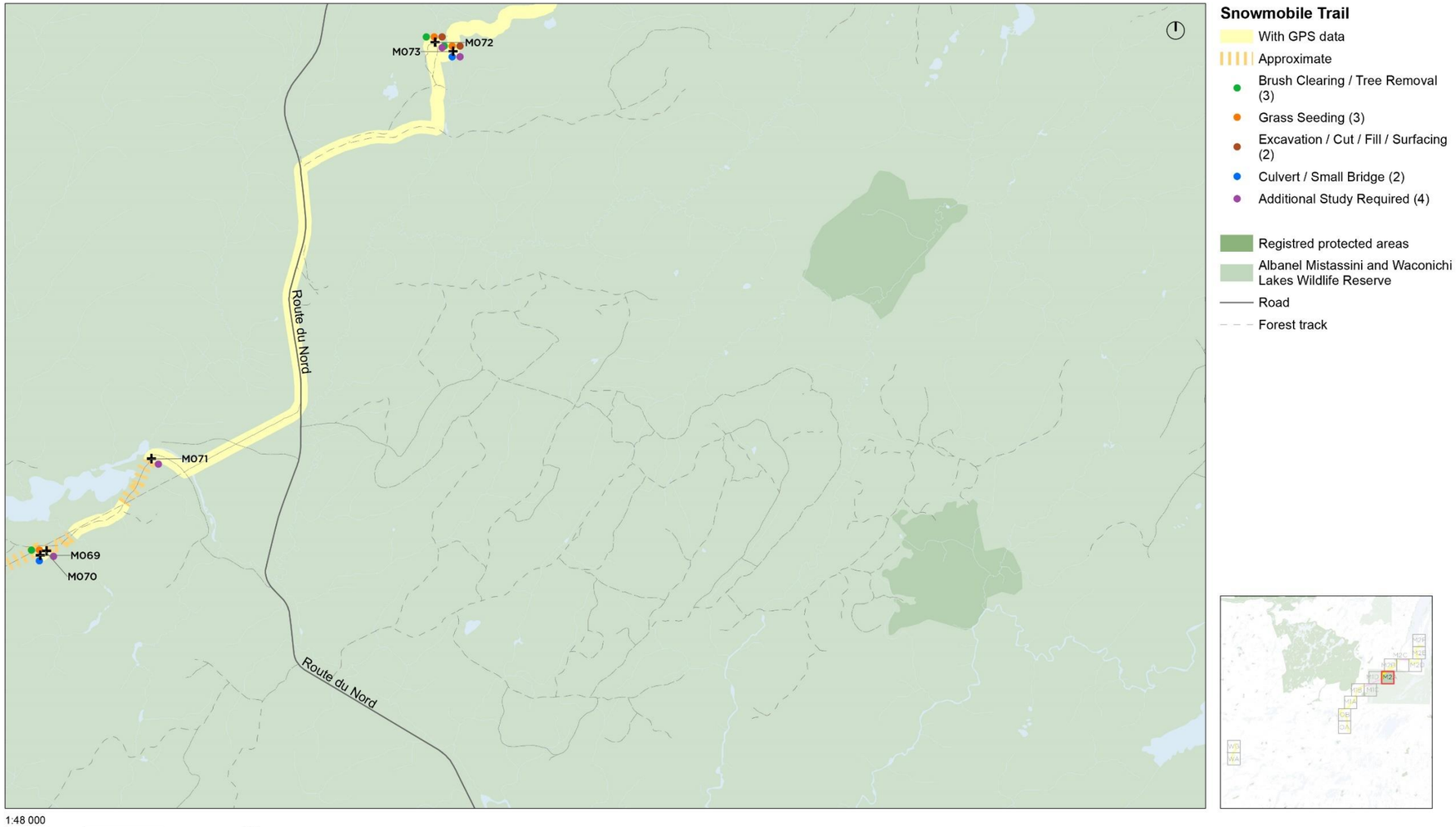
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.


M073
M072
M071
M069
M070
Route du Nord
Route du Nord
1:48 000
0 0.5 1 2 3 km
Snowmobile Trail
With GPS data
Approximate
Brush Clearing / Tree Removal (3)
Grass Seeding (3)
Excavation / Cut / Fill / Surfacing (2)
Culvert / Small Bridge (2)
Additional Study Required (4)
Registred protected areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Road
Forest track

## **MISTISSINI** | OUJÉ-BOUGOUMOU TO ROUTE DU NORD

| | Brush Clearing | Tree Removal | Excava-tion | Cut / Fill | Surfacing | Culvert | Grass Seeding | Signage | ADDITIONAL STUDY REQUIRED | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Inacces-sible | Steep Slope | Wetland | |
| **M1-D** | | | | | | | | | | | | |
| M069 | X | | | | X | X | X | X | | | | Road crossing; 2 culverts required, 1 per side of road; brush clearing required |
| M070 | | | | | | | | | X | | X | Major brush clearing required; inspection of trail section not possible due to presence of wetland; ADDITIONAL STUDY REQUIRED |
| M071 | | | | | | | | | | | X | Major brush clearing required; trail flooded with 0.6m (depth) of water due to beaver dam; ADDITIONAL STUDY REQUIRED |

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** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.

*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

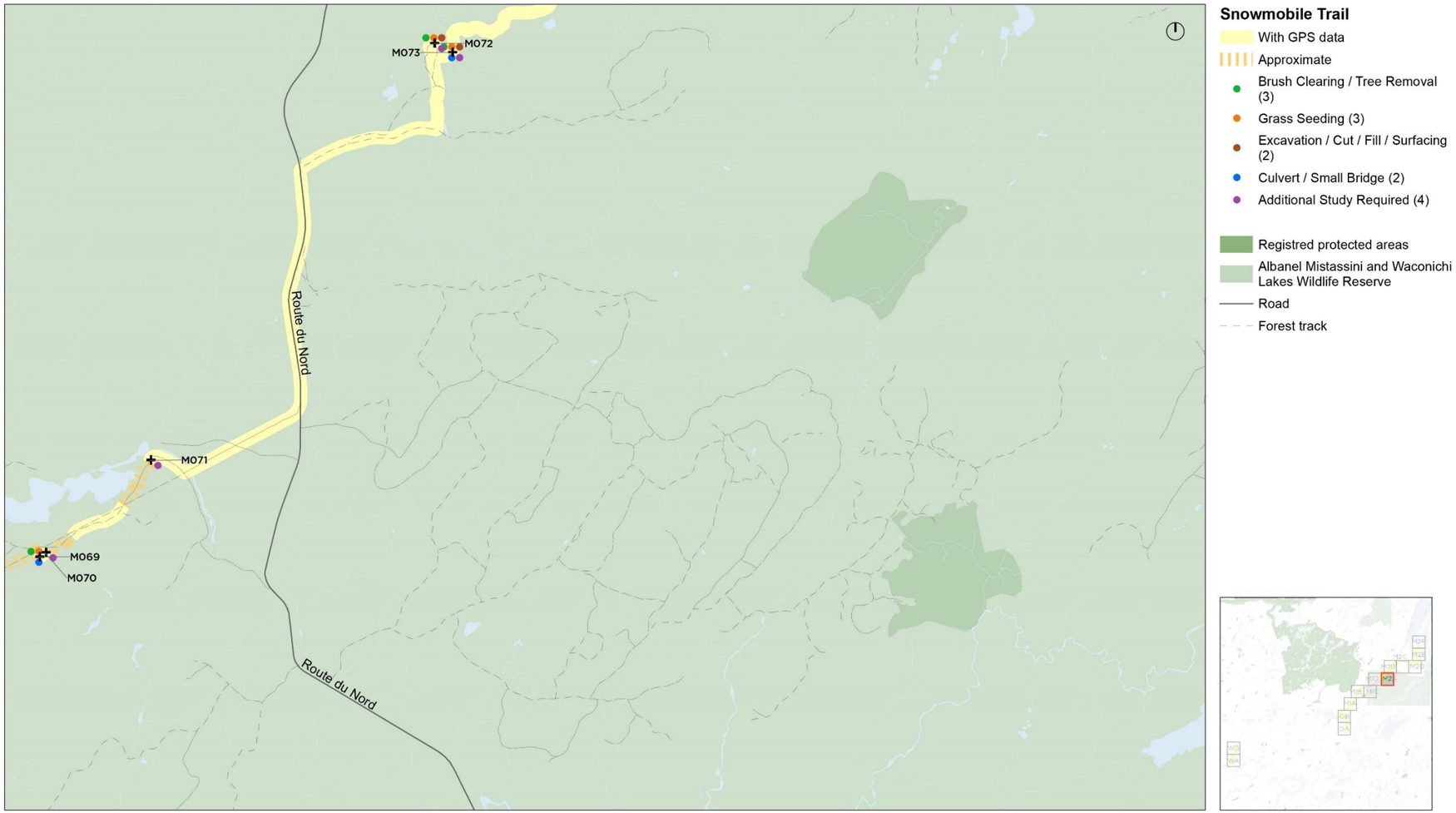
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.


M073
M072
M071
M069
M070
Route du Nord
Route du Nord
1:48 000
0 0.5 1 2 3 km
Snowmobile Trail
With GPS data
Approximate
Brush Clearing / Tree Removal (3)
Grass Seeding (3)
Excavation / Cut / Fill / Surfacing (2)
Culvert / Small Bridge (2)
Additional Study Required (4)
Registred protected areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Road
Forest track

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-A** | | | | | | | | | | | | | | | |
| M072 | X | | | | | | | | | | | | | | Slope: 68m (long) x 11.2m (high) = 16%; major brush clearing required; ADDITIONAL STUDY REQUIRED |
| M073 | | | | | | | | | X | | | | | | Culvert or small bridge required: 5m (wide) x 1m (long); ADDITIONAL STUDY REQUIRED |

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** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.

*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

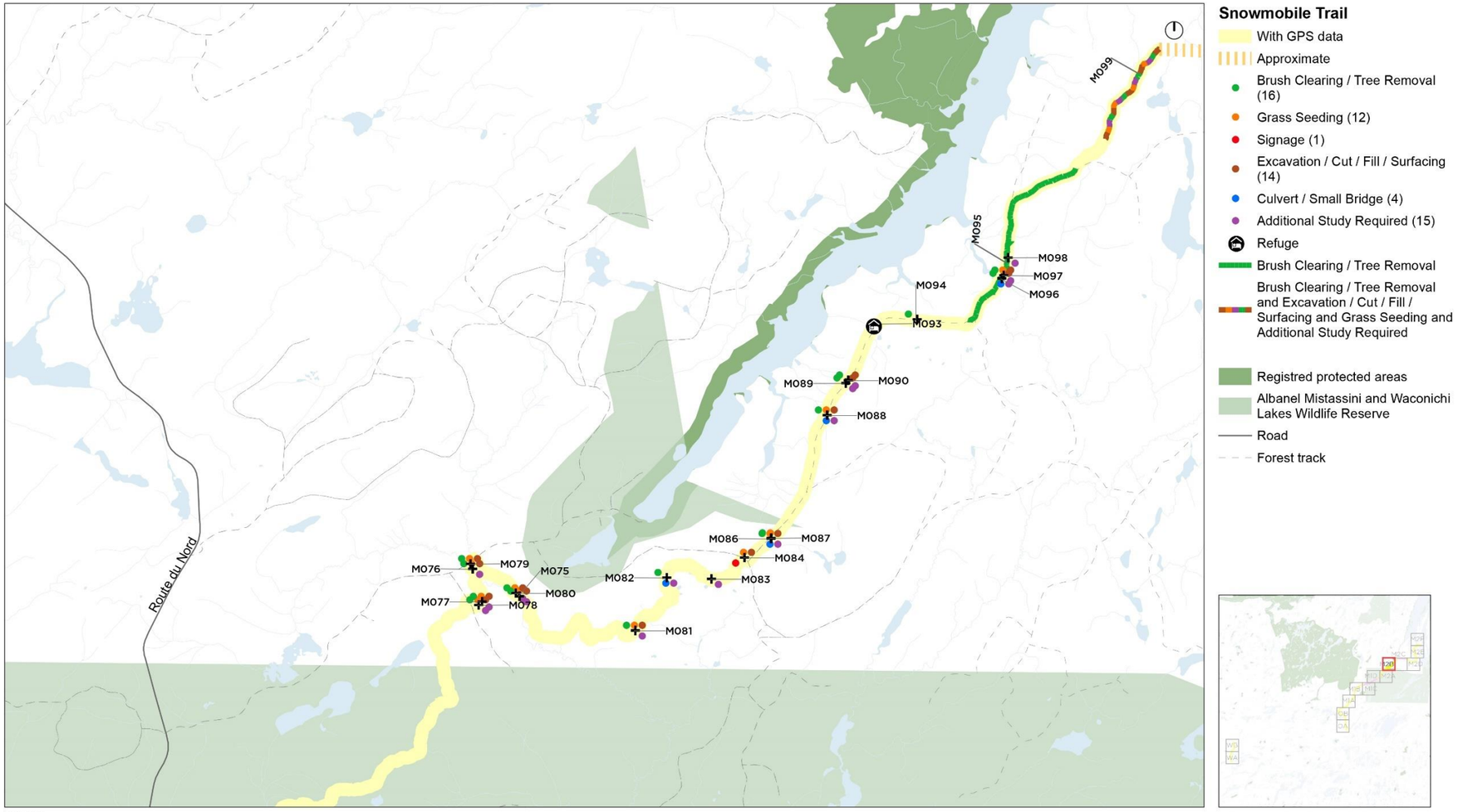
**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.




**Snowmobile Trail**

- With GPS data
- Approximate
- Brush Clearing / Tree Removal (16)
- Grass Seeding (12)
- Signage (1)
- Excavation / Cut / Fill / Surfacing (14)
- Culvert / Small Bridge (4)
- Additional Study Required (15)
- Refuge
- Brush Clearing / Tree Removal
- Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required

- Registred protected areas
- Albanel Mistassini and Waconichi Lakes Wildlife Reserve
- Road
- Forest track

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-B** | | | | | | | | | | | | | | | |
| M075 | X | | X | | | | | X | | | X | | | | Slope: 20m (long) x 4m (high) = 20%; ADDITIONAL STUDY REQUIRED |
| M076 | X | | X | | | | | X | | | X | | | | Slope: 14m (long) x 3,1m (high) = 22%; ADDITIONAL STUDY REQUIRED |
| M077 | X | X | | X | | | | X | | | X | | | | Widening required of trail curve; major brush clearing required; slope: 10m (long) x 2.2m (high) = 22%; ADDITIONAL STUDY REQUIRED |
| M078 | X | | | X | X | | | X | | | X | | | | Slope: 25m (long) x 4.6m (high) = 18%; ADDITIONAL STUDY REQUIRED |
| M079 | X | X | X | | | | | X | | | | | | | Brush clearing and tree removal required to create smoother trail curves |
| M080 | X | X | | X | | | | X | | | X | | | | Remove fallen tree; slope: 31m (long) x 5.5m (high) = 18%; ADDITIONAL STUDY REQUIRED |
| M081 | X | | | X | | | | X | | | X | | | | Slope: 4m (long) x 2m (high) = 50%; ADDITIONAL STUDY REQUIRED |
| M082 | X | | | | | X | | | | | | | X | | Area flooded with water = approx. 0.25m (depth); ADDITIONAL STUDY REQUIRED |
| M083 | | | | | | | | | | | | | X | | Bog (wetland) to be avoided; ADDITIONAL STUDY REQUIRED |
| M084 | | | | X | | | | X | X | | | | | | Roadside embankment: 2.2m (high) between trail and road surface elevations |
| M086 | X | | | X | | X | | X | | | | | X | | Culvert required = approx. 5m (wide) x 3.5m (long); water characteristics to be confirmed; ADDITIONAL STUDY REQUIRED |
| M087 | X | | | | | | | | | | | | | | Major brush clearing required |
| M088 | X | X | X | | | X | | X | | | | | X | | New culvert required = approx. 1m (high); ADDITIONAL STUDY REQUIRED |
| M089 | X | | | X | | | | | | | | | X | | Culvert cleaning required |
| M090 | X | X | | X | | | | | | | | | X | | Culvert cleaning required |
| M094 | X | | | | | | | | | | | | | | Major brush clearing required |
| M095 | X | X | | | | | | | | | | | | | Major brush clearing required |
| **POTENTIAL INTERVENTIONS** | | | | | | | | | | | | | | | |
| M93 | | | | | | | | | | | | | | | Wood stove required to use existing refuge during winter |

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**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.
**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.
**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.
**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.
Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.
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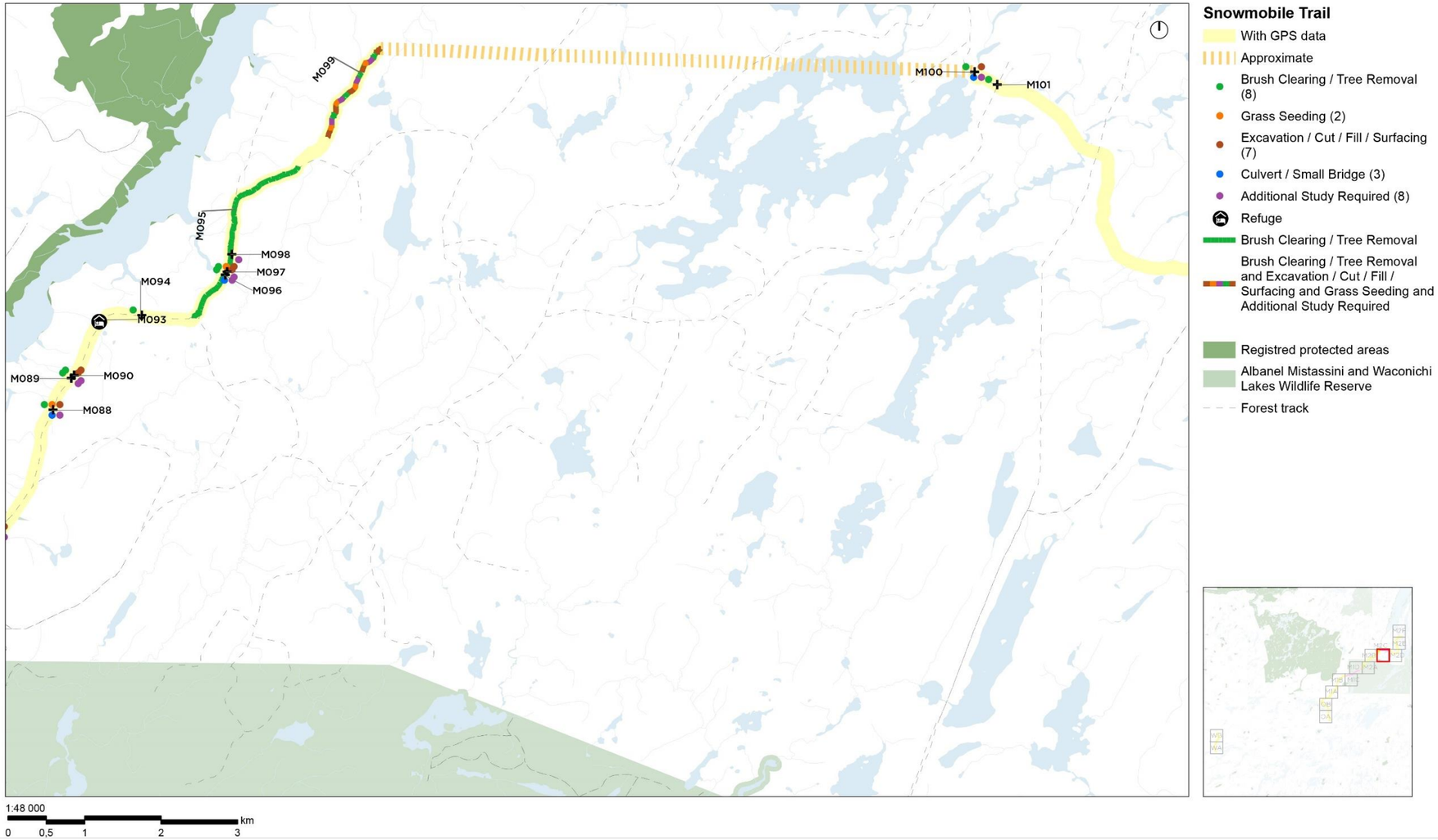


**Snowmobile Trail**

- With GPS data
- Approximate
- Brush Clearing / Tree Removal (8)
- Grass Seeding (2)
- Excavation / Cut / Fill / Surfacing (7)
- Culvert / Small Bridge (3)
- Additional Study Required (8)
- Refuge
- Brush Clearing / Tree Removal
- Brush Clearing / Tree Removal and Excavation / Cut / Fill / Surfacing and Grass Seeding and Additional Study Required

- Registred protected areas
- Albanel Mistassini and Waconichi Lakes Wildlife Reserve
- Forest track

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-C** | | | | | | | | | | | | | | | |
| M096 | X | X | | X | | | X | | | | | X | | | Major brush clearing required; culvert required = approx. 12m (long); ADDITIONAL STUDY REQUIRED |
| M097 | X | | X | | | | | X | | | X | | | | Slope: 6m (long) x 2.9m (high) = 48%; ADDITIONAL STUDY REQUIRED |
| M098 | | | | | | | | | | | | | X | | Wetland to be avoided; ADDITIONAL STUDY REQUIRED |
| M099 | X | | X | | | | | X | | X | | | | | Major brush clearing required; inacessible (trail comes to a dead end); ADDITIONAL STUDY REQUIRED |
| M100 | X | | | X | | X | | | | | | | X | | Culvert required = 4m (wide) x 50m (long); ADDITIONAL STUDY REQUIRED |

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**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

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M100
M101
M109
M110
Snowmobile Trail
With GPS data
Approximate
Brush Clearing / Tree Removal (2)
Signage (1)
Excavation / Cut / Fill / Surfacing (1)
Culvert / Small Bridge (1)
Additional Study Required (2)
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Forest track
1:48 000
0 0,5 1 2 3 km

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-D** | | | | | | | | | | | | | | | |
| M101 | X | X | | | | | | | | | | | | | Major brush clearing required |
| M109 | | | | | | | | | X | | | | | | Change of trail direction at road intersection |
| M110 | | | | | | | | | | | | | X | | Existing culvert blocked by dam; culvert cleaning required; ADDITIONAL STUDY REQUIRED |

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**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

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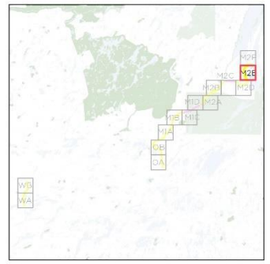
**Snowmobile Trail**

- With GPS data
- Brush Clearing / Tree Removal (2)
- Grass Seeding (2)
- Excavation / Cut / Fill / Surfacing (2)
- Culvert / Small Bridge (1)
- Proposed Lookout Point

- Albanel Mistassini and Waconichi Lakes Wildlife Reserve
- Road
- Forest track



1:48 000

0 0.5 1 2 3 km

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-E** | | | | | | | | | | | | | | | |
| M111 | | | X | | | | | X | | | | | | | Minor excavation required of existing excess gravel along trail to provide scenic viewpoint |
| M113 | X | X | | | | | | | | | | | | | Major brush clearing required to achieve min 5m trail width |
| **POTENTIAL INTERVENTIONS** | | | | | | | | | | | | | | | |
| M112 | X | X | | X | | | X | X | | | | | | | Potential to construct trail to access hilltop lookout point; section approx. 1200m (long); water crossing and brush clearing required; ADDITIONAL STUDY REQUIRED |

**ADDITIONAL STUDY REQUIRED:** Further site study is required due to either inaccessible trail sections*, steep slopes**, bridge design*** or the presence of wetlands****.

* In the case of inaccessible trail sections, additional ground or aerial studies are required to assess site conditions along the trail alignment. If site conditions prove unfavorable, a revised trail alignment may be required.

** In the case of steep slopes (greater than 15%), additional assessement is required on site to see if the slope may be reduced by cut/fill methods. If slope reduction is not possible, then a new trail alignment should be considered.

*** In the case of large or complex water crossings, specialized bridge design and site/environmental studies are required.

**** In the case of wetlands, further site and environmental studies are required to determine if the wetland can be avoided or traversed.

**Trail:** Minimal width of trail is 5m. Maximum total width of right-of-way 10m. See detail.

**Culvert:** Maximum right-of-way width is 5m. See FCMQ detail.

**Small Bridge:** Ideal for crossing water channels 1 to 3m wide. Specialized bridge design and site/environmental studies may be required.

**Brush clearing, tree removal and pruning of branches:** Must be done during the month of August. See detail.

Signage refers to the necessity to identify a road crossing for safety. 4 signs must be provided, one for each intersection.

If creating a new path, it must be made of natural soil. Seeding with native grasses should be done to prevent soil erosion problems.

Whenever possible, it is advisable to keep a distance of at least 30m between a road and an intermittent watercourse and not to approach the watercourse less than 5m with the machinery, during site operations.


Snowmobile Trail
With GPS data
Brush Clearing / Tree Removal (1)
Excavation / Cut / Fill / Surfacing (1)
Additional Study Required (2)
Registred protected areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
Road
Forest track
M122
M123
M124
Nesk Street
Amisk Street
Awashish Drive
1:48 000
0
0,5
1
2
3
km

## **MISTISSINI** | ROUTE DU NORD TO MISTISSINI

| | Brush Clearing | Tree Removal | Excavation | Cut / Fill | Surfa-cing | Culvert | Small Bridge | Grass Seeding | Signage | Garbage Cleanup | ADDITIONAL STUDY REQUIRED | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Inacces-sible | Steep Slope | Bridge Design | Wetland | |
| **M2-F** | | | | | | | | | | | | | | | |
| M122 | | | | | | | | | | | | | X | | Bog (wetland) inaccessible; ADDITIONAL STUDY REQUIRED |
| M123 | | | | | | | | | | | | | X | | Bog (wetland); no intervention; ADDITIONAL STUDY REQUIRED |
| M124 | X | X | X | | | | | X | | | | | | | Major brush clearing required |

**ADDITIONAL STUDY REQUIRED:** Further site study is required due to either inaccessible trail sections*, steep slopes**, bridge design*** or the presence of wetlands****.

* In the case of inaccessible trail sections, additional ground or aerial studies are required to assess site conditions along the trail alignment. If site conditions prove unfavorable, a revised trail alignment may be required.

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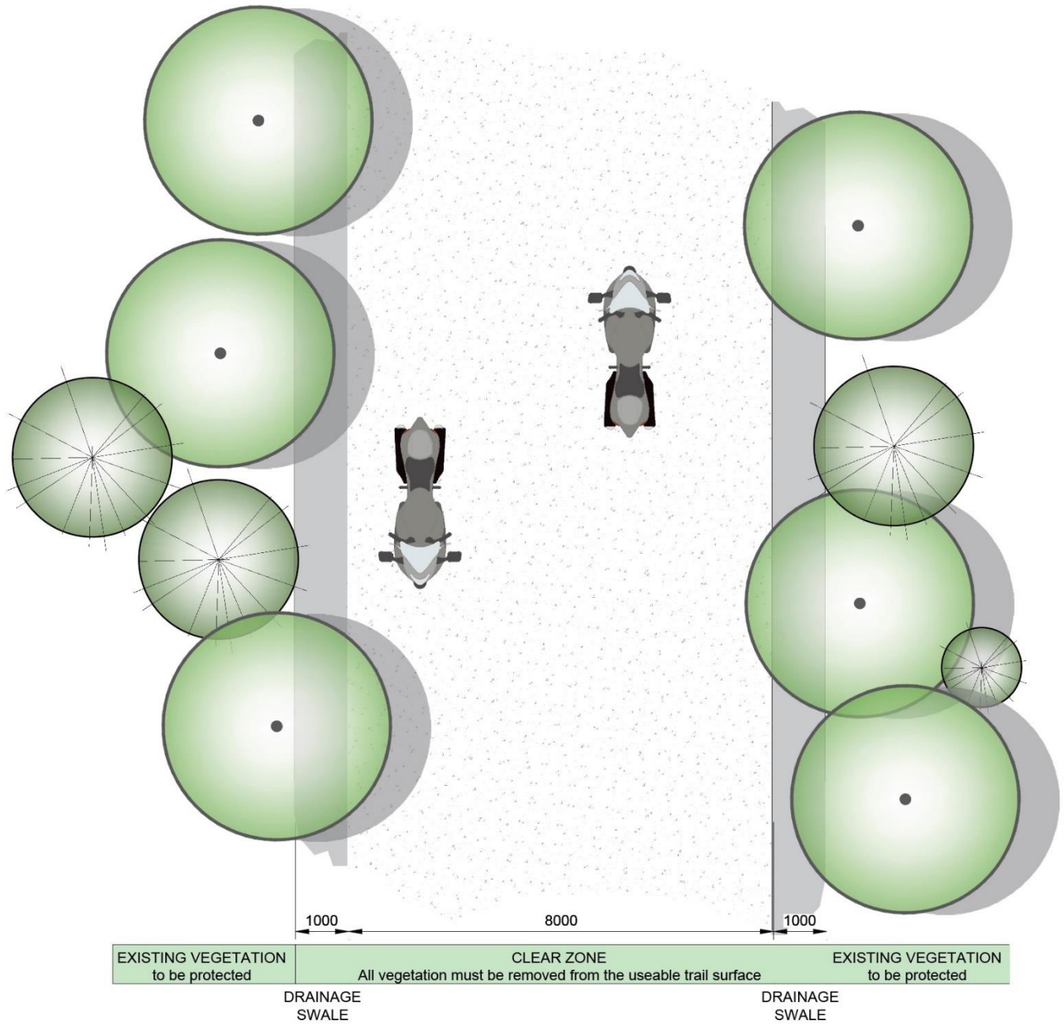



**GENERAL NOTE:**

REFER TO THE QUEBEC SNOWMOBILE TRAIL MANAGEMENT AND MAINTENANCE GUIDE (FRENCH ONLY: "GUIDE D'AMÉNAGEMENT ET D'ENTRETIEN DES SENTIERS DE MOTONEIGE AU QUÉBEC").

**EARTHWORKS:**

TRAIL SLOPES SHOULD NOT EXCEED THE MAXIMUM RECOMMENDED PERCENTAGE OF **(15%)**.

**SITE RESTORATION:**

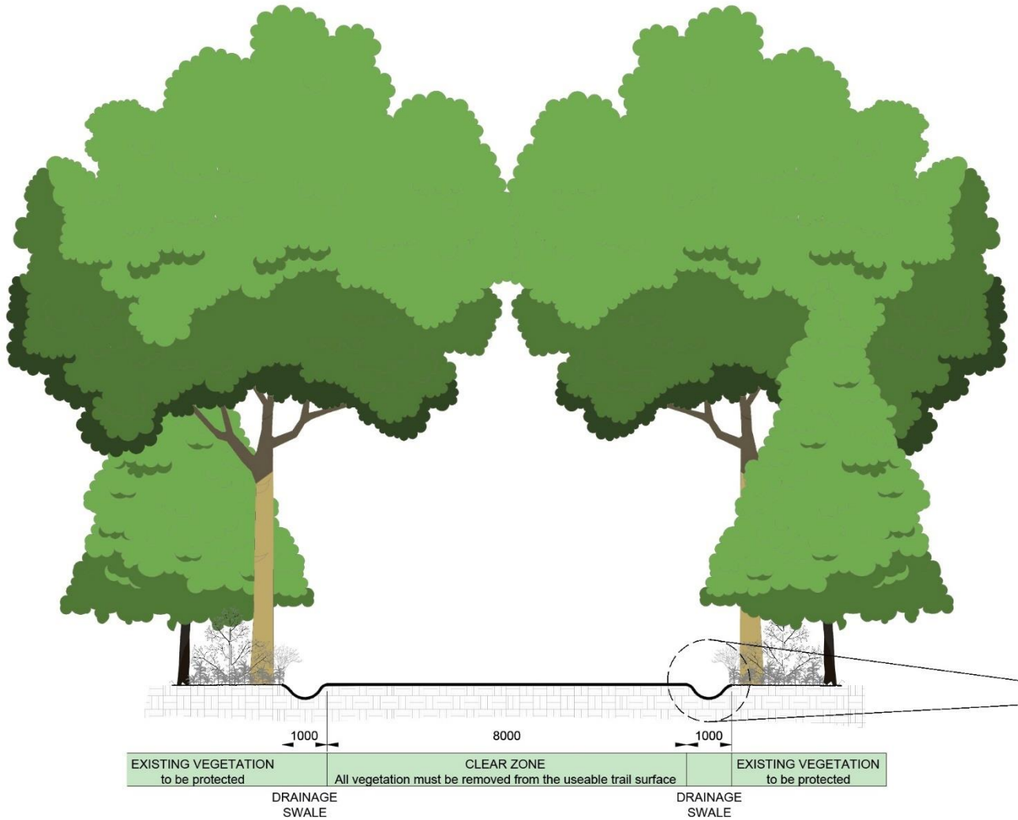
THE CONTRACTOR MUST TAKE ALL NECESSARY MEASURES TO PREVENT DISPLACEMENT, COLLAPSE OR DAMAGE OF EXISTING WORKS, SERVICES, SURFACES, TREES, LANDSCAPES AND ADJACENT GRASS OR SOILS. THE CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED SITE RESTORATION.

**NOTE:**

BRUSH CLEARING MUST BE DONE ON THE COMPLETE TRAIL NETWORK TO REACH A TOTAL TRAIL WIDTH OF 10 METRES. THIS INCLUDES THE WIDTH OF THE UESABLE TRAIL SURFACE (5 TO 8 METRES) AND THE WIDTH OF THE DRAINAGE SWALES (1 METRE EACH). **IMPORTANT:** DO NOT CLEAR MORE THAN A 10-METRE WIDTH. MINOR BRUSH CLEARING INVOLVES THE REMOVAL AND TRIMMING OF VEGETATION INFRINGING ON USEABLE TRAIL SURFACE. MAJOR BRUSH CLEARING INVOLVES A GREATER QUANTITY OF VEGETATION TO BE REMOVED AND POSSIBLE REMOVAL OF TREES.

**NOTE:**

WHEN CUTTING A TREE, IT IS IMPORTANT TO MAKE THE CUT AS CLOSE TO THE GROUND AS POSSIBLE. **AS PER THE QUEBEC SNOWMOBILE TRAIL MANAGEMENT AND MAINTENANCE GUIDE (P.65).

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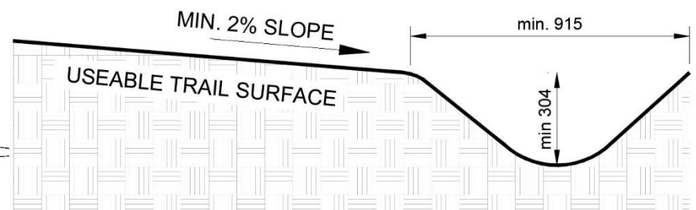



DRAINAGE SWALE - TYPICAL DETAIL - SIDE VIEW



# 4. RECOMMENDATIONS

# RECOMMENDATIONS

Thus far, the preliminary planning required to realize the Sustainable Snowmobile Circuit has been completed. The impacts of the project have been assessed, the population has been consulted and a good comprehension of the economic considerations, land, and uses is available. Although the methodology had to change because of the COVID-19 pandemic, thorough field work enabled the creation of plans, specifications and cost estimates that can be used to guide future planning processes. However, several steps are still required before a Sustainable Snowmobile Circuit can be opened to the public in Eeyou Istchee Baie-James.

## STEP 1: FURTHER CONSULTATIONS

The population expressed concerns during the consultations. Therefore, further consultations must be held with the communities to address some points more concretely:

- A strategy should be presented to forbid off-trail activities, perhaps at the booking stage of the experience. Not only does off trail snowmobiling disturbs the wildlife and land users, but there are a lot of wetlands. The ice is unreliable and there have been fatal accidents in the past. This strategy is therefore crucial.

- The exact implications of creating federated trails and snowmobile clubs must be presented to the communities so they are able to make an informed decision. They have voiced concerns about their rights, the costs and administrative implications for the maintenance of the trails, the fees to use the trails, the impacts on the environment, and the services that should be available to the tourists.

- The communities have expressed interest in the economic benefits that could arise from this project. Perhaps more discussions regarding the services that can be offered and related businesses could benefit the population.

Important stakeholders should also be consulted further:

- A meeting with Nibiischii Corporation will allow to clarify the rules that must be respected when crossing a wildlife reserve. Furthermore, they should be aware of the work that will be carried out when the trail is built. Also, possibilities to develop packages with the Corporation should be discussed.

- Companies involved with forestry and mining operations on the territory should be met to have a common understanding of the long-term planning projects and make sure that the cohabitation issues can be addressed. This will also allow to understand the range of responsibility of the snowmobiling clubs.

- A meeting with the merchants and entrepreneurs that have businesses that could complement the project or be included in packages will help to understand their capacity to greet more visitors in the region, or to develop strategies to meet the future needs of tourists.

## STEP 2: FURTHER TECHNICAL STUDIES

This study has provided a comprehensive feasibility study for the Sustainable Snowmobile Circuits. In order to have plans that are ready for a call for tender and considering the challenges that arose from the difficulty of the field study and the COVID-19 pandemic, more technical work must be carried out:

- For the trail sections that were not accessible, a discussion should be raised with the communities in order to find a different path that could be more accessible.

- A more detailed field study must be completely, especially in places that were identified as needing more studies or that were inaccessible.

- Members of the communities should be able to accompany the teams to provide insights on the land and how it is used by the land users.

## STEP 3: DEFINE THE ELECTRIC SNOWMOBILING STRATEGY

The benefits of accommodating electric snowmobiling on the circuit have been explored previously. The partners of the project must decide on a strategy to implement this offer if they wish to pursue it:

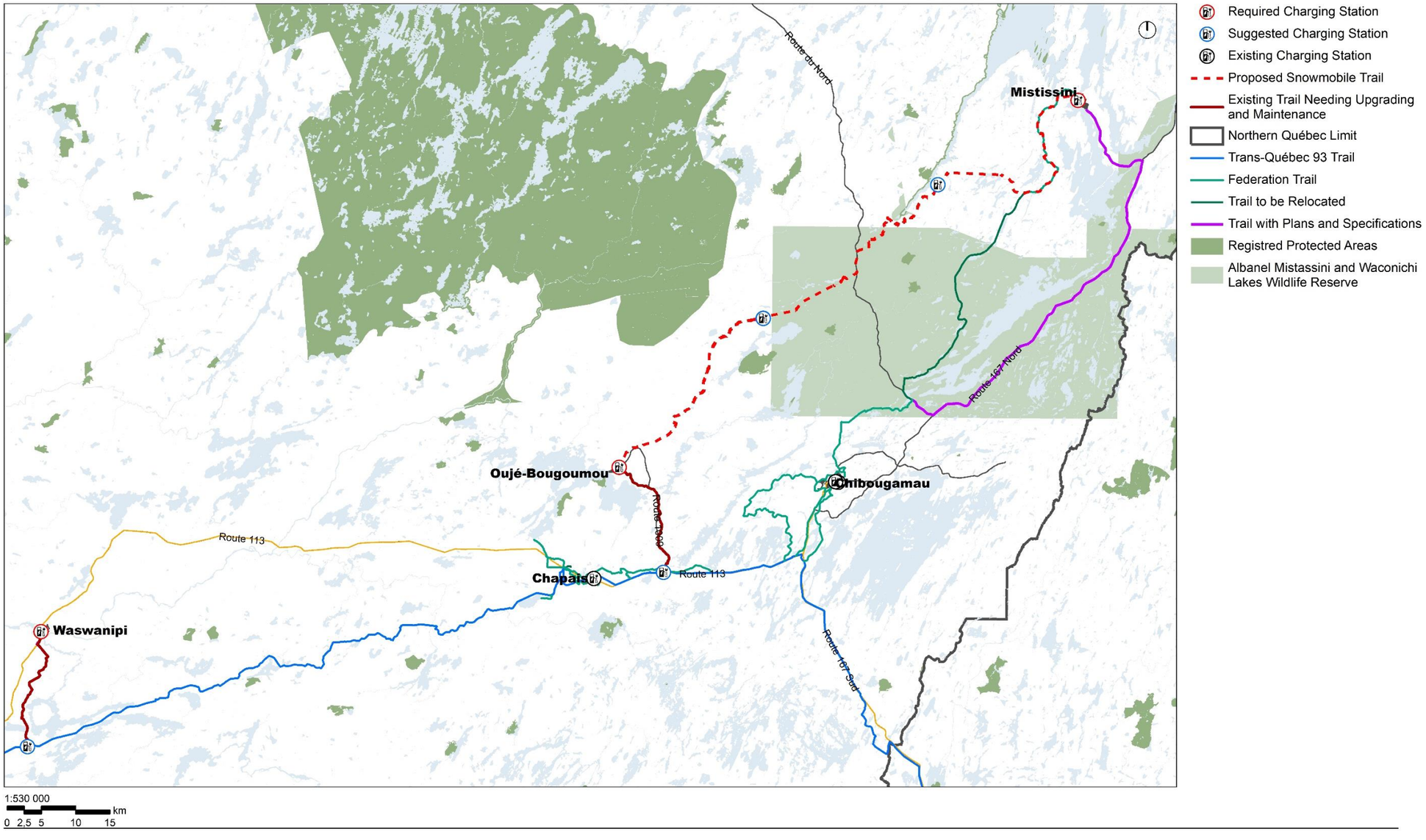
- **Scenario 1:** Stakeholders could acquire electric snowmobiles and offer packages where visitors can rent the equipment. Based on the case studies, multi-day packages can be offered with guides, equipment, fuel, accommodation, various activities, snacks, and meals. This scenario requires bigger investments and more management and coordination with the services that must be offered locally. Yet, during the consultations the population was concerned that even the restaurants and hotels of the region might not be able to greet more tourists.

- **Scenario 2:** Stakeholders can provide charging stations on the trails to accommodate visitors with electric snowmobiles, who can decide how much time they want to spend in the region and book their services. This scenario requires fewer investments and could be a first step towards eventually reaching Scenario 1.

As discussed in the trends section of this document, three manufacturers currently make electric snowmobiles. It is interesting that Taiga Motors is a company located in Québec, as it is a more sustainable choice of providers. An electric snowmobile manufactured by Taiga Motors costs around $20,000.

An electric circuit also requires charging stations. Those stations should be implemented in cities and communities. Charging stations should be provided every 140 km (in red) since high-range snowmobiles and high-performance charging stations should be prioritized. Three charging stations (in blue) are proposed to ensure visitors do not get stranded. Three stations (in black) already exist in Chibougamau and Chapais. It should be noted that the technology is always improving, therefore ranges should become longer over time. The charging stations can charge a snowmobile in 30 minutes - which is an appropriate time for safety concerns. The total cost for one is around $100,000, bringing the investments to about $700,000.

Some investments will be required to provide a sustainable energy supply to the charging stations. Although some models can use solar panels, the number of hours of direct light and the power required, as well as their energy storage capacity should be verified and tested with the manufacturer. Alternatively, the charging stations could be connected to Hydro-Québec's grid for additional costs if there are no existing connections. Submissions for such connections need to be evaluated with Hydro-Québec.


Route du Nord
Mistissini
Route 167 Nord
Oujé-Bougoumou
Chibougamau
Route 113
Route 113
Chapais
Route 167 Sud
Waswanipi
Required Charging Station
Suggested Charging Station
Existing Charging Station
Proposed Snowmobile Trail
Existing Trail Needing Upgrading and Maintenance
Northern Québec Limit
Trans-Québec 93 Trail
Federation Trail
Trail to be Relocated
Trail with Plans and Specifications
Registred Protected Areas
Albanel Mistassini and Waconichi Lakes Wildlife Reserve
1:530 000
0 2,5 5 10 15
km

## STEP 4: DEFINE A MANAGEMENT AUTHORITY

There is no snowmobile management structure in place. Following this study, the concerned communities will have to select an organization that will take the lead on the project's implementation. This organization could for instance be a new snowmobile club if the trails comply with the FCMQ standards. A local management structure could also be proposed. Stakeholders have expressed an openness to split management responsibilities.

The *Guide d'aménagement et d'entretien des sentiers de motoneige au Québec* produced by the FCMQ in 2011 offers interesting insights on the requirements regarding the management and maintenance of snowmobile trails. It could help the partners determine their needs and strategy.



## STEP 5: ACQUIRE THE PERMITS AND AUTHORIZATIONS REQUIRED

*Please note that the following legal framework is only indicative and, in no way, replaces the steps to be taken with the various governmental entities to validate the necessary authorizations and permits.*

### Required Permits and Authorizations

An application for a public land use right must first be submitted to the Ministry of Energy and Natural Resources (MERN). This application is a prerequisite for authorizations from other ministries.

Other types of authorizations are required for other aspects, such as the use of the property of other entities (i.e., bridges, sections of road managed by the Ministère des Transports du Québec, trails managed by a FCMQ club, sections of power lines managed by Hydro-Québec, etc.). These elements should be addressed in the application to the MERN.

An environnemental certificate of authorization from the Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) will be required. These certificates typically require an in situ ecological characterization and a request for wildlife information from the MFFP. Depending on the results of this work, additional inventories may be required.

A permit for other purposes (''autres fins'') from the MFFP will also be required, especially if there is a need for deforestation. The volume of wood to be cut and what will be done with it will have to be evaluated. Other MFFP authorizations may be required, depending on the types of environments crossed by the trails

### Cohabitation of Uses

A harmonious cohabitation of snowmobiling with forestry and mining activities should be ensured by the previously mentioned authorization and permit procedures. Furthermore, cohabitation with forestry activities will have to be validated with the MFFP when applying for permits for other purposes. Similarly, cohabitation with mining claims will have to be validated with the MERN during the application process for the use of public land. Regarding the AMW wildlife reserve, it should also be always mentioned during the applications.

## STEP 6: DEFINE THE TOURISM OFFER

### Environment and Wildlife Preservation

**On-trail electric snowmobiling should be prioritized in Eeyou Istchee.** While motorized snowmobiles pollute the environment and can scare animals due to the noise, off trail or back country snowmobiling can impact the trappers and wildlife. To promote green and quieter snowmobiling, the region could offer electric snowmobile rentals as well as guided tours. Eeyou Istchee Baie-James could also benefit from i**mplementing a strategy to ensure the preservation of the wildlife and important species** such as the Woodland Caribou. The initiatives that are carried on in Revelstoke could inspire the design of such strategy.

### Tailoring the Offer to the Customers

Studies revealed that the main customers are young adults interested in having a safe and special experience, seeing wildlife, and meeting local communities. Most visitors that come from outside Québec are from Ontario, the United States and France. Knowing this, it would be beneficial to tailor the offer to these customers. For instance, Ontario customers like to attend cultural winter events; therefore, it could be interesting to tailor the offer to these customers through offering cultural activities in addition to snowmobiling. Studies show that Americans have a preference for hiking in national parks and fauna observation. French people are the tourists that are the more enthusiastic about winter sports. About ten outdoor activities are practised by more than 10% of them. The three most popular are hiking, visiting a national park and downhill skiing. Offering packages that comprise both snowmobiling and hiking activities could therefore be beneficial to attract American and French visitors.[35] In this regard, the activities and accommodations related to the snowmobile circuit in the region must be clearly identified.

### Picking Trail Access Options

There are four main trail access options that could be offered in Eeyou Istchee Baie-James: day passes, year memberships, daily or multi-day rentals and/or daily or multiday guided tours. As mentioned before, Eeyou Istchee Baie-James might want to prioritize on-trail electric snowmobiling. Therefore, it could offer a combination of the four options and have a business plan in many phases.

#### *Phase 1*

After having implemented the new snowmobile trail, it could begin by offering a day passes and year memberships. This could help promote the area and establish it as a unique snowmobile destination. Simultaneously, it could start to develop the necessary installations for the trail network to be suitable to electric snowmobiles.

[35] Réseau Veille Tourisme. (2013). La pratique de la motoneige au Québec : État des lieux. Retrieved from https://veilletourisme.ca/2013/02/18/la-pratique-de-la-motoneige-au-quebec-etat-des-lieux/

***Phase 2***

The region could then develop electric snowmobile rentals as well as daily guided tours that correspond to a combination of Aurora eMotion's safaris and the Wilderness Guided Tours.

To promote cultural and environmental awareness and minimize the impact of snowmobilers on the environment, it could indeed propose electric snowmobiling trips that comprise the rental of the sled as well as a local Cree guide to educate visitors on the region's unique wildlife and history.

***Phase 3***

The last phase would be to develop multi-day electric snowmobile tours. The achievement of this phase would, however, require accommodations and shelters as well as enough trained local guides.



## STEP 7: DEVELOP A BUSINESS PLAN

A business plan should be developed before the new trail construction begins. Depending on the objectives of the partners, the business plan could cover various topics such as operations, organizational structure, financing, packages, etc. It is an important tool to understand the potential of the project and the amount of involvement it will require. The business plan will detail the expected profits and the necessary financing to cover the expenses (see financing programs in section 2 of this study). Furthermore, it will help to develop agreements between stakeholders and a maintenance structure for the trails. Presently, a lot of questions arise from the population regarding fees, maintenance of the trails and control mechanism for access to the land.

Complementary services such as guiding, tour operators, lodging, rental, transportation, and cultural activities are essential to make the trail network attractive to tourists. Therefore, potential partners as well as representatives of the FCMQ should be identified early in the process. They should also be involved when conceiving the plan. Throughout the process of building the business plan, the communities should be meaningfully involved from the start.

## STEP 8: INTEGRATE THE PROJECT TO THE REGIONAL MARKETING STRATEGY

Since the partners of the project have created tourism strategies that contain marketing objectives, the promotion of this project should fall in line with other such endeavours in the region. Namely, the project should be promoted on the partners' websites as well as via maps, packages and reservation options available online and though the regional booking agency Eeyou Istchee Baie-James Travel. Agreements should be made with local tourism officers and international tour operators to create packages and offer services. The marketing should be adapted to the targeted customers (within Québec, Americans, French, etc.)

As for the promotional content that will be used for the Sustainable Snowmobile Circuits (online, in media, advertisements, booklets, maps, emails, etc.), it would be interesting to create a visual identity specific to the project, in continuity with the Signage Master Plan.

## STEP 9: CREATE A SIGNAGE MASTER PLAN

Considering COTA's intention to create a distinctive and uniformized road signage system for Eeyou Istchee Baie-James, we propose to explore the possibility to have such a system for the snowmobile trail network. The signage master plan's purpose would be to identify the signs that should be located on the trails and create a visual identity for each type. These signs can only be created once the construction of the trails is well started as they give indications on how to navigate the existing circuit. They should namely include maps of the trails at certain distances; points of interest; shelter; how to call for help; etc.

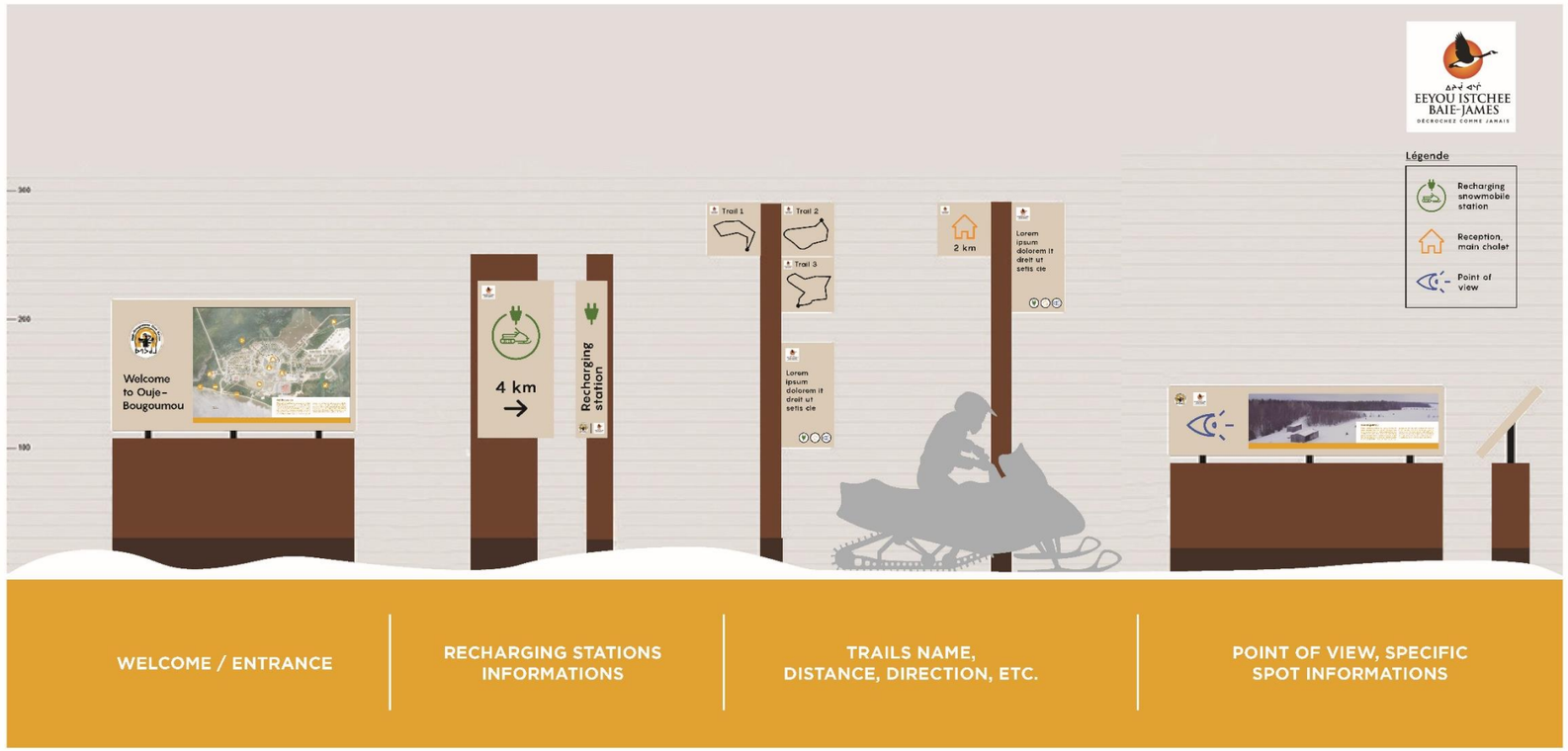
Since they will be visible to all the tourists that enjoy the circuit, the signs' graphic design should reflect the tourism strategy and identity of the region. Such distinctive and uniformized signage system would reinforce

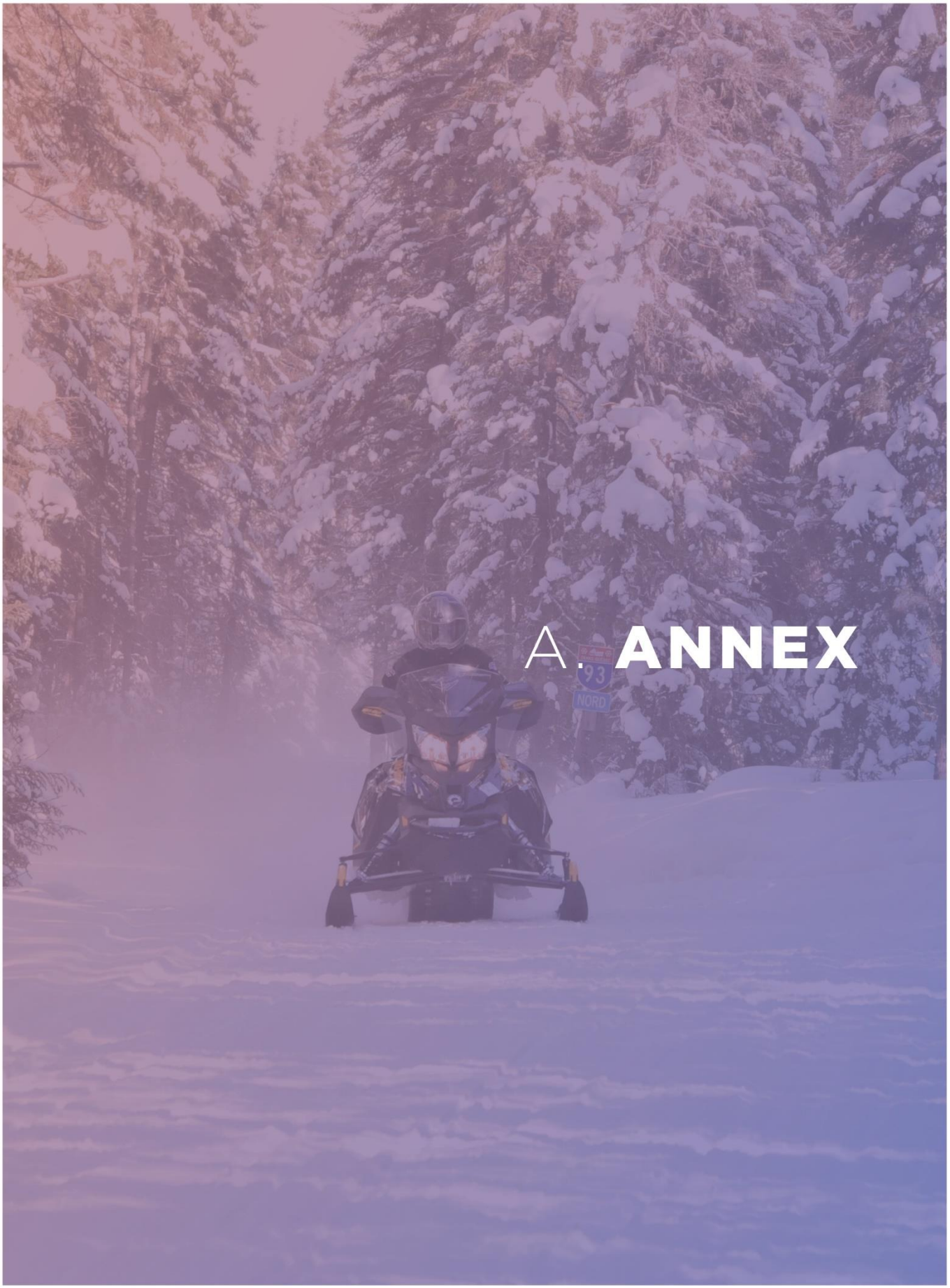
the recognition of the region as a unique destination and would also increase the attractiveness of the trail network. An example of design that could inspire the region's signage system is presented on the next page.

Some of the signs required to navigate the trails must follow the MTQ's standards. These are the signs that indicate any construction work, prescription, danger, and indication. The norms to follow are in the document *Signalisation : sentiers de véhicule hors route* provided by the MTQ. If the partners choose to create federated trails following the FCMQ's standards, they could benefit from a financial assistance (must be submitted before June 15th). The planned location of the panels must sent to Info-Excavation before the construction of the trails to verify that no damage can be caused to any infrastructure.



**Figure 1** **Example of Signage System**






# A. ANNEX

## ANNEX 1 OPINION OF PROBABLE COSTS

### ZONE 1: Mistissini - from Oujé-Bougoumou to Route du nord

| | Quantity | Unit | Unit price | Amount | Subtotal by category |
|---|---|---|---|---|---|
| **1 - GENERAL CONDITIONS / SITE MANAGEMENT** | | | | | **$144 000,00** |
| 1.1 General Conditions (5%) | 1 | global | $144 000,00 | $144 000,00 | |
| **2 - PREPARATORY WORKS** | | | | | **$848 000,00** |
| 2.1 Brush Clearing | 1 | global | $1 238 000,00 | $1 238 000,00 | |
| 2.2 Tree Removal | 1 | global | $848 000,00 | $848 000,00 | |
| **3 - EARTHWORKS / GRADING** | | | | | **$257 000,00** |
| 3.1 Excavation | 1 | global | $211 000,00 | $211 000,00 | |
| 3.2 Cut / Fill | 1 | global | $46 000,00 | $46 000,00 | |
| **4 - SURFACE TREATMENT** | | | | | **$376 000,00** |
| 4.1 Surfacing | 1 | global | $376 000,00 | $376 000,00 | |
| **5 - WATER CROSSINGS** | | | | | **$10 000,00** |
| 5.1 Culvert | 1 | global | $10 000,00 | $10 000,00 | |
| **6 - RESTORATION** | | | | | **$125 000,00** |
| 6.1 Grass Seeding | 1 | global | $125 000,00 | $125 000,00 | |
| **7 - SIGNAGE** | | | | | **$8 000,00** |
| 7.1 Signage | 1 | global | $8 000,00 | $8 000,00 | |
| **8 - ADDITIONAL STUDIES** | | | | | **$0,00** |
| 8.1 Inaccessible Trail, by others | 1 | global | $0,00 | $0,00 | |
| 8.2 Steep Slope, by others | 1 | global | $0,00 | $0,00 | |
| 8.3 Wetland, by others | 1 | global | $0,00 | $0,00 | |

| | |
|---|---|
| **Subtotal 1 Zone 1** | **$3 006 000,00** |
| Contingency (30%) | $901 800,00 |
| **Subtotal 2 Zone 1** | **$3 907 800,00** |
| Northern Construction (20%) | $781 560,00 |
| **Subtotal 3 Zone 1** | **$4 689 360,00** |
| G.S.T. (5%) | $234 468,00 |
| P.S.T. (9.975%) | $467 763,66 |
| **TOTAL ZONE 1** | **$5 391 591,66** |

## ZONE 2: MISTISSINI - FROM ROUTE DU NORD TO MISTISSINI

| | Quantity | Unit | Unit price | Amount | Subtotal by category |
|---|---|---|---|---|---|
| **1 - GENERAL CONDITIONS / SITE MANAGEMENT** | | | | | **$55 000,00** |
| 1.1 General Conditions (5%) | 1 | global | $55 000,00 | $55 000,00 | |
| **2 - PREPARATORY WORKS** | | | | | **$164 000,00** |
| 2.1 Brush Clearing | 1 | global | $712 000,00 | $712 000,00 | |
| 2.2 Tree Removal | 1 | global | $164 000,00 | $164 000,00 | |
| **3 - EARTHWORKS / GRADING** | | | | | **$85 000,00** |
| 3.1 Excavation | 1 | global | $41 000,00 | $41 000,00 | |
| 3.2 Cut / Fill | 1 | global | $44 000,00 | $44 000,00 | |
| **4 - SURFACE TREATMENT** | | | | | **$6 000,00** |
| 4.1 Surfacing | 1 | global | $6 000,00 | $6 000,00 | |
| **5 - WATER CROSSINGS** | | | | | **$95 000,00** |
| 5.1 Culvert | 1 | global | $45 000,00 | $45 000,00 | |
| 5.2 Small Bridge | 1 | global | $50 000,00 | $50 000,00 | |
| **6 - RESTORATION** | | | | | **$32 000,00** |
| 6.1 Grass Seeding | 1 | global | $32 000,00 | $32 000,00 | |
| **7 - SIGNAGE** | | | | | **$2 000,00** |
| 7.1 Signage | 1 | global | $2 000,00 | $2 000,00 | |
| **8 - ADDITIONAL STUDIES** | | | | | **$0,00** |
| 8.1 Inaccessible Trail, by others | 1 | global | $0,00 | $0,00 | |
| 8.2 Steep Slope, by others | 1 | global | $0,00 | $0,00 | |
| 8.3 Wetland, by others | 1 | global | $0,00 | $0,00 | |

| | |
|---|---|
| **Subtotal 1 Zone 2** | **$1 151 000,00** |
| Contingency (30%) | $345 300,00 |
| **Subtotal 2 Zone 2** | **$1 496 300,00** |
| Northern Construction (20%) | $299 260,00 |
| **Subtotal 3 Zone 2** | **$1 795 560,00** |
| G.S.T. (5%) | $89 778,00 |
| P.S.T. (9.975%) | $179 107,11 |
| **TOTAL ZONE 2** | **$2 064 445,11** |

## ZONE 3 : OUJÉ-BOUGOUMOU - FROM CHAPAIS TO OUJÉ-BOUGOUMOU

| | Quantity | Unit | Unit price | Amount | Subtotal by category |
|---|---|---|---|---|---|
| **1 - GENERAL CONDITIONS / SITE MANAGEMENT** | | | | | **$131 000,00** |
| 1.1 General Conditions (5%) | 1 | global | $131 000,00 | $131 000,00 | |
| **2 - PREPARATORY WORKS** | | | | | **$93 000,00** |
| 2.1 Brush Clearing | 1 | global | $492 000,00 | $492 000,00 | |
| 2.2 Tree Removal | 1 | global | $93 000,00 | $93 000,00 | |
| **3 - EARTHWORKS / GRADING** | | | | | **$230 000,00** |
| 3.1 Excavation | 1 | global | $124 000,00 | $124 000,00 | |
| 3.2 Cut / Fill | 1 | global | $106 000,00 | $106 000,00 | |
| **4 - WATER CROSSINGS** | | | | | **$1 745 000,00** |
| 4.1 Surfacing | 1 | global | $5 000,00 | $5 000,00 | |
| 4.2 Small Bridge | 1 | global | $100 000,00 | $100 000,00 | |
| 4.3 Large Bridge | 1 | global | $1 640 000,00 | $1 640 000,00 | |
| **5 - RESTORATION** | | | | | **$55 000,00** |
| 5.1 Grass Seeding | 1 | global | $55 000,00 | $55 000,00 | |
| **6 - SIGNAGE** | | | | | **$5 000,00** |
| 6.1 Signage | 1 | global | $5 000,00 | $5 000,00 | |
| **7 - CLEANUP** | | | | | **$0,00** |
| 7.1 Garbage cleanup, by others | 1 | global | $0,00 | $0,00 | |
| **8 - ADDITIONAL STUDIES** | | | | | **$0,00** |
| 8.1 Inaccessible Trail, by others | 1 | global | $0,00 | $0,00 | |
| 8.2 Steep Slope, by others | 1 | global | $0,00 | $0,00 | |
| 8.3 Bridge Design, by others | 1 | global | $0,00 | $0,00 | |
| 8.4 Wetland, by others | 1 | global | $0,00 | $0,00 | |

| | |
|---|---|
| **Subtotal 1 Zone 3** | **$2 751 000,00** |
| Contingency (30%) | $825 300,00 |
| **Subtotal 2 Zone 3** | **$3 576 300,00** |
| Northern Construction (20%) | $715 260,00 |
| **Subtotal 3 Zone 3** | **$4 291 560,00** |
| G.S.T. (5%) | $214 578,00 |
| P.S.T. (9.975%) | $428 083,11 |
| **TOTAL ZONE 3** | **$4 934 221,11** |

## ZONE 4 : WASWANIPI - FROM TRANS-QUÉBEC 93 TO WASWANIPI

| | Quantity | Unit | Unit price | Amount | Subtotal by category |
|---|---|---|---|---|---|
| **1 - GENERAL CONDITIONS / SITE MANAGEMENT** | | | | | **$19 000,00** |
| 1.1 General Conditions (5%) | 1 | global | $19 000,00 | $19 000,00 | |
| **2 - PREPARATORY WORKS** | | | | | **$16 000,00** |
| 2.1 Brush Clearing | 1 | global | $211 000,00 | $211 000,00 | |
| 2.2 Tree Removal | 1 | global | $16 000,00 | $16 000,00 | |
| **3 - EARTHWORKS / GRADING** | | | | | **$47 000,00** |
| 3.1 Excavation | 1 | global | $9 000,00 | $9 000,00 | |
| 3.2 Cut / Fill | 1 | global | $38 000,00 | $38 000,00 | |
| **4 - WATER CROSSINGS** | | | | | **$85 000,00** |
| 4.1 Culvert | 1 | global | $35 000,00 | $35 000,00 | |
| 4.2 Small Bridge | 1 | global | $50 000,00 | $50 000,00 | |
| **5 - RESTORATION** | | | | | **$13 000,00** |
| 5.1 Grass Seeding | 1 | global | $13 000,00 | $13 000,00 | |
| **6 - SIGNAGE** | | | | | **$2 000,00** |
| 6.1 Signage | 1 | global | $2 000,00 | $2 000,00 | |
| **7 - ADDITIONAL STUDIES** | | | | | **$0,00** |
| 7.1 Bridge Design, by others | 1 | global | $0,00 | $0,00 | |
| 7.2 Wetland, by others | 1 | global | $0,00 | $0,00 | |

| | |
|---|---|
| **Subtotal 1 Zone 4** | **$393 000,00** |
| Contingency (30%) | $117 900,00 |
| **Subtotal 2 Zone 4** | **$510 900,00** |
| Northern Construction (20%) | $102 180,00 |
| **Subtotal 3 Zone 4** | **$613 080,00** |
| G.S.T. (5%) | $30 654,00 |
| P.S.T. (9.975%) | $61 154,73 |
| **TOTAL ZONE 4** | **$704 888,73** |

## OVERALL PROJECT

| | |
|---|---|
| **Subtotal 1 Zone 1** | **$4 689 360,00** |
| **Subtotal 1 Zone 2** | **$1 795 560,00** |
| **Subtotal 1 Zone 3** | **$4 291 560,00** |
| **Subtotal 1 Zone 4** | **$613 080,00** |
| **GRAND SUBTOTAL** | **$11 389 560,00** |
| G.S.T. (5%) | $569 478,00 |
| P.S.T. (9.975%) | $1 136 108,61 |
| **GRAND TOTAL** | **$13 095 146,61** |

## ANNEX 2 CONSULTATION ATTENDEES

**Attendees in Mistissini consultation, February 19th 2020**

| Name | Trapline # \| Company \| Occupancy |
|---|---|
| Stanley Mianscum | M45 |
| John Iserhoff | M50 |
| Willie J Loon | CTA Mistissini |
| Mireille Gravel | Nibiischii |
| Johnny Mianscum | M49C |
| Samuel Shecapio | M51 |
| Robert Coonishish | M17C |
| Louis Mianscum | M45A |
| Harry Coonishish | M17C |
| Abel Mianscum | M45 |
| Paul Mianscum | M56 |
| Kevin Neeposh | Big Rock Racing |
| Blazo Voyageur | Big Rock Racing |
| Billy Mianscum | M56 (Waco) |
| Melvin Riskin | M1 |
| Conrad Mianscum | Tourism planner |
| Andrew Coon | EDO-CNM |
| Gerald Longchap | Deputy Chief CNM |
| Marie-Pierre McDonald | BC2 |
| Dex Savage | Cota |
| Kim Régimbald Bélanger | FaunENord |



**Attendees in Waswanipi consultation, February 20th, 2020**

| Name | Trapline # \| Company \| Occupancy |
|---|---|
| Stanley Saganash | HFT coordinator CFNW |
| Joshua Blacksmith | Mining coordinator |
| Johnny Cooper | Local envi. Admin |
| Paul Dixon | CTA-Local Admin. |
| Ron Blacksmith | W24A |
| Frank Blacksmith | W24A |
| Allan Saganash Jr | W24A |
| Marlene Kitchen | Elders, Culture, Tourist, Women's Association |
| Irene Otter | Tourism Planner/Coordinator |
| Steven Blacksmith | Director of Natural Resources |
| Marie-Pierre McDonald | BC2 |
| Dex Savage | Cota |
| Kim Régimbald Bélanger | FaunENord |



**Attendees in Ouje-Bougoumou consultation, February 24th, 2020**

| Name | Trapline # \| Company \| Occupancy |
|---|---|
| Wesley Mianscum | O55 |
| Johnny Capissisit | O54 |
| Walter Capissisit | O54 |
| Paulina Cooper | Public works band |
| Peter Bossum | Economic devel. band |
| Marie-Pierre McDonald | BC2 |
| Dex Savage | Cota |
| Kim Régimbald Bélanger | FaunENord |



**Attendees in Chibougamau consultation, February 27th, 2020**

| Name | Trapline # \| Company \| Occupancy |
|---|---|
| Michel Perreault | Club auto-neige |
| Daniel Blais | Club Auto-neige |
| René Martel | Planète 93,5 |
| Ovide Ross | L'Amec-Chib. |
| Mario Simard | Club Auto-neige |
| Valérie Bélanger | Nibiischii |
| Mireille Gravel | Nibiischii |
| Marie-Pierre McDonald | BC2 |
| Dex Savage | Cota |
| Kim Régimbald Bélanger | FaunENord |



## ANNEX 3 FIELD WORK

### WINTER SURVEY

Due to COVID, most winter field surveys were cancelled. The safest period to travel on unfamiliar lands is from mid-March to the end of April. Visibility and snow conditions are indeed less dangerous during this time. The team completed the survey for the first part of the planned itinerary (from Route du Nord to Ouje-Bougoumou). The rest of the itinerary could not be completed due to the Covid-19 health restrictions that resulted in the team not being able to go into the communities.





**SUMMER SURVEY**

The field work took place between August 17 to 28 to find and characterize all the new snowmobile trails planned between Mistissini and Ouje-Bougoumou (around 136 kilometres). The technical team had to follow the trail with all-terrain vehicles (ATVs) to gather topographic data and geolocate dangerous areas, wet areas, rivers, road crossing as well as all other elements that could be an obstacle for the project, and potential tourist sightseeing locations.

The field work was harder than expected at multiple levels. Due to the COVID-19 pandemic the team was not able to do the initial winter fieldwork, therefore, be sure of the planned route for the summer and anticipate the field condition. The coordination of the fieldwork and the tallyman was also challenging. It took a long time for Dex Savage, the project manager, to gather the tallymen's authorization to do field work and no tallymen were available to guide the team during the two weeks.

With all these unknowns, the technical team was confronted with many challenges. Access to the trails was challenging, which slowed the field work process. Most of the snowmobile trails were directly in the forest and often difficult to complete with ATVs due to the narrowness of the trails and the stumps in the way. The harshness of the field conditions also caused unexpected damages to the ATVs. The use of a drone was also necessary in certain areas to locate the trails. Furthermore, some areas were inaccessible due to rivers, swamps, beaver dams and destroyed culverts, which limited the data gathering in those areas. The technical team tried several times to find alternative routes, got stuck in the mud multiple times and was sometimes unable to access the trails. On average, the team characterized daily around 10 kilometres. The data gathering was the most time consuming for the technical team. The trails were less clean than expected, and the team needed to take multiple data, sometime even every 100 metres. Fortunately, there were also some trails in very good condition near Ouje-Bougoumou and Mistissini and the team progressed very quickly on them.

Despite the difficulties, the technical team retrieved all required data for most of the snowmobile trails and was able to characterize around 114 kilometres out of the 136 kilometres planned. Among the sections that have not been analyzed during the summer survey, there is the section between Mistissini and the Route du Nord located east of Lake Mistissini's Penicouan Bay.

**INTER-NATION COLLABORATION**

NORTHERN
INDIGENOUS
SOUTHERN

- ENVIRONMENTAL RESILIENCE
- SUSTAINABLE URBANIZATION
- SOCIAL SUSTAINABILITY
- HOUSING
- CULTURE AND LEISURE

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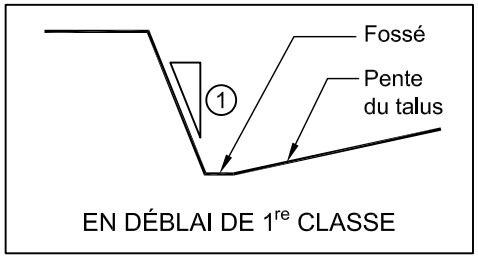
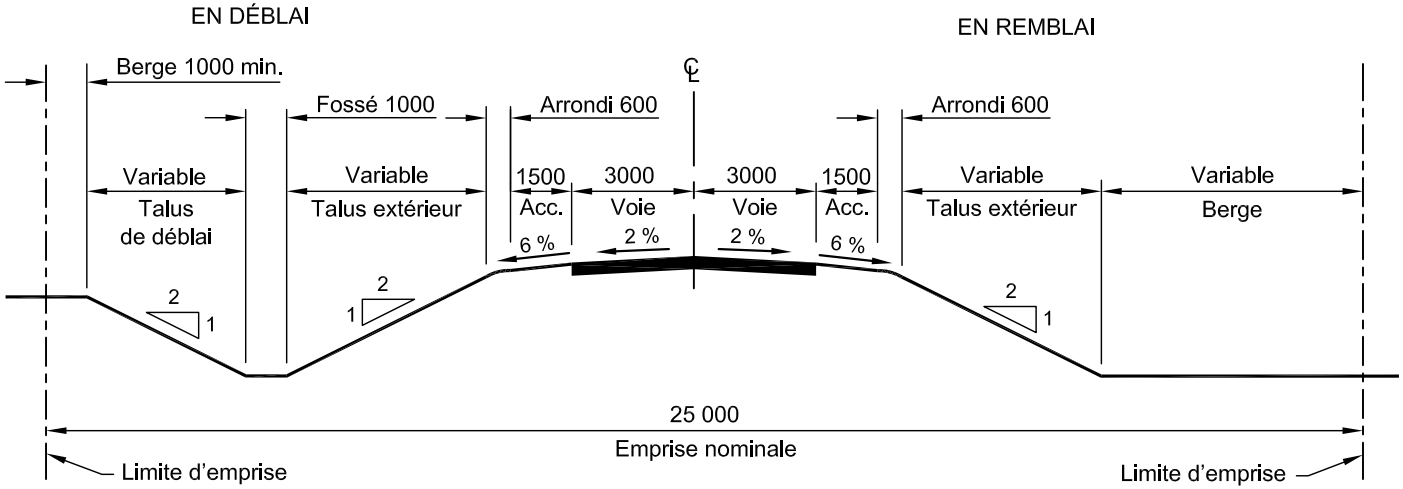
INTER-NATION
COLLABORATION

85 SAINT-PAUL STREET W. SUITE 300
MONTREAL (QUEBEC) H2Y 3V4
**T** 1 514 507 3600

BC2

ROUTE RÉGIONALE : DJMA < 500
ROUTE COLLECTRICE OU LOCALE : DJMA 500 – 2000




TYPE E : ROUTE RÉGIONALE – COLLECTRICE OU LOCALE

① Pour les déblais de 1re classe, se référer au *Tome II – Construction routière*, chapitre 1 « Terrassement ».

**Notes :**

- la nécessité d'un dispositif de retenue et, le cas échéant, la surlargeur de l'accotement doivent être évaluées en fonction des critères énoncés au *Tome VIII – Dispositifs de retenue*;
- les cotes sont en millimètres.

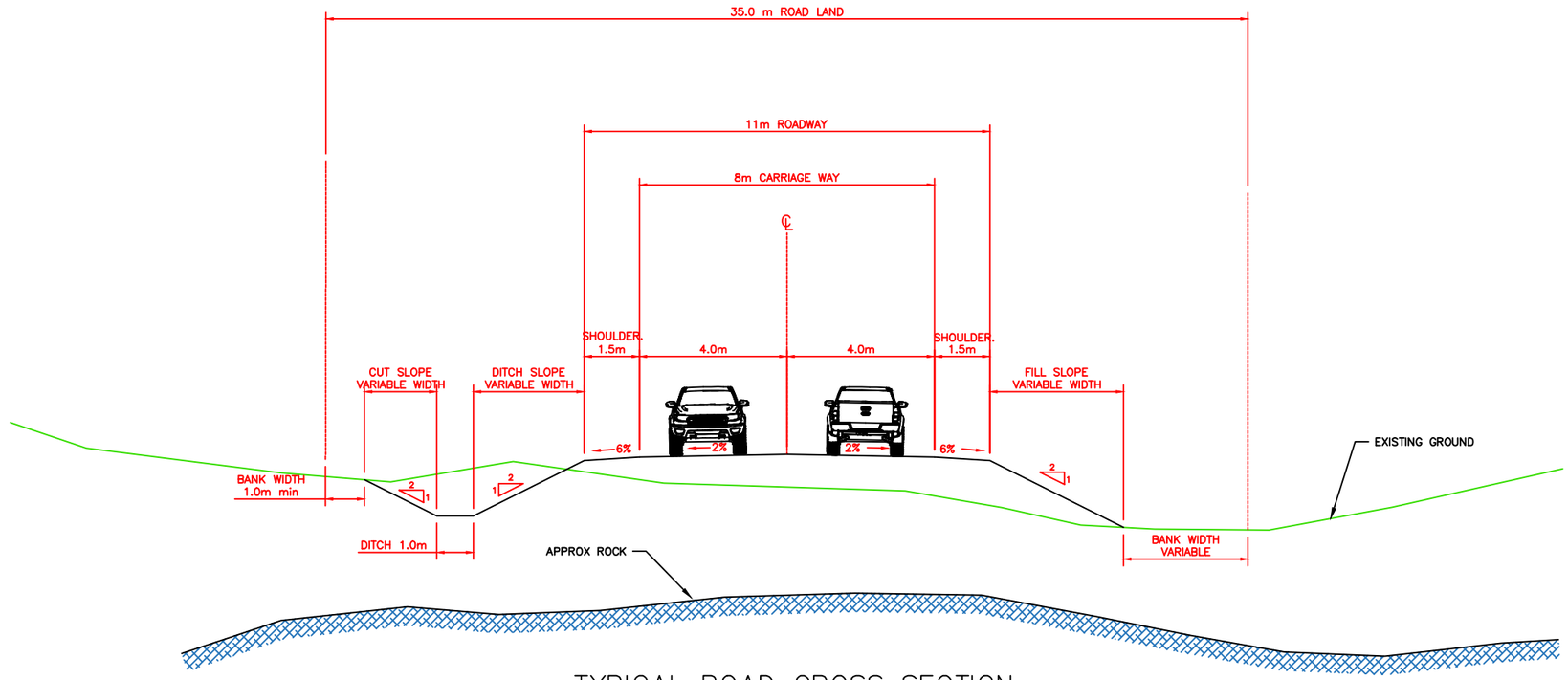
Transports, Mobilité durable et Électrification des transports
Québec

NORME

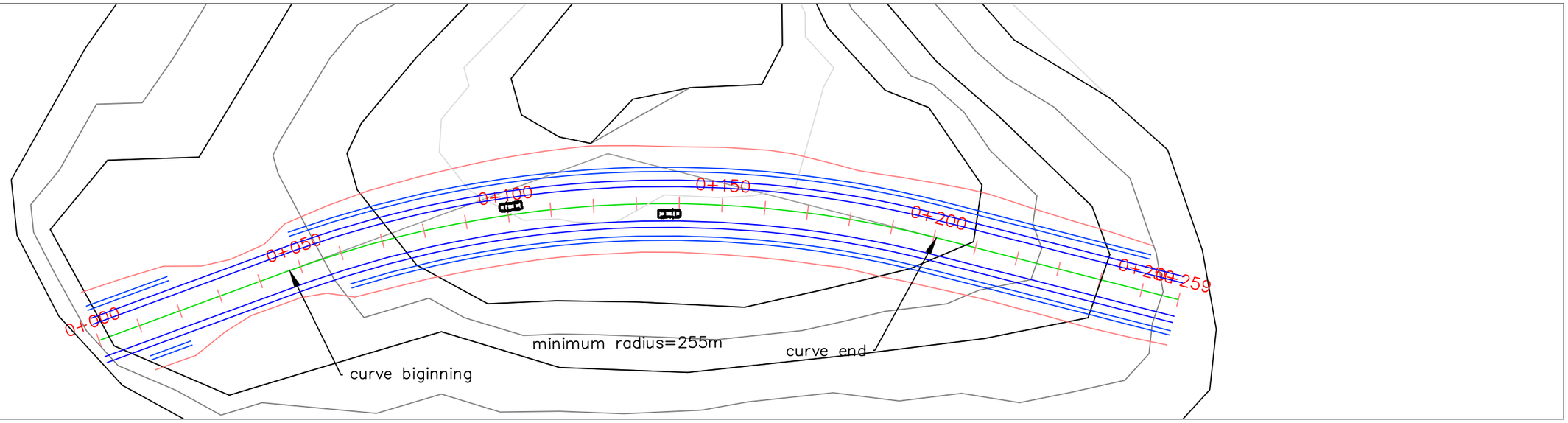
DESSIN NORMALISÉ

PROFIL EN TRAVERS EN MILIEU RURAL (TYPE E)

| Tome | Chapitre | Page | Date |
|---|---|---|---|
| I | 5 | 005 | 2016 06 15 |




TYPICAL ROAD CROSS SECTION
NON PAVED ROAD




| REV. | DATE | DESCRIPTION | PREPARED BY | VERIFIED BY |
|---|---|---|---|---|
| 00 | | FIRST ISSUE | SYLVAIN PELLETIER tech. | MARC ANTOINE ALLARD ing.f. |

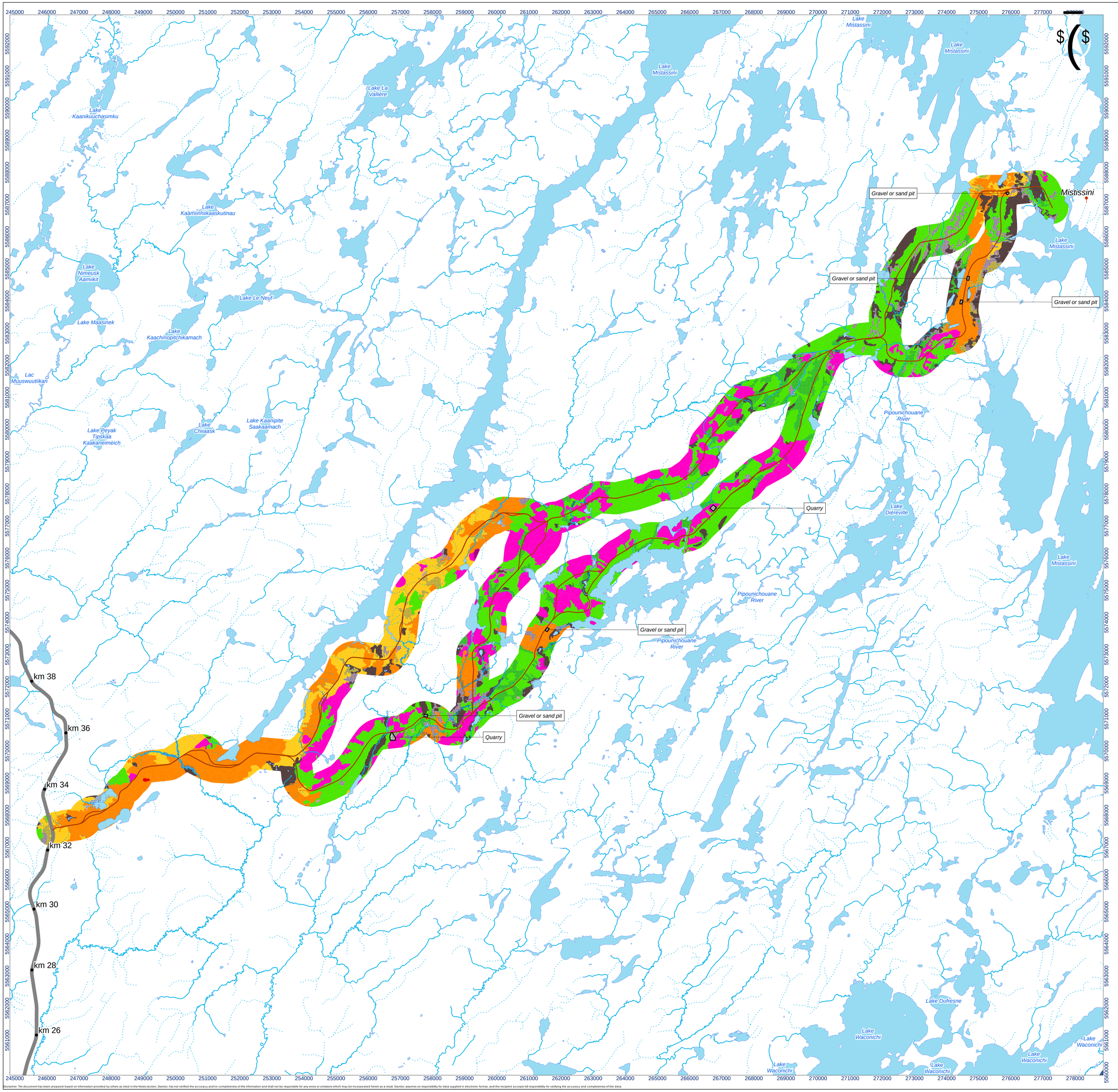
REVISION

Scale: variable
dimension in meter

Vision Eeyou Istchee
Connect • Develop • Protect
Stantec | DESFOR | SYSTRA

| | | | |
|---|---|---|---|
| PREPARED BY: SYLVAIN PELLETIER Tech.g.c. | DATE: 2022-05-30 | PROJECT: GRANDE ALLIANCE PHASE 1 | |
| DRAWN BY: SYLVAIN PELLETIER Tech.g.c | DATE: 2022-05-30 | | |
| VERIFIED BY: MARC ANTOINE ALLARD ing.f. | DATE: 2022-05-30 | ROAD TYPICAL CROSS SECTION PAVED ROAD | |
| APPROVED BY: CAMILLE PARÉ P.Eng. | DATE: 2022-05-30 | FORMAT: A3 | DWG N°: LGA-1-MI-T-HAL-PL-0002 REV: 00 |

PRINT TIME: 2022/07/12 – 1:46pm




- Kilometer marks
- Route 167 Nord
- Route du Nord
- Route options
- Potential sand and gravel pits
- Potential wetlands

Surface materials

- Gravel pits
- Others (islands, flooded environments)
- Pt - Peat less than 2m
- Pt - Peat more than 2m
- R - 80% of rock
- R+Tm/R = Rock with thin till
- S - Sand
- SG - Sand and gravel
- SM - Silty sand or sandy silt
- T - Till

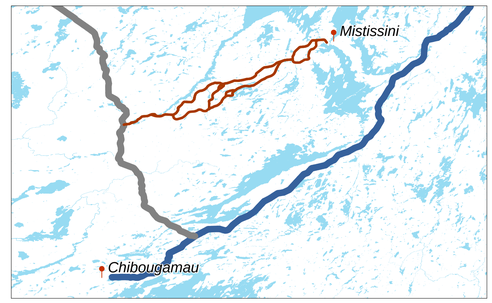
- Permanent watercourse
- Intermittent watercourse
- Lakes

0 1 000 2 000 3 000 metres

1:40 000
(At original document size of 34x44)

Notes

1. Coordinate System : NAD 1983 CSRS MTM 8
2. Road Network, MRNF
3. Surface Deposits, MRNF
4. Watercourse and Waterbody, Government of Canada and MRNF
5. Potential Wetlands, MELCCFP




Project Location
Mistissini

Surface Materials
Prepared by Clovis Déry on 2023-02-22
Approved by Marc-Antoine Allard, For. Eng on 2023-02-22

Client/Project
LA GRANDE ALLIANCE
Phase 1

Map No.
1

Title
Surface deposit Within 500 Meters of Routes Options

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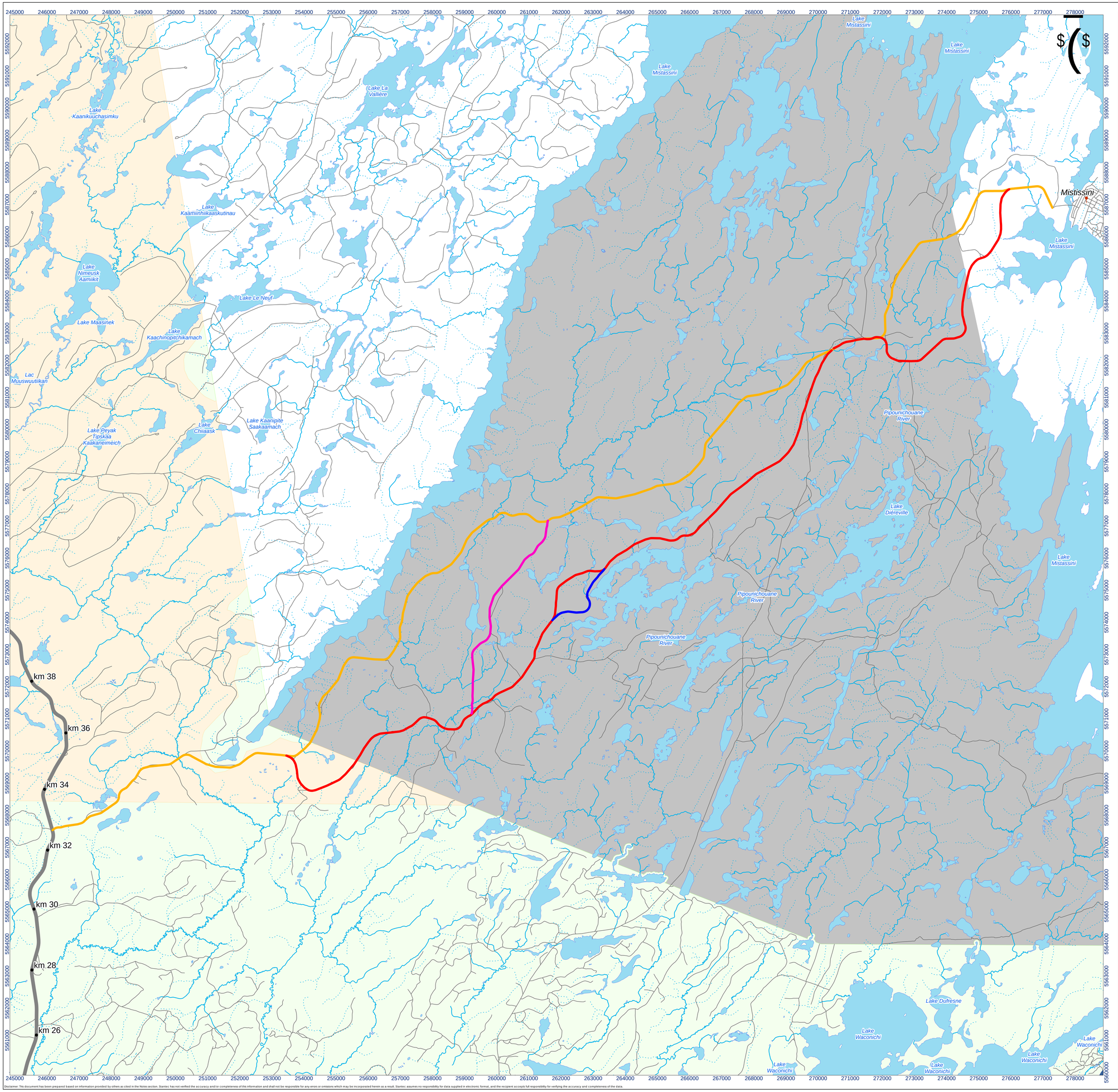


LE GROUPE DESFOR 25 ANS

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- Kilometer marks
- Route 167 Nord
- Route du Nord
- Existing roads - All classes

**Studied Road Corridors**

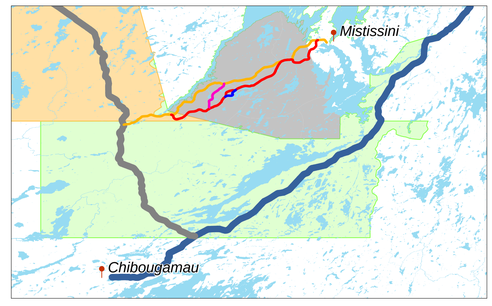
- Option 1
- Option 2
- Variant 1
- Variant 2

- Category I lands
- Assinica Wildlife Reserve
- Albanel-Mistassini-and-Waconichi Lakes Wildlife
- Permanent watercourse
- Intermittent watercourse
- Lakes

0 1 000 2 000 3 000 metres

1:40 000
(At original document size of 34x44)

Notes
1. Coordinate System : NAD 1983 CSRS MTM 8
2. Watercourse and Waterbody, Government of Canada and MRNF
3. Protected Areas and Biological Refuges, MRNF
4. Forest Territorial Subdivisions (Categorie I Lands), MRNF
5. Road Network, MRNF




Project Location

Mistissini

Route Location

Prepared by Clovis Déry on 2023-02-24
Approved by Marc-Antoine Allard, For. Eng on 2023-02-24

Client/Project

LA GRANDE ALLIANCE
Phase 1

Map No.

1

Title

Studied Road Corridors

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LE GROUPE DESFOR 25 ANS

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- Bornes de kilométrage
- Route 167 Nord
- Route du Nord
- Réseau routier existant

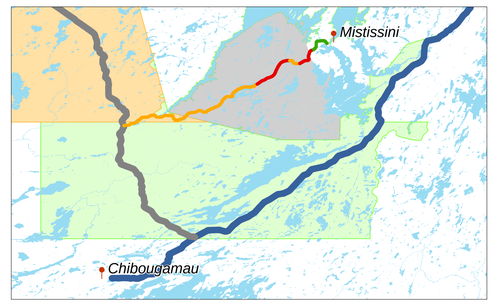
**Option 2 retenue**
- Utilisation du chemin existant
- Réfection
- Construction

- Terres de catégorie I
- Réserve faunique Assinica
- Réserve faunique des Lacs-Albanel-Mistassini-et-Waconichi
- Cours d'eau permanents
- Cours d'eau intermittents
- Lacs

0 1 000 2 000 3 000 mètres

1:40 000
(Grandeur originale de 34x44)

Notes
1. Système de coordonnées : NAD 1983 CSRS MTM 8
2. Réseau routier, MRNF
3. Lacs et cours d'eau, Gouvernement du Canada et MRNF
4. Aires protégées et refuges biologiques, MRNF
5. Subdivisions territoriales forestières (terres de catégorie I), MRNF




Localisation du projet
Mistissini

Option 2 retenue
Préparé par Clovis Déry le 2023-02-09
Approuvé par Marc-Antoine Allard, ing.f. le 2023-02-09

Client/Projet
LA GRANDE ALLIANCE
Phase 1

Carte No.
1

Titre
Option 2 retenue

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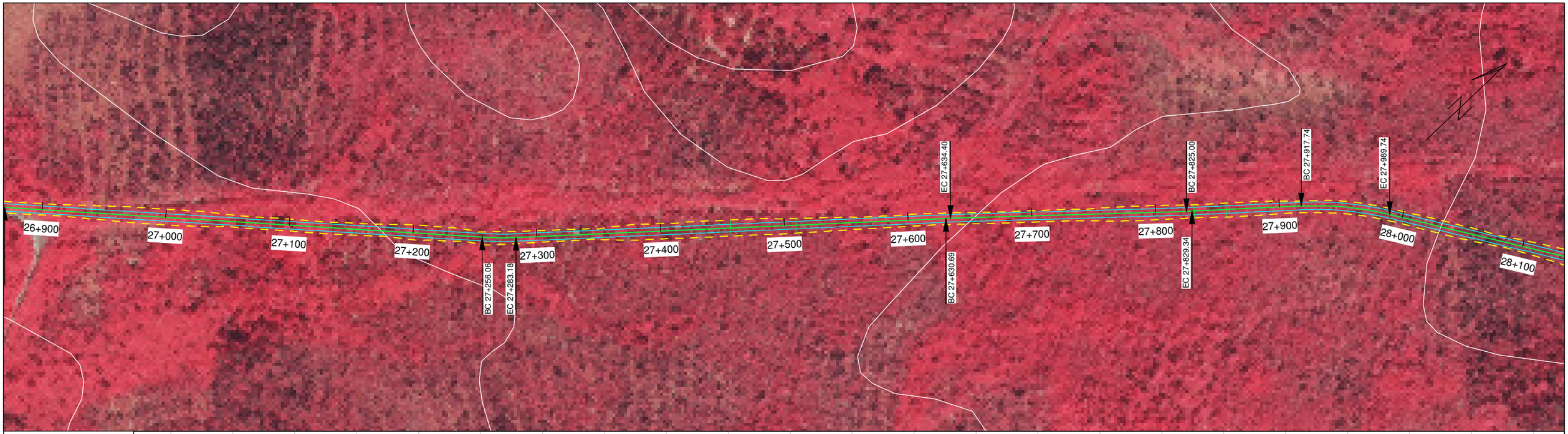


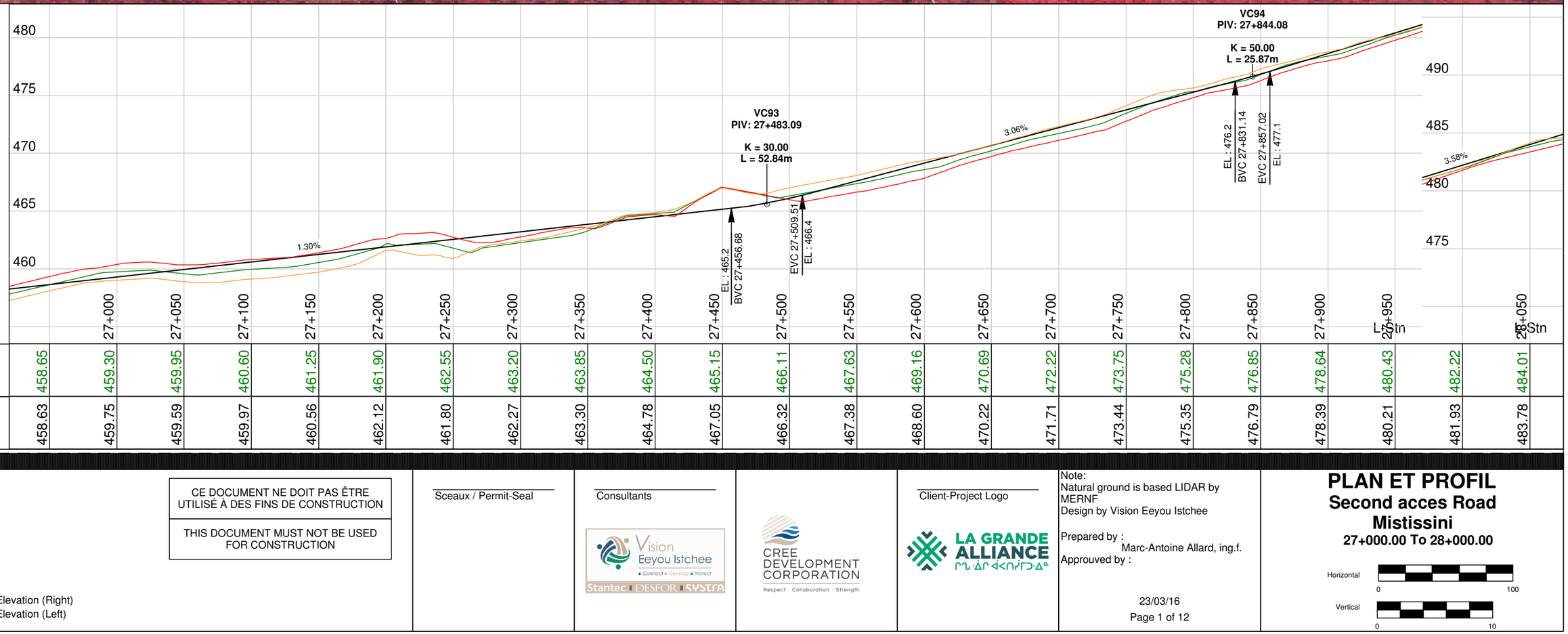


| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 458.65 | 459.30 | 459.95 | 460.60 | 461.25 | 461.90 | 462.55 | 463.20 | 463.85 | 464.50 | 465.15 | 466.11 | 467.63 | 469.16 | 470.69 | 472.22 | 473.75 | 475.28 | 476.85 | 478.64 | 480.43 | 482.22 | 484.01 | |
| PROFILE SUBGRADE ELEVATION | 458.63 | 459.75 | 459.59 | 459.97 | 460.56 | 462.12 | 461.80 | 462.27 | 463.30 | 464.78 | 467.05 | 466.32 | 467.38 | 468.60 | 470.22 | 471.71 | 473.44 | 475.35 | 476.79 | 478.39 | 480.21 | 481.93 | 483.78 | |

- Contour
- Center Line
- Road Edges
- Clearing Limits
- Plan Culverts
- Topopgraphy
- Profile Subgrade
- Profile Culverts
- Natural Ground Elevation (Right)
- Natural Ground Elevation (Left)

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THIS DOCUMENT MUST NOT BE USED FOR CONSTRUCTION

Sceaux / Permit-Seal

Consultants

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CREE DEVELOPMENT CORPORATION
Respect · Collaboration · Strength

Client-Project Logo

LA GRANDE ALLIANCE

Note:
Natural ground is based LIDAR by MERNF
Design by Vision Eeyou Istchee

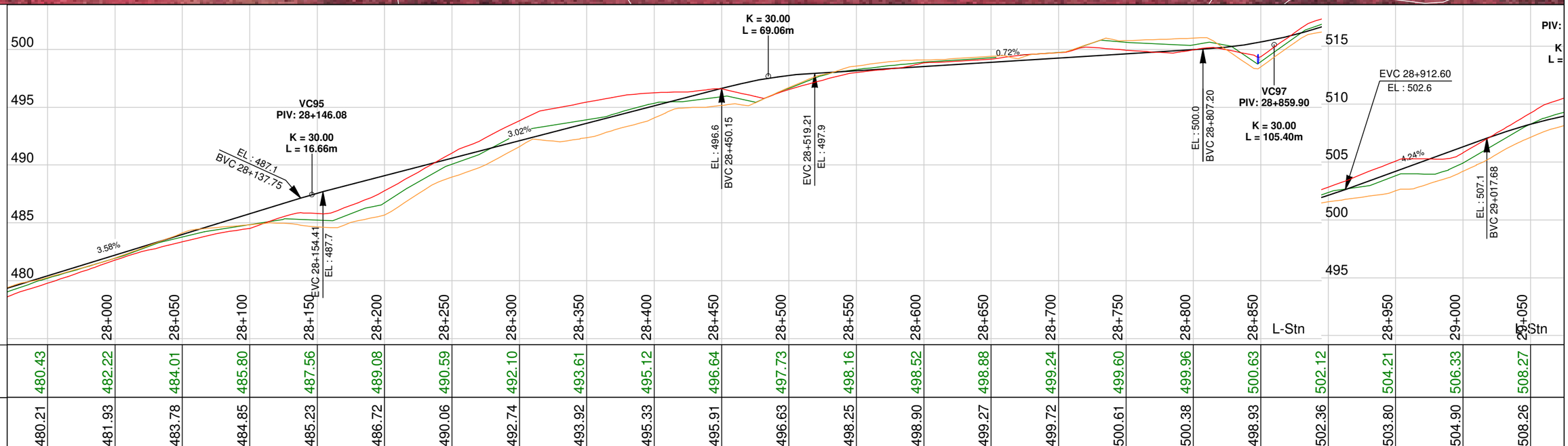
Prepared by :
Marc-Antoine Allard, ing.f.
Approved by :

23/03/16


# PLAN ET PROFIL
## Second acces Road Mistissini
### 27+000.00 To 28+000.00

Horizontal 0 100
Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 480.43 | 482.22 | 484.01 | 485.80 | 487.56 | 489.08 | 490.59 | 492.10 | 493.61 | 495.12 | 496.64 | 497.73 | 498.16 | 498.52 | 498.88 | 499.24 | 499.60 | 499.96 | 500.63 | 502.12 | 504.21 | 506.33 | 508.27 |
| PROFILE SUBGRADE ELEVATION | 480.21 | 481.93 | 483.78 | 484.85 | 485.23 | 486.72 | 490.06 | 492.74 | 493.92 | 495.33 | 495.91 | 496.63 | 498.25 | 498.90 | 499.27 | 499.72 | 500.61 | 500.38 | 498.93 | 502.36 | 503.80 | 504.90 | 508.26 |

- Contour
- Center Line
- Road Edges
- Clearing Limits
- Plan Culverts
- Topopgraphy
- Profile Subgrade
- Profile Culverts
- Natural Ground Elevation (Right)
- Natural Ground Elevation (Left)

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LA GRANDE ALLIANCE

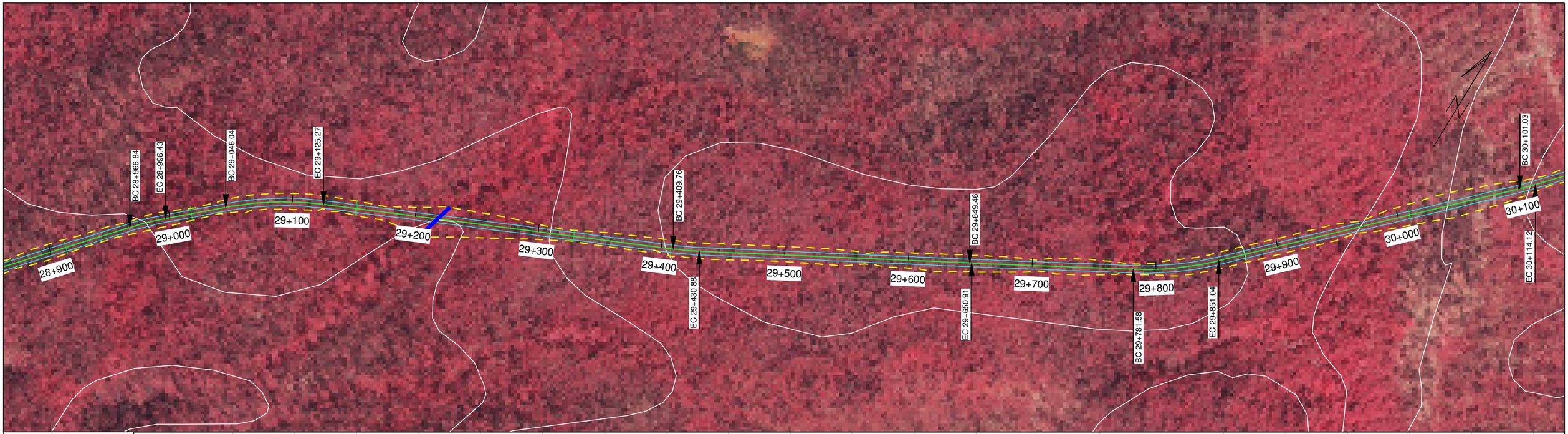
Note:
Natural ground is based LIDAR by MERNF
Design by Vision Eeyou Istchee

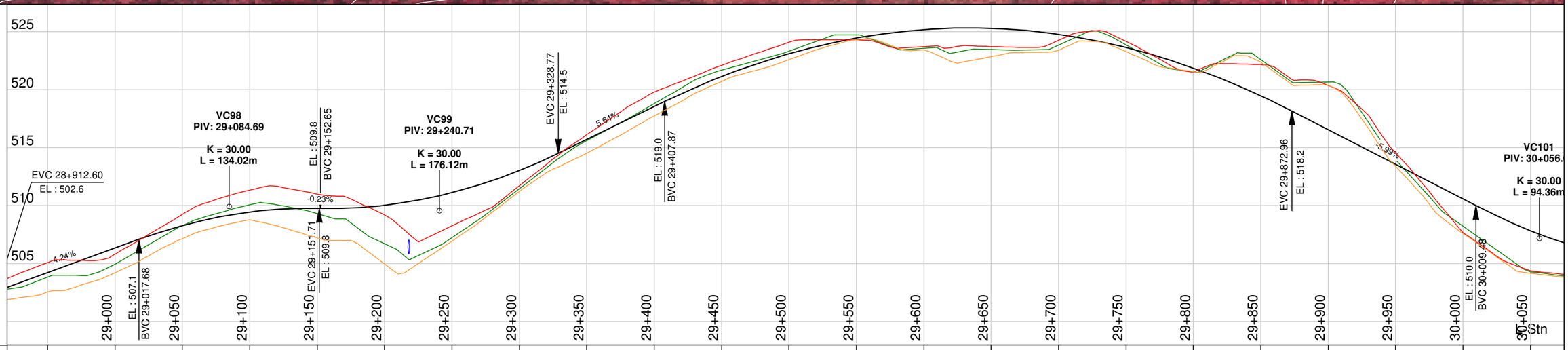
Prepared by :
Marc-Antoine Allard, ing.f.
Approved by :

23/03/16


# PLAN ET PROFIL
## Second acces Road Mistissini
### 28+000.00 To 29+000.00

Horizontal 0 100
Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 504.21 | 506.33 | 508.27 | 509.43 | 509.76 | 510.02 | 511.11 | 513.03 | 515.72 | 518.54 | 521.13 | 523.11 | 524.47 | 525.20 | 525.30 | 524.78 | 523.64 | 521.87 | 519.47 | 516.55 | 513.55 | 510.56 | 507.84 |
| PROFILE SUBGRADE ELEVATION | 503.80 | 504.90 | 508.26 | 510.06 | 509.31 | 506.71 | 507.23 | 511.43 | 515.59 | 518.78 | 521.69 | 523.32 | 524.72 | 523.58 | 523.47 | 523.84 | 523.88 | 521.53 | 522.61 | 520.67 | 513.96 | 508.21 | 504.30 |

- Contour
- Center Line
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Approuved by :

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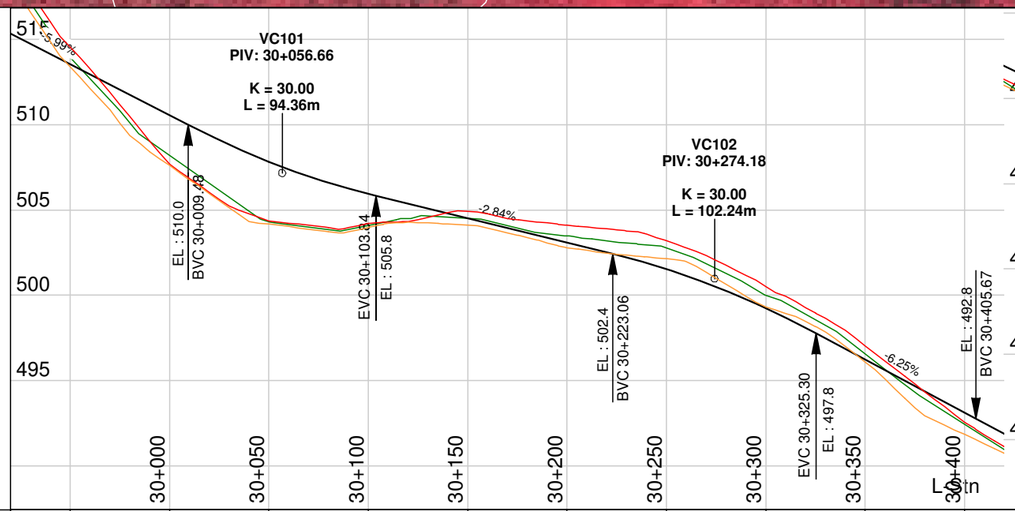
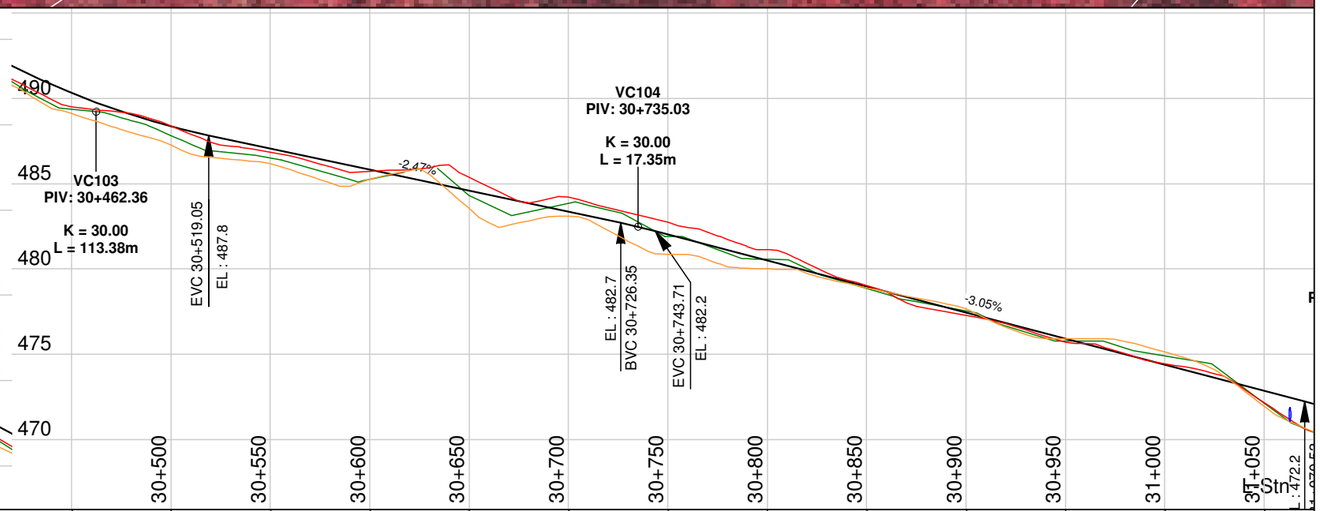
# PLAN ET PROFIL
## Second acces Road Mistissini
### 29+000.00 To 30+000.00

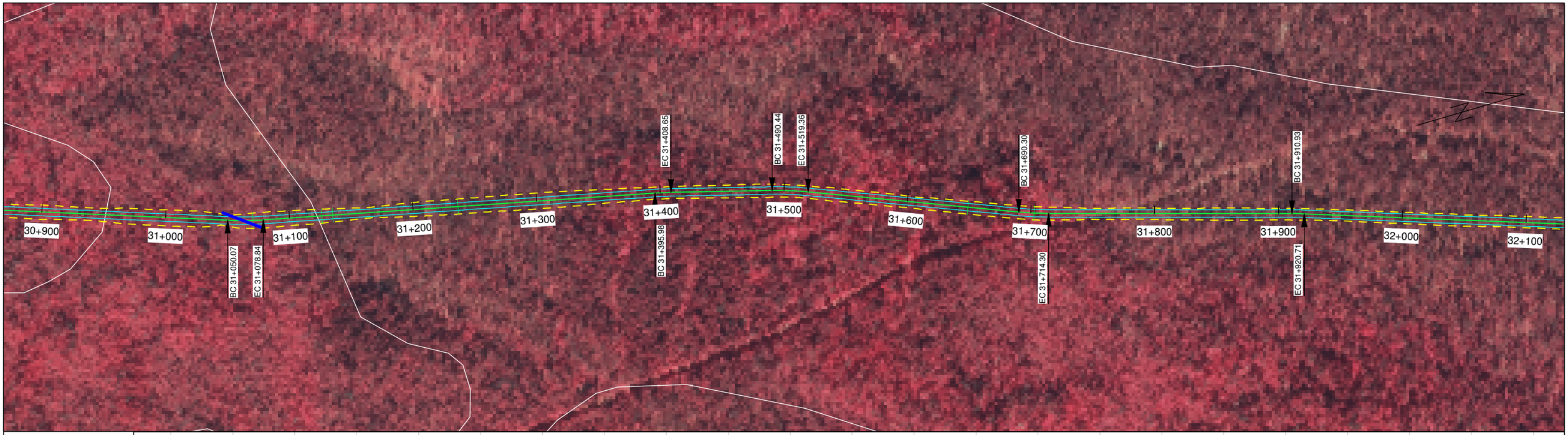
Horizontal 0 100
Vertical 0 10

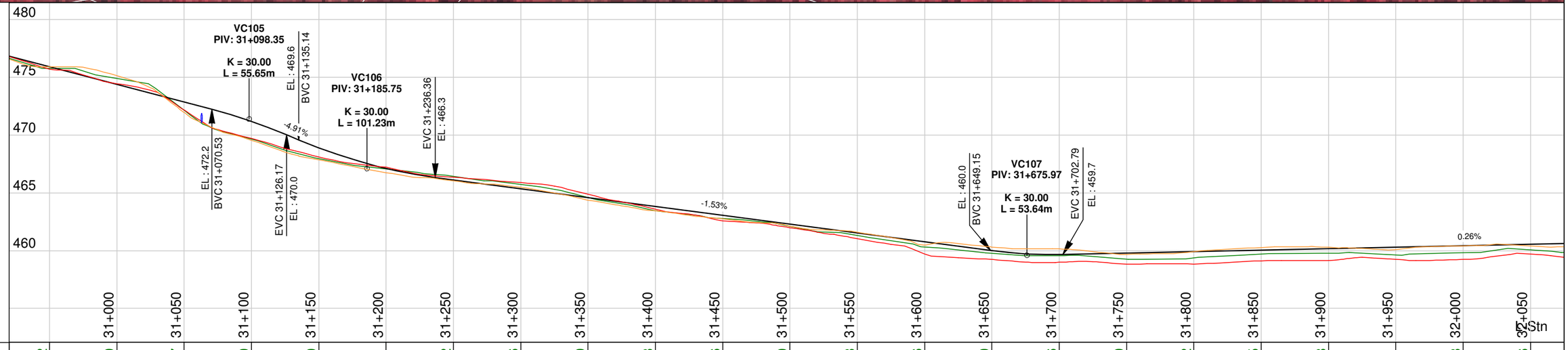

29+900
30+000
30+100
30+200
30+300
30+400
30+500
30+600
30+700
30+800
30+900
31+000
31+100
BC 30+101.03
EC 30+114.12
BC 30+198.95
EC 30+235.69
BC 30+465.77
EC 30+521.71
BC 30+789.60
EC 30+800.92
BC 31+050.07
EC 31+078.84


VC101
PIV: 30+056.66
K = 30.00
L = 94.36m
VC102
PIV: 30+274.18
K = 30.00
L = 102.24m
-5.99%
-2.84%
-6.25%
EL : 510.0
BVC 30+009.48
EVC 30+103.84
EL : 505.8
EL : 502.4
BVC 30+223.06
EVC 30+325.30
EL : 497.8
EL : 492.8
BVC 30+405.67
510
505
500
495
30+000
30+050
30+100
30+150
30+200
30+250
30+300
30+350
30+400
Lgth


VC103
PIV: 30+462.36
K = 30.00
L = 113.38m
VC104
PIV: 30+735.03
K = 30.00
L = 17.35m
-2.47%
-3.05%
EVC 30+519.05
EL : 487.8
EL : 482.7
BVC 30+726.35
EVC 30+743.71
EL : 482.2
490
485
480
475
470
30+500
30+550
30+600
30+650
30+700
30+750
30+800
30+850
30+900
30+950
31+000
31+050
Lgth

| | | |




| Stn | 31+000 | 31+050 | 31+100 | 31+150 | 31+200 | 31+250 | 31+300 | 31+350 | 31+400 | 31+450 | 31+500 | 31+550 | 31+600 | 31+650 | 31+700 | 31+750 | 31+800 | 31+850 | 31+900 | 31+950 | 32+000 | 32+050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 475.92 | 474.39 | 472.87 | 471.20 | 468.90 | 467.11 | 466.12 | 465.36 | 464.59 | 463.83 | 463.06 | 462.30 | 461.53 | 460.76 | 460.00 | 459.66 | 459.79 | 459.92 | 460.05 | 460.18 | 460.31 | 460.43 | 460.56 |
| PROFILE SUBGRADE ELEVATION | 475.76 | 474.91 | 472.16 | 469.65 | 467.96 | 467.08 | 466.43 | 465.72 | 464.61 | 463.46 | 462.79 | 462.12 | 461.31 | 460.31 | 459.77 | 459.56 | 459.27 | 459.37 | 459.70 | 459.76 | 459.64 | 459.83 | 460.06 |

- Contour
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LA GRANDE ALLIANCE

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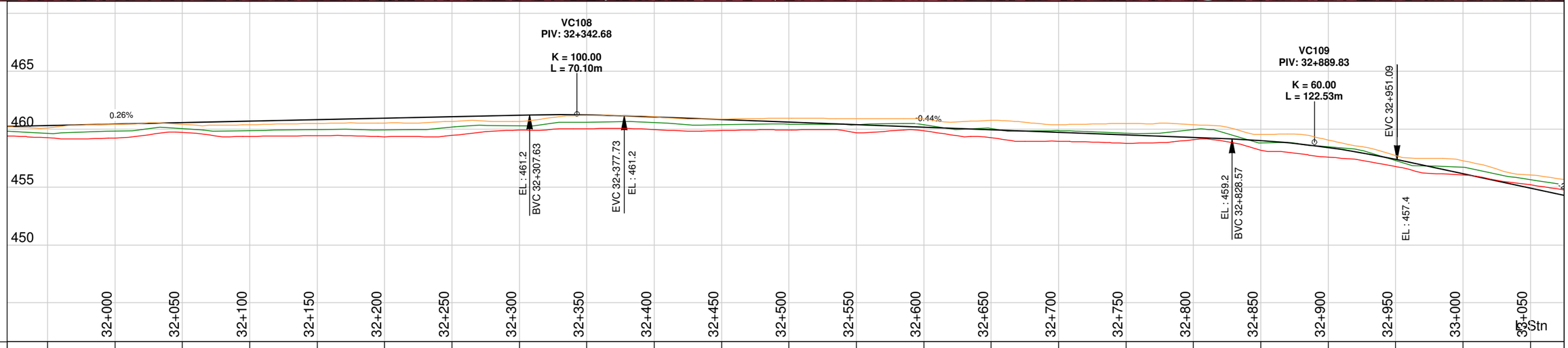
Prepared by :
Marc-Antoine Allard, ing.f.
Approved by :

23/03/16


# PLAN ET PROFIL
## Second acces Road Mistissini
### 31+000.00 To 32+000.00

Horizontal 0 100
Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 460.31 | 460.43 | 460.56 | 460.69 | 460.82 | 460.95 | 461.08 | 461.20 | 461.24 | 461.06 | 460.84 | 460.62 | 460.39 | 460.17 | 459.95 | 459.73 | 459.51 | 459.28 | 459.02 | 458.41 | 457.39 | 456.15 | 454.90 |
| PROFILE SUBGRADE ELEVATION | 459.64 | 459.83 | 460.06 | 459.88 | 459.96 | 459.94 | 460.19 | 460.28 | 460.61 | 460.57 | 460.37 | 460.43 | 460.38 | 460.38 | 460.05 | 459.88 | 459.65 | 459.95 | 458.80 | 458.48 | 457.30 | 456.71 | 455.65 |

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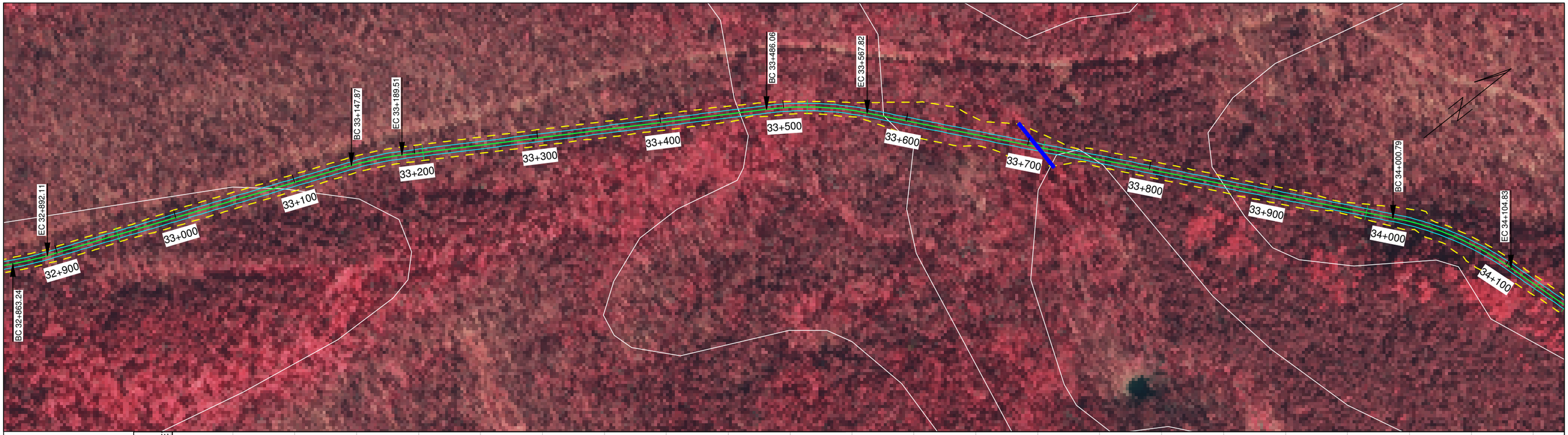
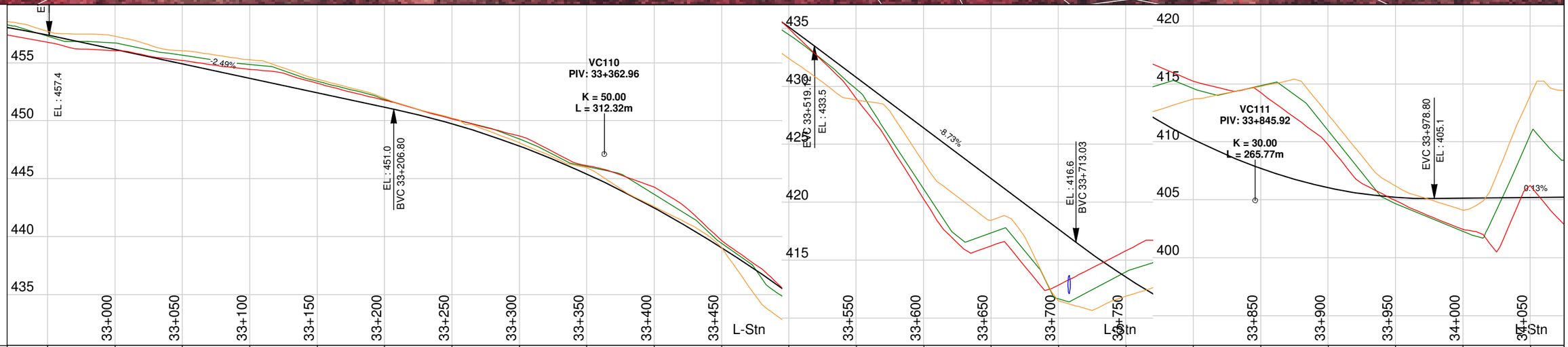
Approuved by :

23/03/16


# PLAN ET PROFIL
## Second acces Road Mistissini
### 32+000.00 To 33+000.00

Horizontal 0 100
Vertical 0 10




| | 33+000 | 33+050 | 33+100 | 33+150 | 33+200 | 33+250 | 33+300 | 33+350 | 33+400 | 33+450 | L-Stn | 33+550 | 33+600 | 33+650 | 33+700 | 33+750 | L-Stn | 33+850 | 33+900 | 33+950 | 34+000 | 34+050 | L-Stn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 457.39 | 456.15 | 454.90 | 453.66 | 452.42 | 451.17 | 449.74 | 447.82 | 445.39 | 442.47 | 439.04 | 435.12 | 430.79 | 426.42 | 422.05 | 417.69 | 413.55 | 410.22 | 407.72 | 406.05 | 405.22 | 405.14 | 405.20 |
| PROFILE SUBGRADE ELEVATION | 457.30 | 456.71 | 455.65 | 454.85 | 453.40 | 451.86 | 450.20 | 448.42 | 446.04 | 443.65 | 439.43 | 434.47 | 429.77 | 421.17 | 417.33 | 411.67 | 413.96 | 414.60 | 414.85 | 411.00 | 404.66 | 402.28 | 410.55 |

- Contour
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Approuved by :

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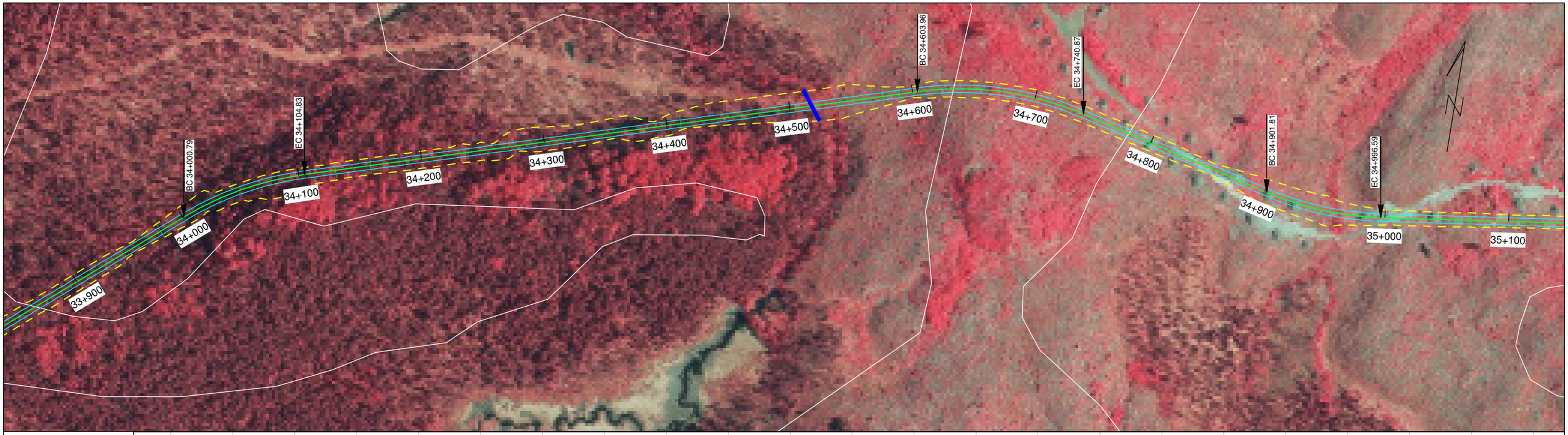
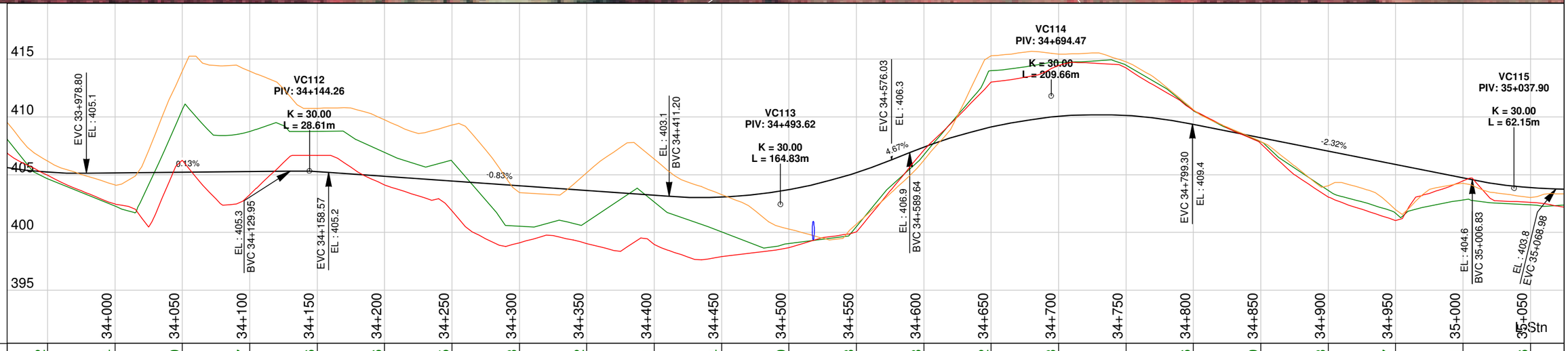
# PLAN ET PROFIL
## Second acces Road Mistissini
### 33+000.00 To 34+000.00

Horizontal 0 100

Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 405.22 | 405.14 | 405.20 | 405.27 | 405.26 | 404.86 | 404.45 | 404.03 | 403.62 | 403.21 | 403.04 | 403.69 | 405.18 | 407.38 | 409.12 | 410.03 | 410.11 | 409.36 | 408.19 | 407.03 | 405.87 | 404.71 | 403.86 |
| PROFILE SUBGRADE ELEVATION | 404.66 | 402.28 | 410.55 | 408.72 | 408.75 | 406.93 | 406.20 | 400.54 | 400.89 | 402.66 | 400.06 | 399.02 | 400.48 | 406.68 | 413.97 | 414.70 | 414.48 | 410.54 | 407.83 | 403.64 | 401.67 | 402.80 | 402.40 |

- Contour
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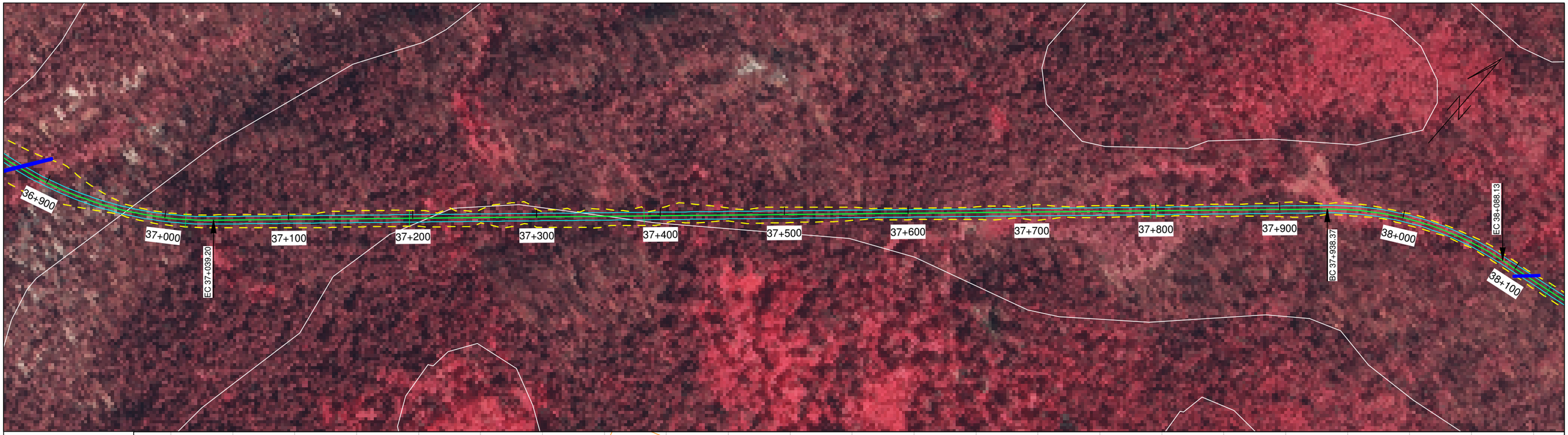
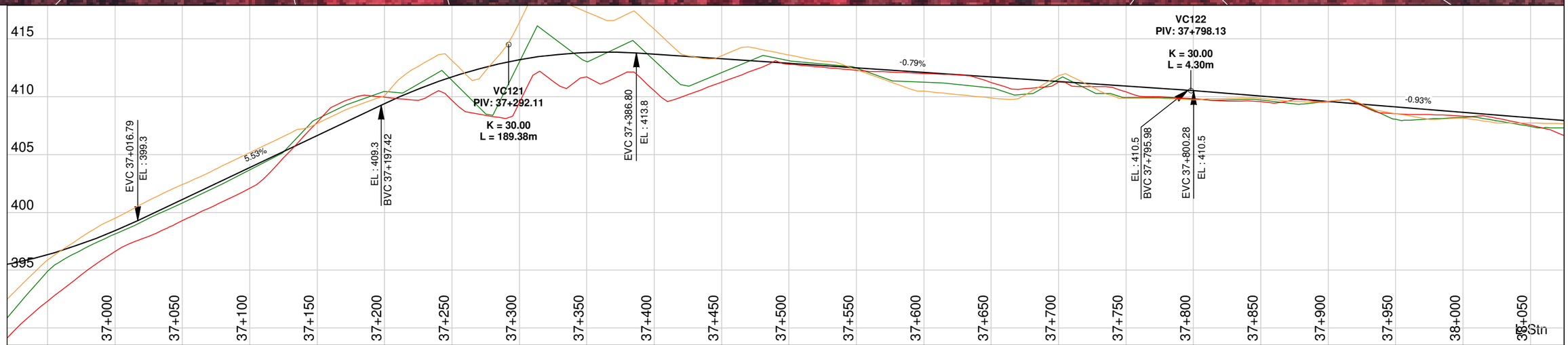
# PLAN ET PROFIL
## Second acces Road Mistissini
### 34+000.00 To 34+000.00

Horizontal 0 100

Vertical 0 10




| Sta | 37+000 | 37+050 | 37+100 | 37+150 | 37+200 | 37+250 | 37+300 | 37+350 | 37+400 | 37+450 | 37+500 | 37+550 | 37+600 | 37+650 | 37+700 | 37+750 | 37+800 | 37+850 | 37+900 | 37+950 | 38+000 | 38+050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 396.35 | 398.41 | 401.13 | 403.89 | 406.65 | 409.42 | 411.72 | 413.19 | 413.83 | 413.66 | 413.26 | 412.87 | 412.48 | 412.08 | 411.69 | 411.30 | 410.90 | 410.51 | 410.04 | 409.58 | 409.11 | 408.65 | 408.18 |
| PROFILE SUBGRADE ELEVATION | 394.87 | 398.13 | 400.80 | 403.67 | 408.08 | 410.46 | 411.40 | 412.97 | 413.03 | 413.17 | 412.08 | 413.12 | 412.47 | 411.24 | 410.75 | 411.53 | 409.92 | 409.79 | 409.72 | 409.59 | 408.04 | 408.21 | 407.43 |

- Contour
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Approved by :

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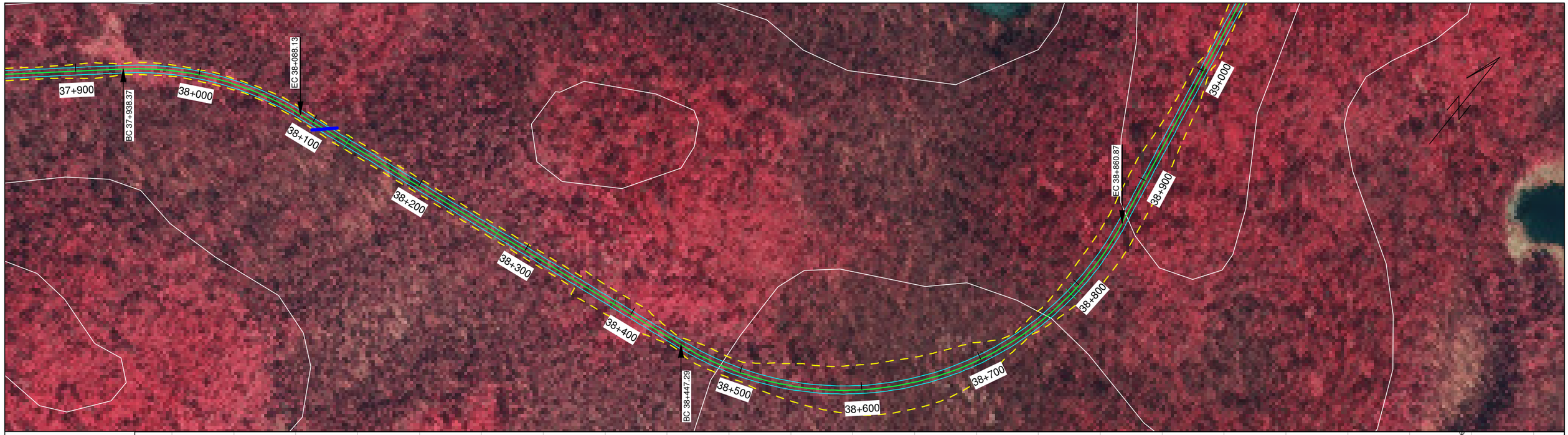
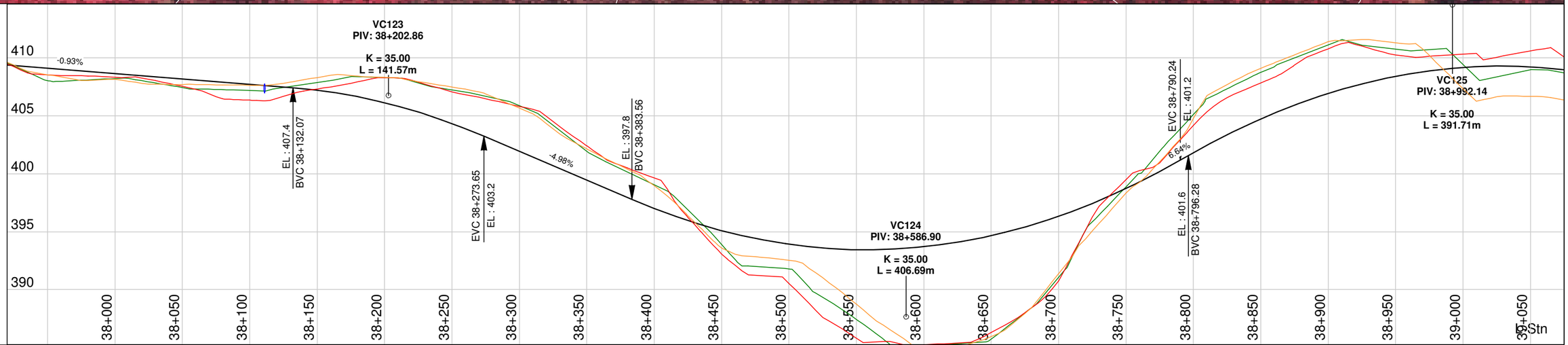
# PLAN ET PROFIL
## Second acces Road Mistissini
### 37+000.00 To 38+000.00

Horizontal 0 100
Vertical 0 10




| | 38+000 | 38+050 | 38+100 | 38+150 | 38+200 | 38+250 | 38+300 | 38+350 | 38+400 | 38+450 | 38+500 | 38+550 | 38+600 | 38+650 | 38+700 | 38+750 | 38+800 | 38+850 | 38+900 | 38+950 | 39+000 | 39+050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 409.11 | 408.65 | 408.18 | 407.72 | 407.21 | 406.13 | 404.33 | 401.93 | 399.44 | 396.99 | 395.09 | 393.91 | 393.45 | 393.69 | 394.66 | 396.33 | 398.72 | 401.81 | 404.72 | 406.92 | 408.40 | 409.17 | 409.23 |
| PROFILE SUBGRADE ELEVATION | 408.04 | 408.21 | 407.43 | 407.17 | 407.86 | 408.30 | 407.24 | 405.88 | 401.96 | 399.05 | 393.92 | 391.78 | 387.46 | 385.18 | 385.72 | 391.02 | 398.86 | 405.07 | 408.73 | 411.10 | 410.76 | 409.44 | 408.96 |

- Contour
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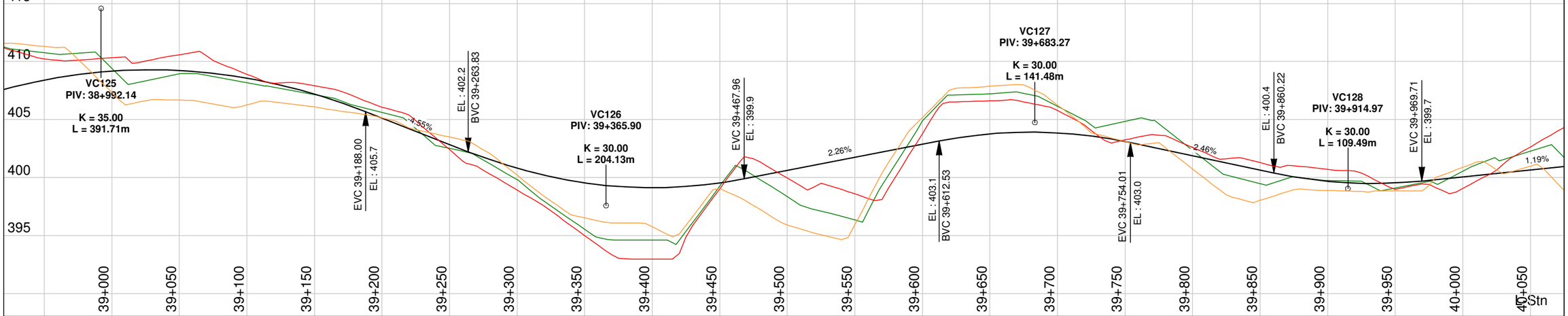
Approved by :

23/03/16


# PLAN ET PROFIL
## Second acces Road Mistissini
### 38+000.00 To 39+000.00

Horizontal 0 100
Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 408.40 | 409.17 | 409.23 | 408.57 | 407.19 | 405.13 | 402.85 | 400.80 | 399.54 | 399.12 | 399.53 | 400.61 | 401.74 | 402.87 | 403.76 | 403.85 | 403.10 | 401.87 | 400.65 | 399.68 | 399.53 | 400.06 | 400.66 |
| PROFILE SUBGRADE ELEVATION | 410.76 | 409.44 | 408.96 | 408.18 | 407.15 | 405.60 | 402.51 | 399.82 | 395.53 | 394.61 | 399.22 | 398.36 | 396.36 | 404.82 | 407.23 | 406.15 | 404.83 | 402.36 | 399.48 | 399.75 | 399.10 | 400.53 | 402.26 |

- Contour
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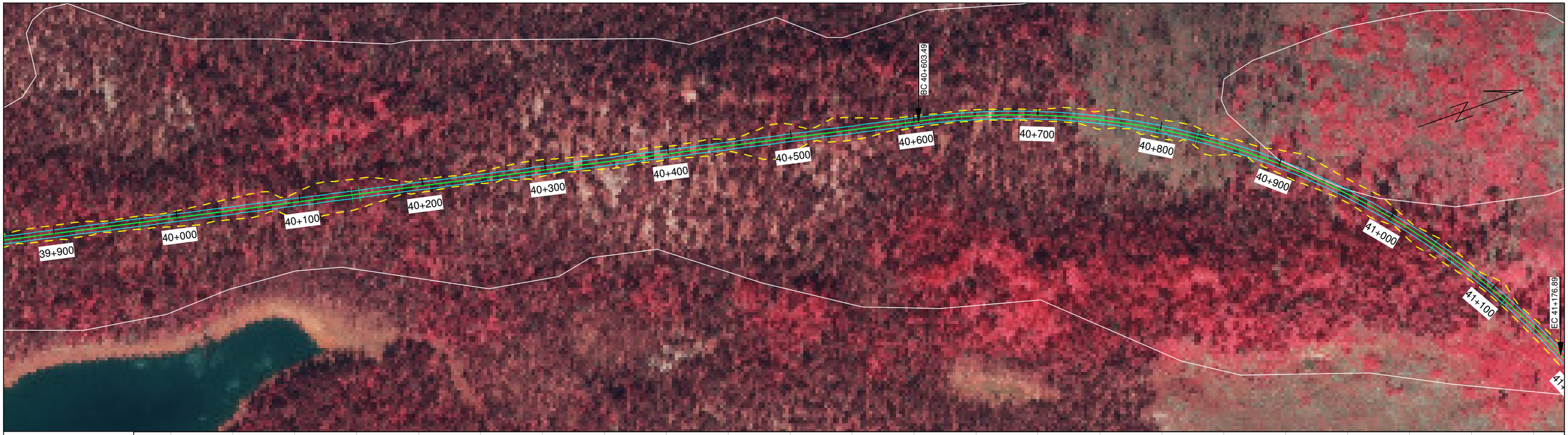
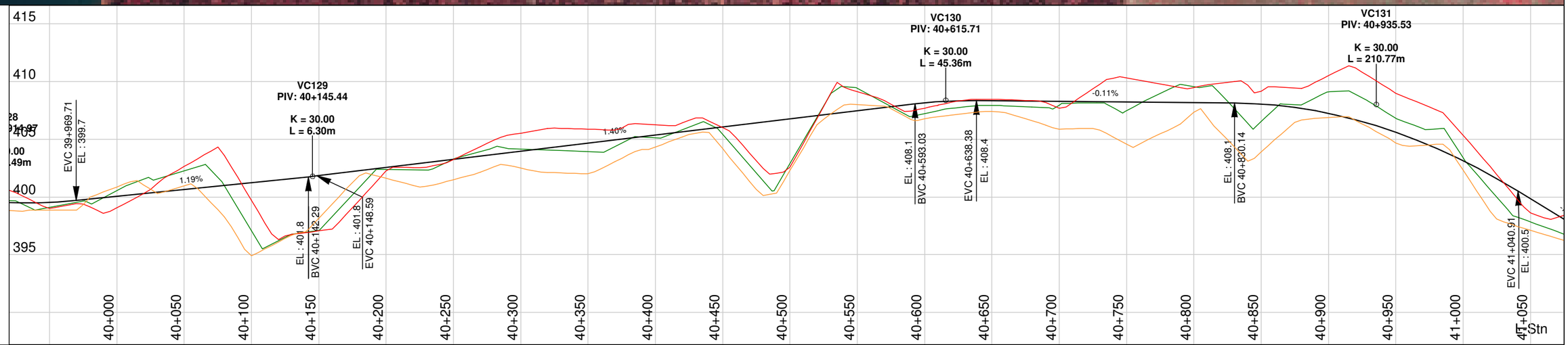
# PLAN ET PROFIL
## Second acces Road Mistissini
### 39+000.00 To 40+000.00

Horizontal 0 100
Vertical 0 10




| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL GROUND ELEVATION | 399.53 | 400.06 | 400.66 | 401.25 | 401.86 | 402.56 | 403.26 | 403.96 | 404.66 | 405.36 | 406.06 | 406.76 | 407.46 | 408.15 | 408.34 | 408.28 | 408.23 | 408.17 | 408.05 | 407.25 | 405.61 | 403.14 | 399.85 |
| PROFILE SUBGRADE ELEVATION | 399.10 | 400.53 | 402.26 | 397.10 | 397.11 | 402.40 | 403.28 | 404.15 | 403.94 | 405.14 | 405.43 | 402.91 | 409.44 | 407.23 | 407.93 | 407.95 | 407.46 | 409.55 | 406.53 | 409.11 | 406.83 | 403.43 | 397.85 |

- Contour
- Center Line
- Road Edges
- Clearing Limits
- Plan Culverts
- Topopgraphy
- Profile Subgrade
- Profile Culverts
- Natural Ground Elevation (Right)
- Natural Ground Elevation (Left)

CE DOCUMENT NE DOIT PAS ÊTRE UTILISÉ À DES FINS DE CONSTRUCTION

THIS DOCUMENT MUST NOT BE USED FOR CONSTRUCTION

Sceaux / Permit-Seal

Consultants

Vision Eeyou Istchee
Connect • Develop • Protect
Stantec | DESFOR | SYSTRA

CREE DEVELOPMENT CORPORATION
Respect · Collaboration · Strength

Client-Project Logo

LA GRANDE ALLIANCE

Note:
Natural ground is based LIDAR by MERNF
Design by Vision Eeyou Istchee

Prepared by :
Marc-Antoine Allard, ing.f.
Approved by :

23/03/16



# PLAN ET PROFIL
## Second acces Road Mistissini
### 40+000.00 To 40+000.00

Horizontal 0 100
Vertical 0 10

# PONCEAUX 8.3 (RADF)

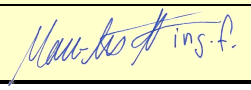
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin001 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 246567 -- Y = 5567663 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | | (Ex: 32A02SO) | | | 32J01NO | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | | 27,95 ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | | 0,00 % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | | 0 # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | | 0 # | |
| Longueur des lignes horizontales | | | | | 1356 m | |
| Longueur des lignes verticales | | | | | 1105 m | |
| Équidistance des courbes de niveau | | | | | 10 m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | Boisé | Pâturage | Culture | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | AB | 27,95 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | B | 0,00 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | BC | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | C | 0,00 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | CD | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **27,95** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 966 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 408 | m | |
| Élévation à 10% en amont du point de traversée | | | | 402 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,83 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,0900 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 109 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 26,07 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,6615 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,12** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,13** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | Enfouissement | | | Conduit avec |
|---|---|---|---|---|---|
| | Note #1 | 10% | 20% | 30% | déversoirs (pente > 2%) |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | 450 | 750 | 600 | 1200 |
| Enfouissement (mm) | | 45 | 250 | 180 | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

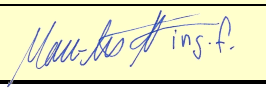
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin002 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 250100 -- Y = 5569763 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J01NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 1 800,45 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 3,06 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 250 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 302 | # | |
| Longueur des lignes horizontales | | | | 90402 | m | |
| Longueur des lignes verticales | | | | 90100 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 507,01 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 543,42 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 624,47 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 125,55 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **1800,45** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 7895 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 395 | m | |
| Élévation à 10% en amont du point de traversée | | | | 392 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,05 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2126 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 323 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 26,07 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,3113 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | C | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,8159 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **7,04** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **7,39** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **2400** | **2400** | **2700** | **2400** |
| Enfouissement (mm) | | **240** | **480** | **500** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 4,29 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

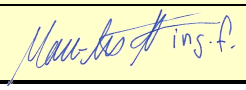
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin030 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 251132 -- Y = 5569643 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 13,70 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 0,00 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 0 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 0 | # | |
| Longueur des lignes horizontales | | | | 687 | m | |
| Longueur des lignes verticales | | | | 611 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 13,70 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 0,00 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY, 4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK, R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,00 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **13,70** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 797 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 0 | m | |
| Élévation à 10% en amont du point de traversée | | | | 0 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,00 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,0900 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 199 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,4360 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,04** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,04** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

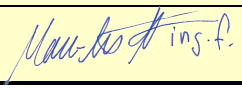
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10322052_bassin003 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 254578 -- Y = 5568871 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 22,59 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 26,95 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 22 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 38 | # | |
| Longueur des lignes horizontales | | | | 1150 | m | |
| Longueur des lignes verticales | | | | 1076 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,85 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 15,74 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **22,59** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 776 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 462 | m | |
| Élévation à 10% en amont du point de traversée | | | | 426 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 6,19 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3785 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 36 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,3687 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,82** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,86** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1000** | **1125** | **1125** | **1400** |
| Enfouissement (mm) | | **100** | **250** | **337,5** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,74 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

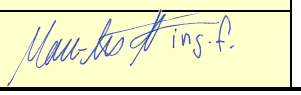
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin004 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 256601 -- Y = 5570573 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 351,11 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 12,51 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 214 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 224 | # | |
| Longueur des lignes horizontales | | | | 17468 | m | |
| Longueur des lignes verticales | | | | 17542 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 64,08 | | | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 60,60 | | | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | | | | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY, 4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK, R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 128,82 | | | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | | | | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 97,61 | | | ha | |
| Superficie totale | | | | **351,11** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 4040 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 387 | m | |
| Élévation à 10% en amont du point de traversée | | | | 380 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,23 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2494 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 222 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,4044 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(Fl)** | | | | 0,5742 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **1,42** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | **%** | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **1,49** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | **2** | **2** | **2** | **2** |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | **S** | **S** | **S** | **S** |
| Diamètre du conduit (mm) | | **900** | **1000** | **1125** | **1200** |
| Enfouissement (mm) | | **90** | **250** | **337,5** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,2 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

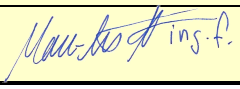
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin005 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 257175 -- Y = 5570684 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 11,56 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 19,82 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 8 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 14 | # | |
| Longueur des lignes horizontales | | | | 535 | m | |
| Longueur des lignes verticales | | | | 575 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,26 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 8,04 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 3,26 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **11,56** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 420 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 427 | m | |
| Élévation à 10% en amont du point de traversée | | | | 391 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 11,43 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3061 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 24 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,7634 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,44** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,46** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **750** | **900** | **900** | **1200** |
| Enfouissement (mm) | | **75** | **250** | **270** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,42 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

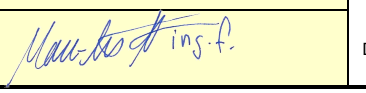
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin006 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 257916 -- Y = 5571016 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 38,18 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 7,56 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 14 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 14 | # | |
| Longueur des lignes horizontales | | | | 1761 | m | |
| Longueur des lignes verticales | | | | 1941 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 15,08 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,07 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY, 4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK, R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 2,64 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 14,40 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **38,18** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 866 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 400 | m | |
| Élévation à 10% en amont du point de traversée | | | | 390 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 1,54 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1199 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 82 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,8084 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5742 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,15** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,16** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **500** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **50** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,19 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

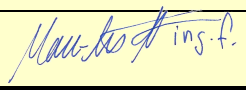
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024 bassin007 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 258384 -- Y = 5570694 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 516,96 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 7,50 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 224 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 164 | # | |
| Longueur des lignes horizontales | | | | 25692 | m | |
| Longueur des lignes verticales | | | | 26019 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 5,11 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 345,92 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 51,51 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 114,41 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **516,96** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 3870 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 415 | m | |
| Élévation à 10% en amont du point de traversée | | | | 400 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,52 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1733 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 234 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,3897 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | A | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5439 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **1,33** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **1,40** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1200** | **1400** | **1400** | **1400** |
| Enfouissement (mm) | | **120** | **280** | **420** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,07 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

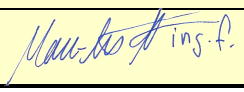
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin008 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 258787 -- Y = 5570704 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 13,12 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 12,53 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 10 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 6 | # | |
| Longueur des lignes horizontales | | | | 646 | m | |
| Longueur des lignes verticales | | | | 631 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 1,91 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 11,15 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,06 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **13,12** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 489 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 427 | m | |
| Élévation à 10% en amont du point de traversée | | | | 403 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 6,54 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,4036 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 15 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 2,3548 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,9450 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,82** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | **%** | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,86** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1000** | **1125** | **1125** | **1400** |
| Enfouissement (mm) | | **100** | **250** | **337,5** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,74 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin009 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 259398 -- Y = 5571332 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 134,46 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 7,45 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 56 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 44 | # | |
| Longueur des lignes horizontales | | | | 6649 | m | |
| Longueur des lignes verticales | | | | 6778 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 1,58 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 84,83 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 19,14 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 28,90 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **134,46** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 1834 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 420 | m | |
| Élévation à 10% en amont du point de traversée | | | | 410 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,73 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1804 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 143 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,5488 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5851 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,54** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,57** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** | Ing. f. | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **800** | **900** | **1000** | **1200** |
| Enfouissement (mm) | | **80** | **250** | **300** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,48 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

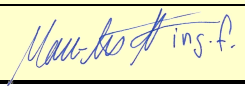
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin010 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 259874 -- Y = 5571571 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 133,77 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 4,34 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 38 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 20 | # | |
| Longueur des lignes horizontales | | | | 6634 | m | |
| Longueur des lignes verticales | | | | 6719 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 3,06 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 98,75 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,00 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 31,97 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **133,77** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 1898 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 450 | m | |
| Élévation à 10% en amont du point de traversée | | | | 416 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 2,39 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1549 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 101 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,6984 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5774 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,58** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,61** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **900** | **1000** | **1000** | **1200** |
| Enfouissement (mm) | | **90** | **250** | **300** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,6 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

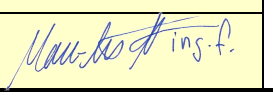
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin031 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 260579 -- Y = 5572090 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 7,11 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 6,72 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 2 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 2 | # | |
| Longueur des lignes horizontales | | | | 317 | m | |
| Longueur des lignes verticales | | | | 279 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,75 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,00 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,36 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **7,11** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 345 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 440 | m | |
| Élévation à 10% en amont du point de traversée | | | | 440 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,00 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1829 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 119 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,6231 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,7152 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,04** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,04** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

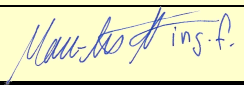
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin011 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 261658 -- Y = 5573979 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 5,64 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 14,83 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 4 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 4 | # | |
| Longueur des lignes horizontales | | | | 280 | m | |
| Longueur des lignes verticales | | | | 259 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,70 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 4,52 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,00 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,41 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **5,64** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 476 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 465 | m | |
| Élévation à 10% en amont du point de traversée | | | | 450 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 4,20 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2348 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 38 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,3155 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,6849 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,08** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,08** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

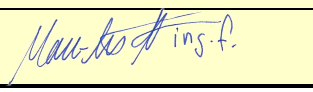
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin012 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 261900 -- Y = 5574286 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 23,87 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 8,60 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 8 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 12 | # | |
| Longueur des lignes horizontales | | | | 1164 | m | |
| Longueur des lignes verticales | | | | 1162 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,43 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 17,44 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **23,87** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 639 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 485 | m | |
| Élévation à 10% en amont du point de traversée | | | | 460 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 5,22 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3842 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 34 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,4103 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,90** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,95** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1000** | **1125** | **1200** | **1400** |
| Enfouissement (mm) | | **100** | **250** | **360** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,74 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

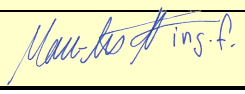
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin013 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 262818 -- Y = 5574892 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 163,74 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 15,24 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 144 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 110 | # | |
| Longueur des lignes horizontales | | | | 8230 | m | |
| Longueur des lignes verticales | | | | 8437 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 58,97 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 92,08 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 12,68 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **163,74** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 2252 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 455 | m | |
| Élévation à 10% en amont du point de traversée | | | | 440 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,89 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3393 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 122 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,6102 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,6783 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **1,61** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | **%** | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **1,69** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1400** | **1400** | **1500** | **1500** |
| Enfouissement (mm) | | **140** | **280** | **450** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,46 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

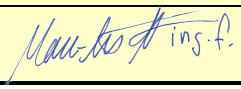
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin014 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 264125 -- Y = 5576319 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 30,15 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 15,63 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 26 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 20 | # | |
| Longueur des lignes horizontales | | | | 1491 | m | |
| Longueur des lignes verticales | | | | 1453 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 9,45 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 20,71 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **30,15** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 518 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 478 | m | |
| Élévation à 10% en amont du point de traversée | | | | 450 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 7,21 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3767 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 28 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,5952 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **1,27** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **1,33** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1200** | **1400** | **1400** | **1400** |
| Enfouissement (mm) | | **120** | **280** | **420** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,07 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

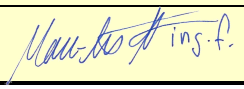
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin015 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 264245 -- Y = 5576409 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | | (Ex: 32A02SO) | | | 32J08SE | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | | 8,72 ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | | 13,72 % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | | 4 # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | | 6 # | |
| Longueur des lignes horizontales | | | | | 323 m | |
| Longueur des lignes verticales | | | | | 406 m | |
| Équidistance des courbes de niveau | | | | | 10 m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | | **Boisé** | **Pâturage** | **Culture** | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | 0,00 ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 8,42 | 0,00 | 0,00 | 0,00 ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | 0,00 ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,17 | 0,00 | 0,00 | 0,00 ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | 0,00 ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,13 | 0,00 | 0,00 | 0,00 ha | |
| Superficie totale | | | | | **8,72** ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | | 527 m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | | 457 m | |
| Élévation à 10% en amont du point de traversée | | | | | 450 m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | | 1,77 % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | | 0,2602 | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | | 52 minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | | 25,17 mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | | 1,0907 | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | | B | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | | 0,8440 | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | | **0,15** m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | | **N/A** m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | | 5 **%** | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | | **0,16** m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | | **N/A** m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **500** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **50** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,19 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

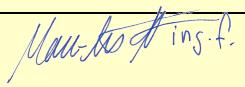
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin016 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 265884 -- Y = 5576701 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 520,48 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 10,96 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 292 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 280 | # | |
| Longueur des lignes horizontales | | | | 26260 | m | |
| Longueur des lignes verticales | | | | 25907 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 314,75 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 152,86 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 52,87 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **520,48** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 4819 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 500 | m | |
| Élévation à 10% en amont du point de traversée | | | | 440 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 1,66 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2886 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 155 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,5172 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | A | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,6007 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **3,26** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **3,42** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1800** | **1800** | **2000** | **1800** |
| Enfouissement (mm) | | **180** | **360** | **500** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 2,41 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

En raison de la largeur de ce cours d'eau un pont sera installé pour être en mesure de respecter le RADF.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

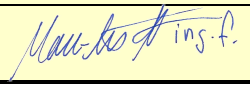
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin017 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 267967 -- Y = 5578494 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 11,36 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 9,94 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 6 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 6 | # | |
| Longueur des lignes horizontales | | | | 553 | m | |
| Longueur des lignes verticales | | | | 654 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,69 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 2,58 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 2,10 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **11,36** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 391 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 500 | m | |
| Élévation à 10% en amont du point de traversée | | | | 500 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,00 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2598 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 68 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,9161 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5973 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,11** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,12** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

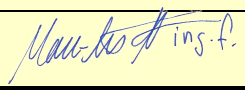
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin018 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 268281 -- Y = 5578743 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 19,16 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 11,81 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 12 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 10 | # | |
| Longueur des lignes horizontales | | | | 934 | m | |
| Longueur des lignes verticales | | | | 929 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 6,79 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 12,38 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **19,16** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 526 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 530 | m | |
| Élévation à 10% en amont du point de traversée | | | | 510 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 5,07 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3698 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 32 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,4702 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C)<br>**A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | B | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,73** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,77** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1000** | **1000** | **1125** | **1200** |
| Enfouissement (mm) | | **100** | **250** | **337,5** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,74 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

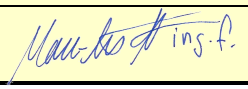
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin019 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 269432 -- Y = 5580064 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05SO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 8,47 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 2,76 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 2 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 0 | # | |
| Longueur des lignes horizontales | | | | 393 | m | |
| Longueur des lignes verticales | | | | 332 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 5,32 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 3,15 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,00 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **8,47** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 617 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 490 | m | |
| Élévation à 10% en amont du point de traversée | | | | 488 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,43 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2021 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 91 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,99 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,7470 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 1,0000 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,09** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,09** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

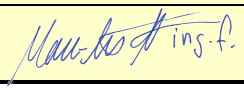
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024 bassin020 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 270425 -- Y = 5582465 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 295,28 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 10,80 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 175 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 141 | # | |
| Longueur des lignes horizontales | | | | 14588 | m | |
| Longueur des lignes verticales | | | | 14669 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 231,47 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 47,55 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 16,26 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **295,28** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 4845 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 483 | m | |
| Élévation à 10% en amont du point de traversée | | | | 432 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 1,40 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2758 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 167 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,93 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,4915 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,7084 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **2,04** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **2,14** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1400** | **1500** | **1600** | **1600** |
| Enfouissement (mm) | | **140** | **300** | **480** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,46 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

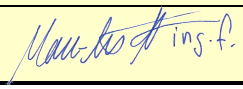
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin021 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 271148 -- Y = 5582835 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 408,77 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 14,09 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 305 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 272 | # | |
| Longueur des lignes horizontales | | | | 20610 | m | |
| Longueur des lignes verticales | | | | 20336 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 284,60 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 84,87 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 39,30 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **408,77** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 5831 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 474 | m | |
| Élévation à 10% en amont du point de traversée | | | | 411 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 1,44 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2751 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 182 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,93 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,4634 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,6574 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **2,47** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **2,59** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 17 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1500** | **1600** | **1800** | **1800** |
| Enfouissement (mm) | | **150** | **320** | **500** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,68 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

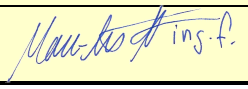
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin022 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 272129 -- Y = 5582638 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32J08SE | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 475,22 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 9,01 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 266 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 165 | # | |
| Longueur des lignes horizontales | | | | 23917 | m | |
| Longueur des lignes verticales | | | | 23940 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 237,10 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 173,21 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 12,77 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 52,15 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **475,22** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 5143 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 441 | m | |
| Élévation à 10% en amont du point de traversée | | | | 411 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,78 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3056 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 202 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,17 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,4315 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,6448 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **2,83** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **2,97** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 17 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1600** | **1800** | **1800** | **1800** |
| Enfouissement (mm) | | **160** | **360** | **500** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 1,91 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin023 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 272427 -- Y = 5582177 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 6,00 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 0,00 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 0 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 0 | # | |
| Longueur des lignes horizontales | | | | 301 | m | |
| Longueur des lignes verticales | | | | 247 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 5,59 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 0,30 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 0,11 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **6,00** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 247 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 0 | m | |
| Élévation à 10% en amont du point de traversée | | | | 0 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 0,00 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,1551 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 104 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,93 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,6853 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,8205 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,04** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,04** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** | Ing.f. | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | Note #3 | **450** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **45** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,15 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.
3. Petit bassin, ruisseau intermittent, tenir compte des directives supplémentaires au RADF

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin024 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 272709 -- Y = 5582134 | | | |

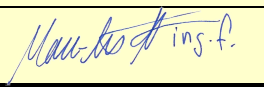
## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | Notes |
|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | 7 726,38 | ha | Voir note #4 |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | 8,42 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | 3474 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | 3036 | # | |
| Longueur des lignes horizontales | | | 386271 | m | |
| Longueur des lignes verticales | | | 386640 | m | |
| Équidistance des courbes de niveau | | | 10 | m | |

| IDENTIFICATION DES DÉPÔTS DE SURFACE | | Boisé | Pâturage | Culture | |
|---|---|---|---|---|---|
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | AB | 228,05 | | | ha |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | B | 3 860,25 | | | ha |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | BC | 0 | | | ha |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY, 4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK, R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | C | 1 770,08 | | | ha |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | CD | 3,02 | | | ha |
| Lacs et terrains dénudés/semi-dénudés humides | | 1 864,98 | | | ha |
| Superficie totale | | | | 7726,38 | ha |

| | | | |
|---|---|---|---|
| LONGUEUR DU COURS D'EAU **(Lc)** | 22107 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | 437 | m | |
| Élévation à 10% en amont du point de traversée | 411 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | 0,16 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | B | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | **N/A** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | **12,00** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | **N/A** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | **12,60** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 17 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | Enfouissement | | | Conduit avec |
|---|---|---|---|---|---|
| | Note #1 | 10% | 20% | 30% | déversoirs (pente > 2%) |
| Nombre de conduits | Note #2 | 2 | 2 | 2 | 2 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | 2200 | 2400 | 2400 | 2200 |
| Enfouissement (mm) | | 220 | 480 | 500 | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 7,2 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

4. Pour les bassins versants dont la superficie se situe entre 2 500 et 15 000 ha, le concepteur doit relever certains indices sur le terrain ou utiliser d'autres méthodes que celles prescrites pour valider ces calculs.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

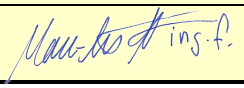
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin025 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 273063 -- Y = 5582103 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 71,94 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 8,93 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 33 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 33 | # | |
| Longueur des lignes horizontales | | | | 3653 | m | |
| Longueur des lignes verticales | | | | 3735 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY,9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 23,74 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 36,87 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 11,33 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **71,94** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 1503 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 432 | m | |
| Élévation à 10% en amont du point de traversée | | | | 396 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 3,19 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,3141 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 68 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,93 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 0,9196 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | A | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5625 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,84** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,88** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **1000** | **1125** | **1125** | **1400** |
| Enfouissement (mm) | | **100** | **250** | **337,5** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,74 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# PONCEAUX 8.3 (RADF)

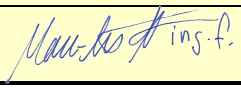
selon conformité aux annexes 6 et 7 du RADF

| Description du projet : | 10321024_bassin026 | Donnée | Unité | Inventaire décennal |
|---|---|---|---|---|
| Localisation géographique : | X = 274008 -- Y = 5582830 | | | |

## CALCUL DU DÉBIT DES COURS D'EAU

| | | | | | | Notes |
|---|---|---|---|---|---|---|
| Feuillet 1:20 000 | (Ex: 32A02SO) | | | 32I05NO | | |
| SUPERFICIE TOTALE DU BASSIN VERSANT **(Ab)** | | | | 19,64 | ha | |
| PENTE MOYENNE DU BASSIN VERSANT **(Sb)** | | | | 29,36 | % | |
| Nombre de fois que les lignes horizontales coupent une courbe de niveau | | | | 24 | # | |
| Nombre de fois que les lignes verticales coupent une courbe de niveau | | | | 36 | # | |
| Longueur des lignes horizontales | | | | 1012 | m | |
| Longueur des lignes verticales | | | | 1031 | m | |
| Équidistance des courbes de niveau | | | | 10 | m | |
| IDENTIFICATION DES DÉPÔTS DE SURFACE | | **Boisé** | **Pâturage** | **Culture** | | |
| 1AB,1BF,1BG,1BI,1BN,1BP,1BPY,1BR,1BT,1P,2,2A,2AE,2AK,2AT,2B,2BD,2BE,2BP,3AC,4GS,5S,6,6A,8AP,8APM,8APY,8AY,8AYP,8CM,8CY,8E,8F,8M, 8P,8PM,8Y,9,9A,9R,9S | **AB** | 0,00 | 0,00 | 0,00 | ha | |
| 1A,1AD,1B,1BC,1BD,1BDY,1B1M,1B1Y,2AM,2AR,2AY,2BEM,2BER,2BEY,2BR,3,3A,3AN,3ANY,4P,6S,6SM,6SR,6SY,8A,8AC,8AL,8ALM,8ALY,8AM,8AR, 8AS,8ASY,8C,8PY, 9SM,9SY,M6S,M8A,M8AP,M8C,M8PY | **B** | 10,88 | 0,00 | 0,00 | ha | |
| 3AE,3D,3DD,3DE,4,4A,4GSM,4GSR,4GSY,5SM,5SR,5SY,6AM,6AY,6R, 8,8G | **BC** | 0,00 | 0,00 | 0,00 | ha | |
| 1AA,1AAM,1AAR,1ADY,1AM,1AR,1ASY,1AY,1AYR,1M,1Y,2BDY,4AR,4AY,4GA,4GAM,4GAY,4GAR,4GD,5A,5L,5R,5Y,M1,M1A,M1AA,R1,R1A,R1BD,R2A,R2AK,R2BE,R3AN,R4,R4GS,R5S,R6,R6S,R8A,R8AP,R8C,R8E,R8P,R9S,RS | **C** | 4,16 | 0,00 | 0,00 | ha | |
| 1AAY,5AM,5AR,5AY,5G,5GR,R,R1AA,R4GA,R5A | **CD** | 0,00 | 0,00 | 0,00 | ha | |
| Lacs et terrains dénudés/semi-dénudés humides | | 4,61 | 0,00 | 0,00 | ha | |
| Superficie totale | | | | **19,64** | ha | |
| LONGUEUR DU COURS D'EAU **(Lc)** | | | | 867 | m | |
| Élévation à 15% en aval de la limite extrême du bassin versant | | | | 422 | m | |
| Élévation à 10% en amont du point de traversée | | | | 405 | m | |
| PENTE 85-10 du cours d'eau **(Sc)** | | | | 2,61 | % | |
| COEFFICIENT DE RUISSELLEMENT PONDÉRÉ **(Cp)** | | | | 0,2467 | | |
| TEMPS DE CONCENTRATION DU BASSIN VERSANT **(Tc)** | | | | 60 | minutes | |
| INTENSITÉ DE PRÉCIPITATION **(I)** | | | | 25,93 | mm/h | |
| COEFFICIENT DE CORRECTION DE L'INTENSITÉ DE PRÉCIPITATION **(Fi)** | | | | 1,0034 | | |
| Distribution des lacs et dénudés/semi-dénudés humides (A, B ou C) | | | | A | | |
| **A=concentrés près du ponceau B=uniformément répartis C=concentrés à la tête** | | | | | | |
| COEFFICIENT DE RÉDUCTION DU DÉBIT DE POINTE **(FI)** | | | | 0,5426 | | |
| Débit maximum instantané d'une récurrence de 10 ans **($Q_{10}$)** (Sup <60 km2) | | | | **0,19** | m3/s | |
| Débit de pointe journalier d'une récurrence de 20 ans **($Q_{1,20}$)** (Sup >60 km2) | | | | **N/A** | m3/s | |
| **AUGMENTATION % DU DÉBIT (RADF)** (Pour évènements climatiques exceptionnels) | | | | 5 | % | |
| Débit récurrence de 10 ans (avec augmentation du % de débit) | | | | **0,20** | m3/s | |
| Débit récurrence de 20 ans (avec augmentation du % de débit) | | | | **N/A** | m3/s | |

Les paramètres du calcul doivent être vérifiés sur le terrain. Cette feuille de calcul de dimensionnement des ponceaux n'a pas de valeur officielle et que les seules textes ayant force de loi sont ceux parus à la Gazette officielle du Québec (Décret 473-2017)

| | | | |
|---|---|---|---|
| Préparé par: | Viviane Dauphinais | | |
| **Approuvé par Ing. f. :** |  | Date : | 16 novembre 2022 |

## A TITRE INDICATIF (avec augmentation % du débit)

| **DIAMÈTRE REQUIS POUR UN CONDUIT CIRCULAIRE** | | **Enfouissement** | | | **Conduit avec** |
|---|---|---|---|---|---|
| | Note #1 | **10%** | **20%** | **30%** | **déversoirs (pente > 2%)** |
| Nombre de conduits | Note #2 | 1 | 1 | 1 | 1 |
| Type d'entrée (S) saillie, (B) biseautée ou mur droit | Saillie | S | S | S | S |
| Diamètre du conduit (mm) | | **600** | **750** | **600** | **1200** |
| Enfouissement (mm) | | **60** | **250** | **180** | Consulter l'annexe 10 du RADF |
| Surface totale d'évacuation après enfouissement (m2) | * | 0,27 | | | |

## NOTES

1. Enfouissement 10%: lorsque le libre passage du poisson n'a pas besoin d'être assuré (articles 103-104)
   Enfouissement 20% ou 30%: lorsque le libre passage du poisson doit être assuré (article 105, annexe 9)
   Conduit avec déversoirs: lorsque le libre passage du poisson doit être assuré (pente de 2 à 6%), (article 106 et annexe 10)
2. Selon l'article 102, les diamètres ne peuvent varier que d'une seule classe de diamètre pourvu que soit respectée la capacité d'évacuation minimale totale déterminée par le calcul.

* La valeur inscrite pour la surface totale d'évacuation après enfouissement ne tient pas compte de la valeur minimale(250mm) et de la valeur maximale (500mm)

Veuillez consulter le schéma décisionnel, les articles et les annexes du RADF pour la construction, l'amélioration ou la réfection d'un ponceau.

RADF

# Cost estimate - Estimation des coûts

| Project number - Numéro de projet | Road -Route |
|---|---|
| 158100425 | Second Road to Mistissini |
| Type of works - Type de travaux | Municipality - Municipalité |
| Building a new acces road | Eeyou Istchee Baie-James |

## Work cost estimate - Estimation des coûts des travaux

### SITE ORGANIZATION - ORGANISATION DE CHANTIER

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| Organization of construction sites and camps - Organisation de chantier et campements | global | 1 | 12 500 000,00 $ | 12 500 000,00 $ |
| | | | | |
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| | | | | |
| | Subtotal - Sous total | | | 12 500 000,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Site Organization - Organisation de chantier** | | | 12 500 000,00 $ |

### EARTHWORK - TERRASSEMENT

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| **Reparation Works - Travaux de réfection** | | | | |
| Clearing 4m each side - Débrousaillage 4m de chaque côté | m.l. | 29 000 | 4,00 $ | 116 000,00 $ |
| Stump removal - Essouchement | ha | 11,6 | 15 000,00 $ | 174 000,00 $ |
| 4m Widening and correction - Élargissement de 4m et correction | m.l. | 14 500 | 250,00 $ | 3 625 000,00 $ |
| Reprofiling ditches - Reprofilage de fossé | m.l. | 14 500 | 12,00 $ | 174 000,00 $ |
| Infrastructure excavation and filling with MG-112 - Excavation de l'infrastructure et r | m.l. | 14 500 | 185,00 $ | 2 682 500,00 $ |
| | | | | |
| **New Road Building - Construction de nouveau chemin** | | | | |
| Clearing works - Déboisement | ha | 42 | 8 500,00 $ | 357 000,00 $ |
| Stump removal - Essouchement | ha | 42 | 15 000,00 $ | 630 000,00 $ |
| 2nd class excavation - Déblais 2e classe | m³ | 64 117 | 16,00 $ | 1 025 872,00 $ |
| Rock excavation - Déblais 1e classe | m³ | 24 013 | 30,00 $ | 720 390,00 $ |
| MG-112 borrowing - Emprunt MG-112 | m³ | 69 281 | 45,00 $ | 3 117 645,00 $ |
| Type-2 geogrid installation - Installation de géogrille Type-2 | m² | 6 000 | 7,50 $ | 45 000,00 $ |
| | Subtotal - Sous total | | | 12 667 407,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Earthworks - Terrassement** | | | 12 667 407,00 $ |

| Project number - Numéro de projet | Road -Route |
|---|---|
| 158100425 | Second Road to Mistissini |
| Type of works - Type de travaux | Municipality - Municipalité |
| Building a new acces road | Eeyou Istchee Baie-James |

## PAVEMENT AND SURFACING - CHAUSSÉE ET REVÊTEMENT

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| | | | | |
| Granular materials, MG 56 for foundation - Matériaux granulaires, MG 56 pour fondation | t | 221 400 | 22,50 $ | 4 981 500,00 $ |
| Granular materials, MG 20 for foundation - Matériaux granulaires, MG 20 pour fondation | t | 140 835 | 25,00 $ | 3 520 875,00 $ |
| Pavement, ESG-14, single layer 80mm - Enrobé, ESG-14, couche unique 80mm | t | 67 053 | 260,00 $ | 17 433 780,00 $ |
| Shoulder recharge with MG 20 granular materials - Rechargement d'accotement en matériaux granulaires MG 20 | t | 38 493 | 30,00 $ | 1 154 790,00 $ |
| | Subtotal - Sous total | | | 27 090 945,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total -Pavement and surfacing - Chaussée et revêtement** | | | 27 090 945,00 $ |

## DRAINAGE

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| **Drainage** | | | | |
| **Reparation Works - Travaux de réfection** | | | | |
| Drainage culvert, HDPE pipe ; Ø 600mm - Drainage, tuyau en PEHD ; Ø 600 mm; | m | 1 362 | 550,00 $ | 749 100,00 $ |
| Circular culvert, HDPE pipe ; Ø 800mm - Ponceau circulaire, tuyau en PEHD ; Ø 800 mm; | m | 141 | 600,00 $ | 84 600,00 $ |
| Circular culvert, CSP pipe ; Ø 1000mm - Ponceau circulaire, tuyau en TTOG; Ø 1000 mm; | m | 39 | 625,00 $ | 24 375,00 $ |
| Circular culvert, CSP pipe with fish weir ; Ø 1200mm - Ponceau circulaire avec dévesoires, tuyau en TTOG; Ø 1200 mm; | m | 30 | 690,00 $ | 20 700,00 $ |
| Circular culvert, CSP pipe ; Ø 1400mm - Ponceau circulaire, tuyau en TTOG; Ø 1400 mm; | m | 87 | 725,00 $ | 63 075,00 $ |
| Circular culvert, CSP pipe with fish weir ; Ø 1400mm - Ponceau circulaire avec déversoirs, tuyau en TTOG; Ø 1400 mm; | m | 162 | 820,00 $ | 132 840,00 $ |
| Circular culvert, CSP pipe with fish weir ; Ø 1800mm - Ponceau circulaire avec déversoirs, tuyau en TTOG; Ø 1800 mm; | m | 36 | 1 150,00 $ | 41 400,00 $ |
| Circular culvert, CSP pipe ; Ø 2400mm - Ponceau circulaire, tuyau en TTOG; Ø 2400 mm; | m | 30 | 1 500,00 $ | 45 000,00 $ |
| Circular culvert, CSP pipe ; 2x Ø 2400mm - Ponceau circulaire, tuyau en TTOG; 2x Ø 2400 mm; | m | 54 | 2 900,00 $ | 156 600,00 $ |
| 20m span wooden steel bridge, 2 lane - Pont acier-bois 20m de long; deux voies | global | 1 | 750 000,00 $ | 750 000,00 $ |
| | | | | |
| **New Road Building - Construction de nouveau chemin** | | | | |
| Drainage culvert, HDPE pipe ; Ø 600mm - Drainage, tuyau en PEHD ; Ø 600 mm; | m | 189 | 550,00 $ | 103 950,00 $ |
| Circular culvert, CSP pipe ; Ø 800mm - Ponceau circulaire, tuyau en TTOG; Ø 800 mm; | m | 72 | 600,00 $ | 43 200,00 $ |
| Circular culvert, CSP pipe with fish weir ; Ø 1200mm - Ponceau circulaire avec déversoirs, tuyau en TTOG; Ø 1200 mm; | m | 30 | 690,00 $ | 20 700,00 $ |
| Circular culvert, CSP pipe ; Ø 1600mm - Ponceau circulaire, tuyau en TTOG; Ø 1600 mm; | m | 72 | 775,00 $ | 55 800,00 $ |
| | Subtotal - Sous total | | | 2 291 340,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Drainage** | | | 2 291 340,00 $ |

| Project number - Numéro de projet | Road -Route |
|---|---|
| 158100425 | Second Road to Mistissini |
| Type of works - Type de travaux | Municipality - Municipalité |
| Building a new acces road | Eeyou Istchee Baie-James |

## SIGNALING - SIGNALISATION

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| **Signaling and marking - Signalisation et marquage** | | | | |
| Longitudinal short-term pavement marking - Marquage longitudinal courte durée | global | 1 | 275 000,00 $ | 275 000,00 $ |
| Road signage - Petite signalisation | global | 1 | 227 500,00 $ | 227 500,00 $ |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | Subtotal - Sous total | | | 502 500,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Signaling -Signalisation** | | | 502 500,00 $ |

## Various work - Travaux divers

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| Guard rail on wooden posts at 1.9 mc/c - Glissière semi-rigide latérale avec profilé à double ondulation sur poteaux de bois à 1,9 m c/c | m | 2 000 | 165,00 $ | 330 000,00 $ |
| Riprap for ditches protection - Enrochement pour protection des fossés | m.l. | 2 200 | 150,00 $ | 330 000,00 $ |
| Riprap for slopes protection - Enrochement pour protection des talus | m² | 9 000 | 50,00 $ | 450 000,00 $ |
| | | | | |
| | | | | |
| | Subtotal - Sous total | | | 1 110 000,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Various works - Travaux divers** | | | 1 110 000,00 $ |

| Project number - Numéro de projet | Road -Route |
|---|---|
| 158100425 | Second Road to Mistissini |
| Type of works - Type de travaux | Municipality - Municipalité |
| Building a new acces road | Eeyou Istchee Baie-James |

## LANDSCAPING - AMÉNAGEMENT PAYSAGER

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| Slope seeding - Ensemencement de talus | m² | 20 000 | 5,00 $ | 100 000,00 $ |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | Subtotal - Sous total | | | 100 000,00 $ |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Landscaping - Aménagement paysager** | | | 100 000,00 $ |

## ENVIRONMENTAL PROTECTION - PROTECTION DE L'ENVIRONNEMENT

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | Subtotal - Sous total | | | |
| | Contingency - Contingence (%) | | 0% | |
| | **Total - Environmental protection - Protection de l'environnement** | | | |

| | |
|---|---|
| **Total - Work costs - Coûts des travaux** | 56 262 192,00 $ |

## Estimate of related costs - Estimation des coûts connexes

### Displacement of utilities - Déplacement des services publics

| Description of works - Description des ouvrages | Payment method - Mode de paiement | Quantities - Quantités | Unit price - Prix unitaire | Cost - Coûts |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | Subtotal - Sous total | | | |
| | Contingency - Contingence (%) | | 0% | |
| | | | | |

| Project number - Numéro de projet | Road -Route |
|---|---|
| 158100425 | Second Road to Mistissini |
| Type of works - Type de travaux | Municipality - Municipalité |
| Building a new acces road | Eeyou Istchee Baie-James |

## COST SUMMARY - SOMMAIRE DES COÛTS

| | |
|---|---|
| **Total - Work costs -Coûts des travaux** | 56 262 192,00 $ |
| **Total - Related costs - Coûts connexes** | |
| **Administration and profits (15%) - Administration et profits (15%):** | 8 439 328,80 $ |
| **Reserve for inflation - Réserve pour inflation** | |
| **Project costs - Coûts du projet** | 64 701 520,80 $ |

**Remarks - Remarques**

Signature

Date

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