TROIS-RIVIÈRES PORT AUTHORITY

TERMINAL 21 CONSTRUCTION PROJECT

SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESSMENT STUDY

Submitted to the Impact Assessment Agency of Canada

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FINAL VERSION

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3535 L.-P.-NORMAND BOULEVARD, 2ND FLOOR
TROIS-RIVIÈRES, QUEBEC G9B 0G8
CANADA

T: +1 819 375-1292
WSP.COM

APPROVAL

PREPARED BY

Original signé
Dany Dumont,B, M.Sc. August 23th 2021
WSP Project Manager

APPROUVED BY

Original signé
Jean Lavoie, Geographer, M.A. August 23th 2021
Project Director

Original signé
Gaétan Boivin August 23th 2021
President and Chief Executive Officer
Trois-Rivières Port Authority

WORK TEAM

TROIS-RIVIÈRES PORT AUTHORITY

President and Chief Executive Officer	Gaétan Boivin
Vice President, Marketing and business development	Jacques Paquin
Director of Sustainable Development and Innovation	Claudie Gagnon
Director of Operations	Sylvain Gendron
Director of Public Affairs	Sara Dubé

WSP CANADA INC. (WSP)

Project Director	Jean Lavoie, Geomorphologist, M. A.
Project Manager	Dany Dumont, Biologist, M.Sc.
Assistant to the Project Manager	Marie-Claude Piché, M. Env., MBA
Consultations	Joany L. Désaulniers, Geographer, M. Sc.
Physical Environment	Marc Deshaies, P.Eng., M. Eng., Coordinator – Sound Environment Component Stéphane Pépin, Acoustician, Lead Technician Sylvain Marcoux, P.Eng. MBA, Coordinator – Greenhouse Gases Component Pascal Rhéaume, Eng. M. Eng., Coordinator – Air Quality Modelling Component Johan Strohmeier, M.Sc., Specialist - Air Quality Modelling Component
Biological Environment	Patrice Hamel, Biologist, M.Sc. Env., Component Coordinator
Local & Regional Communities	Laurence D. Langevin, Anthropologist, M.A., Component Coordinator
First Nations	Karine Neumann, Anthropologist, M. Sc., Component Coordinator Marie-A. Burelle, Anthropologist, M.Sc., Specialist
Cumulative Effects	Éric Deneut, M. Env., Specialist
Accident Risk Management	Nathalie Martet, Chemist, M.Sc., Specialist
Cartography	Alain Lemay, Cartographer, DEC
Editing	Nancy Laurent, DEC

OTHER PARNEETERS

Arkéos inc.	Gilles Rousseau, Archaeologist

FOREWORD

This summary presents, in a simplified and popularized manner, the main elements of the Environmental Impact Assessment (EIA) of the Terminal 21 project developed by the Trois-Rivières Port Authority (TRPA) and submitted to the Impact Assessment Agency of Canada (IAAC).

The reader is encouraged to refer to the EIA as well as the appendices that accompany the main report for detailed information.

The French version of this summary is the official version. In the event of a conflict of interpretation between the English and French versions, the French version shall prevail.

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1 INTRODUCTION AND OVERVIEW OF THE PROMOTER

This document is a simplified summary of the Environmental Impact Assessment (EIA) report for the Terminal 21 Project, developed by the Trois-Rivières Port Authority (TRPA).

Located on the western flanc of the current facilities, the Terminal 21 project consist in building a multi-purpose terminal with an operational area of 96,510 m^2 sharing a common border (Pier 20) with the existing dry and liquid bulk terminal (see Map 1). This new terminal will extend the Port of Trois-Rivières' seafront by 716.4 m. It will be used for the transshipment of dry bulk and general cargo. The construction of the terminal includes a wharf, retaining structures, road and rail access roads and storage space.

This summary is prepared in accordance with the Final Guidelines issued by the Canadian Environmental Assessment Agency[1]. An assessment of the potential effects of the project in areas of federal jurisdiction must be undertaken. Government authorities will use this EIA issue an environmental assessment report on the project's potential to cause adverse effects on areas of jurisdiction. This summary consists in the following sections:

1 Introduction and overview of the promoter;
2 Description of the Port of Trois-Rivières;
3 Project Rationale
4 Project Description;
5 First Nations participation and concerns;
6 Consultation and public concerns;
7 Environmental impact assessment workflow;
8 Description and potential effects on the physical environment;
9 Description and potential effects on the biological environment;
10 Description and potential effects on First Nations;
11 Description and potential effects on local and regional communities;
12 Cumulative effects;
13 Effects of the environment on the Project;
14 Risk and accident management;
15 Summary of Environmental Effects Assessment;
16 Monitoring and follow-up programs.

1.1 PRESENTING THE TRPA

The Trois-Rivières Port Authority (TRPA) has nearly 140 years of operations. On May 17, 1882, the law setting up the Trois-Rivières Harbour Commissioner Corporation, known as the Harbour Commission, was adopted. Over the course of its history, the Port of Trois-Rivières has been under the responsibility of the Harbour Commission (1882-1935), the National Harbours Board (1936-1982), the Canada Ports Corporation (1983-1998). Under the *Canada Marine Act* (S.C. 1998, c. 10), the Government of Canada created the TRPA (1999-Today).

The TRPA is a federally governed, financially autonomous organization. Its mission is to promote commercial activity, regional and national development by sound management of the public infrastructure for which it is responsible. The Port of Trois-Rivières' land, wharves, as well as certain buildings and other assets are legally owned by the federal government. The TRPA's role is to manage them in accordance with its mission.

The TRPA accepts full responsibility for port facilities and must ensure that they are maintained and improved, while supporting trade and commerce, maximizing the economic benefits of port activities and minimizing their environmental impact. The TRPA is mindful of its duties to protect the environment. The Environmental Policy (APTR-E-03 - 2018) defines environmental guidelines, principles and protection orientations. Also, it identifies the means for its implementation. It is designed to demonstrate the TRPA's commitment to minimizing the

[1] Now the Impact Assessment Agency of Canada.

environmental impact of port activities through continuous improvement of its environmental performance. This policy also strives to maintain the safety of people as well as their assets, and thus to ensure compliance with applicable legislation.

Furthermore, sustainable development is widely considered within the strategic planning Setting Course for 2030. Since the infrastructures will benefit several generations, it is important that the port community adhere to the principles of sustainable development, i.e. “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The Port is committed to balancing economic, social and environmental objectives.

The TRPA is also working on the publication of its second sustainable development plan for 2021. This new action plan will be the outcome of a closely related reflection on the Port's Strategic Development Planning, which is intended to be sustainable A sustainable port contributes to economic prosperity through trade and market positioning. It interfaces with an engaged and active community, and maintains the integrity of the environment to thrive in a healthy environment. The TRPA has therefore chosen to focus on sustainable orientations that will consolidate the foundations of a progressive and participatory sustainable development approach, which both responds to today's challenges and will even help future generations to face future challenges.

In addition, the TRPA is a founding member of Green Marine, an environmental certification program for the North American marine industry. It is a rigorous, transparent and inclusive initiative that targets priority environmental issues through 12 distinct performance indicators including air, land and water pollution. As a participant in Green Marine, the TRPA is committed to continually reducing its environmental footprint.

Promoted as flagship project and an innovation accelerator, the construction project for the new Terminal 21 is a unique opportunity for the Port to immediately adopt innovative practices, workflows and equipment that will enable it to meet tomorrow's logistics and port needs today. To be successful, the Port sets the goal of adopting innovative practices that are both inclusive and make use of the knowledge of the various partner networks.

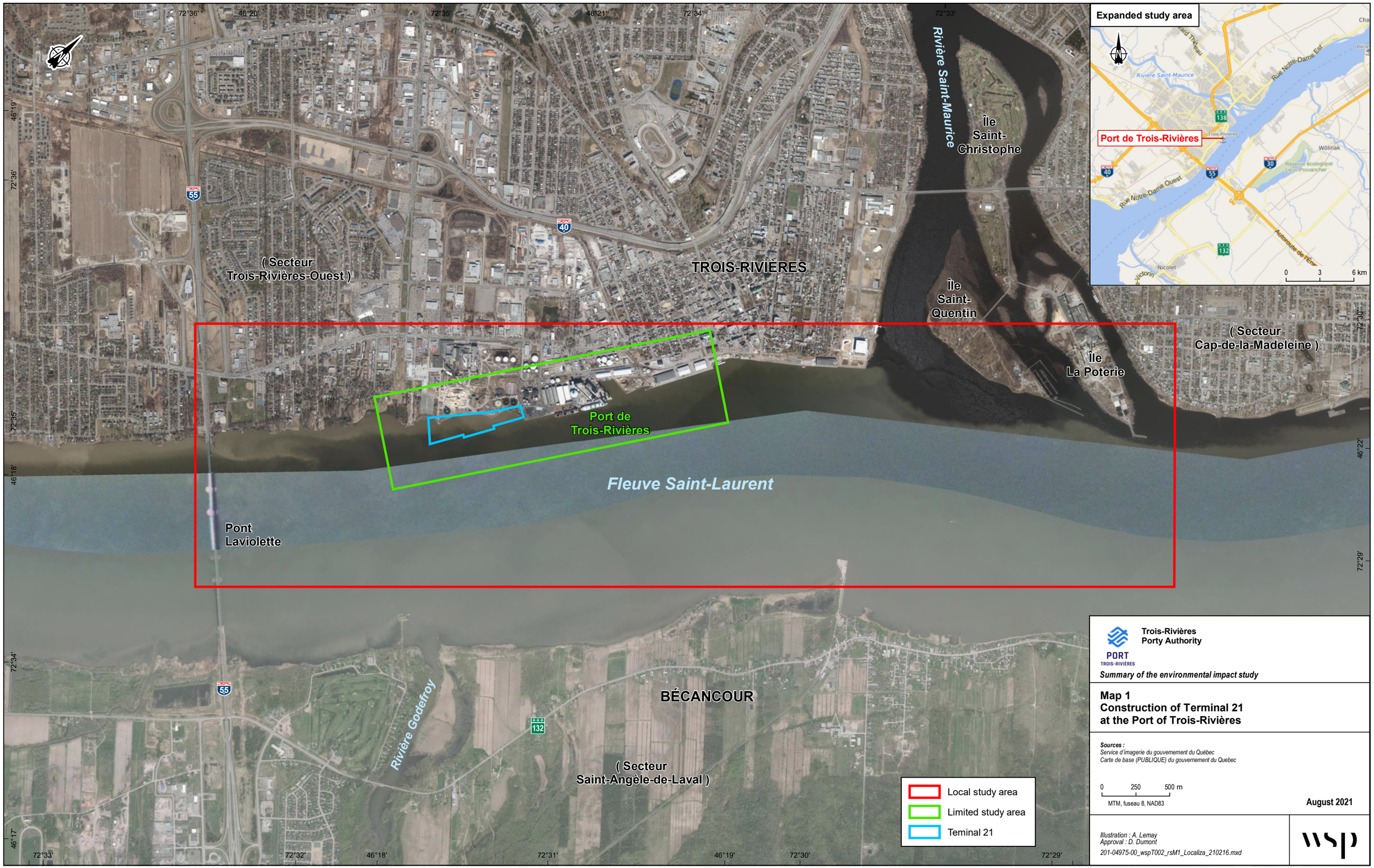
1.2 REGULATORY FRAMEWORK

1.2.1 FEDERAL LEGISLATION

As the developer of the port facility expansion, the TRPA submitted a description of its Project to the Canadian Environmental Assessment Agency[2] (CEAA) in 2015. The Agency determined that it was indeed a "designated project" within the meaning of the *Canadian Environmental Assessment Act* [3](CEAA 2012, c. 19, s. 52). In fact, the *Regulations designating physical activities*[4] (SOR/2012-147) subject to the federal environmental assessment process specify, pursuant to subsection 24(c) of Schedule 1:

> *"« 24 c). The construction, operation, decommissioning and abandonment of a new marine terminal designed to handle ships larger than 25,000 DWT, unless the terminal is located on lands that are routinely and have been historically used as a marine terminal or that are designated for such use in a land-use plan that has been the subject of public consultation ".*

[2] Now the Impact Assessment Agency of Canada (IAAC).
[3] Now Impact Assessment Act (S.C. 2019, c. 28, s. 1).
[4] Now *Physical Activities Regulations* (SOR/2019-285).



The accuracy of the boundaries and measurements shown in this document should not be used for engineering or land delineation purposes. No property analysis has been performed by a land surveyor.

1.2.2 PROVINCIAL LEGISLATION

As the project is on federal territory, an EIA that meets the *Regulation respecting environmental impact assessment and review* is not required.

Steps have been taken with the *Centre d'expertise hydrique du Québec* (CEHQ) to obtain the rights to the water domain (water lots) belonging to the province, in application of the *Regulation respecting the water property in the domain of the State*.[5] A regularization claim was therefore submitted for an administrative transfer (equates to a transferred right of use) of the lot of land on the bottom of the St. Lawrence River within the project boundaries. The CEHQ's commitment is conditional on obtaining an agreement for the transfer of ownership of the riparian band.

1.2.3 MUNICIPAL LEGISLATION

The Project must also comply with all regulations of the City of Trois-Rivières.

1.2.4 APPLICABLE LAWS AND REGULATIONS

In addition to the mitigation measures provided for in this EIA, the Project's overall design will have to comply with the applicable standards with respect to the projected equipment and infrastructure. The preparation of the definitive plans and specifications must be undertaken in compliance with the legal framework of the federal government, the provincial government, the City of Trois-Rivières, and all other applicable laws, regulations, policies and directives.

1.3 IDENTIFIED CHALLENGES AND LIMITATIONS

Based on the comments received from the public on the Project Description and Guidelines issued by the CEAA, the identified challenges and limitations are as follows:

- Air quality;
- Luminous environment;
- Sediment quality;
- Freshwater quality;
- Avifauna and their habitat;
- Sea mammals;
- Protected areas;
- First Nations traditional activities;
- Built environment;
- Territory use for recreation and tourism;
- Landscapes;
- Recreational and commercial fishing;
- Noise level (terrestrial environment);
- Soil quality (terrestrial and riparian environments);
- Underwater noise;
- Pisces and their habitat;
- Aquatic flora and benthos;
- Endangered species (fauna and flora);
- Territory use by First Nations;
- Natural and cultural or archaeological heritage;
- Commercial and recreational boating;
- Human health risks;
- Erosion of the stream bed and banks;
- Accidents and malfunction risks.

[5] Although not a legal requirement because of the constitution of the project, this is desirable following a Supreme Court decision that introduced the concept of cooperative federalism.

2 THE PORT OF TROIS-RIVIÈRES OVERVIEW

2.1 OVERALL PICTURE

The Port of Trois Rivières, located in the town of the same name, consists in 2.7 km of quay fronts on the St. Lawrence River. As one of 17 Canadian Port Authorities, the Port of Trois-Rivières serves the maritime industry with a wide range of facilities and services in all seasons. Its various terminals can welcome dry bulk, liquid bulk and general cargo both indoors and outdoors.

It is a key player in regional, national and international economic development for major industrial sectors such as aluminium, forestry and agri-food. The Port of Trois-Rivières is a true intermodal platform with its rail and road links, making it an essential component of the supply chains binding many Canadian companies to their overseas markets. Each year, the Port of Trois-Rivières welcomes 250 ships and connects roughly 125 ports in 50 countries, whereas 11,000 railcars as well as 55,000 trucks use its installations each year.

In 2019, a record total of 4.2 Mt of freight transited through the Port of Trois-Rivières, with an estimated trade value of $3.3 billion. In fact, since the launch of the Strategic Planning Aiming for 2020 in 2008, the Port's business has grown by 68%. Because of this planning, 40% more traffic capacity has been added and is now fully exploited despite the fact that the Port is solicited by many other shippers The Port currently serves companies located throughout Quebec (76% of tonnage in 2018), Ontario (20%), Western Canada (2%) and elsewhere in North America (2%). The Port of Trois-Rivières services the needs of many key sectors of the Canadian economy: manufacturing (43% of tonnage in 2018), agri-food (26%), mining (25%) and energy (6%).

With an approximate surface area of 457,000 m^2, the Port of Trois-Rivières has several specialized terminals. The localisation of the terminals and their current activities are shown on Figure 1.

Every year, during summer, many cruise passengers choose a stop in Trois-Rivières. The liners are generally docked at wharves 2 and 3 of the Port facilities. In 2019, 3,000 passengers visited our region from 25 cruiseship stopovers.

The Logistics Park E (PL-E) terminal is used for grouping, ungrouping and assembly of oversized equipment. Owned by the TRPA, this logistics park covers an area of 39,200 m^2. The PL-E is currently under development. Located in the core of the Industrial-Port Zone (Zone IP), PL-E is the ideal location to meet the needs of several shippers in the metallurgy field, one of three priority niches identified by the local development committee for the Zone IP, along with those of biomass processing and bulk transport and processing.

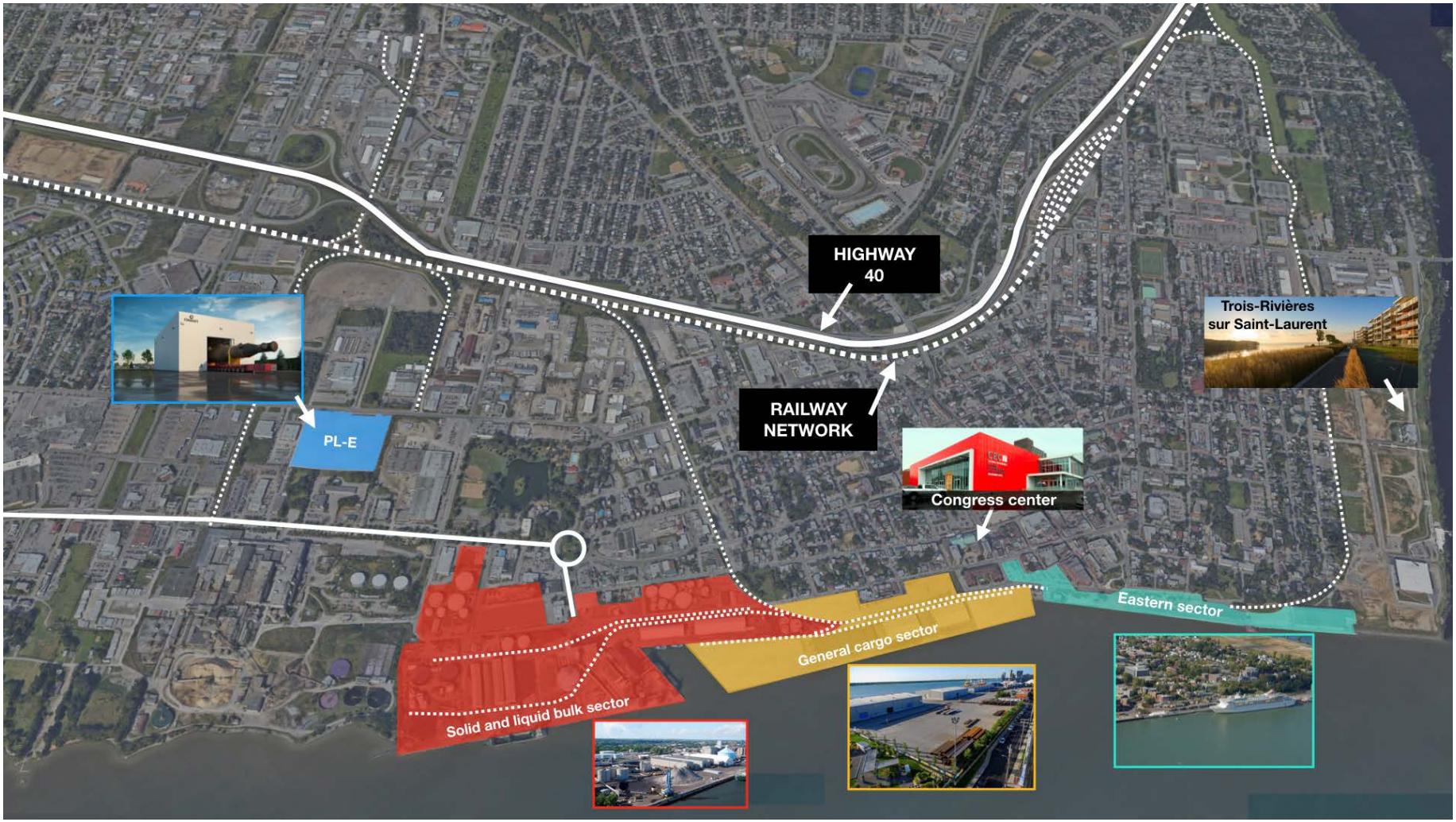


Figure 1 : Current Port of Trois-Rivières facilities

3 PROJECT RATIONALE

3.1 PROJECT PURPOSE

As Trois Rivières is a port involved in the transport of bulk raw materials and non-containerised general cargo, the record over the past ten years shows that average annual traffic must be limited to no more than 75% of its capacity to meet market demands. Exceeding this threshold implies a loss of productivity, a decrease in the quality of services to be rendered and even the refusal of ships and traffic. This is precisely what happened in 2018 when the average utilisation rate of the Port reached 80% with peaks of up to 117% during the year. This situation persisted throughout 2019, with an annual average usage rate of 87% with peaks of 109% in the fourth quarter. The Port of Trois-Rivières can no longer support the growth of its existing customers and is currently selecting whom it can serve to the detriment of others.

Modernization work for the Setting Course for 2020 Strategic Plan took place between 2009 and 2017, leaving the Port constantly under construction during this period. It was only able to fully benefit from its new facilities by 2018, over which it set its new record of 3.8 Mt of cargo. In 2019, this amount increased to 4.2 Mt, not factoring that the handlers estimate that they refused 371,000 t of goods due to insufficient capacity. This is still a conservative value since not every missed opportunity could be listed.

3.2 EXPECTED TRAFFIC AND NEEDS ANALYSIS

Three different possible scenarios were defined for the level of traffic related to Terminal 21, granting 5 years for the fulfilment of these performance targets: realistic, pessimistic and optimistic (Table 1). These projections are based on the estimated tonnages for 16 traffic corridors under consideration, all of which are closely related to the activities of five major industrial sectors.

The realistic scenario sets the international maritime transport at 1.5 Mt. The expected tonnage to be exported (64%) and imported (36%) will be delivered respectfully to and from the Port by road, rail or short sea shipping. Some cases involve a combination of rail and road as shown in Table 1. To avoid duplication, the analyses are based on tonnage related to international maritime traffic only.

Based on the pessimistic scenario, the target for international maritime traffic is set at 1.1 Mt, i.e. 50% of the Terminal's theoretical capacity after 5 years of operations. On the other hand, the optimistic scenario sets a traffic target of 1.9 Mt, or 83% of the theoretical capacity of Terminal 21.

According to current forecasted traffic, it is believed that in 2020 only, the Port will have to turn down 650,000 t. This figure is consistent with the traffic estimates established for Terminal 21, which amount to approximately 1.5 Mt. The fact that the declined tonnages could have used an alternative port does by no means call into question the necessity for Terminal 21. The traffic, refused and projected for Terminal 21, are both seeking for the best supply chain, which goes without contest through the Port of Trois-Rivières.

The Port of Trois-Rivières currently serves many key sectors of the Canadian economy: manufacturing (43% of its current traffic), agri-food (26%), mining (25%) and renewable energy (6%). The traffic forecast for Terminal 21 is related to the activities of companies in these same sectors. The shippers have contacted the TRPA with shipping requests, and continue to do so, without the TRPA having to make any specific marketing efforts for the New Terminal Project, a sign of a true necessity.

Table 1 : Annual dry bulk traffic scenarios at Terminal 21 for each mode of transport (after 5 years)

Transport type	Annual traffic (metric tons)		
	Pessimistic Scenario	Realistic Scenario	Optimistic Scenario
International Maritime	1,110,289	1,480,386	1,850,482
Short Sea Shipping	73,383	97,844	122,305
Rail	286,195	381,593	476,991
Route	750,711	1,000,948	1,251,185
Total	**2,220,578**	**2,960,772**	**3,700,964**

3.3 PROJECT MEASURABLE OUTCOME ANALYSIS

This Project proposal not only benifits the TRPA, but also the Terminal 21 user companies as well as the entire Canadian society.

Terminal 21's handling-related activities alone will lead to the creation of some 495 direct and indirect jobs, to say nothing of the jobs created by companies that will be setting up in the Trois-Rivières IP Zone. For Canada, the total profits of Terminal 21 would be 1.5 time greater than the latter's realization cost. The total value of the Project's outcomes represents an average of $11.4 million per year.

Discounted benefits (50 years) for the entire analysis period total $119.6 million, broken down as follows:

- 2.6 million from reduced congestion for existing customers related to improved traffic flow and reduced average truck wait times;
- 110.9 million from competitive gains related to reduced transportation and logistics costs;
- 6.1 million from a relative reduction in greenhouse gas emissions.

3.4 ECONOMIC BENEFITS OF THE PROJECT

The Port of Trois-Rivières is currently one of the most important ports in Quebec and Eastern Canada. In 2019, it handled for over 4.2 Mt of traffic with an estimated commercial value of $3.3 billion. It is credited with $219 million in economic spin-offs in Canada, an increase of 71% in comparison with 2008. Port users, for their part, have made massive investments in their equipment and facilities

The Project will generate significant economic benefits for current and future Port users, for the local community and for Canada. A study carried out for a variant of Terminal 21 like the one presented in the EIA estimates the annual economic impact (excluding induced spin-offs) at $36 million.

Facilitating access to overseas markets will support the international trade of Canadian exporting and importing companies, thereby contributing to their competitiveness and growth. It will thus lead to an increase in Canada's foreign trade. At the local level, it will promote the creation of quality, well-paying jobs within the Port, but also in other parts of the transportation chain and in both local and regional businesses, as well as in First Nations communities.

The Project will complement the economic development objectives of Trois-Rivières while contributing to achieving the Canadian Governement’s objectives in terms of the growth and diversification of international trade for Canadian businesses. As Terminal 21 is an infrastructure with a lifespan of over 50 years, the regional and national economy will benefit from the long-term advantages provided by Terminal 21.

3.5 CONSEQUENCES OF NOT CARRYING OUT THE PROJECT

Terminal 21 will be designed to adapt the Port's capacity to meet the needs of the market. The main repercussions of not carrying out the Project include the following:

- Limit the TRPA's ability to organize an intermodal service that can meet the needs of current and future users at a reasonable cost;
- Limit the investment intentions of many Canadian companies wishing to take advantage of the economic benefits of the Port of Trois-Rivières;
- Interfere with domestic and international trade;
- Hinder the creation of employment and substantial economic benefits at a local and regional level;
- Compromise the IP Zone development on which the City of Trois-Rivières and the Government of Quebec are also promoting;
- Generate higher greenhouse gas emissions through the transportation of goods to port facilities beyond Trois-Rivières.

3.6 OTHER WAYS OF CARRYING OUT THE PROJECT

3.6.1 LOCATION VARIANTS

Potential sites were identified by considering the constraints to development around the existing facilities and the site's capacity to meet the fundamental objectives of the Project, namely the development of multi-functional docks and new spaces that could be used as storage areas. The analysis of these variants was performed using criteria considering economic, technical, environmental and social aspects. A total of four sites were examined:

Extension towards the river. Expansion of the current installations towards the St. Lawrence River, by means of wharves advancing into the river perpendicularly or at an angle to the current wharves. This will require not only the addition of wharves, road and rail access, but also storage areas. Adding such infrastructure to the south of the current harbour would cause it to overflow into the St. Lawrence navigation channel, not to mention the need to relocate much of the current handling and storage infrastructure, which would consequently find itself further away from the new docks. This variant also has significant impacts, such as impeded navigation, increased safety risks, a significant visual impact, increased costs, etc.

West of the current facilities. Expansion towards the west, upstream of the Port's current facilities. This expansion would essentially involve encroachment on the river and would entail the acquisition of the riverside strip. The latter is part of the site on which Kruger's paper and cardboard mill is located. The encroachment on the river will result in a loss of fish habitat that the TRPA intends to compensate. The planned activities are compatible with the sector's industrial vocation and would even support the development of the IP Zone. In addition, this site would benefit from the Port's excellent road and rail connections as well as existing handling capacities, which would lead to economies of scale favourable to a competitive port passage of goods. Furthermore, this location allows for synergy with the Port's current activities, infrastructures, equipment and personnel. Finally, the paper mill's current installations already block the view of the river, creating a visual impact.

Sainte-Angèle Wharf. The TRPA owns the Sainte-Angèle de Laval wharf, located on the southern shore of the St. Lawrence River. The wharf is currently leased to the City of Bécancour, which has been investing in this area to make it a recreational and tourist destination. The wharf is not served by rail and its road access is via a rural road that runs through the village, which compromises the site's intermodal capacity. This alternative would require the construction of kilometers of rail and highway to connect the wharf to the national networks, in the middle of agricultural land. In addition, this area is subject to heavy sedimentation that would require recurring maintenance dredging efforts to ensure the required depth along the wharves. Moreover, the fact that this site is far from the

current port facilities means that it does not allow for synergy and complementarity with existing infrastructures and optimal use of the handling equipment and labour already available. It should also be added that the portion belonging to the TRPA is insufficient. Acquisitions and expropriations would be necessary to build a commercial surface terminal.

Notre-Dame du Cap-de-la-Madeleine. The TRPA also owns an abandoned wharf located in front of the Notre-Dame-du-Cap Sanctuary, east of the Saint-Maurice River. Since 1888, the Sanctuary has been a place of pilgrimage, renewal and prayer for millions of visitors. It was once used by local industry that has since disappeared. Given the residential and recreational/touristic vocation that this area has taken on, especially for spiritual renewal, this property has very little potential for industrial and port development. It should also be added that the portion owned by the TRPA is insufficient. The acquisition of numerous properties, or even expropriations, would be necessary for the construction of a commercial surface terminal. This option also suffers from intermodal links, lack of economies of scale and synergy since the site is far from the current port facilities.

3.6.2 DOCK DESIGN VARIANTS

The Port of Trois-Rivières has been evaluating the development of a new terminal for several years. The first port development study for the site west of Wharf 20 was completed in 2012. The study consisted in evaluating the various development possibilities offered by the site as well as the type of port activities that could undertaken. At the end of the analysis, none of the proposed alternatives were selected.

Then, between 2012 and 2015, the Port of Trois-Rivières worked to optimize its needs. A second variant analysis was carried out in 2015 and included six options for the design and construction of the docks. Once again, no variant was selected as part of this study.

Through 2015 to 2017, the TRPA continued its internal analysis of the needs, constraints and challenges related to this project. To optimize the Project's execution while respecting the concerns of the community, different construction variants were analyzed. This third variant study considered the type of wharf to be built, the volumes of fill and excavated material and the related handling arrangements. Also in 2017, additional design variants were added.

The variants were compared, considering economic, technical, environmental and social aspects. On the basis of this comparison, the selected variant shown in Chapter 4 is the construction of Terminal 21 using a combined wall of steel sheet piling and piles (pier 22) and rockfill embankments (piers 21 and 23).

3.6.3 CONSTRUCTION VARIANTS

Sheet pile driving. Three main types of sheet pile installation were studied: vibratory driving, ramming method and installation by hydraulic press. The method of sheet pile installation must also take into consideration the insertion environment and the expected effects. As for the Port, the main expected effect is related to noise and vibration emissions, which may be a nuisance for the neighbourhood, the downtown business community and recreational and tourist activities in the area.

Levelling dredging. Within the framework of the maintenance work, various dredging alternatives were considered. There is a wide variety of dredging equipment on the market that can perform this type of work. Some of this equipment has been used for many times on the St. Lawrence River, others have never been used because of their characteristics or regulatory restrictions. Among the equipment evaluated are mechanical dredges, hydraulic dredges and special dredges.

Dredged sediments management. Three variants were compared: open water disposal, shoreline disposal and land disposal.

The selected variants are presented in Chapter 4. Sheet pile driving will be done by vibratory pile driving, dredging will be done by mechanical dredging, while the dredged sediments will be managed on land.

4 PROJECT DESCRIPTION

It should be noted that the assumptions concerning the development of transhipment infrastructures in the operational phase for the EIA, are that Terminal 21 will be operated in a similar manner to wharves 19 and 20, i.e. mainly in the processing of dry bulk. This is also the type of handling that may present the greatest environmental management challenges. Consequently, this hypothetical scenario provides for a "realistic worst-case" analysis of the handling operations.

This project is part of the TRPA's strategic planning, Setting Course for 2030, which was released in October 2018. This planning is resolutely geared towards sustainable development, aimed at ensuring a fair balance between today's social, economic and environmental needs without compromising those of future generations. That is why Terminal 21 includes climate change adaptation strategies and why the TRPA intends to continue to exercise its responsibilities in terms of sound management, environmental protection and pollution prevention.

The life expectancy of the new facilities is estimated at 50 years, but refurbishment work could significantly extend this period. For example, it will be possible to repair damaged sections of piles and sheet piling, replace concrete structures such as the curb of the wharf, or repair the paved surfaces of the new terminals to increase the life of the facilities. It should be noted that the Port of Trois-Rivières has been in operation for nearly 140 years and has undergone several repairs in the past.

Although the construction of closed storage spaces (sheds, warehouses or infrastructure) or the addition of conveyors are not currently planned as part of the Project, the addition of permanent infrastructure cannot be ruled out during the life of Terminal 21 and each will have to be the subject of a specific agreement between the TRPA and the users. All new related projects carried out after the construction of Terminal 21 will be carried out in accordance with the regulations in force, which means that these related constructions will have to be authorized, in particular under the *Impact Assessment Act*.

4.1 OBJECTIVES OF THE PROJECT

The current capacity of the Port of Trois-Rivières is currently saturated. The Terminal 21 Project will make it possible to meet the growing needs of domestic and international trade and will ensure the regularization of the logistics chain by absorbing the capacity gap between maritime and land transportation. Apart from being an addition at the maritime level, this new terminal will also contribute to improving the fluidity of current traffic and eliminating bottlenecks encountered at the Port by adding new road and rail access. When designing the project, the TRPA considered the development orientations of the City of Trois-Rivières and its economic arm, IDE Trois-Rivières, and the regional branches of numerous Québec ministries that are collaborating with the Port on the development of the IP Zone.

The specific objectives of the Project are to:

- satisfy companies looking for solutions to route their export and import products and that have already submitted requests to the TRPA;
- have sufficient storage space to ensure the regularization of the supply chain;
- offer infrastructures and services that are easily adaptable to market changes;
- decongest the Port's existing access routes to support and increase trade flows of road, rail and marine carriers;
- support the activities of companies interested in developing in the Industrial-Port Zone (IP Zone) (see section 3.6);
- offer intermodal transportation service at a competitive cost while respecting high levels of health and safety and environmental protection;

- be a vector for investments from multiple partners and contribute to the achievement of local, regional and national economic development objectives;
- design a Terminal that will meet the environmental and social challenges of the 21st century, considering climate change, the need to reduce GHG emissions by aiming for carbon neutrality, and the challenges of automation and the application of artificial intelligence in the various links of the transportation chain;
- contribute to the resilience of the country's transport system.

4.2 FINANCING OF THE PROJECT

The funding structure that the TRPA intends to use to carry out this Investment Project is shown in Table 2. Confirmation of significant financial assistance of $33.4 million for the construction of Terminal 21 was received from the federal government through the National Trade Corridors Fund (NTCF) on October 9, 2020. A request for financial assistance from the Québec government has been submitted and the TRPA is awaiting a response. Financing for the construction phase of this Project must be completed with a down payment from the TRPA's cash flow and a loan.

Table 2 : Summary of investment plan

Investor	Contribution
Government of Canada	33,4 M$
Government of Quebec	22,6 M$
Port Users	40,0 M$
Trois-Rivières Port Authority	33,9 M$
Total investments	**129,9 M$**

In anticipation of the start of operations at the Terminal, investments of $40 million are expected by 2030 from users for the acquisition of new handling equipment and the development of the new facilities. In fact, during the implementation of Setting Course for 2020, users invested more than $52 million in their equipment and facilities, which represented 40% of the total investment of $132 million.

4.3 PROJECT LOCATION

The Terminal 21 Construction Project is in the city of Trois-Rivières, on the shore of the St. Lawrence River. These lands are in continuity with the Port's current facilities, upstream from Wharf 20. The new terminal will add an area of 96,510 m^2 that will be used for the transhipment and storage of goods.

The entire Project is nearly 716.4 m long along the river and represents an area of 8,227 m^2 in land[6] area, including an irregularly shaped parcel of land owned by Kruger Trois-Rivières L.P. (hereinafter referred to as Kruger) with an area of 11,310 m^2. For the construction of the Terminal, a water lot owned by the provincial government will be backfilled on an area of 106,051 m^2 in the aquatic environment[7]. The acquisition of the waterfront strip belonging to Kruger and the obtaining of the administration rights on the water lots owned by the Government of Québec are necessary for the realization of the Project. Steps in this regard are underway.

The land surrounding the study site is industrial and is part of the Trois-Rivières IP Zone (Figure 2). The site is in an industrial zone. Transportation facilities, such as highways 40 and 55 and rail access via the Port, are nearby. To the north is the Kruger mill and to the east are the existing port facilities. The St. Lawrence River is located to the south, while the Notre-Dame public boat launch (4145 Notre-Dame Street West) and private properties are located approximately 600 m west of the study site.

[6] Work area located above the level of the 0-2 year floodplain, evaluated at 6.00 m geodetic datum by the City of Trois-Rivières.

[7] Area below the level of the floodplain.

The Port and the IP Zone (industrial-port) are in an area where there are different activity sectors according to the City of Trois-Rivières zoning plan (port, industrial and local commercial). These sectors are almost entirely developed, but the current industrial landuse lends itself to real estate redevelopment and recycling.

4.4 PROJECT COMPONENTS

The various components included in the Terminal 21 Construction Project can be summarized as follows:

- The 231m long Wharf 22, made of steel sheet piles;
- Wharves 21 and 23, two structures with a rockfill embankment of 231 m and 254.4 m respectively;
- The 193m long rockfill embankment forming the west face of Wharf 23 (return of the wharf);
- The removal of two existing dolphins and their footbridge at the west end of Wharf 20;
- Temporary works required for the construction of the project;
- The relocation of Kruger's existing storm and process water outfalls to new outfalls integrated into Terminal 21;
- The decommissioning of the existing pipeline and the relocation of Kruger’s water intake;
- The construction of an overflow outfall for the City of Trois-Rivières and its extension through Wharf 21;
- The addition of six dolphins and footbridges for docking ships in front of Wharves 21 and 23;
- The creation of an access road to Terminal 21 (east side), by the extension of Père-Garnier and Notre-Dame Centre streets;
- The construction of two railway tracks and their connection to the railway network present at Wharf 20;
- The development of Terminal 21, including water supply, fire protection, rainwater collection and treatment, electrical and lighting systems and paving;
- Terracing on the Kruger Company land affected by the construction of Terminal 21;
- Fence installation to secure Terminal 21 and tree planting;
- The development of transhipment, storage and handling areas for all types of merchandise: dry bulk and general cargo;
- Transhipment related operations, storage and handling of goods;
- Vessel manoeuvring areas, access channel and anchorage areas;
- Sediment dredging on some portions in front of the Terminal to a depth of -11.0 m;
- Sediment disposal sites in the terrestrial environment;
- Maintenance Dredging, if required;
- Construction waste and excavated material management;
- Cargo residues, hazardous materials and waste management;
- Rainwater and wastewater management;
- Snow waste management.

Figure 2 : Location of the Port of Trois-Rivières and the Terminal 21 Project in the context of the Trois-Rivières Industrial-Port Zone

4.5 CONSTRUCTION OF TERMINAL 21

4.5.1 BUILDING MODE

In today's construction industry, clients, professionals and contractors alike are trying to change conventional ways of carrying out projects in the hope of reducing delays, lowering costs, avoiding litigation and conflict situations or improving the overall quality of the work to be built. Offering various advantages, the TRPA will mandate the construction of Terminal 21 in turnkey mode (Turnkey or Design/Build or EPC). The client, the TRPA, then entrusts a single company or group of companies with all the detailed engineering, procurement and construction work. In this mode, the performance of the works is guaranteed by the selected company. Its responsibility ends after commissioning. This construction method was successfully used by the TRPA for the reconstruction project of Wharf 9 in 2017.

Since the selected company will be responsible for the detailed engineering, the methods and materials for the construction of Terminal 21 may vary from the generic information presented in the following sections.

4.5.2 FOOTPRINT OF PROJECTED INFRASTRUCTURES

The Project consists of the construction of a new terminal with a total area of 1175,640 m^2 (Table 3). The terminal will provide 96,510 m^2 of flat surface area for the transhipment, storage and handling of goods. The 716.4 m long seafront of Terminal 21 will consist of Wharf 22 made with a 231m long steel sheet pile wall and two wharves (21 and 23) with a rockfill embankment 231 and 254.4 m long respectively. These last two wharves will include a docking and mooring face consisting of three dolphins each (Figure 3).

Table 3 : Footprint of projected infrastructures

Project breakdown	Surface area (m^2)
TERMINAL 21 FOOTPRINT	
Total land encroachment of Terminal 21	8,227
Total aquatic encroachment of Terminal 21	106,051
Access road to Terminal 21	3,362
20 m working buffer zone (Kruger property)	13,974
TOTAL	
Total area of permanent infrastructure (Terminal 21)	**117,640**
Total area of permanent and temporary infrastructures (Terminal 21 + buffer zone)	**131,614**

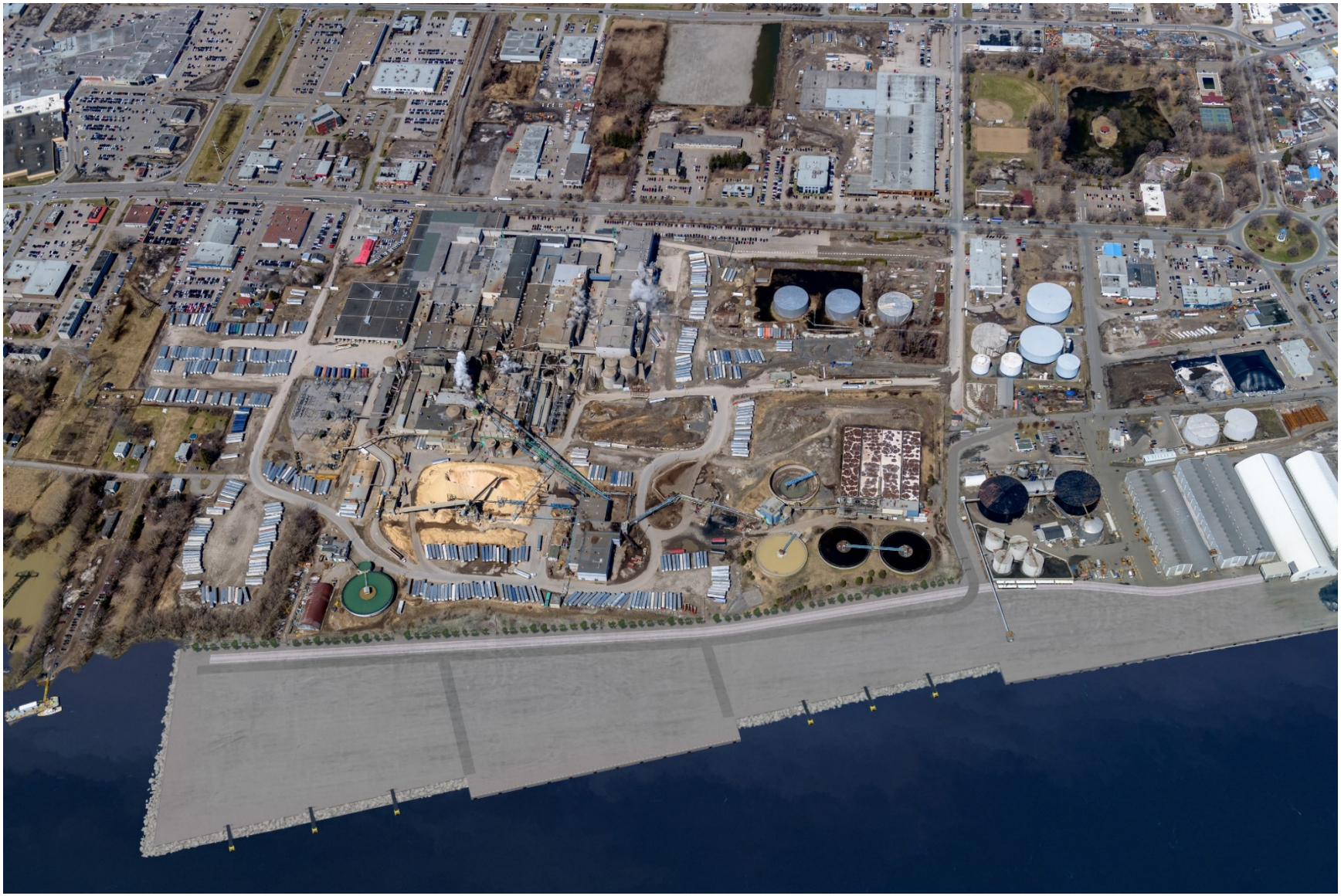


Figure 3 : Terminal 21 (Wharves 21, 22 and 23)

4.5.3 DEMOLITION OF THE FOOTBRIDGE WEST OF WHARF 20

West of Wharf 20, a steel footbridge is mounted on two dolphins on steel piles. The steel footbridge will be dismantled and laid out in accordance with regulations. This infrastructure will have to be dismantled over the river bed (approximately -10 m at chart datum) since it is located within the projected alignment of the rockfill embankment of Pier 21. The piles of the two dolphins are inside the alignment with Wharf 20, and therefore in line with the future rockfill wall of Terminal 21.

The concrete supports of the two dolphins will be crushed and reused as backfill material for Terminal 21. The pile heads of the two dolphins will be levelled at sea level so as not to interfere with the new riprap embankment at Wharf 21. The rest of the piles forming the base of the dolphins will remain in place and will therefore be buried in the new Terminal 21 that will be built over.

4.5.4 CLEARING AND STRIPPING OF RIPARIAN AREAS

The construction of the wharf and related work requires the clearing and stripping of the shoreline. In total, the estimated stripping will cover an area of 17,336 m^2, including the access road and the 20m buffer strip along the northwest façade of the future terminal. The excavated material (granular material, concrete and rock demolition debris) that is not contaminated can be reused as backfill for the new Terminal 21.

There will also be excavation to complete the construction of the rainwater drainage systems for Terminal 21, the Kruger process and intake water systems, and the City of Trois-Rivières rainwater pipe. All other existing equipment remains in place and will be covered by Terminal 21.

The piling and treatment of woody debris will be carried out according to current practices and applicable regulations. Wherever possible, it will be recovered for commercial purposes or disposed of at an authorized site. Clearing work will be limited to work areas only. Trees will be replanted at the north boundary along the entire length of Terminal 21 upon completion of the work.

4.5.5 INSTALLATION OF THE STEEL SHEET PILE WALL IN THE SEABED (WHARF 22)

The sheet piles will be installed by vibratory driving. In fact, vibratory driving is the most commonly used method for driving piles in the type of soil found at the Port of Trois-Rivières site. The vibratory driver is a very heavy piece of equipment that is installed at the head of the piece to be driven (piles or sheet pile) and produces vertical vibrations throughout the entire piece. The vibrations thus produced have the effect of reshaping the soil around the part of the pile in contact with the ground, which promotes its sinking to the desired depth. This technique creates less noise pollution than pile driving, offers good yields and is therefore recommended for the construction of the combined wall (pile-sheet pile system) of Wharf 22.

It is expected that the piles and sheet piles will be sunk down to approximately -27.5 m at chart datum, which is approximately -16.5 m below the existing seabed to provide the necessary bearing capacity. The actual sinking depth will be determined based on the results of the geotechnical study that will be carried out over the entire work site prior to construction.

4.5.6 MAIN TERMINAL BACKFILL

The aquatic area between the new dock line and the shoreline (106,051 m^2) will be filled in progressively from the shore with stone of different calibers. The estimated backfill required for the construction of Terminal 21 totals approximately 1.83 Mt.

The first section of backfill will be carried out from the northern limit of the terminal at elevation ±4.0 m (tide gauge) towards the south with 0-300 mm gauge stone that will be discharged onto the shore or directly into the water and placed in layers using a hydraulic shovel. It is planned that this layer of fill will extend southward until the seabed reaches a depth of -4.5 m (tide gauge). The slope at the end of the embankment is 1 V:1.5 H.

The second section of fill will be composed of 600-900 mm stone that will be placed with a hydraulic shovel from the end of the 0-300 mm stone embankment in a progressive southward direction limiting the disturbance of marine sediments. The stones that will be deposited on the seabed will be driven into the sediment with the hydraulic excavator (long arm) to an expected thickness of 1.2 m. This embankment will extend southward to the limit of the embankments forming wharves 21 and 23 with a slope of 1 V:1.25 H and to the foot of the sheet pile wall of wharf 22 with a slope of 1 V:1 H. This layer of fill will be raised to elevation ±1.5 m (tide gauge).

Subsequently, the different layers of backfill according to the two types of platform structures (sheet piling or embankments) will be carried out successively up to the level of the underside of the pavement infrastructure (elevation ±3.95 m tide gauge). These embankments will be carried out of the water and mechanically compacted.

With respect to the steel sheet pile dock area (Wharf 22), backfilling of the area behind the wall will be carried out according to the steps described below. A layer of ±1.0 m of stone 100-200 mm will be deposited directly on the slope of the 600-900 mm stone embankment with an excavator, up to the elevation ±2.1 m (tide gauge), forming part of the horizontal platform for the foundation of the dock tie rods. A 20-80 mm stone fill will be poured on the 100-200 mm layer of stone. This stone layer will rest on the inner face of the sheet pile wall and will encapsulate the platform tie rods, up to the elevation ±2.5 m (tidal). The backfilling will be completed by the installation of a layer of “MG-56” stone to the level of the underside of the pavement infrastructure (elevation ±3.96 m tide gauge).

All backfill material located above the water level will be placed in layers and mechanically compacted using compacting rollers to achieve the desired densities. Also, geotextile membranes may be installed between certain layers of fill to prevent the migration of fine particles into the underlying fill.

In order to ensure control over the suspended particles generated during the various backfilling operations, a turbidity curtain equipped with oil absorbent rolls will be installed downstream of the work. The curtain will contain suspended solids (SS) within the work area while the rolls will absorb petroleum products in the event of an accidental spill, preventing them from reaching the aquatic environment. Regular monitoring by turbidity measurement will be carried out throughout the duration of the backfilling work in the water to verify the concentration of total suspended solids (TSS).

Temporarily captive water within the space created by the backfill during the construction of walls will have to be managed so that when discharged into the natural environment, it does not create an increase of more than 25 mg/L in the TSS content of the receiving environment.

4.5.7 ARMOUR STONE SLOPE PROTECTION

The surface of the embankments, or carapace, forming Wharves 21 and 23, which are 231 m and 447.4 m long respectively, will be protected against erosion due to waves and ice effects by a layer of 600-900 mm thick armour stone to a thickness of about 1.0 m. This armour stone will be placed with a long arm excavator over the entire surface of the embankments which will also be composed of stone of the same caliber and placed with an excavator. The expected slope of the embankments is 1V:1.25H. The top of the riprap will be 300 mm lower than the elevation of the terminal deck, approximately 4.4 m at chart datum. The embankment will have a platform 1.5 m wide. The end of the wharves will be bounded by a ±600 mm wide concrete wall on which a steel wheel guard will be installed along its entire length. The access footbridges to the six dolphins will be supported on these concrete walls.

4.5.8 DYNAMIC COMPACTION

The area between the shoreline and the end of the stone embankment will be backfilled to an elevation of ±1.5m above the water level; the platform thus formed will be dynamically compacted over its entire surface. This dynamic compaction will consolidate the stone embankments and consolidate the underlying soils to a maximum depth. This work will increase the load-bearing capacity of the handling and storage areas and reduce settlement in the short and medium term. The compaction work will be carried out using a crane that will use a 15 to 19t mass released from a height of approximately 15m. This method causes vibrations that can be felt several tens of meters from the impact. Following the dynamic compaction of the stone layer, the backfill will be completed in successive layers mechanically compacted to the level of the pavement subgrade.

4.5.9 INSTALLATION OF THE ANCHOR WALL (SHEET PILING)

To retain the top of the main sheet pile façade wall of Wharf 22 as well as its two side walls, sheet pile anchor walls parallel to these structures are planned. These anchor walls will be located ± 33.0 m behind the sheet pile walls, to form a stop retaining the sheet pile facing. A series of horizontal tie rods will then connect the two walls together.

The installation of these anchor walls will require an over-excavation in the embankment 600-900 mm behind the dock to make a trench, since they cannot be driven directly into the stone. The sheet piles of the anchor walls will be positioned in the center of this trench and a 100-200 mm stone backfill will be used to fill the trench and embed the wall in this backfill. This backfill will be carried out up to the level of the foundation of the tie rods of the dock (elevation ±2.10 m tide gauge).

4.5.10 INSTALLATION OF TIE RODS

Tie rods of approximately 110 mm nominal diameter spaced at ± 2.0 m center to center will be installed at ± 2.3 m tidal elevation to connect the sheet pile walls on the face of Wharf 22 (including the side walls) to the anchor walls. Once the tie rods are in place, they will be covered with 20-80 mm crushed stone up to ±2.5 m tide gauge.

4.5.11 CONSTRUCTION OF THE COPING WALL

A reinforced concrete coping wall on a range 231 linear meters and two 22m side walls, placed above the sheet pile wall of Wharf 22, will complete the transshipment dock in the center of Terminal 21. These coping walls will be ±2.4 m high and will rise to the level of the top of the Terminal, i.e. ±4.7 m tide gauge. These walls will be made of reinforced concrete and poured at full height in sections of ±14 m with expansion or construction joints between sections. The mooring bollards and wheel guards will be integrated into the structure during the assembly of the reinforcing steel. The upper edge of the cope on the river side will be protected by a quarter round steel plate anchored to the reinforcement.

4.5.12 WATER SUPPLY AND RAINWATER COLLECTION NETWORK

The Project also includes the construction of a water supply system and a rainwater collection and treatment system. The water system will be connected to that of Wharf 20 and will be used for fire protection as well as to supply water to ships that will dock at this Terminal. A rainwater catchment network consisting of catch basins located throughout the terminal will allow the captured water to be conveyed to a pre-treatment system (hydrodynamic vortex separators) that will discharge it from coarse suspended particles (> 60 microns) and any presence of oil and floating particles before it is discharged into the river. Filtration systems will be required from operators handling dry bulk to treat fine suspended particles (< 60 microns).

4.5.13 COVERING OF THE SURFACE OF TERMINAL 21

The paving infrastructure will be backfilled with “MG-56” and “MG-20” granular material mechanically compacted using vibratory rollers. Surface drainage slopes will be made from the backfill for final profiling of the pavement towards the drainage points (manholes and catch basins). The surface of Terminal 21 (transhipment, storage and handling areas) will be completely covered with a 150mm thick layer of paving.

4.5.14 LAND ACCESS FOR ROAD TRAFFIC

The Project provides for the creation of a permanent access road on the east side, between Terminal 21 and Notre-Dame Centre Street, which will join Gene-H.-Kruger Street via Père-Garnier and de la Commune Streets. To facilitate road traffic within the Port's enclosure, circulation routes will provide connectivity between Terminal 21 and Wharf 20. The proposed routes are all located on the Port's current property. They will be paved with a hot-mix asphalt concrete pavement.

4.5.15 RAILROADS

The Project includes the construction of two new ground-level railroads, each approximately 700 m long, and switches to connect these tracks to the Port's existing network located at wharves 19 and 20. The tracks will be installed parallel to the Terminal, on its north side.

The construction will require the ground to be compacted by a roller compactor and the installation of a drainage system, a geotextile membrane, an “MG-56” backfill underlayment approximately 300 mm thick, all covered with No. 3-gauge ballast backfill approximately 250 mm thick. The track material will be installed on this compacted soil and the whole will be covered with two layers of paving up to the height of the rail.

4.5.16 DEFINITIVE LAYOUT OF THE AREA

The lighting of Terminal 21 will be provided by outdoor floodlights using high-power, weatherproof LED technology. Various networks (electrical system, fiber optics, industrial pipes) and an electrical distribution chamber will also be integrated. The arrangement of the marine structures includes the integration of security equipment such as guards and ladders, as well as objects used to secure and moor ships, such as fenders and mooring bollards.

4.5.17 INITIAL DREDGING FOLLOWING CONSTRUCTION

The selected variant requires little dredging to reach the desired depth of -11.0 m during the construction phase. Based on a conservative scenario, the final volume of sediment to be dredged during the construction phase will be at most 5,000 m^3. The dredging method selected is the same as the one applied and recommended in the five-year program for the dredging of existing wharves at the Port, i.e. mechanical dredging. The dredging will be carried out after the construction of the sheet pile wall and riprap walls.

The substrate is composed of sand and silt over the entire thickness to be dredged. The dredged sediments will be valorized on land as fill material to backfill cavities formed between the new Terminal 21 and the Kruger site.

4.6 SIDE ACTIVITIES RELATED TO CONSTRUCTION

4.6.1 TEMPORARY SITE INFRASTRUCTURES

For construction work, contractors need space for equipment, material storage and work areas. The selected site will be located along the shoreline on Kruger's land as well as on the west side of the existing Wharf 20.

The main equipment required for the construction of the docks are hydraulic excavators, loaders, backhoes and cranes for sinking, concrete mixers, heavy trucks, floating equipment, as well as diving equipment for underwater work.

The contractor will be able to install all the temporary conduits required for the water supply of its equipment from the fire hydrants at Wharf 20. The TRPA will allow the contractor to get power supply from Wharf 20.

4.6.2 CONSTRUCTION DEBRIS

A Non-Hazardous Solid Waste Disposal Plan including methods and locations for disposal of solid waste, and debris from the clearing work, will be required from the contractor. Burial of waste and scrap materials on the job site will not be allowed. Excavation and demolition debris will be sorted to manage their future use or disposal according to current standards. Materials that will not be reused in the new works will preferably be recycled, otherwise disposed of in sites authorized by the MELCC. Construction debris from work on road foundations or other structures, as well as residual materials contained in excavations will be managed according to applicable regulations, including the

Regulation respecting hazardous materials. They will be disposed of in sites authorized by the MELCC according to their level of contamination, where applicable.

4.6.3 TRAFFIC DURING CONSTRUCTION

To facilitate traffic within the Port's enclosure, routing will provide connectivity between Terminal 21 and Wharf 20. The new routes are all located on existing Port property. The access roads will be paved with hot mix asphalt concrete pavement. The work site will be accessible primarily via Gene-H Kruger Boulevard, as it is the preferred route according to the City of Trois-Rivières' indications. This roadway has an estimated annual average daily traffic flow of 14,442 vehicles per day.

The transportation of materials for backfill (1.83 Mt) and concrete (2,500 m^3) is the main activity that will generate a significant increase in traffic on this artery. The number of trucks (30 t) is estimated at 61,107 for all the backfilling work at Terminal 21.

4.6.4 CONSTRUCTION MACHINERY

Terracing and concreting work of this scale requires the use of specialized equipment such as bulldozers, dredgers, hydraulic excavators, on- and off-road trucks of 20 and 50 tons, graders and drills. Concrete work will require concrete mixers and concrete pumps. The concrete (approximately 2,500 m^3) will be prepared at an existing plant outside the work area. Cranes will be required to handle the structural elements and equipment. Machinery refuelling activities will be authorized at specifically identified locations and at more than 30 m from the river.

4.6.5 CONSIDERING KRUGER'S CONSTRAINTS

An analysis of the infrastructure elements of the Kruger mill located in the area where the Terminal will be built and which will have to be moved, rebuilt or dismantled was carried out. Some of these elements must always remain in operation or with very short shutdown periods, either during or after the construction of Terminal 21. This is particularly the case for the water intake and the process water outfall, which must also be the subject of certification applications. In addition, since the Kruger site has been in operation for many years, there is potentially contaminated soil on this land. Should any of these soils be excavated during the construction of the terminal, they will be dealt with in accordance with the *Politique de protection des sols et de réhabilitation des terrains contaminés* ("Policy on Soil Protection and Remediation of Contaminated Sites") and disposed of at a site approved by the MELCC.

4.6.6 SECURITY

The TRPA wants the work to be planned so as not to interrupt services and operations at the other wharves in the Port, and at the Kruger Mill as much as possible. Due to its proximity, some disruptions in operations could occur at Wharf 20. The safety of docking manoeuvres by ships using the Port must also be ensured during the work. In addition, the contractor and its subcontractors will have to comply with the TRPA's safety and control requirements for access within the secure perimeter of the Port. Workers will be required to familiarize themselves with the requirements, policies and procedures to be followed with respect to health and safety and access control within the Port's perimeter.

4.7 SIDE ACTIVITIES NOT RELATED TO CONSTRUCTION

The Project will also consider the construction of an overflow outfall owned by the City of Trois-Rivières and its extension across Wharf 21. The City was already planning to review this outfall as part of a sewer system upgrade in this area. It will be under the City's responsibility and will be approximately 300 m long.

4.8 OPERATION PHASE

After the new Terminal 21 is commissioned, an estimated period of up to five years may be required for it to operate at full capacity.

4.8.1 PRODUCTS HANDLED

It is anticipated that the products handled at the new Terminal will be like those currently received at the Port, mainly dry bulk. Currently, there are no plans to handle hazardous products on the new docks.

4.8.2 DOCKING AND MANOEUVRING AREAS

The navigable waters under the jurisdiction of the Port of Trois-Rivières are defined under the *Canada Marine Act*. Ship speeds in the main channel of the St. Lawrence Seaway between the ports of Québec City and Montréal vary, depending on the sector, from 5 knots to 16 knots. The average speed of vessels can be considered between 11 and 13.5 knots. Ahead of the Port of Trois-Rivières, this speed is reduced to 5 knots. This obligation is due to the change of St. Lawrence pilot in front of the Port, which consequently obliges all vessels to reduce to a safe speed.

When docking, it is recommended to keep a speed of 3 knots in order to control the vessel on approach, speed becoming practically nil for the last few meters at docking. With the permanent current of 5 knots, for vessels docking on the port side, a zero speed on the bottom allows this maneuver with control of the vessel.

Considering that the orientation of the new wharves is in the extension of existing wharves, the same docking conditions will be used. Through its regulations, the Port can impose the number of tugs at all times or in the event of certain weather conditions (wind, waves, ice). At other times, the decision as to the number of tugs is primarily the responsibility of the pilot assigned to pilotage on the St. Lawrence. It is customary to generally use two tugs for mooring in the Port.

The Port of Trois-Rivières' anchorage areas are in the St. Lawrence River and are part of the navigable waters of the Port as defined under the *Canada Marine Act*. No vessel at anchor within the Port's limits (two anchorage zones) may stop or deactivate its main propulsion apparatus without prior permission from the TRPA.

4.8.3 CIRCULATION AND TRAFFIC

The operation of Terminal 21 will optimize the flexibility of current operations and increase the capacity to 94 vessels in a realistic scenario, for an approximate average of two additional vessels per week. According to a realistic scenario, 4,240 additional railcars per year will be expected in the operation phase. Considering that a locomotive coming to the Port has a 50-car convoy due to its passage through an urban environment, there will be an addition of approximately 85 trains per year, for an average of one to two additional convoys per week.

During the operation of Terminal 21, trucks will use the eastern access road between the new docks and Gene-H.-Kruger Boulevard, the extension of Notre Dame Centre and Père-Daniel streets. The site will be accessible mainly via Gene-H.-Kruger Boulevard, which is the preferred route for the Port, according to the City of Trois-Rivières. In-service transportation for the realistic scenario is estimated at 33,365 trucks annually, or approximately 128 trucks per business day. Thus, the operation of Terminal 21 will increase traffic on Gene-H Boulevard. Kruger Boulevard by approximately 0.9%.

4.8.4 TRANSSHIPMENT

For the time being, no specific handling activities are defined for the new infrastructure, but the facilities will be designed for transhipment of dry bulk and general cargo, including oversized parts. Part of the transhipment will be done by truck or by the existing on-site rail link.

No hangars, warehouses or permanent infrastructure is currently planned to be built at the terminal. If applicable, all new related projects carried out after the construction of Terminal 21 will be carried out in accordance with the regulations in force, which implies that these related constructions will have to be authorized, notably under the *Impact Assessment Act* (2019).

Ongoing operations will take place on a regular 12-hour daily schedule (7:00 a.m. to 7:00 p.m.), five days a week, following the Port's current schedule. However, depending on traffic, vessel arrival times and handling schedules, operations may continue evenings and weekends. For example, there were approximately 8 and 6 nights of work at wharves 19 and 20 respectively in 2019.

4.8.5 WATER AND ELECTRICITY SUPPLY

The new wharves and storage areas will be equipped with a water supply system to supply vessels with drinking water and for fire prevention. In addition, the entire new terminal will be supplied with electricity to provide lighting for the storage areas and for the operation of specialized equipment by cargo handlers.

The installation of an electrical connection station for ships is not currently planned since the connection specifications are different for each ship, but this remains under analysis. In the alternative where a regular service would be established at Terminal 21, a shore power connection could easily be added for the ships using this service.

4.8.6 GENERAL MAINTENANCE

It is estimated that paving will be required after 15 to 20 years of wharf use. Ladders repairs, lighting fixture replacements, wheel guard and bollard painting, or other relatively minor work may also be required during this period.

4.8.7 PERIODIC MAINTENANCE DREDGING

To maintain safety at docks of the Port and in the ship manoeuvring areas during low-water periods, the TRPA periodically levels the shoals in front of the docks. A depth of -10.7 m at chart datum is maintained at its commercial wharves.

The Port intends to ensure a depth of -11.0 m in front of Terminal 21. To maintain this depth, periodic low volume maintenance dredging will be required. It is assumed that the volume of dredging will be comparable to that of wharves 19 and 20, or approximately 1,000 m^3 every 6 to 8 years. In fact, this area is subject to strong currents and therefore requires very little maintenance dredging. The sediments consist almost exclusively of sedimentary materials (fine sands and silts) related to natural solid transport phenomena.

4.8.8 SNOW REMOVAL

A winter maintenance plan will be developed to plan for effective snow removal for the new Terminal 21, its access roads and rail lines. The design involves ensuring that the designated areas are wide enough to allow for efficient snow removal operations.

Snow management is part of the *General Conditions of Occupancy Regulations*, conditions established by the TRPA under the *Canada Marine Act*. Waste snow on storage areas and new docks will be managed in the same manner as at other terminals, i.e. pushed and accumulated on the Port's territory on an asphalt surface with a meltwater collection system. If the storage site is not sufficient, the snow is loaded onto trucks and transported to an authorized storage site in the City of Trois-Rivières.

The spreading of melting agent, or a mixture of melting agent and abrasive stone is carried out as required to ensure the safety of port activities.

4.8.9 BALLAST WATER MANAGEMENT

Ballast water from any vessel entering waters under Canadian jurisdiction must be managed according to Transport Canada guidelines. The TRPA has also established specific rules for ballast water management. In fact, the TRPA's *General Conditions of Occupancy Regulations* established under the *Canada Marine Act* (S.C.1998, c. 10) reinforce the rules for ballast water management. Compliance with environmental rules implies, among other things, that "Every operator or owner of a ship in the Port who carries or has on board ballast water must comply with all environmental rules that apply to ballast water, including the *Ballast Water Control and Management Regulations* made under the *Canada Shipping Act, 2001* (S.C. 2001, c. 26), and must take, at his own expense, within any time limit set by the TRPA, all preventive or corrective measures to ensure compliance with these environmental rules.

4.8.10 CARGO RESIDUE AND HAZARDOUS MATERIALS MANAGEMENT

Authorization from the Harbour Master's Office is required to move, store or transport dangerous goods. Dangerous goods are goods as defined in Section 2 of the *Transportation of Dangerous Goods Act, 1992*. In addition, the TRPA's *General Conditions of Occupancy Regulations* specify the conditions for handling dangerous goods. Under this regulation, it is prohibited to, among other things, “load, unload, move or handle explosives, firearms or other dangerous goods in the Port without the TRPA's written permission and under such conditions as the TRPA may then impose, including those relating to liability”. Finally, any remaining cargo and hazardous material residues are sent to authorized residual hazardous material processing and transfer centers.

The TRPA may refuse one or more hazardous cargoes that, due to their quantity or level of risk, may become a potential threat to persons, facilities or the environment. The Port of Trois-Rivières Emergency Response Plan defines organizational responsibilities and coordination information in the event of an incident. The Emergency Plan is updated by the TRPA.

4.8.11 SHIP REFUELLING AND WASTE MANAGEMENT

During the operation of Terminal 21, it is expected that the supply of petroleum products to ships will be carried out from road transport, as is currently the case at the Port. Ships are then required to comply at all times with the *Canada Shipping Act* (S.C. 2001, c. 26), specifically Parts 8 and 9 on pollution prevention. In addition, a ship's fuelling must be constantly monitored to ensure that no spills occur.

With respect to the management of ship-generated waste, Canadian regulations require that residues from foreign countries, except the United States, be landed on Canadian soil as international waste and must therefore be disposed of by a duly authorized facility or service.

4.8.12 OTHER RELATED PHYSICAL ACTIVITIES

Depending on the contractual agreements that will be negotiated with potential users of the docks, ancillary facilities may be required, such as the construction of enclosed storage spaces (sheds, warehouses or infrastructure) or conveyors depending on the goods to be handled. The design and execution of this work will be the responsibility of the users and will follow the practices established by the TRPA. Furthermore, all these projects will be carried out in compliance with the regulations in force, which means that these constructions will have to be authorized under the *Impact Assessment Act*. As a Federal Authority, the TRPA has the obligation to verify that an Environmental Impact Assessment (EIA) is produced for a physical activity designated by regulation, as well as an Assessment of the Environmental Effects (AEE) for a non-designated concrete activity.

4.8.13 SOURCES OF CONTAMINANT EMISSIONS

Regarding dust emissions, note that the TRPA has its own continuous air quality monitoring network. The instantaneous result of the total particle concentration is continuously analysed to trigger actions aiming to reduce them when the total particles emitted are high.

If serviced infrastructures are built on the new terminals, the TRPA will require the handler to direct the sanitary waste generated into the City of Trois-Rivières' sanitary sewer system or into a biological treatment that meets current standards.

The Project also includes the construction of a rainwater collection and treatment network (see section 4.5.12). Ships are not allowed to discharge directly into City sewers or into the St. Lawrence River according to existing regulations.

4.8.14 GOOD ENVIRONMENTAL AND OPERATIONAL PRACTICES

The TRPA is constantly working on balancing the Port's industrial activities with the surrounding urban environment. To manage usage conflicts, the TRPA advocates the application of good environmental and operational practices aimed at reducing nuisances. A nuisance is any factor that has a negative impact on the health or well-being of residents living near the facilities (e.g., noise, vibration, dust, light, odours). It is therefore a matter of publicising, promoting as well as encouraging Port users to apply desirable good practices and encouraging the implementation of voluntary initiatives to standardize uses.

4.9 DECOMMISSIONING AND CLOSURE PHASE

No closure or decommissioning is currently planned for this Project. The life expectancy of the new facilities is estimated at 50 years. There will most likely be a refurbishment at the end of the useful life, which will then require permits and ministerial authorizations. It should be noted that the Port of Trois-Rivières has been in operation for nearly 140 years and has undergone numerous refurbishments in the past.

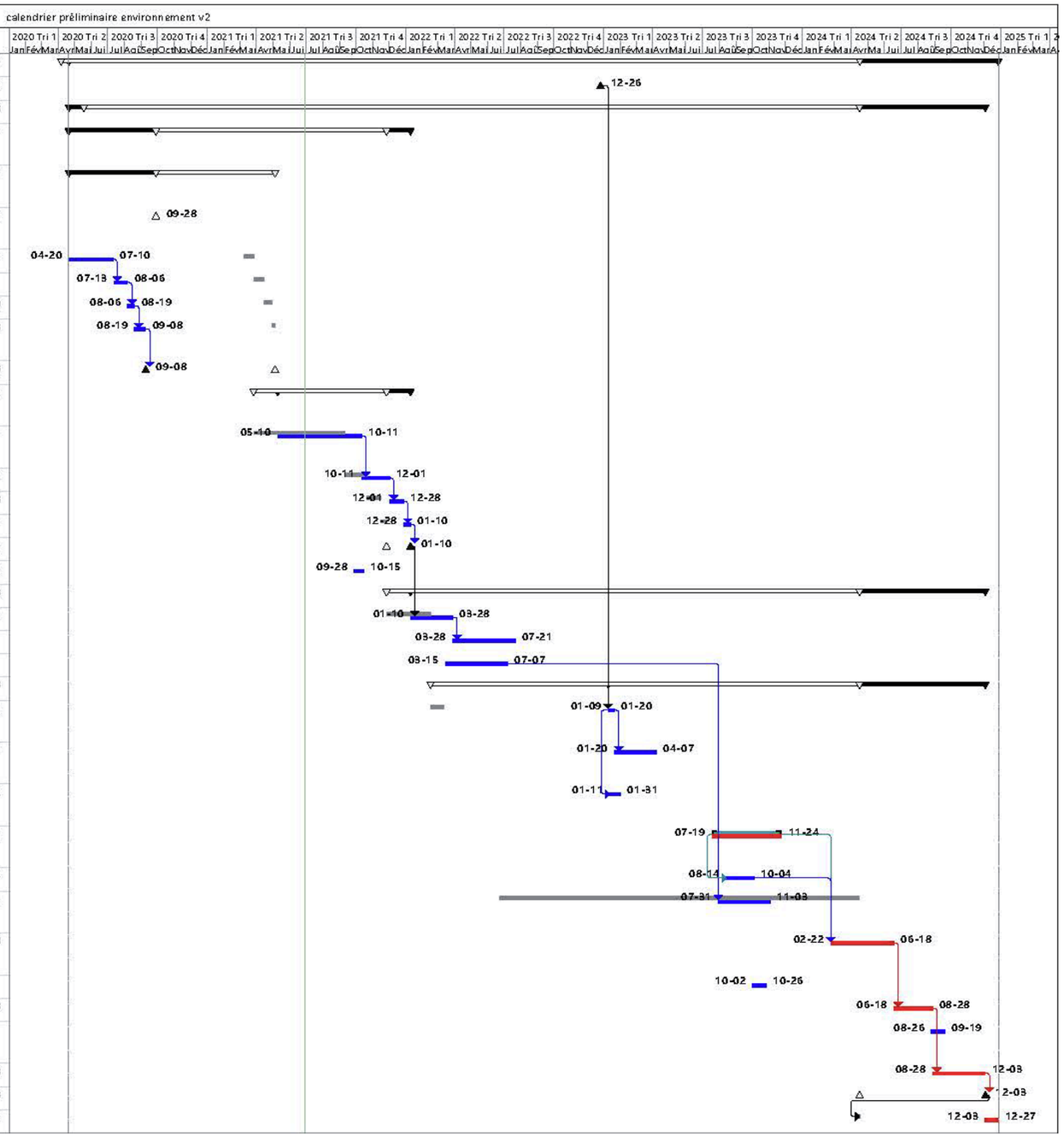
4.10 PROJECT TIMELINE

The 24-30 months construction phase of the Project will begin with the mobilization of the construction site, the civil works beginning in 2023, and will end with the commissioning of the work by the contractor by the end of 2024. This schedule is based on the government approvals for the Project. Figure 4 shows the detailed schedule for the construction of Terminal 21.

Figure 4 : Detailed construction schedule for Terminal 21

calendrier préliminaire environnement v2

Nom de la tâche	Durée	Prédécesseurs	Début prévu	Fin prévue
Nouveau Terminal 21	**1302,29 jours**		**Lun 20-04-20**	**Ven 24-12-27**
Autorisation environnementale ACÉI	0 jour		Lun 22-12-26	Lun 22-12-26
Réalisation/ Exécution	**1282,29 jours**		**Lun 20-04-20**	**Mar 24-12-03**
Travaux préparatoires pour l'octroi du contrat de construction	**472,29 jours**		**Lun 20-04-20**	**Lun 22-01-10**
Préqualification des équipes Ingénieur-Constructeur	**124,86 jours**		**Lun 20-04-20**	**Lun 20-09-28**
Go de la direction de procéder à l'AO de préqualification	0 jour		Lun 20-09-28	Lun 20-09-28
Préparation du document de préqualification	65 jours		Lun 20-04-20	Ven 20-07-10
Appel d'offre de préqualification	20 jours	7	Lun 20-07-13	Jeu 20-08-06
Analyse des offres	10 jours	8	Jeu 20-08-06	Mer 20-08-19
Recommendations et sélection des équipes qualifiées	15 jours	9	Mer 20-08-19	Mar 20-09-08
Approbation des firmes qualifiées	0 jour	10	Mar 20-09-08	Mar 20-09-08
Appel d'offre du clé en main aux firmes préqualifiées	**190 jours**		**Lun 21-05-10**	**Lun 22-01-10**
Préparation des documents contractuels, devis de performance	6 mois		Lun 21-05-10	Lun 21-10-11
Appel d'offfre du clé en main	8 semaines	13	Lun 21-10-11	Mer 21-12-01
Analyse des soumissions	4 semaines	14	Mer 21-12-01	Mar 21-12-28
Recommendations et approbation du CA	2 semaines	15	Mar 21-12-28	Lun 22-01-10
Octroi du contrat	0 jour	16	Lun 22-01-10	Lun 22-01-10
Déplacement des moules	15 jours		Mar 21-09-28	Ven 21-10-15
Réalisation des travaux de construction	**810 jours**		**Lun 22-01-10**	**Mar 24-12-03**
Ingénierie préliminaire	3 mois	17	Lun 22-01-10	Lun 22-03-28
Ingénierie définitive	90 jours	20	Lun 22-03-28	Jeu 22-07-21
Commande et achat des palplanches	90 jours		Mar 22-03-15	Jeu 22-07-07
Réalisation des travaux	**538,71 jours**		**Lun 23-01-09**	**Mar 24-12-03**
Mobilisation au chantier (travaux terrestre phase 1)	10 jours	2	Lun 23-01-09	Ven 23-01-20
Travaux de remplacement de l'émissaire V3R et chemin d'accès (partie terrestre)	3 mois	24	Ven 23-01-20	Ven 23-04-07
Travaux sur le site (bande riveraine) coupe des arbres	15 jours	24DD+3 jours	Mer 23-01-11	Mar 23-01-31
Travaux de remblayage dans le fleuve, jusqu'au niveau 1.5 m	100 jours		Mer 23-07-19	Ven 23-11-24
Compaction dynamique	40 jours	27DD+20 jours	Lun 23-08-14	Mer 23-10-04
Installation du rideau mixte, palplanche (quai 22)	75 jours	22	Lun 23-07-31	Ven 23-11-03
Remblayage final, installation tirants et mur d'ancrage	90 jours	28;27FD+70 jours	Jeu 24-02-22	Mar 24-06-18
Installation duc d'Albes, pieux	20 jours		Lun 23-10-02	Jeu 23-10-26
Pluvial, acqueduc et électricité	55 jours	30	Mar 24-06-18	Mer 24-08-28
Dragage, enlèvement bourlet et atteinte niveau	20 jours		Lun 24-08-26	Jeu 24-09-19
Pavage, installation accessoirs	75 jours	32	Mer 24-08-28	Mar 24-12-03
Fin des travaux	0 jour	34	Mar 24-12-03	Mar 24-12-03
Fermeture du dossier	20 jours	35	Mar 24-12-03	Ven 24-12-27



5 FIRST NATIONS PARTICIPATION AND CONCERNS

The objective of the consultation process with First Nations is to avoid, mitigate or compensate for the potential negative impacts of the Project. To this end, the consultations aim to learn about the issues raised by First Nations, particularly in terms of health, socio-economic, natural and cultural heritage, location or matter of historical, archaeological, paleontological or architectural significance, and the current use of lands and resources for traditional purposes.

The TRPA has developed a collaborative approach to promote the participation of First Nations in the different phases of the Project. The involvement of First Nations facilitates the identification of the impacts of the Project on their rights and interests and aims to contribute to the planning, improvement and development of the Project, as well as to its success. This participation also allows the acquisition of traditional knowledge that could improve the implementation of the Project, notably by reducing or mitigating its effects on the environment.

Thus, the TRPA has undertaken a consultation process with the First Nations identified by the IAAC (formerly CEAA), namely:

- the W8banakiak of Wôlinak;
- the W8banakiak of Odanak;
- the Huron-Wendat Nation;
- the Mohawks of Kahnawà:ke;
- the Mohawks of Akwesasne;
- the Mohawks of Kanesatake.

It should be noted that within the framework of the consultations, the W8banakiak of Wôlinak and Odanak are represented by the Grand Conseil de la Nation Waban-Aki (GCNWA), more precisely by the Ndakina Office. The W8banaki Nation includes the members of Odanak and Wôlinak. The Huron-Wendat Nation (HWN) is represented by the Nionwentsïo Office, and the interlocutors for the three Mohawk communities are their respective councils: the Mohawk Council of Kahnawà:ke (MCK), the Mohawk Council of Akwesasne and the Mohawk Council of Kanesatake.

The information and consultation approaches implemented with the various First Nations are presented according to two consultation periods, from 2015 to 2019 and starting in 2020. The first period corresponds to the drafting of a preliminary version of the EIA and the time required to carry out sectoral and feasibility studies. The second period corresponds to the resumption of the TRPA Project and consultations in 2020.

The TRPA’s exchanges with First Nations have made it possible to identify several issues and concerns related to the Project. Concerns have also been expressed by First Nations in letters addressed to the TRPA and the IAAC, during the review of the 2017 EIA and in studies related to the Project. The TRPA undertakes to address these concerns to the best of its ability to improve the Project, while avoiding, mitigating or compensating for potential negative effects on First Nations.

5.1 LAND USE AND OCCUPANCY

The GCNWA pointed out that access to the river has been reduced over time, due to the privatization of the banks, and land users are concerned that the Project could encroach on the Notre-Dame boat launch ramps near the Port.

- The TRPA has stated at meetings that the Project will not change the access to the river. In addition, it has entered into a partnership with the City of Bécancour so that access to the Sainte-Angèle wharf launch will be free for everyone.

Concerns have been raised about the impacts of the project on the landscape.

- To address this concern, the Project has been revised to incorporate more extensive revegetation.

According to the First Nations, the environmental impacts of the Project, particularly those on ichthyofauna and avian fauna, could influence the experience on the territory and traditional activities, whether for food, ritual, knowledge transmission or social purposes. This would have negative consequences on the exercise of their rights and interests. First Nations have also undertaken studies and consultations with their members to better determine the impacts of the Project. The GCNWA and the HWN believe that a specific follow-up of the impacts of the project on the activities of their members should also be considered.

— The TRPA has supported the conduct of studies on land use and occupation by First Nations. These studies were used to better plan the various stages of the Project. They are essential for evaluating the Project's impacts on the environment. Steps are underway to specify the methods and frequency of future follow-ups.

5.2 PROTECTION OF THE ARCHAEOLOGICAL POTENTIAL

Some First Nations consider that the archaeological potential study presents a lack of information on the historical presence of First Nations in the Project area, and propose adjustments to this study.

— The TRPA encourages the enhancement of the archaeological potential study by interested First Nations. The TRPA has received and integrated the comments sent by the HWN and the GCNWA and has mandated the GCNWA to send a complementary document concerning the occupation by the First Nations and the W8banaki Nation.

First Nations want to be informed of any archaeological discoveries that concern them, as the project area is considered a place of exchange and gathering for several First Nations.

— The TRPA plans to forward to interested First Nations a Procedural Plan to be followed for the identification of archaeological resources in the event of incidental discoveries, for comments and suggestions to improve the plan.
— The TRPA intends to remain in close communication with First Nations throughout the project, and them will be informed without delay in the event of an archaeological discovery.

5.3 POTENTIAL IMPACTS OF THE PROJECT ON THE ENVIRONMENT

Concerns were raised regarding:

— the hydrodynamics and general water quality of the St. Lawrence River and its tributaries;
— invasive alien plant species (IAS);
— valued species and their habitats in general;
— reptiles and their habitats;
— lake sturgeon, Atlantic sturgeon, yellow perch and their habitats;
— migratory birds and mammals;
— species at risk and the measures planned to protect them;
— special-status fish species that have been identified and special-status fish species that have not been identified in the Project inventories but that could potentially be found in the Project;
— the methodology used to define fish habitat compensation plans;
— the methodology used to determine the significance of residual effects;
— the ecosystem, which could be disturbed by the risks of leaks, spills and accidents.

Concerns and suggestions were considered and used to improve the EIA. They were also used to improve the compensation projects, and the planning of the follow-ups for certain species.

It should be noted that the TRPA shared the sectoral reports with the First Nations that requested them and invited all the First Nations concerned to participate in the compensation plans. For the selected projects, the First Nations

will be informed of the results of follow-up monitoring and the effectiveness of the fish habitat compensation measures.

The TRPA also plans to send the contractor's environmental monitoring and follow-up report on the progress of the construction work to the First Nations that so wish.

5.4 FIRST NATIONS PARTICIPATION PROCESS

All the First Nations consulted asked to review relevant sections of the impact report to ensure that the issues that affect them and the description of their communities are properly taken into account. They also indicated that meeting the requirements of the Agency's regulatory process can lead to a certain workload, it is time consuming and requires consultations, particularly regarding the scope of the impacts on First Nations' rights.

- Although the Project is subject to the former impact assessment process (CEAA 2012), the impacts of the Project on First Nations' rights are still being assessed. The TRPA has considered First Nations' contributions to improve the EIA by allowing time for the preparation of the reports and for the review of the EIA by the First Nations.
- Thus, the TRPA integrated the reports received into the EIA and sent the First Nations the entire content of the preliminary EIA so that they could comment on it before it was submitted to the IAAC. Certain chapters were translated into English as an accommodation for First Nations who requested it. The TRPA therefore allowed a privileged and exclusive consultation with First Nations, lasting approximately one month, on the preliminary EIA. This step was important for the TRPA, considering that it strongly values the contribution of First Nations to the EIA. This input was integrated into the various chapters of the EIA.

First Nations have expressed the wish to participate in environmental follow-up monitoring, fish habitat compensation projects and archaeological inventories since they have the necessary human resources.

- The TRPA has contracted out several reports to First Nations and has invited First Nations to submit fish habitat compensation projects.
- Throughout the project, the TRPA will invite the First Nations to carry out other studies, taking into account the current expertise held by each Nation and the willingness to develop new expertise.

First Nations wish to be involved in the different stages of the Project and benefit from economic opportunities.

- —The TRPA has revised its strategic plan to integrate the willingness to collaborate with First Nations, particularly through consultation during development projects, by awarding employment contracts to Aboriginal businesses, by supporting the hiring of First Nations members and by investing in Aboriginal initiatives. Thus, the TRPA strives to maximize opportunities for economic benefits for First Nations, in compliance with the conditions of its Procurement Policy (TRPA C-09).
- —It should be noted that the TRPA intends to continue its interactions and the sharing of relevant information on the Project with interested First Nations throughout the construction and operation of the Project and that a designated person has been identified by the TRPA to ensure the fluidity and continuity of these exchanges.

5.5 CUMULATIVE EFFECTS

All of the First Nations consulted expressed concern about the increase in traffic on the river, mainly related to commercial navigation, but also recreational boating. These concerns relate to the effects on the ecosystem, on the ability to navigate, on the ability to continue to access resources for traditional purposes, and finally on the ability to continue to ensure the integrity of the St. Lawrence River. They believe that the cumulative effects of projects on the St. Lawrence River have, and will continue to have, significant cumulative effects on their traditional and contemporary activities.

Some First Nations are concerned that the port projects on the St. Lawrence River (Contrecoeur, the City of Québec, Saguenay and Trois-Rivières) will be completed before the studies on their cumulative effects undertaken by Transport Canada and the IAAC have made sufficient progress.

Some First Nations feel that the section on cumulative effects does not include all the aspects required for a complete assessment and that the scope of the impact assessment should be regional, i.e., at the scale of the river section that extends from Montréal to the City of Québec.

The TRPA recognizes that a comprehensive report is indeed required to better assess cumulative impacts and underscores its participation in the Ocean Protection Plan and its initiative to assess the cumulative effects of marine transportation (2020). More recently, the Minister of the Environment and Climate Change contracted out to the IAAC to conduct a regional assessment of the St. Lawrence River region (Québec) in which the Port intends to collaborate. The TRPA is also collaborating on an INRS report on the effects of maritime and port activity on shoreline erosion.

6 PUBLIC CONSULTATION AND CONCERNS

The TRPA and its handlers pay attention to reconciling industrial activities with the adjacent urban environment. Loading, unloading and handling operations are adapted to the surrounding residential context, ensuring that the citizen remains at the center of concerns. For example, lighting installations have been modified so that they are directed only towards the terminals rather than reaching neighbouring houses. The redesign of the circulation routes allowed truck traffic to be concentrated within the port area, avoiding the downtown core. In addition to adapting its industrial activities, the TRPA has adopted a vision of sustainable development by contributing to the urban development of the spaces surrounding its operating site. More than 41,000m², or 12% of the TRPA's land, is devoted to recreational activities or public areas.

The TRPA's information and consultation activities are part of its social and environmental management approach. This approach ensures that its projects contribute to the socio-economic vitality of the region in accordance with the Canada Marine Act, while meeting the environmental expectations of the host communities. Holding information and consultation activities on its various projects reflects TRPA's desire to do more and better in integrating the public's expectations and suggestions. Social acceptability is a fundamental condition for the Terminal 21 project. The TRPA's citizen information and consultation strategy make it possible to consider the concerns, fears and expectations of community stakeholders at every stage of the project.

Since the fall of 2018, various communication activities have been carried out by the TRPA, notably through conferences, open houses, presentations and broadcasts on social networks and the Internet. These activities make it possible to answer questions from the public, organizations and partners. In addition, the comments and concerns of the groups consulted are heard by the TRPA, which ensures that the necessary follow-up is provided.

To carry out the impact assessment report, surveys were conducted among organizations, businesses and residents located in the study area. The purpose of these surveys was to document land use, the particularities of the study area and respondents' concerns about the project or current use of the study area. The selection of participants was guided by their involvement in the community, as well as their knowledge of the area. A total of 30 interviewees were consulted between September 2016 and February 2017.

During the interviews, document research and numerous communication activities held, few concerns were raised about the Port of Trois-Rivières expansion project. The majority considered that the development will have little effect on the surrounding environment and that the site is already highly industrialized. However, some participants raised concerns about noise. According to them, operating activities at the Port, like those at Kruger, are relatively noisy. A possible increase in noise generated by increased activity at the Port is therefore of concern to interview respondents.

Concerns were shared regarding access to water. As few accesses can be used free of charge by the population, those that are available are heavily used. For example, one person mentioned having concerns about the traffic on the Notre-Dame boat launch. The impact of this traffic could diminish the quality of life and tranquility of the area's residents, especially since the City of Trois-Rivières was planning to install a second ramp. The traffic generated by the ramp, as well as the use of the ramp by some people at night, are a few examples of the nuisance experienced by residents near the ramp site.

A few respondents mentioned the desire to be informed of how the sediment will be disposed of during dredging and excavation work.

The study area is located near Lake Saint-Pierre, an area where sport and commercial fishing activities are present. Following the implementation of the complete moratorium on commercial and recreational yellow perch fishing in Lake Saint-Pierre, the concerns of the regional population about the fishing stock are numerous.

Besides the concerns reported above, most respondents interviewed consider the Port expansion to be a positive contribution to the economic development of the region. Whether by answering questions at events or through the Project's Web page, the TRPA has put in place mechanisms to address people's questions or concerns. In addition, 26 local organizations were contacted by email in December 2020 to ask for their concerns. To date, no new concerns about the project have emerged.

In 2021, the TRPA plans to continue its presentation and information activities with target audiences to ensure that any concerns that may emerge are addressed. The schedule includes a presentation of the project to the group of citizens living near the Port, as well as to various local, regional and national organizations. The TRPA is also willing to hold specific meetings with other target groups should the request be forwarded to them.

7 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

This chapter provides the methodological context for the EIA for TRPA's Terminal 21 Project. The general approach used to assess the environmental effects of the Project is consistent with federal requirements for conducting environmental assessments. The methodology used takes into consideration the federal reference document on the determination of the significant environmental effects of a project (Federal Environmental Assessment Review Office, 1994), as well as the IAAC Guidelines issued for the preparation of the project-specific EIA (CEAA, 2015).

The assessment of the Project's effects on the environment is divided into two parts: knowledge of the environment and the Project, and the assessment of the effects on the environment. Prior to the assessment of the environmental effects of the Project, the activities described below were carried out:

- Technical knowledge of the Project. This step aims to understand the technical characteristics of the infrastructures to be developed in terrestrial and aquatic environments, to specify the construction methods as well as the activities in operation. Chapter 4 presents the technical aspects of the Project.
- Knowledge of environmental concerns, interests and issues associated with the Project. Communications and community relations (Chapters 5 and 6) identified specific environmental concerns, interests and issues related to the Project. Consideration of these elements made it possible to identify the components that were the subject of a more detailed assessment of the effects of the Project.
- Knowledge of the environment. The relevant data on the environment were obtained from existing information and specific inventories of the physical (chapter 8), biological (chapter 9) and human (chapters 10 and 11) environments. This exercise made it possible to describe the environment affected by the Project and to identify the most sensitive elements.

The main steps in assessing the effects of the Project on the components of the natural (physical and biological) and human (First Nations and local and regional communities) environments are as follows:

- The selection of the components under study and the valued components;
- Determining the scope of the environmental effects assessment;
- The description of the biophysical and human environment before any disturbance of the environment;
- Assessment of residual environmental effects;
- Surveillance and monitoring programs (if required).

Understanding the technical aspects allows the effects of the Project on the components of the environment, in particular the valued components, to be determined, their significance to be assessed and the appropriate mitigation measures to be defined. The assessment of the significance of the effects (negative and positive) takes into account the standard mitigation measures normally applicable and technically and economically feasible for projects of this type, as well as the specific measures or improvements required by the Project under study. Residual effects are those that remain after the implementation of all such measures. If necessary, compensation programs will be presented, as well as monitoring and follow-up programs if required.

Once the description and analysis of the biophysical and human components were completed, the likely environmental effects were conservatively assessed to determine if further analysis was required.

In the absence of a significant interaction, the likely environmental effects are considered insignificant and no further analysis is required. Anticipated changes have no impact when potential effects are nullified through the application of standard practices or regulations that impose strict standards. If interactions can still cause significant effects on the environment, then these likely effects are further addressed with the determination of the significance of residual effects.

The procedure presented in Table 4 summarizes the methodology used to assess the effects of the Project on environmental components.

Table 4 : Summary of the Environmental Assessment Methodology for Project Effects

1. DETERMINATION OF THE SCOPE OF THE ASSESSMENT
Selection of valued components
It is necessary to justify the choice of components, whether or not they are selected as valued components. The regulatory framework and the concerns raised by First Nations and local and regional communities serve, among other things, to identify the components, including the valued components.
Spatial and Temporal Boundaries
The spatial and temporal boundaries used in the environmental assessment vary according to each valued component.
2. PRESENTATION OF EXISTING CONDITIONS
Key highlights of the environmental description are presented in the EIA report and where appropriate, reference is made to a sectoral report in the appendix. The sources of information used are detailed for each component described.
3. ENVIRONMENTAL IMPACT ASSESSMENT
Predictions of likely environmental effects
These predictions apply to both natural and human environments (First Nations and local and regional communities). A description of the likely environmental effects is given for each component.
Effect mitigation
For each component, common or specific mitigation measures to reduce effects are presented. If necessary, a compensation program to limit losses, or a bonus program to maximize gains, is detailed.
Determining whether the residual effects are significant
Residual effects after the application of mitigation measures are assessed and significant effects are determined.
Cumulative effects
Cumulative effects for the valued components are analyzed (this section is stand-alone, as requested in the Guidelines).
4. MONITORING AND FOLLOW-UP PROGRAMS
The construction phase work supervision program and the operation and maintenance follow-up program, if required, are presented.

Mitigation measures and compensation programs that are technically and economically feasible will mitigate any significant adverse environmental effects of the project. These mitigation measures are integrated into the analysis of residual effects on valued components.

The TRPA initially used an approach focused on avoiding and reducing effects at the source. Where possible, the Project design was modified, and the positioning of certain Project infrastructures was optimized to limit the effects at the source. Where the principles of avoidance and mitigation have been applied, habitat losses that are unavoidable may be compensated for through the creation or enhancement of equivalent habitat.

The residual effects of the Project on the components take into account the application of mitigation measures. These effects may be significant or insignificant based on the following criteria: the overall environmental value, including the notions of ecological and social contexts;

- The degree of disturbance;
- Magnitude (intensity);
- Geographical scope;
- Duration;
- The probability of occurrence.

With respect to cumulative effects, the methodology used involves the following key steps:

- The identification of the valued components (VCs) of the environment, i.e., those identified by the CEAA and the Guidelines, as well as the components of the environment valued by the populations concerned or by specialists and likely to be modified or affected by the Project;
- The determination of the spatial and temporal boundaries considered for each of the VCs, as well as the identification of the indicators used to describe them;

- The identification, description and selection of past, present or future projects, actions or events that may interact with one of the VCs;
- A description of the reference status of each VC selected;
- A description of the historical trends of each VC selected;
- The determination of cumulative effects for each selected VC;
- The development of mitigation measures and follow-up of cumulative effects.

To be considered in a cumulative effects assessment, a VC must:

- Be highly valued by the populations concerned or by specialists;
- Be protected or identified by legislation;
- Be likely to be modified or affected by the Project;
- Be analyzed based on reliable and sufficient information and data, both for the reference state and for historical trends.

According to the definition provided by the IAAC in its Guidelines (CEAA, 2015), the term “valued component” refers to: “… biophysical or human attributes that may be affected by a project. The value of a component is not only its role in the ecosystem, but also the value placed on it by humans. For example, a component may be valued because of its scientific, social, cultural, economic, historical, archaeological or aesthetic importance.” The valued components identified in the EIA are shown in Table 5.

Table 5: Selected valued components

	Valued component	Guidelines*	Stated concern
Physical environment	Unconsolidated deposits		
	Sediment dynamics		
	Soil quality		
	Sediment quality		
	Circulation of flow		
	Ice		
	Water quality		
	Groundwater quality		
	Air quality		
	Greenhouse gases (GHG)		
	Noise in terrestrial environment		√
	Underwater noise		
	Lighting environment		
Biological environment	Terrestrial and riparian vegetation	√	
	• Wetlands	√	
	• Species at risk	√	
	• Invasive alien species		
	Aquatic vegetation	√	
	• Species at risk	√	
	Benthic invertebrates	√	
	• Species at risk	√	
	Fish and its habitat	√	
	• Species at risk	√	
	Birds and bird habitat	√	
	• Species at risk	√	
	Terrestrial fauna	√	
	• Large animals	√	
	• Small animals	√	
	• Micromammals	√	
	• Bats	√	
	• Herptiles	√	
	• Species at risk	√	

8 DESCRIPTION OF EFFECTS THE PHYSICAL ENVIRONMENT

The characteristics of the physical environment are summarized on Map 2.

8.1 GENERAL DESCRIPTION OF THE PHYSICAL ENVIRONMENT

The study area is within the St. Lawrence-Great Lakes Lowlands physiographic region, which lies between the Canadian Shield and the Appalachians. The flat relief rarely exceeds 15 m in elevation along the river. The present physiography of the St. Lawrence River has been established for about 3,000 years by isostatic rebound, which allowed the river to carve its bed by eroding the Quaternary formations.

The area is subject to tides, with a maximum tidal range of about 0.3 m. The tidal wave profile at Trois-Rivières is two hours for the rising tide and ten hours for the falling tide.

Total annual precipitation is 1,123 mm, of which 864 mm is rain and 259 cm is snow. Average daily temperatures range from -12.1 °C in January to 20.0 °C in July. Annually, prevailing winds are predominantly from the south-southwest and, to a lesser extent, from the northeast.

8.2 SEDIMENT AND RIVER DYNAMICS

The river flow is concentrated mainly in the navigation channel, and adjacent areas carry only a small percentage of the total flow. As a result, current velocities outside the navigation channel are lower and the tractive forces are much lower, which can result in the accumulation of sediment near the banks.

The waters of the St. Lawrence River and its tributaries carry large quantities of sediment. The movement of sediment is influenced by seasonal fluctuations in flows (low and high water), currents and tides. The seasonal sediment load is greatest in the spring (50% to 60% of the annual load) and in the fall (15% to 25% of the annual load).

Hydrodynamic modelling was carried out to determine the conditions during the work and in the exploitation phase.

The results show that the hydrodynamic conditions do not change significantly during the construction period. The difference in flow velocity over the water column does not exceed 5%. The works will have little effect on the flow conditions in the river and in the Terminal 21 area. Only an acceleration of the velocity at the end of the planned extension is reported, where the maximum velocity locally reaches the value of 1.58 m/s. The hydrodynamic conditions at the Port’s current infrastructure do not undergo any change. Thus, the residual effect relative to the sedimentary and river dynamics during the construction phase is considered very small and not significant.

In the operation phase, the models carried out show that in average conditions the extension of the platforms (Terminal 21) creates a speed slowing zone at the end of the projected structure. This zone could favour the accumulation of sediments. Along the current wharves 19 and 20 of the Port of Trois-Rivières, a slight slowing of flow velocities is observed in the water column. However, there will be no change at wharves 14, 15 and 16. In terms of sedimentation, the extension of the Port of Trois-Rivières in the continuity of the existing wharves reduces erosion of the developed banks and leads to an increase in suspended sediments along the existing wharves. The sand and silt, which is re-suspended, spread downstream along the future and existing wharves. However, the installation of Terminal 21 does not affect the concentration of sediment in the study area. Thus, the residual effect relative to the sediment and river dynamics during the operation and maintenance phase is considered low and not significant.

The TRPA undertakes to conduct bathymetric monitoring after the implementation of Terminal 21 (years 1, 3 and 5) to verify the dynamics of accumulation or erosion of sediments in this area.

8.3 WATER QUALITY

Overall, the water quality in the St. Lawrence River is good and no exceedances of MDDELCC or CCME water quality criteria for the protection of aquatic life are observed.

Only fecal coliforms show values that exceed quality criteria, including the criterion for the protection of recreational activities and aesthetics. The quality criteria value for nitrite and nitrate is relatively low. With respect to metals, exceedances of the CCME criterion are observed for aluminum and iron. Cadmium and copper show point exceedances of the CCME criterion. Finally, in general, the median value of the bacteriological and physicochemical water quality index shows a satisfactory water quality.

Since the work will take place near and in the water of the St. Lawrence River, there is a risk of water contamination related to poor management of excavated material during the work or an accident with equipment with hazardous products. This work could also modify the drainage and thus accentuate the runoff in certain areas and facilitate the transport of fine particles towards the river. With respect to dredging, the TSS concentration should remain near the bottom, and the suspension of particles and TSS will be brief in the water column.

During construction and operation, numerous mitigation measures will protect water quality. Thus, the residual effect on water quality during the construction and operation phases is considered very low and not significant.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

The monitoring program will include the measurement of TSS levels in the river water downstream of the work site during the construction phase and during dredging work, in accordance with the Recommendations for the Management of Suspended Solids (SS) During Dredging Activities developed by MDDELCC and ECCC (2016) under the St. Lawrence Action Plan. Appropriate measures will be implemented as needed to meet the SS emission criteria.

8.4 SEDIMENT QUALITY

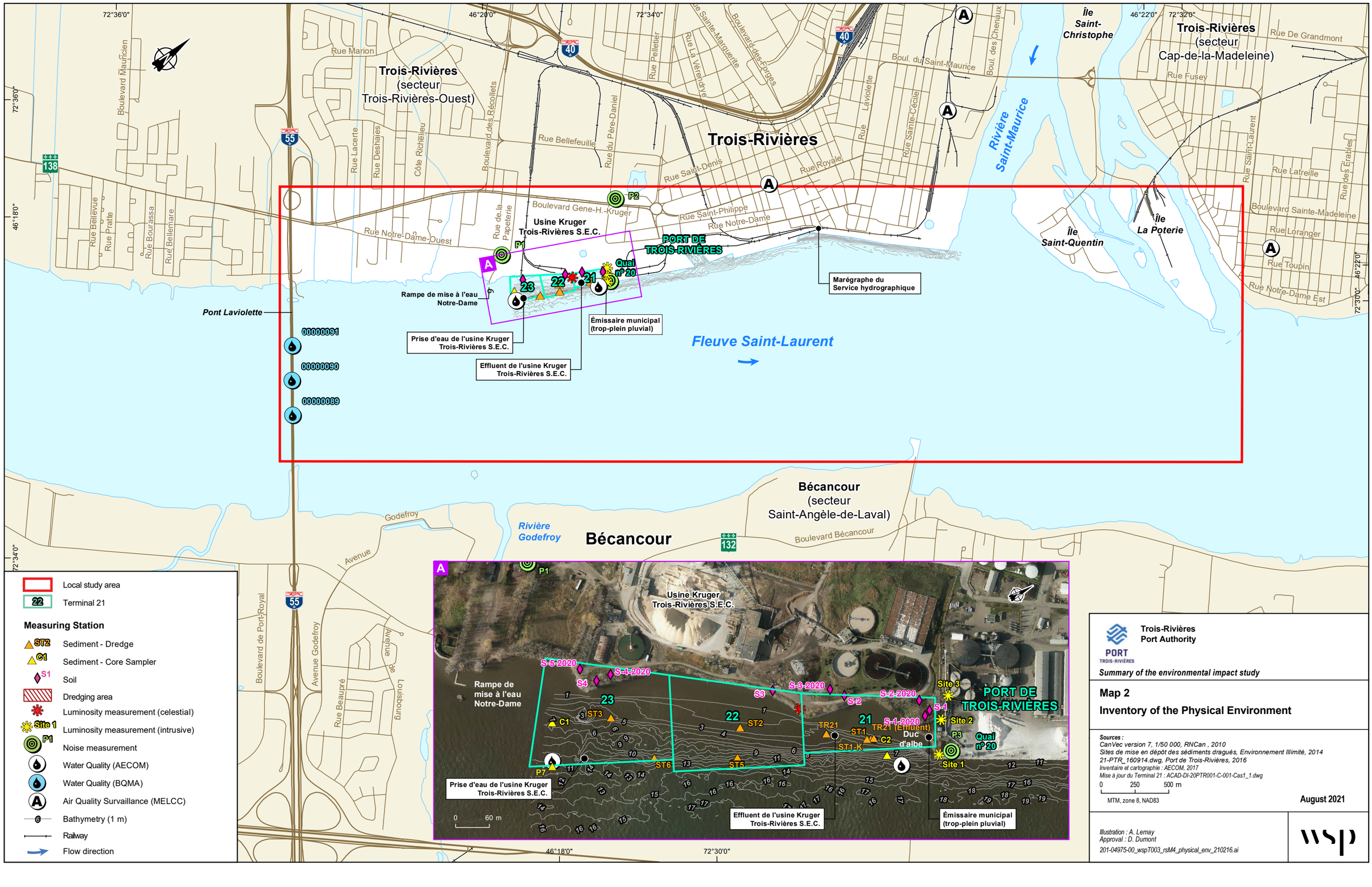
Sand is the main component of the substrate in the restricted study area, except in the area around the Kruger final effluent outfall, where gravel is more abundant. The secondary substrate is a mixture of silt and clay.

At the site under consideration for the construction of Terminal 21, some of the sediments, located in shallow water (about 2 m), are more contaminated with metals and PAHs. One station, located in the eastern portion, has several parameters with exceedances. The sample from the sediment core between 0.50 and 1 m has more contamination than the surface layer. Stations located at greater depths (11.0 to 12.0 m) showed fewer signs of contamination. Sediments found in the area of the future Kruger intake pipe are minimally contaminated. It therefore appears that stations located in shallower water and further east, towards the current port facilities, show greater contamination.

Since the work will take place near and in the water of the St. Lawrence River, there is a risk of sediment contamination related to poor management of the cuttings during the work, an accident with equipment with hazardous products, or during dredging operations.

For construction and operation, numerous mitigation measures will protect sediment quality. Thus, the residual effect on sediment quality during the construction and operation phases is considered very low and not significant.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.



Trois-Rivières
Port Authority

Summary of the environmental impact study

Map 2

Inventory of the Physical Environment

Sources :
CanVec version 7, 1/50 000, RNCan , 2010
Sites de mise en dépôt des sédiments dragués, Environnement Illimité, 2014
21-PTR_160914.dwg, Port de Trois-Rivières, 2016
Inventaire et cartographie : AECOM, 2017
Mise à jour du Terminal 21 : ACAD-DI-20PTR001-C-001-Cas1_1.dwg

0 250 500 m
MTM, zone 8, NAD83

August 2021

Illustration : A. Lemay
Approval : D. Dumont
201-04975-00_wspT003_rsM4_physical_env_210216.ai

The monitoring program will include the measurement of TSS levels in the river water downstream of the work site during the construction phase and during dredging work, in accordance with the Recommendations for the Management of Suspended Solids (SS) During Dredging Activities developed by MDDELCC and ECCC (2016) under the St. Lawrence Action Plan. Appropriate measures will be implemented as needed to meet the SS emission criteria.

8.5 SOIL QUALITY

A Phase I Environmental Site Assessment Study was conducted on the vacant land located south of the Kruger mill. The land is composed of a mixture of gravel and sand, with pebbles and boulders depending on the area. There are also some trees and grasses. This land is associated with current and past activities (notably related to the spill history) of the Kruger mill. Thus, there are potential sources of contamination near the work area. In addition to the Phase I Environmental Site Assessment Study, soil samples were taken and analyzed.

Most of the surface soils sampled along the Kruger paper mill's shoreline contain levels of metals, PAHs and C10-C50 petroleum hydrocarbons that are lower than criterion C of the *Guide d'intervention pour la protection des sols et réhabilitation des terrains contaminés* (Intervention Guide for Soil Protection and Remediation of Contaminated Sites). However, the soil quality at three stations (S2, S1_2000 and S2_2000) exceeds the copper C criterion. One station (S4) has soil free of contamination with a quality level below criterion A. The quality of the soils located in the area of the future infrastructures of the Kruger plant reveals ten cases of exceedance of the C criteria for metals and C_{10}-C_{50} petroleum hydrocarbons, in most cases at depths ranging from 1.5 to 4.6 m. The main aspects likely to have an impact on soil quality correspond to site management activities, goods handling, transportation and traffic (hazardous and residual materials, particulate matter emissions). To limit the potential infiltration of contaminants into the soil beneath the terminal, the terminal site will be paved, as well as the access roads leading to it, i.e., the extensions of Père-Garnier and Notre-Dame Centre streets.

For construction and operation, numerous mitigation measures will protect soil quality. Thus, the residual effect on soil quality during the construction phase is considered very low and not significant. No effects are expected for the operation and maintenance phase, considering that the entire surface of the terminal will be made of asphalt.

The work monitoring program during the construction phases will verify that work methods do not result in the release of contaminants into the soil and that plans and specifications are followed, including the types of fill materials to be used and the mitigation measures to be implemented.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

8.6 AIR QUALITY

The concentrations of pollutants already present in the atmosphere were determined from the Québec Air Quality Monitoring Network. The results show that the initial concentrations are similar to those compiled in Schedule K of the provincial Clean Air Regulation. For particulate matter, carbon monoxide and sulphur dioxide, the initial concentrations are well below the standards and criteria. Air quality is thus considered good relative to these pollutants. For nitrogen dioxide, the initial concentrations are well below the Québec standards and criteria, while the Canadian thresholds are exceeded. Air quality relative to nitrogen dioxide concentrations is therefore considered good according to Québec regulations, but is considered average in Canada. However, this disparity is not discussed in this report. It should also be remembered that the initial concentrations for nitrogen dioxide correspond to generic values defined by the MELCC and applicable for all of Québec, since no measurements are available in the region. Overall, the air quality in the region under report is considered good.

During the construction phase, the sources of project impacts that could have an impact on air quality are as follows: site preparation, material unloading, terminal backfill, dynamic compaction, paving, construction of water and

rainwater systems, construction of the railway line and all transportation associated with these activities. Based on the air dispersion modelling performed, emissions from construction activities are expected to have a moderate residual effect on air quality. Indeed, since the transportation and handling of the fill, at their maximum expected level, are considered appreciable, it will be essential to ensure that the mitigation measures that will be implemented are effective, to avoid an overly significant effect.

During the operation and maintenance phase of the terminal, the sources of project impacts likely to have an impact on air quality are: unloading and loading of dry bulk (ships, trucks and rail cars), bulk transportation, movement of rail cars, ships and any other machinery on site. According to the atmospheric dispersion modelling performed, emissions from activities related to the operation of the terminal are expected to have a low impact on air quality since air emissions will be mostly confined to the industrial-port area. The expected residual effect is moderate (not significant).

An environmental management program specific to air quality will be applied during the different phases of the project to ensure that it will be built and operated according to good environmental practices.

8.7 GREENHOUSE GASES (GHG)

Current Port operations generate greenhouse gas emissions through the combustion of fossil fuels by machinery, land vehicles, motorized equipment and vessels.

The construction of the project, including dredging, will generate a one-time non-recurring quantity of GHGs in the order of 9.3kt of CO2eq over 30 months (3.7kt per year). GHG emissions from the project in operation will add approximately 6kt of CO2eq to the annual emissions of the facility, excluding vessels. Total emissions from the operation of the facility without the vessels will remain below the threshold for reporting to the federal government's Greenhouse Gas Reporting Program (GHGRP). These emissions are therefore considered low.

For construction and operation, numerous mitigation measures will reduce GHG emissions, including the installation of electrical machinery, the use of biofuel and the training of operators in eco-driving. Thus, for construction and operation, the residual effect on GHG emissions is considered very moderate and not significant.

The work monitoring program during the construction and operation phases will have to quantify the greenhouse gas emissions of the activities involved. The GHG emissions inventory may be based on the ISO 14064-1 standard and on good practices and methodologies, in particular the methodologies used by Environment and Climate Change Canada in its annual national inventory report.

8.8 SOUND ENVIRONMENT

Port activities, the Kruger mill and traffic on Gene-H-Kruger Boulevard contribute greatly to the noise climate that currently prevails in the area, with noise levels more than 52dBA both day and night.

During the construction phase, the impact sources of the project likely to affect the noise climate are: site preparation, terminal backfill, dynamic compaction, marine works, paving, construction of water and rainwater systems and construction of the railway. Noise from construction work is expected to have a low impact in the area given the current high noise climate and the distance (over 200 m) between the area where the work will take place and populated areas.

During the operation and maintenance phase of the terminal, the sources of project impacts that could have an impact on the noise environment are: unloading of solid bulk, bulk transportation, rail car movement, ship (generator), etc. Noise from activities related to the operation of the terminal is expected to have a low impact in the area given that the current noise climate is already high and the distance (more than 300 m) between the area where the operations will take place and populated areas.

Considering the mitigation measures put forward, the residual effect related to noise during the construction and operation phases is considered low and not significant.

For each phase of the Project (construction, operation and maintenance), an ambient noise measurement campaign will be carried out to quantify the effect of the activities on the environment. In principle, this program will consist of taking a series of measurements at the residential receptor closest to the future terminal area.

This monitoring will allow the verification of the Project's compliance with the regulations applicable to the noise climate and, if necessary, to add mitigation measures to limit the impacts related to noise emissions.

8.9 UNDERWATER NOISE

Because sound travels more easily through water than through air, the aquatic environment is consequently relatively noisy, even in the absence of human activity. No underwater noise measurements were taken as part of the EIA.

Although no blasting is planned at the site of the future terminal, the noise produced by drilling and vibratory driving of the sheet piles will induce underwater noise during the construction phase. Peak sound pressure levels reported in the literature for the installation of piles by vibratory driving vary from 185dB re: 1µPa to 195dB re:1µPa, depending on the diameter of the piles, the type of sediment, geotechnical conditions and water depth. Underwater noise generated by construction activities and dredging could cause a disturbance in fish behaviour, such as a short duration startle response to impulse noises or temporary avoidance of the work area by fish. Given the availability of suitable habitat outside the work area, localized avoidance should have a negligible effect on fish behaviour.

To avoid permanent or temporary physical damage to fish, sinking operations will be initiated gradually over a 30-minute period to allow fish to move away from the noise source and avoid exposure to noise. Mobile aquatic fauna will be able to avoid the sector by avoidance behaviour during noisy work In addition to avoiding the mortality of fish eggs and fry from spring spawning, construction work will proceed only between July 15 and March 31.

Considering the mitigation measures put forward, the residual effect related to underwater noise during the construction and operation phases is considered moderate and not significant.

Given the low impacts anticipated with the implementation of mitigation measures, no monitoring and/or follow-up program is required.

8.10 LIGHTING ENVIRONMENT

For the study area, an appreciable portion of the artificial night light (LAN) measured comes from sources outside the maritime terminal, since the terminal is in downtown Trois-Rivières and close to the industrial facilities of the Kruger company (in operation 24 hours a day). In other words, even if no LAN was emitted on the terminal site, the level of LAN measured on the site would remain quite high.

With rare exceptions, the current lighting at the port is usually turned off at 8 p.m. or earlier. When the lights are on, they are directed towards the operations, the dock deck and the terminal, and not towards the river. However, some secondary lighting may be left on overnight for safety reasons.

During the construction phase, site preparation and temporary site infrastructure will cause temporary and generally insignificant light pollution, as most of construction work and associated activities will take place during the day. Thus, the residual effect on the lighting environment during the construction phase is considered low and not significant.

During the operation and maintenance phase, the activities likely to induce effects on nighttime light intensity are lighting at the site of the new terminal and road traffic in exceptional situations. There will be no significant lighting at night unless special situations arise, so lighting at Terminal 21 will normally be turned off at 8:00 p.m. or earlier. Some secondary lighting installed for safety reasons will have a minimal effect on nighttime brightness, as it will blend in with the existing brightness, which is greatly affected by the presence of the City of Trois-Rivières and industrial activities near the project site. Thus, the residual effect on the lighting ambience during the operation and maintenance phase is considered low and not significant.

The work monitoring program will make it possible to verify that the work methods do not cause light to be emitted directly into the St. Lawrence. No specific monitoring is required.

9 DESCRIPTION OF EFFECTS ON THE BIOLOGICAL ENVIRONMENT

The characteristics of the biological environment are summarized on Map 3.

9.1 TERRESTRIAL, WETLAND AND AQUATIC VEGETATION

The study area is in an industrialized urban environment with only a small amount of terrestrial vegetation. It is essentially herbaceous wetland (8,700 m^2) and tree-covered wetland (13,500 m^2). Below the high-water mark, two tree-covered swamps (wetlands MH2 and MH3) are located at the location of the future docks and will be affected over an area of 5,340 m^2 by the project. The two swamps have a low floristic diversity and are currently contaminated by the presence of purple loosestrife at the MH2 site and a large colony of common reed at the MH3 site. Two aquatic beds with floating bur-reed and American bulrush are found at the site of the future docks. Vegetation density varies from 30 to 50% substrate cover.

None of the 69 plant species inventoried in the study area is at a fragile status and the Québec Natural Heritage Data Centre (QNHC) database does not mention any recent mention of such species. Vegetation found within the footprint of the wharves will be permanently lost. These losses total 7,230 m^2 of wetland, 5,340 m^2 of wetlands and 1,232 m^2 of aquatic grass beds. The disturbance of terrestrial vegetation within the work buffer strip (20 m × 716 m) will only be temporary since the areas that have suffered vegetation losses within this sector will be revegetated at the end of the work. Encroachment into the wetlands will be fully compensated through the implementation of a compensation plan aimed at protecting existing wetlands in loss of area and creating new ones. This compensation project, which is sponsored by the Comité ZIP du lac Saint-Pierre in collaboration with the Ministère des Forêts, de la Faune et des Parcs (MFFP) and the Department of National Defence (DND), aims to restore wetlands and disturbed aquatic habitats along several waterways on the DND site in Nicolet. Based on preliminary characterization data and expert opinion, the project could represent a gain in wetlands (new areas periodically flooded) of several tens of hectares. No residual effects are expected on wetlands following the application of mitigation measures.

Encroachment into aquatic grass beds will significantly affect this type of habitat within the work area, but will represent only a minor disturbance of the component on a regional scale. The residual effect on this component is considered moderate and not significant. Other likely Project effects on vegetation (e.g., encroachment on treed and herbaceous wetlands, risk of introduction or spread of IAS, risk of contamination by hydrocarbons or other hazardous materials) are considered low and not significant.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

The follow-up program will include verification of the absence of colonization by IAS in the areas that will be restored or revegetated, verification of vegetation recovery in the revegetated areas, as well as monitoring the effectiveness and sustainability of the measures implemented to compensate for the loss of wetlands. Monitoring will be conducted 1 year and 3 years following completion of the development.

9.2 BENTHIC INVERTEBRATES

The benthic invertebrate community found at the site of the future wharves is diversified and abundant and contributes to the feeding of benthivorous fish species in this sector of the river. Among the species identified in the study area are two freshwater mussel species at risk: the hickorynut, an endangered species in Canada, and the fragile papershell, a species likely to be designated threatened or vulnerable in Québec. There are also molluscs of the Dreissenidae family, which are represented in Québec only by the zebra mussel and the quagga mussel, two IAS.

The Project will result in the death of freshwater mussels within the Terminal 21 footprint. Given the special-status mussel relocation plan to be developed jointly with DFO, the mortality of status freshwater mussel species affected by the construction work expected at this stage is low and not significant. In fact, the proposed mitigation measures include the harvesting of all status mussels found at the location of the future wharves and their relocation to a suitable habitat located upstream in the river, prior to construction work. The benthic invertebrate community will still be affected by the Project. The construction of the wharves will result in the permanent destruction of approximately 106,051 m^2 of aquatic habitat colonized by benthic invertebrates. In addition, construction dredging in front of the wharf (0-3,500 m^2) and maintenance dredging (on about 2,500 m^2 every 6–8 years) will cause temporary disturbance of the riverbed.

The effects of wharf encroachment into the aquatic environment will be offset through the implementation of a fish habitat compensation plan. Therefore, there are no residual effects associated with the encroachment. The disturbance of benthic communities during construction and maintenance dredging work will result in a moderate effect, considered not significant. Residual effects related to the increase in TSS content during the work and the risk of accidental spills in the aquatic environment are considered low and not significant. Other effects on the component are negligible.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

The monitoring program will also include the measurement of TSS levels in the river water downstream of the work site during the construction phase and during dredging work, in accordance with the Recommendations for the Management of Suspended Solids (SS) During Dredging Activities developed by MDDELCC and ECCC (2016) under the St. Lawrence Action Plan. Appropriate measures will be implemented as needed to meet the TSS emission criteria.

The special-status mussel relocation plan will include a follow-up program to verify mussel’s survival.

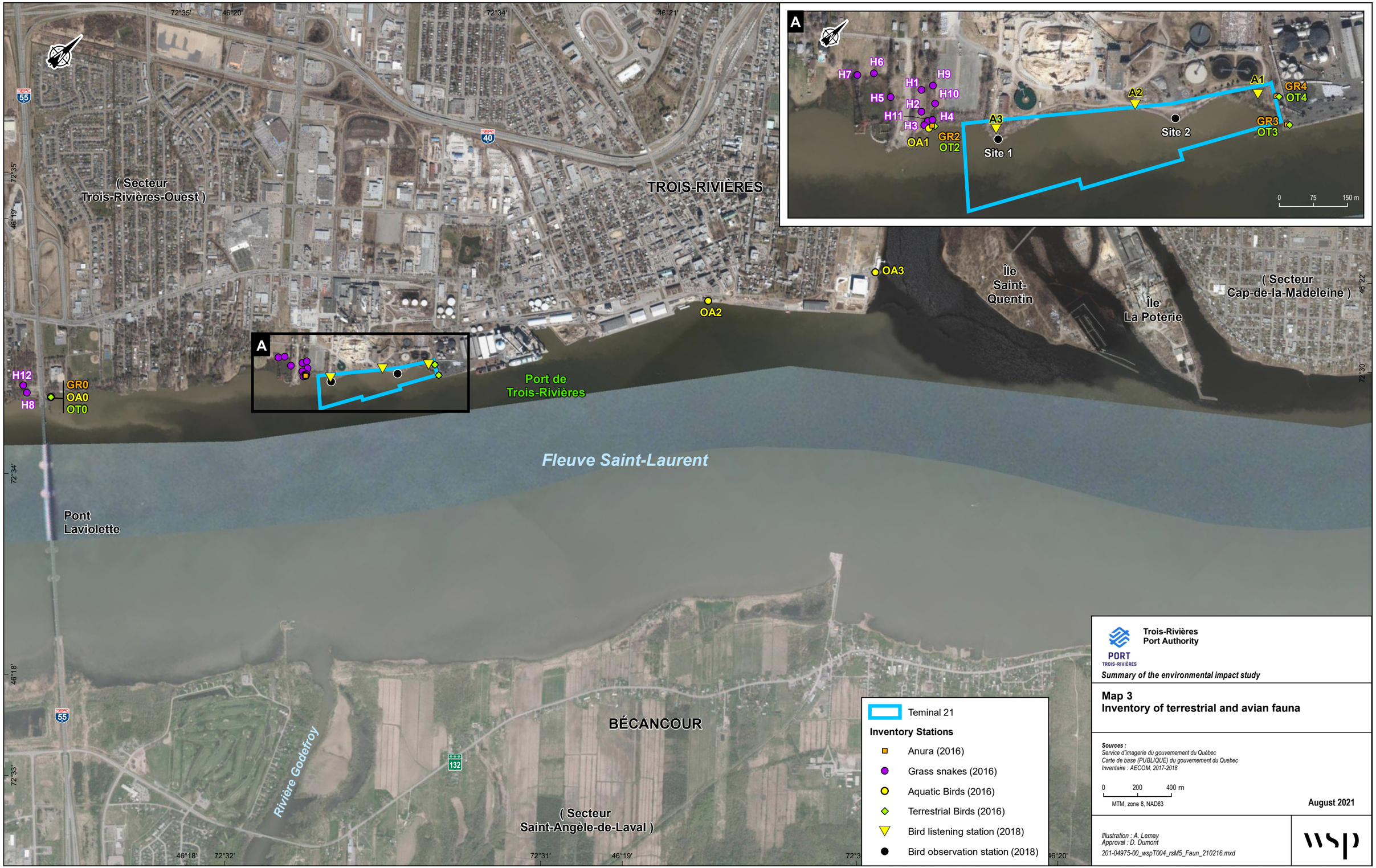
9.3 FISH AND ITS HABITAT

About sixty species of fish are present in the river in the study area, including 11 species at risk or likely to become so. Among the special status species, the American eel, lake sturgeon and rosyface shiner were caught at the site of the future wharves during the inventories conducted.

The most abundant species are mainly small-sized species: spottail shiner, emerald shiner, alewife, mooneye, round goby and trout-perch. Numerous fry and young-of-the-year of the following species were also part of the catch: tench, yellow perch, pumpkinseed, walleye, white perch, alewife, mooneye, and spottail shiner.

The area of the proposed wharves is a confirmed rearing and feeding habitat for several species, including yellow perch. The aquatic grass beds is a potential spawning habitat for certain summer spawning phytophilous species (e.g. tench, white perch, spottail shiner), as well as a nursery, shelter and feeding area suitable for several species. However, there are no confirmed spawning ground within the restricted study area.

No fish mortality is apprehended regarding the construction work. To ensure this, in-water work will only be carried out during the low-risk period for fish in the Mauricie region (July 15—March 31). The permanent destruction of 106,051 m^2 of fish habitat for the construction of the wharves will be fully compensated by the restoration or development of habitat as prescribed by the Fisheries Act. Among the potential compensation projects submitted to the TRPA as part of its October 2020 call for proposals, the following projects appear promising and are currently selected: Project 1: Improving access to aquatic habitat for fish on National Defence land; Project 2: Restoring habitat connectivity for eels in the Champlain River watershed; Project 3: Reduction of predation of yellow perch and other fish species in Lake Saint-Pierre by double-crested cormorants. As a result, there are no residual effects associated with the encroachment of wharves into the aquatic environment.



Teminal 21

Inventory Stations

- Anura (2016)
- Grass snakes (2016)
- Aquatic Birds (2016)
- Terrestrial Birds (2016)
- Bird listening station (2018)
- Bird observation station (2018)

Trois-Rivières
Port Authority

PORT TROIS-RIVIÈRES

Summary of the environmental impact study

Map 3
Inventory of terrestrial and avian fauna

Sources :
Service d'imagerie du gouvernement du Québec
Carte de base (PUBLIQUE) du gouvernement du Quebec
Inventaire : AECOM, 2017-2018

0 200 400 m
MTM, zone 8, NAD83

August 2021

Illustration : A. Lemay
Approval : D. Dumont
201-04975-00_wspT004_rsM5_Faun_210216.mxd

The accuracy of the boundaries and measurements shown in this document should not be used for engineering or land delineation purposes. No property analysis has been performed by a land surveyor.

The temporary disturbance of habitat during construction and maintenance dredging, and the associated decrease in benthic productivity, will result in a moderate impact that is not considered significant. Noise generated by construction, dredging and navigation during operation could result in fish avoiding the immediate vicinity of the wharves. This effect is considered moderate and not significant. Other effects on the component are considered negligible.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

The monitoring program will also include the measurement of TSS levels in the river water downstream of the work site during the construction phase and during dredging work, in accordance with the Recommendations for the Management of Suspended Solids (SS) During Dredging Activities developed by MDDELCC and ECCC (2016) under the St. Lawrence Action Plan. Appropriate measures will be implemented as needed to meet the TSS emission criteria.

The fish habitat compensation plan to be prepared by TRPA will include an environmental monitoring program to verify the effectiveness of the compensation measures implemented.

9.4 AMPHIBIANS AND REPTILES

The surveys carried out only identified three herpetofauna species in the study area, namely the American toad, the northern leopard frog and the wood frog, which are common species in Québec.

Data from the Atlas of Amphibians and Reptiles of Québec (AARQ) contain no record of herpetofauna species within the restricted study area, but 13 species were observed within a 5km band around this area. Four special status species were observed in the vicinity or regionally (wood turtle, green snake, map turtle and marsh frog), but only the green snake has the potential to occur in the study area.

The encroachment of the wharves into the terrestrial environment will cause only minor disturbance to the herpetofauna since the areas involved are already unwelcoming because they are largely anthropized and because much more interesting habitats for herpetofauna will remain available along the river upstream from the future wharves. The residual effect is considered low and not significant. Avoidance of the construction site area during the work represents only a minor disturbance to the entire component, resulting in a small and insignificant residual effect. Other effects on the component are considered negligible.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

No follow-up measures specific to herpetofauna are deemed necessary.

9.5 BIRDS AND THEIR HABITAT

Several bird surveys were carried out during different periods of the year for a period of three years. The main species observed at rest are the mallard duck and the ring-billed gull. A group of 41 mallards (females and juveniles) was counted in the area of the future Terminal 21.

During the forest bird surveys 26 species were recorded, of which about ten common species are possible or probable breeders. In addition, the red-winged blackbird, American robin, American crow and song sparrow are confirmed breeders. No suitable raptor nesting habitat (cliffs, large mature trees, etc.) is present in the study area.

Among the species observed is the eastern wood-pewee, a special concern species in Canada. Only one specimen was recorded at a station located west of the Notre-Dame boat launch, in a sector that will not be affected by the

Project. Surveys specific to certain species of special-status birds (chimney swift, bank swallow, barn swallow, whip-poor-will) confirm that they are not present in the study area.

The destruction of the terrestrial environment at the site of the future wharves will result in the loss of 7,220 m^2 of habitat for avifauna located in herbaceous and tree-covered wetlands already largely disturbed by anthropization, as well as the loss of 106,051 m^2 of resting and feeding habitat in the aquatic environment. Taking into account the proposed mitigation measures, which include clearing the land outside of the birds' breeding season, and the significant areas of bird habitat nearby, the residual effect is considered moderate (not significant). No net loss of wetland habitat is anticipated since these losses will be fully compensated by the TRPA. The potential avoidance of the site's surroundings during the work and the risk of contamination of the aquatic environment by hydrocarbons or hazardous materials will result in low (not significant) residual effects. Other effects on the component are considered low (insignificant) or negligible.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's specific commitments and obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

No follow-up measures specific to avifauna and its habitat appear to be necessary, other than the follow-up related to the vegetation and compensation work for wetlands already announced.

9.6 MAMMALS

Small and micro-mammals were not the subject of specific surveys within the framework of the Project, but particular attention was paid to these species during the other surveys and site visits. The species likely to frequent the study area are common in Québec. The QNHC does not report any record of mammalian species with special status in the study area.

Chiropterans (bats) were inventoried and a total of five species were identified, namely, in decreasing order of activity, the hoary bat, the silver-haired bat, the big brown bat, the red bat and the little brown bat. The little brown bat is an endangered species in Canada, while the hoary, silver-haired and red bats are likely to be designated threatened or vulnerable in Québec. Mature trees at the eastern and western extremities of the restricted study area could provide summer habitat for bats. It is also possible that roosts and maternity colonies for bats using the study area as hunting land are located outside the study area.

For the quantification of residual effects, a high environmental value was assigned to chiropterans due to the presence of special-status species in the study area, while a medium value was assigned to small and micromammals likely to frequent the study area.

The loss of habitat associated with clearing and the presence of the wharves will force small—and micromammals that frequent the study area to move in search of replacement habitat. Such habitat is present along the river upstream of the study area, but is largely residential and may have limited suitable habitat capacity. The residual effect is considered moderate (not significant). Light and noise pollution in the vicinity of the wharves during the operation phase could also cause slight disturbance to the mammals present around the wharves. The residual effect is low (not significant).

The loss of habitat associated with clearing operations and the presence of the wharves will result in the displacement of chiropteran hunting lands, possibly to upstream habitats along the river, but is not expected to significantly affect local populations. A large-capacity artificial roost will be built to compensate for the potential loss of roosting sites. The residual effect is considered moderate (not significant). Light and noise pollution near the wharves during the operation phase could cause slight disturbance to the use of the land by chiropterans in the vicinity of the wharves. The residual effect is moderate and not significant.

Other effects on mammals are considered negligible.

Technical and environmental compliance of the work will be ensured by a dedicated site supervisor. In addition, environmental monitoring will also be carried out to ensure that the work complies with the laws, policies and regulations in force, the proponent's commitments and specific obligations, the technical plans and specifications and the mitigation measures proposed to minimize the effects of the Project.

The use of the artificial shelter by chiropterans will be monitored annually for up to three years following its construction. If necessary, corrective measures will be taken (modification or relocation of the shelter) to ensure the effectiveness of this mitigation measure.

10 DESCRIPTION AND POTENTIAL EFFECTS OF THE PROJECT ON FIRST NATIONS

Map 4 presents the location of the First Nations involved in the Project.

10.1 W8BANAKI NATION

10.1.1 RIGHTS AND INTERESTS

The ancestral territory of the W8banaki Nation, Ndakina, means “our territory” in the W8banaki language. This territory is not subject to a claim under the federal Comprehensive Land Claims Policy, but rather to a process of land affirmation by the Nation.

The vast territory of W8banakiak covered between the 17th and 19th centuries, an area that today corresponds to part of Québec, New Brunswick and the American states of Maine, Vermont and New Hampshire. The Québec portion of the Ndakina has as its southern limit the Canada-U.S. border and ends, in the north, near La Tuque. The Richelieu River serves as the western boundary of the Ndakina, and extends to the Montmagny area to the east. As for the St. Lawrence, it enters the Ndakina at the mouth of the L’Assomption River on the north shore and the Richelieu River on the south shore. It then leaves it in the middle estuary, at Cap-Saint-Ignace on the north shore and L’Islet on the south shore.

In 2001, the Grand Council of the Waban-Aki Nation (GCNWA) signed a specific agreement with the Government of Québec concerning the practice of hunting, fishing and trapping for food, ritual or social purposes by members of the First Nations of Wôlinak and Odanak. This agreement led to the development and implementation of codes of practice aimed at framing the management and practice of hunting, fishing and trapping activities by members of the W8banaki Nation.

10.1.2 LAND USE AND OCCUPANCY

The W8banakiak have frequented the St. Lawrence River since time immemorial. The first written evidence of their presence along the St. Lawrence River dates back to the early 17th century. In ancient and historical times, Mad8baloden (Trois-Rivières) was the gathering place for First Nations in the St. Lawrence Valley because of its central geographic location.

The GCNWA has conducted a study that lists, in a non-exhaustive manner, contemporary activities practised on the St. Lawrence River. These activities, which take place between the downstream end of Lake Saint-Pierre and Cap-de-la-Madeleine, including the mouth of the Saint-Maurice River, include fishing, hunting of migratory birds, gathering, the use of cultural sites as well as launching sites and the presence of numerous navigation circuits.

The state of the fish populations in the St. Lawrence River and that of the sturgeon and yellow perch species is a major concern for the Nation. Members are observing a marked decrease in the quality and size of fish, which they associate with cumulative impacts, habitat loss, changes in water quality and an increase in parasites on fish.

Fishing takes place almost all year round, with more intense periods in the spring when the ice melts, in early summer, around mid-autumn and in January-February for winter fishing. Access to the river is important for the W8banakiak people who carry out various wildlife harvesting activities or walk there for pleasure or to observe nature. As for migratory bird hunting, the W8banakiak practice this activity in the fall and spring. In the area of the future terminal, no hunting activities or gathering areas have been identified, but fishing is practised. A family gathering site is located on the south shore of the river, east of the Sainte-Angèle wharf.

During the construction phase, the navigation activities of W8banakiak carried out in the vicinity of the works will be disturbed by the noise of the works and it is likely that users will avoid this area. However, the Notre-Dame boat launch ramps will remain accessible. The residual effect is moderate (not significant). During the operation and

maintenance phase, users will no longer have access to the Terminal 21 site for fishing. This loss is relatively small given the diversity of fishing sites frequented by W8banakiak on the St. Lawrence River. In addition, they will still be able to use the Notre-Dame boat launch. The residual effect on access to the river by the W8banaki Nation during the operation and maintenance phase is moderate (not significant).

Concerning fishing activities and the state and availability of the fishing resources, in the construction phase, the works will cause losses of habitats for the fauna and will be a source of disturbance for the species present. These effects could have a temporary effect on fishing near the site of the works. The residual effect is moderate (not significant). During the operation and maintenance phase, the availability of fisheries resources at the Terminal 21 site may be slightly reduced due to the decrease in habitat area. The residual effect is considered moderate (not significant). There is a degree of uncertainty associated with the level of confidence in the absence of a significant residual effect because the GCNWA believes that a medium residual effect would result in a significant effect in a cumulative context, and the results of the compensation projects are not known.

For navigation, during the construction phase, disruptions related to the work and the new facilities will be felt mainly by users using the Notre-Dame boat launch ramps. The residual effect is small (not significant). During the operation and maintenance phase, marine traffic will increase slightly. The residual effect on navigation is moderate (not significant). As mentioned previously, the GCNWA believes that a medium residual effect would result in a significant effect in a cumulative context.

The Ndakina Office has indicated a desire to follow up with the members of the Nation during the construction and operation phases, to better assess the effects, particularly the subjective effects of the implementation of the project on the users of the territory related to the feeling of security and quietude, cultural continuity, w8banaki governance, etc. Discussions on the objectives and monitoring of land use by GCNWA members, including fishing and land use experience related to Project effects, will be conducted with GCNWA. Appropriate mitigation or remedial measures will be determined if effects are found.

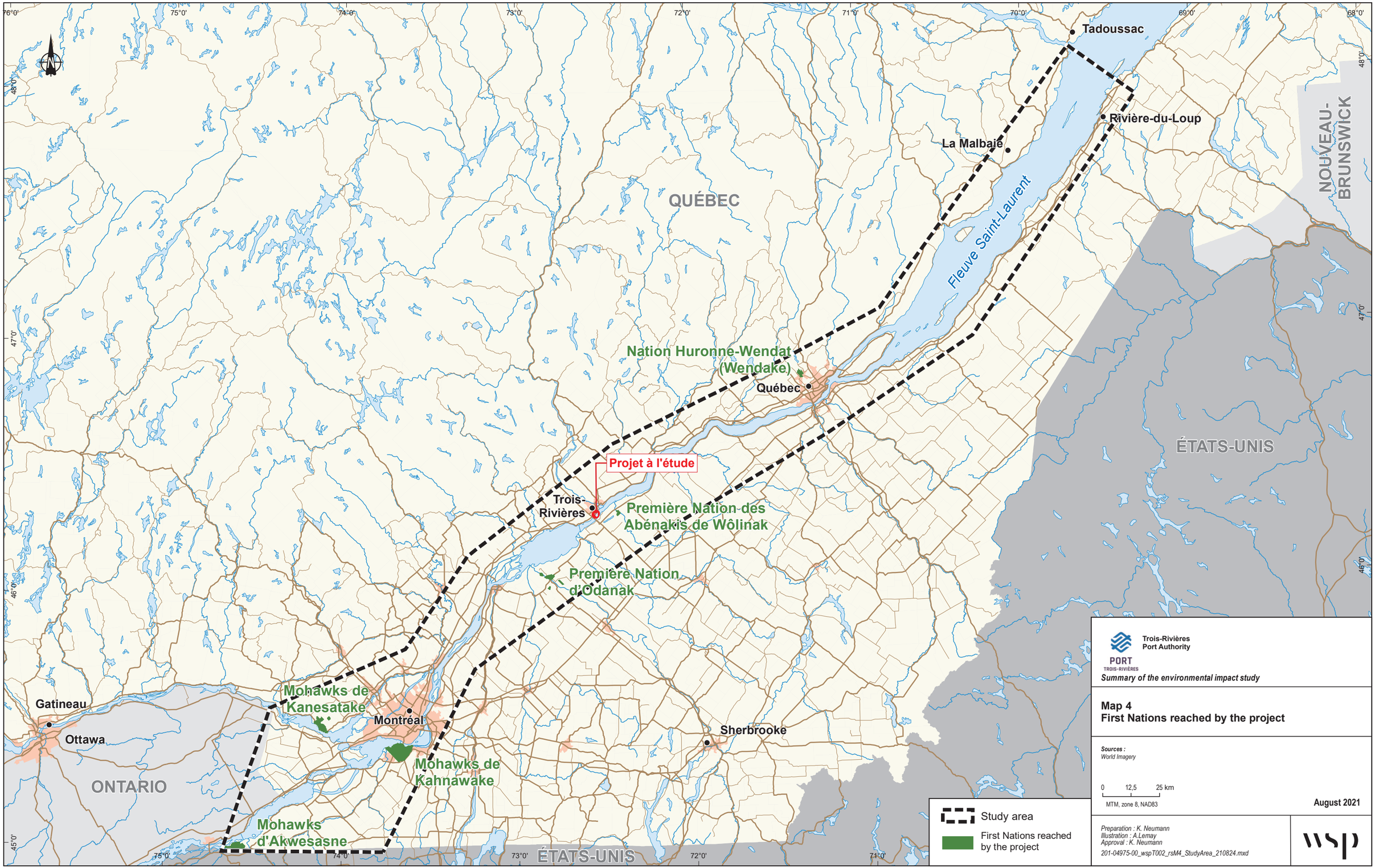
10.1.3 HEALTH AND SOCIO-ECONOMIC PLANS

The economy of the communities of Wôlinak and Odanak is mainly based on public administration. There are also businesses in the areas of cabinet making, handicrafts and tourism, recreation, accommodation and catering.

Concerning the commercial activities related to the river and its resources, no precise data on all the commercial activities of the members of the Nation is available. The W8banakiak activities documented in the study area are of a food, ritual and social nature. They contribute significantly to the food security of several families. They are activities that can be community-based, and whose products are distributed among the extended families of fishermen, but also to those whose socio-economic situation is precarious. As a result, families in a precarious economic situation are more dependent on traditional fishing and hunting, and include it in a greater proportion in their diet. It is important to mention that the activities on the territory are central to the construction of identity and the sense of belonging to the Nation, whether or not the members reside in the community.

With regard to human health, the fragile balance of the river, as well as the threats to the St. Lawrence (e.g., invasive alien species and presence of contaminants) can affect land use and occupation, and could potentially affect the health of the Nation’s members who use natural resources.

With regard to the health and socio-cultural aspects, during the construction period, the completion of the work could result in changes in terms of activities, availability or quality of the resource (perceived or proven), and an increased sense of insecurity. The residual effect is considered moderate (not significant). During the operation and maintenance phase, the activities at the new terminal and the increase in marine traffic could result, as in the construction phase, in changes in the availability or quality of the resource (perceived or actual), and an increased sense of insecurity. The residual effect is considered medium (not significant).



The accuracy of the boundaries and measurements shown in this document should not be used for engineering or land delineation purposes. No property analysis has been performed by a land surveyor.

In terms of economic opportunities, the completion of the work in the construction phase as well as the activities of the new terminal in the operation and maintenance phase could result in employment and contract opportunities for workers, organizations and businesses of the W8banaki Nation. The application of the enhancement measures will be aimed at maximizing the opportunities for economic spinoffs for the W8banaki Nation. The positive residual effect is considered medium.

No follow-up or monitoring program is currently defined. Discussions on the objectives and modalities of land use monitoring by GCNWA members in relation to project effects are ongoing with GCNWA

10.1.4 NATURAL CULTURAL HERITAGE AND SITES OF INTEREST

W8banakiak has a strong sense of belonging to the St. Lawrence River, Lake Saint-Pierre, the Sainte-Angèle wharf area and the Saint-Maurice, Bécancour and Godefroy rivers. Indeed, many of them have been frequenting them since their childhood for their traditional activities or simply to be in nature.

Several places are of particular cultural, symbolic and heritage importance, without necessarily having archaeological potential. No exhaustive list is maintained, but some known places of interest are listed by the Ndakina Office, namely the Bécancour River (W8linaktegw) as a whole, Lake Saint-Pierre (Nebesek), Saint-Quentin Island and the Saint-Maurice River (Mad8balodenitegw).

In addition, the activities practised on the territory have an important cultural value and an identity dimension that it is essential to take into consideration. The W8banakiak indicated that they have frequented the St. Lawrence River since time immemorial, and that the location of Trois-Rivières had a significant significance and geopolitical situation for the Algonquin and Iroquoian Nations.

According to the archaeological potential study, no historical or prehistoric archaeological sites have been identified in the restricted study area, nor in the local study area. However, the GCNWA has identified an area of high archaeological potential in the vicinity of the project. Discussions are currently underway with the GCNWA to determine the approach to be taken for further analysis. In addition, according to the HWN, artifacts were found in the late 1960s in the vicinity of the current Kruger mill site.

During the construction phase, activities that are likely to have an effect on the cultural heritage associated with archaeology are related to the encroachment of work into the riparian and aquatic environment. If areas of high potential are identified, they will be the subject of an archaeological inventory, archaeological monitoring during the work or another agreed-upon monitoring method. The residual effect on the archaeological heritage is thus deemed to be low (not significant). No other significant negative effects on the natural and cultural heritage component and sites of importance to the W8banaki Nation are anticipated during the construction and operation phase. No mitigation measures have therefore been planned for this phase of the project.

10.2 HURON-WENDAT NATION

10.2.1 RIGHTS AND INTERESTS

Nionwentsïo is the term used by the Huron-Wendat to designate their current customary territory, where they have been carrying out their traditional activities since the mid-17th century. In the Huron-Wendat language, this term means “Our magnificent territory”. This territory (approximately 66 056 km^2) extends from north to south, from the Saguenay River to the American border. From east to west, it goes from New Brunswick to the Saint-Maurice River. The southeastern fringe of this territory also includes a small part of the State of Maine, between the Saint John River and the Canada-U.S. border. The current Project is thus located on the southwestern edge of the Nionwentsïo. The Huron-Wendat Nation’s commercial activities, as well as diplomatic activities and resource extraction activities, were mainly carried out in Nionwentsïo, but they could also extend outside of it.

The Huron-Wendat Nation entered into a treaty of alliance, peace and mutual protection with British General James Murray, the Huron-British Treaty of 1760. This treaty, whose validity was recognized by the Supreme Court of Canada in 1990 in the Sioui decision, protects the customary and religious activities of the Nation that take place on

Nionwentsïo. Nionwentsïo is of capital importance to the Huron-Wendat Nation both spiritually and culturally, since it is the territory on which the rights and freedoms protected by the treaty are exercised.

10.2.2 LAND USE AND OCCUPANCY

The Port of Trois-Rivières Expansion Project is located adjacent to the western limit of Nionwentsïo. The use of the territory has always been an important aspect of the Huron-Wendat identity and the exploitation of the Nionwentsïo's resources has formed the basis of the Nation's way of life and economy for centuries. Members of the Huron-Wendat Nation continue to use the Nionwentsïo for many hunting, trapping and fishing activities. Members of the Huron-Wendat Nation travel the river by boat for various activities. Some do so regularly, on sections between Québec City and Montréal, and carry out activities in the local Project area.

During construction, the work may overlap periods of land use by members of the Nation. A communication program with the Huron-Wendat Nation will inform members of the progress of the construction work and the measures put in place. During the operation and maintenance phase of Terminal 21, Port activities could cause disturbances near the site and cause fish to avoid noisy areas. The increase in marine traffic may affect the safety and experience of users who travel by boat in or near the waterway, in the Project area, but also when the waterway crosses the Nionwentsïo, as well as create additional pressure on the river's ecosystem and sensitive species.

No significant residual effects on the land use and occupancy component among members of the Huron-Wendat Nation are anticipated in the construction and operation phases. However, the increase in marine traffic expected with the Port Project could have an effect on sensitive species and on the quality of the experience of activities on the river.

An environmental supervisor will be present on a regular basis at the work site throughout the construction period to ensure that the work respects, among other things, the laws, policies and regulations in force, the proponent's specific commitments and obligations, as well as the various mitigation measures proposed to minimize the effects of the Project.

The consulted First Nations will be invited to submit offers of services to carry out the biological monitoring work, and will be kept informed of the results of these follow-ups and the effectiveness of the compensatory measures for fish habitat.

Furthermore, discussions with the NHW, through the Nionwentsïo Office, may allow for the specification of additional measures or follow-ups in order to consider unforeseen impacts.

10.2.3 HEALTH AND SOCIO-ECONOMIC PLANS

According to the Nionwentsïo Office, a large part of the Huron-Wendat population has a residence outside of Wendake, and many live in Trois-Rivières or in nearby communities.

On the health front, a range of health and social services are offered to community members by the Centre de santé Marie-Paule-Sioui-Vincent located in Wendake.

In terms of the economy, the proximity to the City of Québec favours the conditions for socio-economic development in Wendake. Over time, Wendake has become an administrative center for the First Nations of Québec, bringing together several head offices of Aboriginal organizations. According to a study by the Huron-Wendat Nation, there were some 215 private businesses on the reserve in 2016, in various fields: construction, electricity, excavation, hardware, auto mechanics, crafts, tourism, hotels, restaurants and various other services.

The completion of the work in the construction phase and the activities of the new terminal in the operation and maintenance phase could result in employment and contract opportunities for Huron-Wendat Nation workers and businesses. The application of the enhancement measures will aim to maximize the opportunities for economic benefits for the Nation. The positive residual effect on economic spinoffs (economic opportunities, jobs and contracts) during the construction and operation phases is therefore considered to be average.

The health and sociocultural plan component also includes wellness and cultural continuity. During construction and operation and maintenance, the completion of the work, activities at the new terminal and increased marine traffic

could result in changes in the availability or quality of the resource (perceived or actual), and an increased sense of insecurity. The residual effect on the health and socio-cultural aspects of the component is moderate (not significant). There is, however, a degree of uncertainty associated with this analysis due to the limited data available for this component.

No follow-up or monitoring program is specifically planned for the Health and Socio-Economic Plans component.

10.2.4 NATURAL CULTURAL HERITAGE AND SITES OF INTEREST

According to the archaeological potential study, no historical or prehistoric archaeological sites have been identified in the restricted study area, nor in the local study area. However, an analysis of settlement patterns identified an area with a high potential for Aboriginal presence in the vicinity of the Project. In addition, according to HWN informants, artifacts were found in the late 1960s in the vicinity of the current Kruger mill site. The HWN indicated the need for a complementary study to clarify the potential presence of Huron-Wendat ancestors.

During the construction phase, activities that are likely to have an effect on the cultural heritage associated with archaeology are related to the encroachment of work into the riparian and aquatic environment. If areas of high potential are identified, discussions will be held with HWN to determine the approach to be taken to assess the need for analysis, a pre-construction archaeological inventory, archaeological monitoring during the work or to determine the requirements of an alternative approach that will have been agreed upon. The residual effect on the archaeological heritage is thus deemed to be low (not significant). No other significant negative effects on the natural and cultural heritage component of the Huron-Wendat Nation’s important sites are anticipated during the construction and operation phases.

Identified high potential areas will be subject to pre-construction archaeological survey, construction archaeological monitoring, or other monitoring as agreed upon with NHW. Discussions on appropriate monitoring are underway with NHW.

10.3 MOHAWKS OF KAHNAWÀ:KE

10.3.1 RIGHTS AND INTERESTS

The MCK states that their indigenous rights protected by Article 35 (1) of the Constitution (1982) include, among others, fishing rights recognized by the Adams decision of the Supreme Court in 1996, hunting rights, harvesting rights (particularly of medicinal plants), trade-related rights, cultural rights (including archaeological heritage) and *environmental* stewardship rights.

According to an anthropological study based on oral tradition, the construction of the St. Lawrence River Waterway (called kahnawakeronon in Kanienke), between 1954 and 1959, would have had a considerable impact on the Mohawk community of Kahnawà:ke. At that time, Kahnawà:ke faced the expropriation of 1,262 acres of land for the construction of the canal, which cut off the community’s access to the river and reduced the amount of reserved land.

As part of their right of governance, the Mohawk Council of Kahnawà:ke maintains that its members have a responsibility to care for and protect the St. Lawrence ecosystem. This responsibility is taken seriously as stewards of the lands and waters for the benefit of future generations.

10.3.2 LAND USE AND OCCUPANCY

The Kahnawà:ke First Nation fishes for migratory fish species in the St. Lawrence River, specifically in the Montréal area. In addition, the Mohawks of Kahnawà:ke and Kanesatake share a territory for traditional activities called Tioweró:ton (near Sainte-Lucie-des-Laurentides). It should be noted that these two Nations also practice their traditional activities near their respective reserves.

In the context of the Contrecœur port project, the Mohawk First Nations stated that the activities practised, such as hunting and fishing, were not only activities, but that they were also Aboriginal rights practised by the Mohawks. The MCK also indicated that the establishment of the waterway had cut off access to the river, resulting in negative effects on social, cultural, spiritual and economic life, which continue today. It believes that the Nation's tolerance threshold related to cumulative impacts has been exceeded since the 1950s, and that the current state of the St. Lawrence no longer supports their constitutionally protected fishing rights (s. 35 [1]) or the exercise of their stewardship responsibilities on the territory.

In general, the Mohawk Nation is concerned about the health of species found in the St. Lawrence. It is concerned about the effects on species at risk and so-called migratory species, which travel long distances in the St. Lawrence and whose vital spaces do not depend on a single site.

The increase in maritime traffic expected with the Port Project could have an effect on the safety of users who travel by boat in or near the waterway, and, through related factors, could put additional pressure on the river's ecosystem and its sensitive species, such as sturgeon species. The increase in marine traffic generated by the various projects planned on the St. Lawrence River could lead to cumulative effects on the Mohawks of Kahnawà:ke. The same would be true, according to them, for fish species at risk.

In the construction phase, the residual effect is considered small (not significant). In the operation and maintenance phase, the residual effect is considered moderate (not significant). However, a certain degree of uncertainty is associated with these analyses. The MCK has indicated that further discussions with the TRPA and members of its community will be required to assess traditional land use in the vicinity of the Project area.

An environmental supervisor will be present on a regular basis at the work site throughout the construction period to ensure that the work respects, among other things, the laws, policies and regulations in force, the proponent's specific commitments and obligations, as well as the various mitigation measures proposed to minimize the effects of the Project.

The consulted First Nations will be invited to submit offers of services to carry out the biological monitoring work, and will be kept informed of the results of these follow-ups and the effectiveness of the compensatory measures for fish habitat.

10.3.3 HEALTH AND SOCIO-ECONOMIC PLANS

The Kahnawà:ke Reserve is a highly urbanized area with many services including a police service, municipal and community services, a hospital and a school board. The reserve also includes the Kahnawà:ke Business Centre, which brings together some provincial organizations. The Kahnawàke Shakotiia'takehnhas Community Services (KSCS) is responsible for the administration of health and social services.

The Kahnawà:ke Economic Development Commission—or Tewatohnhi'saktha (TEWA)—is responsible for creating and implementing businesses for the community to generate income. An autonomous entity of the Mohawk Council of Kahnawà:ke, its goal is to stimulate economic growth by offering a variety of business services—administrative, financial and training support. In 2020, more than 190 businesses are listed in the Kahnawà:ke Business Directory. This directory reflects a diverse range of economic activity, from recreational services, to catering, decorating, machine shops, communications services, construction, etc.

The data consulted, as well as the slight increase in marine traffic related to the Project upstream from Montréal, do not allow us to anticipate significant effects on the health and socio-economic component among the Mohawks of Kahnawà:ke, particularly with regard to the intergenerational transmission of indigenous knowledge, community cohesion and the assessment of disproportionate effects on certain subgroups of the population. The MCK indicated that further discussions with the TRPA and members of his community would be necessary to better assess the impacts of the Project.

With regard to economic opportunities, the completion of the work in the construction phase and the activities at Terminal 21 in the operations and maintenance phase could result in employment and contract opportunities for workers and businesses in the Nation because of the hiring and purchasing policies implemented by the TRPA in order to maximize economic benefits for First Nations. In the construction and operation phases, the positive residual effect on economic spinoffs is considered moderate.

No follow-up or monitoring program is specifically planned for the Health and Socio-Economic Plans component.

10.3.4 NATURAL CULTURAL HERITAGE AND SITES OF INTEREST

The Mohawk Council of Kahnawà:ke indicates that the Port of Trois-Rivières area was highly frequented by the Iroquois Nations in the 17th century, who are the ancestors of the Mohawk Nation, and which, according to them, could result in a potential Mohawk presence in the local study area.

According to the archaeological potential study carried out, no historical or prehistoric archaeological sites have been identified in the restricted study area, nor in the local study area. However, an analysis of settlement patterns has identified an area with a high potential for Aboriginal presence in the vicinity of the Project. In addition, according to the HWN, artifacts were found in the late 1960s in the vicinity of the current Kruger mill site.

Increased marine traffic could potentially alter the tranquility of the experience in some places of significance, but without affecting its cultural and symbolic importance. The data consulted to date does not allow us to identify significant sites that could be affected by this effect, nor to anticipate any effects during the operation and maintenance phase on the other elements of the component.

During the construction phase, activities that are likely to have an effect on the cultural heritage associated with archaeology are related to the encroachment of work into the riparian and aquatic environment. If areas of high potential are identified, they will be the subject of an archaeological inventory, archaeological monitoring during the work or another agreed-upon monitoring method. The residual effect on the archaeological heritage is thus deemed to be low (not significant). No other significant negative effects on the natural and cultural heritage component and sites of importance to the Mohawk Nation of Kahnawà:ke are anticipated during the construction and operation phases. However, a certain degree of uncertainty is associated with this analysis due to the limited data available for this component.

As mentioned above, the high potential areas identified will be subject to an archaeological inventory prior to construction, archaeological monitoring during construction, or other follow-up as agreed upon with the consulting nations. Discussions on appropriate follow-up are ongoing.

10.4 MOHAWKS OF KANESATAKE

10.4.1 RIGHTS AND INTERESTS

Since the time of the Conquest in 1760, Kanesatake has taken numerous steps to have its rights to the lands and resources of the Lac-des-Deux-Montagnes seigneury recognized. The territorial issue of Kanesatake is particular since the community does not occupy a reserve within the meaning of the Indian Act. It is made up of some fifty non-contiguous parcels, most of which are located within the Town of Oka. Since 2001, this territory has been subject to the Kanesatake Interim Land Government Act. This Act gives Kanesatake authorities rights similar to those of a Band council under the terms of the Indian Act.

With respect to the activities practised, particularly hunting and fishing, the Mohawks indicated that they are not only activities, but also Aboriginal rights practised by the Mohawks. In fact, the Mohawks point out that these Aboriginal rights are protected by section 35 (1) of the Constitution (1982). According to the Mohawks, these rights include, among others, fishing rights recognized by the Adams decision of the Supreme Court in 1996, hunting rights, harvesting rights (particularly of medicinal plants), commercial rights, cultural rights (including archaeological heritage) and environmental *stewardship rights.*

10.4.2 LAND USE AND OCCUPANCY

The community of Kanesatake is grappling with a particular territorial issue. The land it occupies, in addition to being considerably fragmented, is owned by the federal government and does not have reserve status. Rather, they are lands reserved for the use and benefit of Indians under section 91 (24) of the Constitution Act. It appears that most of the traditional activities of the Mohawks of Kanesatake take place in the vicinity of Kanesatake and on the territory of Tioweró:ton. The use of this territory is high, particularly in the summer between June and October. The data consulted does not identify the waterways used by Kanesatake members, nor whether any of them carry out activities in the Project's local study area. In this regard, the analysis of the effects on land use and occupation does not focus on these potential activities in the Project area, but on the effects that the Project could have upstream of the river.

In general, the Mohawk Nation is concerned about the health of species found in the St. Lawrence. It is concerned about the effects on species at risk and so-called migratory species, which travel long distances in the St. Lawrence and whose vital spaces do not depend on a single site. During the impact study on the Contrecœur port project, the Mohawk Nation expressed concern about the repercussions on the maintenance of activities for traditional purposes in the river, considering that several projects could negatively affect the species found there.

The increase in maritime traffic expected with the Terminal 21 Project could have an effect on the safety of users who travel by boat in or near the waterway, and could involve, through related factors, additional pressure on the river's ecosystem and its sensitive species, such as sturgeon species. During the construction phase, the residual effect on the "Land Use and Occupancy" component is considered low (significant). In the operation and maintenance phase, the residual effect is considered moderate (not significant). However, a certain degree of uncertainty is associated with this analysis due to the limited data available on the use and occupancy of the territory by First Nation members. However, the Nation Council has not indicated to the TRPA that it has any concerns about the Project.

An environmental supervisor will be present on a regular basis at the work site throughout the construction period to ensure that the work respects, among other things, the laws, policies and regulations in force, the proponent's specific commitments and obligations, as well as the various mitigation measures proposed to minimize the effects of the Project.

The consulted First Nations will be invited to submit offers of services to carry out the biological monitoring work, and will be kept informed of the results of these follow-ups and the effectiveness of the compensatory measures for fish habitat.

10.4.3 HEALTH AND SOCIO-ECONOMIC PLANS

The Kanesatake Health Centre offers a variety of health and social services to the on-reserve population. According to the First Nations of Québec Business Network (FNQBN), there are about twenty businesses in Kanesatake, mostly dedicated to retail trade, services, forest maintenance and orchard operations. There are also businesses specializing in agriculture, arts and crafts, construction and transportation.

The data consulted, as well as the slight increase in marine traffic related to the Project upstream from Montréal, do not allow us to anticipate significant effects on the health and socio-economic component among the Mohawks of Kanesatake, particularly with regard to the intergenerational transmission of indigenous knowledge, community cohesion and the assessment of disproportionate effects on certain population subgroups.

With regard to economic opportunities, the completion of work in the construction phase and activities at Terminal 21 in the operations and maintenance phase could result in employment and contract opportunities for workers and businesses in the Nation because of the hiring and purchasing policies implemented by the TRPA to maximize economic benefits for First Nations. The positive residual effect on economic spinoffs is considered medium.

No follow-up or monitoring program is specifically planned for the Health and Socio-Economic Plans component.

10.4.4 NATURAL CULTURAL HERITAGE AND SITES OF INTEREST

The Port of Trois-Rivières was highly frequented by the Iroquois Nations in the 17th century. According to the MCK, they are the ancestors of the Mohawk Nation, which would indicate the possibility of discovering remains of Mohawk origin in the local study area. However, according to the archaeological potential study, no historical or prehistoric archaeological sites have been identified in the restricted study area or the local study area. However, an analysis of settlement patterns identified an area with a high potential for Aboriginal presence near the project. Furthermore, according to the HWN, artifacts were found in the late 1960s in the vicinity of the current Kruger mill site.

During the construction phase, activities that are likely to have an effect on the cultural heritage associated with archaeology are related to the encroachment of work into the riparian and aquatic environment. If areas of high potential are identified, they will be the subject of an archaeological inventory, archaeological monitoring during the work or another agreed-upon monitoring method. The residual effect on the archaeological heritage is thus deemed to be low (not significant). No other significant negative effects on the natural and cultural heritage component and sites of importance to the Mohawk Nation of Kanesatake are anticipated during the construction and operation phases. However, a certain degree of uncertainty is associated with this analysis due to the limited data available for this component.

As mentioned above, the high potential areas identified will be subject to an archaeological inventory prior to construction, archaeological monitoring during construction, or other follow-up as agreed upon with the Nations consulted. Discussions on appropriate follow-up are ongoing.

10.5 MOHAWKS OF AKWESASNE

10.5.1 RIGHTS AND INTERESTS

The Mohawk Territory of Akwesasne was the subject of a historic treaty when more than thirty land cessions were negotiated by agents of the Indian Department with the Aboriginal inhabitants of the Great Lakes region from 1764 to 1862 (Southern Ontario Treaties). In 1916, an Ontario-Canada Commission of Inquiry proposed that a new treaty be made in the area between Georgian Bay and the Ottawa River north of Lake Simcoe, as well as the lands west of the Bay of Quinte. The Williams Treaties of 1923 ceded this territory, for a fixed sum of money, to the authority of Canada and the Province of Ontario. Five land claims were also filed, three of which were concluded (these claims related to loss of use of islands in the St. Lawrence River and breaches of treaties, among other things). In addition, in 2013, two agreements-in-principle were signed by the Mohawks of Akwesasne and the Government of Canada regarding self-government negotiations. The parties are negotiating a final agreement to both agreements. Currently, one specific claim remains under negotiation. This is the Dundee claim, an area of 20,000 hectares. The First Nation alleges improper surrender of land in the Township of Dundee and claims the land not covered by letters patent, adjacent to the boundaries of its existing reserve.

In terms of the activities practised, such as hunting and fishing, the Mohawks indicated that they were not only activities, but also Aboriginal rights practised by the Mohawks. In fact, the Mohawks point out that these Aboriginal rights are protected by section 35 (1) of the Constitution (1982). According to the Mohawks, these rights include, among others, fishing rights recognized by the Adams decision of the Supreme Court in 1996, hunting rights, harvesting rights (in particular medicinal plants), commercial rights, cultural rights (including archaeological heritage) and environmental *stewardship rights*.

10.5.2 LAND USE AND OCCUPANCY

The Mohawks of Akwesasne carry out a variety of traditional activities on the St. Lawrence River and ensure that their history and traditions are passed on to future generations. The data consulted does not identify the waterways used by the members of Akwesasne, nor whether any of them carry out activities in the local study area of the

Project. As such, the analysis of the effects on land use and occupancy does not focus on these potential activities in the Project area, but on the effects that the Project could have upstream of the river.

In general, the Mohawk Nation is concerned about the health of species found in the St. Lawrence. It is concerned about the effects on species at risk and so-called migratory species, which travel long distances in the St. Lawrence and whose vital spaces do not depend on a single site. During the impact study on the Contrecœur port project, the Mohawk Nation expressed concern about the repercussions on the maintenance of activities for traditional purposes in the river, considering that the project risked negatively affecting the species found there.

The increase in maritime traffic expected with the Port Project could have an effect on the safety of users who travel by boat in or near the waterway, and, through related factors, could put additional pressure on the river's ecosystem and its sensitive species, such as sturgeon species. During the construction phase, the residual effect on the "Land Use and Occupancy" component is considered low (not significant). In the operation and maintenance phase, the residual effect is considered moderate (not significant). However, a certain degree of uncertainty is associated with this analysis due to the limited data available on land use and occupancy by First Nation members. However, the Nation Council has not indicated to the TRPA that it has any concerns about the Project.

An environmental supervisor will be present on a regular basis at the work site throughout the construction period to ensure that the work respects, among other things, the laws, policies and regulations in force, the proponent's specific commitments and obligations, as well as the various mitigation measures proposed to minimize the effects of the Project.

The consulted First Nations will be invited to submit offers of services to carry out the biological monitoring work, and will be kept informed of the results of these follow-ups and the effectiveness of the compensatory measures for fish habitat.

10.5.3 HEALTH AND SOCIO-ECONOMIC PLANS

Health and social services are available in Akwesasne. Community members have access to programs aimed at families, youth, and seniors, whether in terms of prevention or primary care. The Akwesasne community has had its own Chamber of Commerce since 2012. Its objective is to offer a platform for networking and sharing ideas, and to support businesses in their administration and operations. It also aims to promote the local economy, to improve the market share of the community's businesses, and to limit economic leakage outside the community. At the same time, the Akwesasne Area Management Board works to improve the skills and competencies of the community's residents. An employment center has been created for the benefit of residents.

Akwesasne's business directory includes nearly 350 companies, including 15 construction companies and 22 professional services companies. The economic sectors on the Akwesasne reserve are agriculture, arts, crafts, trade and services, primarily in the areas of construction, transportation and real estate development. There is a bakery, banking, bingo hall, casino, bookstore and other services.

The data consulted, as well as the slight increase in marine traffic related to the Project upstream from Montréal, do not allow us to anticipate significant effects on the health and socio-economic component among the Mohawks of Akwesasne, particularly with regard to the intergenerational transmission of Aboriginal knowledge, community cohesion and the assessment of disproportionate effects on certain subgroups of the population.

With regard to economic opportunities, the completion of the work in the construction phase and the activities at Terminal 21 in the operations and maintenance phase could result in employment and contract opportunities for workers and businesses in the Nation because of the hiring and purchasing policies implemented by the TRPA in order to maximize economic benefits for First Nations. In the construction and operation phases, the positive residual effect on economic spinoffs is considered moderate.

No follow-up or monitoring program is specifically planned for the Health and Socio-Economic Plans component.

10.5.4 NATURAL CULTURAL HERITAGE AND SITES OF INTEREST

The Port of Trois-Rivières was highly frequented by the Iroquois Nations in the 17th century. According to the MCK, they are the ancestors of the Mohawk Nation, which would indicate the possibility of discovering remains of

Mohawk origin in the local study area. However, according to the archaeological potential study, no historical or prehistoric archaeological sites have been identified in the restricted study area or the local study area. However, an analysis of settlement patterns identified an area with a high potential for Aboriginal presence in the vicinity of the project. In addition, according to the HWN, artifacts were found in the late 1960s in the vicinity of the current Kruger mill site.

During the construction phase, activities that are likely to have an effect on the cultural heritage associated with archaeology are related to the encroachment of work into the riparian and aquatic environment. If areas of high potential are identified, they will be the subject of an archaeological inventory, archaeological monitoring during the work or another agreed-upon monitoring method. The residual effect on the archaeological heritage is thus deemed to be low (not significant). No other significant negative effects on the natural and cultural heritage component and sites of importance to the Mohawk Nation of Akwesasne are anticipated during the construction and operation phases. However, a certain degree of uncertainty is associated with this analysis due to the limited data available for this component.

As mentioned above, the high potential areas identified will be subject to an archaeological inventory prior to construction, archaeological monitoring during construction, or other follow-up as agreed upon with the Nations consulted. Discussions on appropriate follow-up are ongoing.

11 DESCRIPTION OF EFFECTS ON LOCAL AND REGIONAL COMMUNITIES

The characteristics of the human environment are summarized on Map 5.

11.1 ADMINISTRATIVE FRAMEWORK AND LAND TENURE

All of the land bordering the project is privately owned, but the seabed is on public land belonging to the Government of Québec. However, the latter has confirmed that it would agree to transfer the rights to administer the water lot as soon as the TRPA has obtained the property rights of the riparian band. The TRPA owns all of the land to the east and Kruger owns the land to the north and west. A waterfront band ownership transfer agreement is currently being negotiated between the two parties.

The port site under the TRPA's responsibility extends over a length of approximately 2.7 km from the Kruger property to the west, up to the site of Hangar 1 near the Cogeco Amphitheatre. The TRPA owns the majority of the land under its responsibility, but a portion of the port park is owned by Publics Services and Procurement Canada.

11.2 LAND PLANNING AND DEVELOPMENT

Responsibility for land use planning and resource management in the local study area rests with the City of Trois-Rivières, which also acts as the regional county municipality. Since 2002, the City of Trois-Rivières is the result of the amalgamation of several municipalities, namely Trois-Rivières, Cap-de-la-Madeleine, Trois-Rivières-Ouest, Pointe-du-Lac, Saint-Louis-de-France and Sainte-Marthe-du-Cap. As a result, the regulatory framework for development and urban planning has changed as the various urban plans have been overhauled. The new city has put in place a revised development plan that was adopted by the municipal council in 2016.

The Port of Trois-Rivières area is located in an industrial zone. The City of Trois-Rivières' urban plan provides for a redefinition of the port sector and the Saint-Philippe district in order to improve the cohabitation of the various functions found there.

11.3 SOCIO-ECONOMIC PROFILE

Four territorial entities are intersected by the regional study area, namely the cities of Bécancour and Trois-Rivières as well as the administrative regions of Mauricie and Centre-du-Québec. The economy of the City of Trois-Rivières is mainly based on the tertiary sector. In 2015, the median total income for people aged 15 and over was $30,563 and $34,603 for the cities of Trois-Rivières and Bécancour. As for the unemployment rate in 2016, it was 7.5% and 5.4%.

During the construction and operation phases, the work and activities will promote local and regional job creation. They will also create favourable conditions for the purchase of goods and services from a regional perspective due to the purchase of materials. The enhancement measures will ensure maximum positive impact by encouraging the hiring of workers from the region and favouring the purchase of local and regional materials, goods and services. The residual effect on the socio-economic context during the construction and operation phases is therefore considered positive.

No monitoring and/or follow-up program is required.

Furthermore, it should be noted that the Director of Finance and Administration validates annually the application of the rules of the purchasing policy, including the application of bonus measures to maximize regional and Aboriginal economic spinoffs, and reports to the TRPA Board of Directors.

11.4 LAND USE

Residential uses are concentrated mainly in the northeast of the work zone, in the Saint-Philippe district of the City of Trois-Rivières. These are mainly multi-family residences, triplexes, duplexes and, more rarely, single-family homes. There is also a school, a community center and a park. Commercial activities are mainly observed along Route 138, Royal Boulevard and Gene-H.-Kruger Boulevard. The most important industrial facility in the area is adjacent to the proposed work zone, i.e. Kruger.

Some major facilities and infrastructures are located in the area, including Highway 55 and Route 132, the Port of Trois-Rivières, the St. Lawrence waterway, a direct rail link with the CN and CP networks via Québec-Gatineau Railways, and a power transmission line.

The project's study area is mainly located in the St. Lawrence River where many ships are operating. The presence of the Port of Montréal on the north shore of the river as well as the St. Lawrence waterway explain the high boat traffic in front of the Port of Trois-Rivières. About 230 merchant and cruise ships use the port's facilities annually. Several navigational infrastructures allow boaters to launch or dock their boats. Three marinas are located within less than 10 km from the Port of Trois-Rivières. A busy boat launch (Notre-Dame) is located near the future Terminal 21. Outdoor businesses use the expanded study area. Most of the excursions or activities of these companies are organized on the Saint-Maurice River and near its mouth, around Saint-Quentin Island. However, a few excursions or events are also organized on the St. Lawrence River.

The study area is located near areas known for sport fishing by boat or wading. The vast majority of fishing activities are carried out closer to the south shore of the river, on the Bécancour side, between the shore and the waterway. Ice fishing is practised only on the south shore, near the Sainte-Angèle wharf. Otherwise, commercial fishing activities take place in the study area, mainly on the south shore.

Road traffic will increase slightly. During the construction phase, traffic on Gene-H.-Kruger Boulevard will increase by 1.5% due to Project trucking and by 0.3% due to daily commuting by workers. During the operations and maintenance phase, traffic on Gene-H.-Kruger Boulevard will increase by approximately 0.9%. However, due to the mitigation measures that will be put in place, the residual effect is considered low and not significant.

Regarding boating, during the construction and operation phases, certain very specific areas for the passage of boats will not be accessible. However, access to the two Notre-Dame boat launch ramps will remain accessible. Otherwise, the increase in marine traffic expected during the operation phase could have an effect on the safety of users (boaters, fishermen, excursionists, etc.) who travel in or near the waterway. Considering that access to the river will not be disrupted and that measures to ensure the safety of boaters will be put in place, the residual effect is considered moderate and not significant.

As for commercial navigation, during the construction phase, it will be slightly affected. Indeed, operations near or at Wharf 20 could be disrupted due to the work. In addition, to ensure the safety of users and workers during construction, access to certain areas will be restricted. However, operations at other wharves will continue and these will remain accessible to vessels. The residual effect on commercial navigation is considered moderate and not significant during the construction phase. As for the operation and maintenance phase, the presence of the new wharves will allow between 96 (realistic estimate) and 120 (optimistic estimate) additional vessels to dock in Trois-Rivières. It will also reduce the waiting time for ships in the river to access available port infrastructures. The residual effect is therefore considered positive.

The TRPA is committed to conducting bathymetric monitoring after the wharves are installed (years 1, 3 and 5) to verify the dynamics of sediment accumulation or erosion in this area. This work is included in the monitoring and follow-up program (see Chapter 16).

Finally, regarding sport fishing, during the construction phase, the few fishermen frequenting the work area as well as the fishermen launching their boats at the Notre-Dame boat ramps could be disturbed by the noise and the presence of the construction site. In addition, they will, if necessary, have to modify their itinerary as well as their fishing site since they will no longer be able to visit the site's surroundings during construction. Nevertheless, the area where the work will take place is very little frequented for sport fishing activities. The residual effect is considered small and not significant. No residual effect is expected during the operation and maintenance phase.

72°36'0"
46°20'0"
72°34'0"
72°32'0"
46°22'0"
46°18'0"
46°16'0"

Trois-Rivières
Trois-Rivières (secteur Trois-Rivières-Ouest)
Trois-Rivières (quartier Saint-Philippe)
Trois-Rivières (secteur Cap-de-la-Madeleine)
Bécancour (secteur Saint-Angèle-de-Laval)
Bécancour

Rue Marion
Boulevard Maurice
Rue Lacerte
Rue Deshaies
Côte Richelieu
Boulevard des Récollets
Rue Pelletier
Rue La Vérendrye
Rue Sainte-Marguerite
Boulevard des Forges
Rue du Père-Daniel
Rue Bellefeuille
Rue Saint-Denis
Rue Royale
Rue Laviolette
Rue Sainte-Cécile
Boulevard du Saint-Maurice
Boul. des Chenaux
Rivière Saint-Maurice
Île Saint-Christophe
Rue De Grandmont
Rue Fusey
Rue Patry
Rue Saint-Laurent
Rue Latreille
Rue des Érables
Boulevard Sainte-Madeleine
Rue Loranger
Rue Toupin
Rue Notre-Dame Est
Rue Bellevue
Rue Pratte
Rue Bourassa
Rue Bellemare
Rue Notre-Dame-Ouest
Boulevard Gene-H.-Kruger
Rue Saint-Philippe
Rue Notre-Dame
Rue de la Papeterie
Avenue Le Neuf
Boulevard de Port-Royal
Avenue Godefroy
Rue Beaupré
Avenue de Louisbourg
Avenue Godefroy
Rivière Godefroy
Boulevard Bécancour
Avenue des Jasmins

Parc Laviolette
Parc Pie-XII
Parc de motorisés Godefroy
Parc de l'île Saint-Quentin
Parc Portuaire

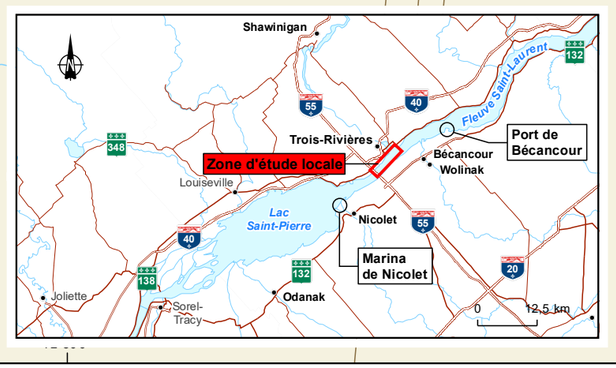
Pavillon St-Arnaud
Jardins publiques
Usine Kruger Trois-Rivières S.E.C.
PORT DE TROIS-RIVIÈRES
Quai nº 20
23
22
21
Émissaire municipal (trop-plein pluvial)
Effluent de l'usine Kruger Trois-Rivières S.E.C.
Rampe de mise à l'eau Notre-Dame
Prise d'eau de l'usine Kruger Trois-Rivières S.E.C.
Pont Laviolette
Terminal de croisières
Boréalis
Amphithéâtre Cogeco
Île Saint-Quentin
Île La Poterie
Fleuve Saint-Laurent
Quai de Saint-Angèle

138
55
40
132
20
348

Local Study Area
Terminal 21

Human Enviroment Elements

- School
- Childcare centre (CPE)
- Daycare and community centre
- Hospital
- Heritage site
- Bus Station
- Marina
- Public Beach
- Warf
- Boat launch ramp (FN = used by First Nations)
- Waterway
- Park
- Ice Fishing area
- Fishing area
- Power transmission line
- Railway
- Flow direction



Trois-Rivières Port Authority

PORT TROIS-RIVIÈRES

Summary of the environmental impact study

Map 5
Inventory of the Human Environment

Sources :
CanVec version 7, 1/50 000, RNCan , 2010
Voie navigable, http://www.ccg-gcc.gc.ca/voiesnavigablesdusaintlaurent
Zones de pêche, MRNF Québec, 2010
Inventaire et cartographie : AECOM, 2017
Mise à jour du Terminal 21 : ACAD-DI-20PTR001-C-001-Cas1_1.dwg

0 250 500 m
MTM, zone 8, NAD83

August 2021

Illustration : A. Lemay
Approval : D. Dumont
201-04975-00_wspT005_rsM7_human_env_210216.ai

wsp

11.5 HUMAN HEALTH

In the field of human health, the most common causes of death are malignant tumours, diseases of the circulatory system, diseases of the respiratory system and diseases of the nervous system.

Water from the St. Lawrence, at the level of the port facilities, is of good quality (section 8.3). Air quality (section 8.6) is generally considered acceptable. The noise climate (section 8.8.) is relatively quiet and the measured equivalent noise levels are between 53 dBA and 59 dBA during the daytime and between 52 dBA and 56 dBA at night. The measured background noise levels are in the range of 47 to 54 dBA. The noises are mainly associated with noise sources from the Kruger mill and traffic on Gene-H Boulevard. Kruger. In terms of the lighting environment, the Terminal 21 site is surrounded by the river, the industrial zone and the residential area to the southwest. These areas already generate significant light pollution. With rare exceptions, the current lighting at wharfs 19 and 20 of the Port is generally turned off at 8 p.m. or earlier.

The Terminal 21 Project complies with all environmental standards issued by federal and provincial governments. This means that disturbances to water, air and sound quality are minimal, as is the lighting, which will blend in with the existing lighting environment. The effects of construction and operation and maintenance of the Project on the human health component are therefore considered insignificant.

An environmental monitoring program will be put in place to ensure that the work complies with the laws, policies and regulations in force, as well as the various mitigation measures proposed for water, air and sound climate in order to minimize the effects of the Project on the Human Health component.

During the operation and maintenance phase, the same components may, if necessary, be subject to follow-up programs. These follow-ups will make it possible to verify the Project's compliance with the applicable regulations and, if necessary, to add mitigation measures to limit the effects that could have an impact on human health.

11.6 NATURAL AND CULTURAL HERITAGE

No strictly delineated natural areas or sites that are valued from a scientific, conservation or natural beauty perspective are included within the restricted study area. There are no heritage sites within the restricted study area.

Two areas of high archaeological potential are targeted within the restricted area for the presence of industrial remains belonging to the Three-Rivers Shipyards, established in 1917, and to Kruger, originally the Three Rivers Pulp and Paper Co. whose work began in 1922. Elements of the Kruger company dating back to the first half of the 20th century are still visible on the waterfront.

No effect is expected on heritage buildings or natural sites of ecological interest since they are located at a good distance from the work site. No effect is expected on built heritage.

During the construction phase, work in terrestrial and aquatic environments could result in the loss or destruction of cultural heritage through the disturbance of existing soil and sediments. Considering the multibeam inventory carried out in an aquatic environment and the backfilling in a terrestrial environment on artificial ground, the residual effect is small and not significant.

Concerning the proposed monitoring and follow-up, the high potential areas will be subject to an archaeological inventory or, at a minimum, to archaeological monitoring during the work.

11.7 LANDSCAPE

The study area used for the inventory and landscape analysis takes into account the visibility of the projected infrastructures. It was divided into 15 local landscape units, which are made up of the landscape surrounding the Project site and which can be perceived from sensitive receptors and valued sites. The study area includes three units of very low resistance, two units of low resistance, seven units of medium resistance, two units of high resistance and two units of very high resistance. The “coastal” and “low-density urban” units are the most likely to have their character or environment disturbed by the Project’s implementation.

The assessment of the likely environmental effects on the landscape was conducted from the main existing viewpoints in each landscape unit. The effects of the Project on the landscape are thus of the order of visual disturbance caused by the works during the construction phase as well as the disturbance of the configuration of the viewpoints and the modification of the perceived atmosphere caused by the presence of the installations during the operation phase.

During the construction phase, the activities will be visible to residents and recreational tourists using the Notre-Dame boat launch. For this point of view only, the residual effect is very strong (significant). From the other points of view, the residual effect on the landscape during the construction phase is considered moderate (not significant).

During the operation and maintenance phase, the activities will be visible to residents and recreational tourists using the Notre-Dame boat launch. The residual effect is considered strong (significant) from this point of view only. From the other viewpoints, the residual effect on the landscape during the operation and maintenance phase is considered moderate (not significant).

No monitoring and follow-up activities are required for this valued component.

12 CUMULATIVE EFFECTS

Cumulative effects assessment focuses on valued components (VCs). These refer to the components of the natural and human environments likely to be significantly modified or affected by the Project and valued by specialists or the populations concerned. In the context of the Terminal 21 Project in Trois-Rivières, this valorization was most often expressed through the concerns collected and integrated within the framework of the EIA. The assessment of cumulative effects also requires that there is a real potential for cumulative effects on these VCs with other projects or actions.

The VCs on which the Project could cause cumulative effects, in addition to those of other regional projects, both in terms of terminal encroachment into the St. Lawrence River and the increase in the number of ships at the Port of Trois-Rivières, are as follows:

- air quality;
- fish and fish habitat;
- avifauna and its habitat;
- endangered species;
- river navigation;
- First Nations (land use).

The analysis of cumulative effects on the selected valued components takes into consideration all current or potential activities, according to the spatial and temporal boundaries selected for each VC. For the First Nations, a larger study area, known as the territorial study area, was used for the analysis of their land use. This is the 550 km stretch of the St. Lawrence River between Tadoussac and Cornwall.

Table 6 identifies completed and planned projects that are sources of potential cumulative effects for which sufficient information is available. An analysis of these projects and their effects is provided in the following sections.

The identification of cumulative effects on the selected VCs takes into consideration the spatial boundary, description of the baseline condition, description of the trend in the VC, and a qualitative assessment of the effect.

The establishment of an original baseline state at a time when the river was not impacted by human activities is not possible in this analysis. Rather, the baseline state attempts to describe the major trends that have influenced and are still influencing the selected VCs.

The following matrix in Table 7 identifies the cumulative effects of the activities present or planned with the Terminal 21 Project.

The analysis of cumulative effects did not result in the addition of new mitigation measures or follow-up actions beyond what was presented in the EIS. The detailed analysis of anticipated effects on the selected Valued Components determined that the Project would have no significant cumulative effects with other activities and projects considered in the region. Table 8 summarizes the overall effect on the valued components selected for the cumulative effects analysis.

Table 6 : Sources of Cumulative Effects for Selected VCs

Sources of Cumulative Effects	Existing (or past) activities	Planned interventions
Expanded study area		
Boat launching ramps in Trois-Rivières and Sainte-Angèle-de-Laval	• Launching ramps for fishing boats and pleasure boats are present throughout the territory of Trois-Rivières.	
Kruger Plant	• The Kruger mill is next to the Port of Trois-Rivières. It produces colored paper and recycled cardboard. Numerous infrastructures are located on the immediate shore of the river.	• In the future, Kruger plans to convert a second machine to produce ultra-high-performance 100% recycled linerboard, as well as the construction of four new packaging board machines.
Highway 40	• The section of Highway 40 closest to the Port has an AADT of 67,000. Highway 55 has an AADT of 42,000 at Notre-Dame Street West.	• There are no major interventions planned, other than repairs.
Trois-Rivières' industrial parks	• The City of Trois-Rivières has eleven industrial parks on its territory.	• The industrial parks that still have land available are almost at capacity. Nevertheless, new companies will most likely set up on the remaining vacant lots in the next few years.
Laviolette Bridge	• The Laviolette Bridge is used by nearly 40,000 vehicles per day (2017), of which 7% are heavy vehicles.	• Each year, several interventions are necessary to ensure the maintenance of the Laviolette Bridge. • Work on the members of the Laviolette Bridge is in progress. • The replacement of the slab of the central spans is an important intervention that will be carried out in the near future.
Société du parc industriel et portuaire de Bécancour (SPIBP)	• SPIPB plans to expand its port facilities • The Bécancour industrial and port park is located along the St. Lawrence River, on the south shore, about 15 km downstream from Trois-Rivières. It has been in operation since 1970.	• The SPIPB is beginning an environmental impact study in anticipation of the expansion of its port facilities. • Maintenance dredging is carried out annually according to a ten-year dredging program.
Other work at the Port of Trois-Rivières	• The Port of Trois-Rivières plans to build Terminal 21, the subject of this EIA. • Recently, work has been carried out at wharves 10, 13, 19 and 20.	• Maintenance dredging work at the Port of Trois-Rivières is carried out on average every 2 or 3 years.
	• The Port of Trois-Rivières is working on the development of the IP Zone and aims to develop a non-standard road corridor to permanently connect the PL-E (3505 Bellefeuille Street) to the port façade.	• Reinforcement work on the Bellefeuille, Père-Daniel, de la Commune and Notre-Dame-Centre roads, burying of electrical and communication wires.
	• The Port of Trois-Rivières plans to develop Logistics Park A (PL-A) along Notre-Dame Centre Street in order to optimize the operational performance and storage capacity of this logistics area.	• The development of a specialized area for the storage of merchandise at the PL-B; the linearization of the urban-port interface to promote a better integration of port facilities to the various land uses.

Table 6 : Sources of Cumulative Effects for Selected VCs (continued)

Sources of Cumulative Effects	Existing (or past) activities	Planned interventions
Other work at the Port of Trois-Rivières (continued)	• The Port of Trois-Rivières plans to develop Logistics Park B (PL-B) along Notre-Dame Centre Street in order to optimize the operational performance and storage capacity of this logistics area.	• The installation of a specialized area for the storage of de-icing salt at the PL-B; • The development of a common service area at the entrance of the Port at PL-B; the linearization of the urban-port interface to promote a better integration of port facilities to the different uses of the territory.
Project to Mitigate the Public Safety Risk from Unexploded Explosive Ordnance (UXO) in Lake Saint-Pierre	• The presence of unexploded explosive ordnance in Lake Saint-Pierre is the result of activities carried out from 1952 to 1999 at the Munitions Experimental Test Centre (METC) in Nicolet, a site belonging to the Department of National Defence (DND). • Ammunition removal and *in situ* detonation activities were undertaken between 2016 and 2018.	• DND is the initiator of the project to mitigate the risk to public safety related to UXO in Lake Saint-Pierre. The objective of the project is to reduce the level of public safety risk from “high” to “low” by removing UXO present in the first 30 centimetres of the lake bottom. • The project involves *in situ* detonation of unsafe projectiles (in the lake) and transportation of the safe projectiles to a land detonation site. Approximately 2,400 pieces of explosive ordnance will be removed annually over 9 years.
Territorial Study Area (First Nations)		
Activities in the ports and on the St. Lawrence River	• When the entire St. Lawrence River is considered in the analysis of cumulative effects (in a territorial approach), the analysis of cumulative effects takes into account the presence of major ports and their activities, including associated navigation : — Société du parc industriel et portuaire de Bécancour (SPIPB) — Canadian Coast Guard (CCG) — Port of Sorel-Tracy — Port of Montréal — Port of Québec	• The SPIPB is beginning an environmental impact study in anticipation of the expansion of its port facilities. • CCG conducts dredging annually to maintain safe operations in the waterway at a depth of -11.3 m. • The Port of Montréal is planning to expand the Contrecœur port terminal. • The Port of Québec is planning to build the Laurentia Project, a deep-water wharf in the Beauport sector. In addition, stabilization and repair work on wharves 31, 49 and 50 are anticipated in the near future.

Table 7 : Matrix for the identification of cumulative effects according to the selected valued components

Selected components	Project Phase Selected for Cumulative Effects Analysis	Reminder of the Project's Residual Effect on VC	Sources of Cumulative Effects												
			Launching ramps in Trois-Rivières and Sainte-Angèle-de-Laval	Kruger Plant	Highway 40	Laviolette Bridge		TroisRivières' industrial parks	Société du parc industriel et portuaire de Bécancour (SPIBP)		Other work at the Port of Trois-Rivières	Project to Mitigate the Public Safety Risk from Unexploded Explosive Ordnance (UXO) in Lake [illegible]	St. Lawrence River Port Operations and Expansion	
			Existing	Existing	Existing	Existing	Planned	Existing	Existing	Planned	Planned	Planned	Existing	Planned
Biophysical environment															
Air Quality	Operation	Changes in air quality caused by the addition of Terminal 21 activities in an already disturbed insertion environment		√	√	√	√	√	√	√	√		√	√
Fish and Fish Habitat	Construction (temporary) and operation	Behavioural changes to fish caused by vessel noise and habitat loss	√			√			√	√	√	√	√	√
Avifauna and its habitat	Construction, but permanent effect and operation	A loss of aquatic resting and feeding habitat of 10.6 ha as well as the loss of herbaceous wastelands is anticipated (0.7 ha).	√			√			√	√			√	√
Species at Risk	Construction, but permanent effect	A loss of aquatic and terrestrial habitat is anticipated, with a low impact on special status fish and chiropterans	√			√			√	√		√	√	√
Local and regional communities															
River navigation	Operation	The operation of Terminal 21 will increase traffic on Gene-H Boulevard. Kruger Boulevard by approximately 0.9%.							√				√	√
First Nations															
First Nations traditional activities	Construction and operation	Loss of river access (construction) and effect on the ability to navigate at the new terminal site. The increase in vessel traffic could result in changes in the availability or quality of the resource (perceived or actual) and an increased sense of insecurity.							√	√		√	√	√

Table 8 : Summary of Cumulative Effects

Valued Environmental Component	Criteria	Overall effect
Air Quality	Environmental Value: Average Disturbance: Medium Magnitude: Medium Scope: Regional Duration: Long Occurrence: Average	Residual effect: Medium Importance: Not important
Fish and its habitat	Environmental Value: Large Disturbance: Low Magnitude: Medium Scope: Regional Duration: Long Occurrence: Average	Residual effect: Medium Importance: Not important
Avifauna and its habitat	Environmental Value: Large Disturbance: Low Magnitude: Medium Scope: Regional Duration: Long Occurrence: Average	Residual effect: Medium Importance: Not important
Species at Risk	Environmental Value: Large Disturbance: Low Magnitude: Medium Scope: Regional Duration: Long Occurrence: Average	Residual effect: Medium Importance: Not important
River navigation	Environmental Value: Average Disturbance: Low Magnitude: Low Scope: Regional Duration: Long Occurrence: Average	Residual effect: Low Importance: Not important
First Nation (land use)	Environmental Value: Large Disturbance: Low Magnitude: Medium Scope: Regional Duration: Long Occurrence: Average	Residual effect: Medium Importance: Not important

13 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

In the Port area, the soils are predominantly clayey. Not very sensitive to erosion, these soils are highly compressible due to their normally high-water content. They are also sensitive to frost and can undergo volume variations during droughts. On the river side, the section where the Port is located is generally shallow except for the channel of the waterway which is maintained by dredging to a depth of -11.3 m. The regulation of Lake Ontario outflows also influences water levels in the ship channel downstream to Trois-Rivières, Québec. In addition, they are influenced by semidiurnal tides, with a tidal range of 0.3 m. The river flow is concentrated mainly in the navigation channel. Areas adjacent to the channel experience relatively low current speeds.

Trois-Rivières has a continental climate with a temperature range of 42 °C between January and July. Climatic data indicate that an average of 1,122 mm of precipitation falls each year, with an average of 259 cm of snow. The lowest observed temperature was -41.1 °C on January 24, 1976, and the highest was 36.1 °C on August 1, 1975 (Environment Canada, 2020). The prevailing winds are predominantly from the southwest, followed by the northeast. The dominant wind direction is south-westerly, however, this wind dominance is variable and influenced by seasonal changes.

The Ouranos Consortium predicts that by 2070 the Mauricie and Centre-du-Québec regions will experience an increase in average annual temperatures of +2.4 °C as well as an increase in total annual precipitation of 55 mm, mainly in winter. Note that a strong increase in the number of days by more than 30 °C is also expected. Ouranos points out that cold spells are expected to decrease markedly with the increase in average winter temperatures. It should also be noted that the forecasts are highly variable, since there is a large degree of uncertainty with respect to the possible evolution of climatological systems.

13.1 EXTREME WEATHER CONDITIONS

Extreme and exceptional weather conditions can influence Trois-Rivières' port facilities and during the execution of main activities (navigation, berthing, transhipment, handling, etc.). Among the most worrisome in the port environment along the St. Lawrence River are fog phenomena, extreme winds and waves, as well as extreme water levels. These extreme phenomena could put the port infrastructure to the test, even damage it, and potentially have repercussions elsewhere, for example on the transportation network, thus disorganizing both access to the port and the supply chain.

WATER LEVEL

Simulations show that by 2050, sea-level rise could have an effect of either zero or 1 to 10 cm of water level rise in Trois-Rivières. These projections consider isostatic adjustment, redistribution of glacier meltwater and changes in oceanographic dynamics. Other simulations showed that for average hydrological conditions, the anticipated water level drops would not adversely affect commercial navigation activities. On the other hand, for a scenario of low hydraulicity (worst-case climate scenario), the drops could reach about 30 cm in Trois-Rivières.

Presently, consensus hasn't been reached on whether the water level should rise or fall, but in both cases the fluctuation would be very minimal.

RIVER FLOW

The projected increase in extreme precipitation events could increase the flow of the St. Lawrence River—and its tributaries, including the St. Maurice River, and increase the potential for flooding. Higher temperatures will result in earlier flooding associated with snowmelt. This warming is expected to lead to a change in ice jams and rain-on-snow events.

Hydraulic simulations of water level variation for the St. Lawrence River were conducted to evaluate the amplitude and spatial distribution of water levels, considering a decrease in water input from the Great Lakes and an increase in sea levels. The results of these simulations reveal that no climate scenario leads to a situation where levels would be below chart datum in Trois-Rivières and suggest that climate change would not have significant impacts on the

current level of navigation activities on the St. Lawrence River if it produces an average hydrological year. However, scenarios that vary more widely in temperature and that focus on a period of low water levels suggest the possibility that water levels would fall below chart datum in August with a decrease of 0.30 m.

Remember that variations in water levels are a normal phenomenon and difficult to predict. In addition, because of their long service life, port facilities are designed to withstand significant variations in water levels and flows.

WIND AND WAVES

For forecasts in terms of extreme winds and waves, two components that can influence the port environment, Ouranos (2015) reports that current data does not allow us to make any reliable forecasts for Québec. Nevertheless, the strength of waves will always be related to the strength of winds. Extreme winds and waves present risks related to breakdowns of wharves and physical infrastructures, as well as risks for navigation approaches to wharves, transhipment and handling activities.

For Terminal 21, its width makes it difficult to build infrastructure on the decks and consequently, no measures to protect the infrastructure from high winds are currently planned or necessary. As for the wharves, the construction includes the installation of a sheet pile anchor wall 33.5 m set back behind the sheet pile wall located in front of the new wharves to resist the weather. The terminal is therefore protected from high winds.

ICE

The seasonal duration of lake ice cover has decreased across Canada over the past five decades. Observations show earlier spring breakup and later freeze-up of small lakes in southern Québec.

For Terminal 21, spring breakup is likely to occur 10 to 25 days earlier by 2050 and freeze-up is likely to occur 5 to 15 days later. However, the impact that changes in river ice regimes will have on ice jams, flooding, river ice phenology and thickness, and seasonal flow regimes remains poorly understood.

FOG

The unpredictable nature of fog makes their predictions difficult. Fog conditions are most critical for navigation in the operational phase. Transportation coordination is necessary. In the context of climate change, the literature does not allow a change in fog occurrence to be determined.

All vessels in Canadian waters are required to report to the Information System on Marine Navigation (INNAV). INNAV is Canada’s means of reporting marine information, including the essential tool for safe navigation in fog and bad weather.

13.2 SEISMIC RISK

Studies conducted in the expanded study area revealed that no faults were active. Historical earthquake surveys in eastern Canada indicate that the expanded study area is particularly safe, as most earthquakes have occurred east of Québec City and west of the Island of Montréal, with very few between these two locations. Trois-Rivières straddles two seismic zones, that is, between the western Québec City and Charlevoix-Kamouraska areas. Thus, Trois-Rivières is not in a seismic zone. Nevertheless, the city of Trois-Rivières could be affected by a large earthquake that could occur at the border of the two proximal seismic zones. In fact, a very strong earthquake has already been felt in Trois-Rivières, dating back to February 5, 1663. However, the probability of a strong earthquake in Trois-Rivières is much lower than in the Charlevoix-Kamouraska and Western Québec seismic zones.

The seismic hazard with the coordinates of the Port of Trois-Rivières was calculated. The average calculated for the 2% exceedance probability over 50 years for ground motion is estimated to be 0.105 (Sa 1.0) for the Port of Trois-Rivières. This value is low compared to Montréal (0.139) and Québec City (0.134). The reduced probability of earthquakes or seismic hazards thus limits the likely effects of ground movements on the port facilities of Trois-Rivières given the low frequency.

13.3 IMPACT ASSESSMENT AND VULNERABILITY ANALYSIS

Anticipated climate change and extreme weather conditions could affect the Port of Trois-Rivières' infrastructure. The highest risk levels are :

- increased temperature that can lead to heat waves;
- intensified and more frequent showers that can cause significant surface runoff;
- increased frequency of snow flurries that can increase the intensity and volume of snowfall in winter;
- increased occurrence of extreme events that can lead to high winds, lightning and thunderstorms;
- changes in flow regimes and the risk of water level drops.

To address the above, the TRPA has put in place a climate change adaptation plan that outlines measures implemented, or to be implemented, to mitigate the projected climate conditions on its current and future infrastructure.

Table 9 provides a summary of the potential effects of the environment on the Project.

Table 9 : Summary of Potential Effects of the Environment on the Project

Event or situation	Long-term risk	Mitigation measure	Effect
Water level	There is no consensus on whether the water level would rise or fall, but in both cases the fluctuation would be very minimal.	None, apart from maintenance dredging if necessary.	Not important
River flow	Possible increase in water levels related to projected increases in precipitation or gradual decrease in river flow due to an increase in average temperature in the Great Lakes Basin.	None. Port facilities are designed to withstand large variations in water levels and flows.	Not important
Winds and waves	Current data do not allow us to make reliable forecasts.	Application of the navigation rules of the Port of Trois-Rivières. CCG Marine Communications and Traffic Services (MCTS) [8]	Not important
Ice	Spring breakup should occur 10 to 25 days earlier by 2050 and freeze-up should occur 5 to 15 days later.	Application of the navigation rules of the Port of Trois-Rivières. CCG Marine Communications and Traffic Services (MCTS)	Not important or positive (ease of navigation in the long run)
Fog	The unpredictable nature of the occurrence of such phenomena makes their prediction difficult.	Application of the navigation rules of the Port of Trois-Rivières. CCG Marine Communications and Traffic Services (MCTS)	Not important
Seismic risk	Reduced probability of earthquakes or seismic risk in Trois-Rivières (low frequency).	Construction of the installations according to the seismic standards of the region.	Not important

[8] MCTS: https://www.ccg-gcc.gc.ca/mcts-sctm/program-info-programme-fra.html

14 ACCIDENT RISK MANAGEMENT

During the construction and operation phases of the Terminal 21 Construction Project, there are risks of potentially dangerous events that could have an impact on environmental components. Accidents and malfunctions are accidents and malfunctions when they refer to unforeseen events that occur independently of an activity or the normal conditions under which it is carried out.

The first line of defense against accidents and malfunctions is the application of existing best practices in environmental protection and health and safety. Thus, potential accidents and malfunctions are associated with risks that will remain possible even with best and rigorously applied management systems. Despite prevention, if such events do occur, it is important to be able to minimize the effects on the environment through the planning and design of effective mitigation measures and the implementation of an emergency response plan.

The purpose of the technological risk analysis related to the New Port Terminal Project in Trois-Rivières is to identify accidents that could occur, to evaluate their possible consequences and to judge the acceptability of the Project in terms of risks. It also serves to identify and improve, if necessary, the protective measures put in place to avoid these potential accidents or to reduce their frequency or consequences.

14.1 METHODOLOGY

The purpose of the analysis of the risks of major technological accidents related to the Project is to identify the major accidents likely to occur, to evaluate their possible consequences for the community and the environment and to judge the acceptability of the Project in terms of risks. It also serves to develop protective measures to prevent these credible worst-case scenarios of accidents and malfunctions or to reduce their frequency and consequences.

The notion of risk involves the following components:

- hazards that materialize in accident scenarios;
- the seriousness of the consequences of these accident scenarios;
- the probability of occurrence of these accident scenarios.

The approach used meets the requirements of the MELCC guide entitled: “Analyse de risques d’accidents technologiques majeurs.” The analysis also meets the main recommendations of the Major “Technological Accident Risk Management Guide” of the Major Industrial Accident Reduction Council.

The first steps consist of identifying the sensitive elements of the environment and the external hazards of anthropic or natural origin related to the activities, infrastructures or equipment present on the site, as well as establishing a history of accidents that have occurred on similar sites. Subsequently, risk-based accident scenarios are developed. During the subsequent steps, the potential consequences of the scenarios are identified and the probability of occurrence is estimated. The safety measures to be implemented are also determined to eliminate or reduce the risk of accidents. A risk management plan including an emergency measures plan will also be established to manage residual risks that cannot be eliminated.

Once the probability of a risk and the level of severity have been assessed, it is then possible, using a matrix, to determine the level of risk of an event. The level of risk that is identified takes into account the prevention and mitigation measures in place, as long as these measures are robust and reliable. Table 10 presents the risk acceptability criteria.

Table 10 : Acceptability Criteria

Level of risk	Definition
Very high	Unacceptable risk likely to cause major damage. Management is advised and must ensure that alternative solutions will be put in place.
High	A risk that requires preventive control measures and risk reduction plans, as well as a reassessment of risks at regular intervals.
Moderate	Risk that is reasonably reduced, but which must be subject to a continuous improvement process in order to achieve, under economically acceptable conditions, the lowest possible level of risk, taking into account the state of knowledge and practices and the vulnerability of the facility's environment.
Low	Acceptable risk. Control measures must be known and applied. Periodic monitoring is required.
Very low	Negligible risk.

14.2 PROJECT HAZARDS

The main hazards related to the construction and operation of Terminal 21 are as follows:

- Use of petroleum products (fuelling of ships [bunkering, overland], refueling of machinery, use of heavy machinery and rolling stock).
- Handling (machinery, road transport, rail transport) and storage of bulk products.
- Maritime transport.

The technological risks identified in the previous sections are summarized in Table 11.

Table 11 : Summary of Risk Analysis Results

Activity	Scenario	Probability of occurrence	Severity level	Level of risk
Use of petroleum products	Land Spill of Petroleum Products (Construction Phase)	High	Low	Moderate
	Land Spill of Petroleum Products (Operation and Maintenance Phase)	High	Very low	Moderate
	Spill of a small quantity of petroleum products into the river	High	Moderate	High
	Large quantity of petroleum products spilled into the river	Moderated	High	High
	Petroleum product fire	Low	High	Moderate
Handling of bulk products	Land dumping of solid bulk	High	Low	Moderate
	Spilling of solid bulk into the river	Low	High	Moderate
	Liquid bulk spill in the river	Low	High	Moderate
	Fire/explosion of bulk material	Low	High	Moderate
Maritime transport	Discharge to the river	Very low	High	Moderate
External hazard	Sabotage, piracy, terrorism	Very low	High	Moderate
	Extreme weather conditions	Moderated	Moderate	Moderate

14.3 RISK MANAGEMENT PROGRAM

The TRPA applies a Risk Management Policy (TRPA-C-14) to identify and assess business risk and, to the extent possible, mitigate this risk. Risk management helps management identify specific adverse circumstances or events that are relevant to the organization's objectives.

Under the requirements of the *Marine Transportation Security Act* and Regulations, the TRPA develops, implements and manages a Marine Security Plan to ensure a high level of security at port and marine facilities with the cooperation of all port operators and their delegates.

The TRPA has an emergency measures plan for the current operations taking place on the lands adjacent to the Terminal 21 Project site. The purpose of this plan is to provide the TRPA with the necessary procedures to proactively and effectively respond to potential marine and land emergencies that could occur on the territory it manages. These procedures will make it possible to coordinate the effective implementation of emergency measures. They will also make it possible to effectively alert and mobilize government, municipal or private stakeholders. This plan will be modified to consider the new equipment and operations of the Terminal 21 Project.

15 SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT

The Project is subject to an EIA in order to determine the possible effects on the physical and biological environments, First Nations and local and regional communities during the different phases of the Project, namely construction and operation and maintenance.

Summary Tables 12 to 15 present the magnitude, extent, duration and probability of occurrence for each component. Finally, the residual effect is discussed and significance is assigned.

Tables 16 to 17 list the common and specific mitigation measures identified by the experts as most appropriate for the Project to mitigate adverse environmental effects.

Table 12 : Evaluation of the residual effect of the project on the components of the physical environment

Project Phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase
Criteria	**Sediment and River Dynamics**		**Water Quality**		**Sediment Quality**		**Soil quality**	
Overall environmental value	Average	Average	Average	Average	Average	Average	Low	Low
Degree of disturbance/improvement (+)	Low	Low	Medium	Low	Low	Low	Low	N. A.
Magnitude	Low	Low	Average	Low	Low	Low	Low	N. A.
Scope	Limited	Local	Limited	Limited	Limited	Limited to local	Limited	N. A.
Duration	Average	Long	Short	Short	Long	Short	Short	N. A.
Probability of occurrence	Low	Average	Low	Low	Average	Low	Low	N. A.
Common mitigation measures	None	None	1 to 14	1 to 14 when working on or near water	1 to 14	1 to 14 when working on or near water	1-2; 8; 10-12; 15 à 26	None
Specific mitigation measures	None	None	None	None	None	None	None	None
Residual effect	Low	Low	Low	Low	Low	Very low	Very low	N. A.
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	Not important	Not important	Not important
Criteria	**Air Quality**		**Greenhouse Gases (GHG)**		**Sound environment**		**Underwater Noise**	
Overall environmental value	Average	Average	Average	Average	Average	Average	Average	Average
Degree of disturbance/improvement (+)	High	Medium	Low	Low	Low	Low	Medium	Low
Magnitude	High	Average	Low	Low	Low	Low	Average	Low
Scope	Limited	Limited	Regional	Regional	Local	Local	Local	Local
Duration	Short	Long	Average	Long	Average	Long	Average	Long
Probability of occurrence	Average	Average	High	High	Average	Average	Average	Average
Common mitigation measures	27 à 37	27 à 37	38 à 41	38 à 41	32; 42 à 54	32; 42 à 54	55-56	None
Specific mitigation measures	None	1 to 4	5-6	5 to 8	9 to 11	9 to 11	None	None
Residual effect	Medium	Medium	Medium	Medium	Low	Low	Medium	Low
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	Not important	Not important	Not important
Criteria	**Lighting ambience**							
Overall environmental value	Average	Average						
Degree of disturbance/improvement (+)	Low	Low						
Magnitude	Low	Low						
Scope	Local	Local						
Duration	Average	Long						
Probability of occurrence	Average	Average						
Common mitigation measures	57 à 62	57 à 62						
Specific mitigation measures	None	None						
Residual effect	Low	Low						
Significance of the residual effect	Not important	Not important						

Table 13 : Evaluation of the residual effect of the project on the components of the biological environment

Project Phases	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase
Criteria	**Aquatic herbariums**		**Wetlands**		**Terrestrial vegetation**		**Invasive alien species**	
Overall environmental value	Average	Average	N/A	High	Low	Low	Average	Low
Degree of disturbance	Medium	Low	Medium	Low	Low	Low	Medium	N. A.
Magnitude	Average	Average	Average	Average	Low	Average	Average	N. A.
Scope	Limited	Limited to local	Limited	Limited to local	Local	Limited to local	Limited	N. A.
Duration	Long	Short	Long	Short	Long	Short	Long	N. A.
Probability of occurrence	High	Low	Low	Low	High	Low	Low	N. A.
Common mitigation measures	63 à 73	1 à 14	63 à 73	1 à 14	63 à 73	1 à 14	63 à 73	1 à 14
Specific mitigation measures	None	None	None	None	None	None	None	None
Residual effect	Medium	Low	Low	Low	Low	Low	Low	N. A.
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	Not important	Not important	Not important
Criteria	**Benthic invertebrates (including mules)**		**Fish**		**Amphibians and reptiles**		**Avifaune**	
Overall environmental value	High	High	High	High	Average	Average	High	High
Degree of disturbance/improvement (+)	Low	Low	Low	Low	Low	Low	Low	Low
Magnitude	Average	Average	Average	Average	Low	Low	Average	Average
Scope	Limited to local	Limited to local	Limited	Limited	Limited to local	Limited to local	Limited	Limited to local
Duration	Short	Average	Short	Short	Long	Short	Short to long	Short to long
Probability of occurrence	Low to high	High	High	High	High	Low	Low to high	Low to high
Common mitigation measures	1 à 14, 74 à 77	1 à 14, 75-76	1 à 14, 55-56, 75 à 77	55, 75-76	1 à 14, 78	1 à 14	78 à 80	1 à 14
Specific mitigation measures	None	None	None	None	None	None	None	None
Residual effect	Low to medium	Medium	Medium	Medium	Low	Very low	Low to medium	Low to medium
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	Not important	Not important	Not important
Criteria	**Small and small mammals**		**Bats**					
Overall environmental value	Average	Average	High	High				
Degree of disturbance/improvement (+)	Low to medium	Low to medium	Low to medium	Low to medium				
Magnitude	Average	Low to medium	Average	Low to medium				
Scope	Limited	Limited	Limited	Limited				
Duration	Long	Long	Long	Long				
Probability of occurrence	High	High	High	Average				
Common mitigation measures	78, 81-82	83	78, 81-82	83				
Specific mitigation measures	None	None	None	None				
Residual effect	Medium	Low to medium	Medium	Low to medium				
Significance of the residual effect	Not important	Not important	Not important	Not important				

Table 14 : Evaluation of the residual effect of the project on First Nations components

Project Phases	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase
Criteria	**W8nanaki Nation - Land Use and Occupancy**		**W8nanaki Nation - Health and Socio-Economic Plans**		**W8nanaki Nation - Natural and Cultural Heritage**		**Huron-Wendat Nation - Land Use and Occupancy**	
Overall environmental value	High	High	High	High	High	High	High	High
Degree of disturbance/improvement (+)	Low to medium	Medium	Low	Low	Low	N. A.	Low and reversible	Low and irreversible
Magnitude	Average	Average	Average	Average	Average	N. A.	Average	Average
Scope	Local	Local	Local	Local	Limited	N. A.	Local	Regional
Duration	Short	Long	Short to medium	Long	Long	N. A.	Short	Long
Probability of occurrence	Average	Low to medium	Average	Low	Low	N. A.	Average	Average
Common mitigation measures	84 à 87	84-85; 87-88	23 à 37; 42 à 54; 57 à 62; 84 à 87; 89	23 à 37; 42 à 54; 57 à 62; 84 à 87; 89	90 à 95	None	84 à 87	84-85; 87-88
Specific mitigation measures	None	None	None	None	None	18; 29-30	None	None
Residual effect	Medium	Medium	Medium (- and +)	Medium (- and +)	Low	N. A.	Medium	Medium
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	N. A.	Not important	Not important
Criteria	**Huron-Wendat Nation - Health and socio-economic plans**		**Huron-Wendat Nation - Natural and cultural heritage**		**Mohawks of Kahnawà:ke - Land Use and Occupancy**		**Mohawks of Kahnawà:ke - Health and socio-economic plans**	
Overall environmental value	High	High	High	High	High	High	High	High
Degree of disturbance/improvement (+)	Low	Low	Low	N. A.	Low and partially reversible	Low and irreversible	Low	Low
Magnitude	Average	Average	Average	N. A.	Average	Average	Average	Average
Scope	Local	Local	Limited	N. A.	Local	Regional	Local	Local
Duration	Short to medium	Long	Long	N. A.	Short	Long	Average	Long
Probability of occurrence	Low to medium	Low	Low	N. A.	Average	Low	Low	Low
Common mitigation measures	27 à 37; 42 à 54; 64 à 69; 92 à 95; 97	27 à 37; 42 à 54; 57 à 62; 84 à 87; 89	90 à 95	None	85; 87	87; 96	27 à 37; 42 à 54; 57 à 62; 85; 87	27 à 37; 42 à 54; 57 à 62; 85; 87; 89
Specific mitigation measures	None	None	None	18; 29-30	None	None	None	None
Residual effect	Medium (- and +)	Medium (- and +)	Low	N. A.	Medium	Medium	Medium (+)	Medium (+)
Significance of the residual effect	Not important	Not important	Not important	N. A.	Not important	Not important	Not important	Not important
Criteria	**Mohawks of Kahnawà:ke - Natural and Cultural Heritage**		**Mohawks of Kanesatake - Land Use and Occupancy**		**Mohawks of Kanesatake - Health and socio-economic plans**		**Mohawks of Kanesatake - Natural and cultural heritage**	
Overall environmental value	High	High	High	High	High	High	High	High
Degree of disturbance/improvement (+)	Low	N. A.	Low and partially reversible	Low and irreversible	Low	Low	Low	N. A.
Magnitude	Average	N. A.	Average	Average	Average	Average	Average	N. A.
Scope	Limited	N. A.	Local	Regional	Local	Local	Limited	N. A.
Duration	Long	N. A.	Short	Long	Average	Long	Long	N. A.
Probability of occurrence	Low	N. A.	Low	Low	Low	Low	Low	N. A.
Common mitigation measures	90 à 95	None	87; 96	87; 96	27 à 37; 42 à 54; 57 à 62; 87; 89; 96	27 à 37; 42 à 54; 57 à 62; 87; 89; 96	90 à 95	None
Specific mitigation measures	None	None	None	None	None	None	None	None
Residual effect	Low	N. A.	Low	Medium	Medium (+)	Medium (+)	Low	N. A.
Significance of the residual effect	Not important	N. A.	Not important	Not important	Not important	Not important	Not important	N. A.

Table 14 : Evaluation of the residual effect of the project on First Nations components (continued)

Project Phases	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase
Criteria	**Mohawks of Akwesasne - Land Use and Occupancy**		**Mohawks of Akwesasne - Health and socio-economic plans**		**Mohawks of Akwesasne - Natural and Cultural Heritage**			
Overall environmental value	High	High	High	High	High	High		
Degree of disturbance/improvement (+)	Low and partially reversible	Low and irreversible	Low	Low	Low	N. A.		
Magnitude	Average	Average	Average	Average	Average	N. A.		
Scope	Local	Regional	Local	Local	Limited	N. A.		
Duration	Short	Long	Average	Long	Long	N. A.		
Probability of occurrence	Low	Low	Low	Low	Low	N. A.		
Common mitigation measures	87; 96	87; 96	27 à 37; 42 à 54; 57 à 62; 87; 89; 96	27 à 37; 42 à 54; 57 à 62; 87; 89; 96	90 à 95	None		
Specific mitigation measures	None	None	None	None	None	None		
Residual effect	Low	Medium	Medium	Medium (+)	Low	N. A.		
Significance of the residual effect	Not important	Not important	Not important	Not important	Not important	N. A.		

Table 15 : Evaluation of the project's residual effect on local and regional communities

Project Phases	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase	Construction phase	Operation phase
Criteria	**Socio-economic profile**		**Land Use - Traffic**		**Land Use - Recreational Boating**		**Land Use - Commercial Navigation**	
Overall environmental value	High	High	Average	Average	Average	Average	High	High
Degree of disturbance/improvement (+)	-	-	Low	Low	Medium	Medium	Low	Medium
Magnitude	High	Average	Low	Low	Average	Average	Average	Strong (+)
Scope	Regional	Regional	Local	Local	Local	Regional	Local	Local
Duration	Average	Long	Average	Long	Average	Long	Average	Long
Probability of occurrence	High	Average	Low	Low	Low	Low	Average	High
Common mitigation measures	None	None	None	None	105-106	None	105-106	None
Specific mitigation measures	None	None	12 to 15	12 to 15	16 to 19	20 to 23	16	21 to 23
Residual effect	Positive (+)	Positive (+)	Low	Low	Medium	Medium	Medium	Strong (+)
Significance of the residual effect	Very strong (+)	Medium (+)	Not important	Not important	Not important	Not important	Not important	Important (+)
Criteria	**Land Use - Sport Fishing**		**Human Health**		**Natural and Cultural Heritage**		**Landscape**	
Overall environmental value	Average	N. A.	High	High	High	N. A.	Average	Average
Degree of disturbance/improvement (+)	Low	N. A.	Low	Low	Low	N. A.	Low	Low
Magnitude	Low	N. A.	Average	Average	Average	N. A.	Average	Low
Scope	Local	N. A.	Local	Local	Limited	N. A.	Local	Local
Duration	Average	N. A.	Short	Long	Long	N. A.	Long	Long
Probability of occurrence	Average	N. A.	Low	Low	Low	N. A.	High	High
Common mitigation measures	105-106	None	27 à 37; 42 à 54; 57 à 62	27 à 37; 42 à 54; 57 à 62	99	None	None	None
Specific mitigation measures	16 to 19	None	None	None	24 to 28	None	18	18; 29-30
Residual effect	Low	N. A.	Low	Medium	Low	N. A.	Medium	Low
Significance of the residual effect	Not important	N. A.	Not important	Not important	Not important	N. A.	Not important	Not important

Criteria	**Landscape (Notre-Dame ramp)**	
Overall environmental value	Average	Average
Degree of disturbance/improvement (+)	High	Medium
Magnitude	Average	Average
Scope	Local	Limited
Duration	Long	Long
Probability of occurrence	High	Average
Common mitigation measures	None	None
Specific mitigation measures	18	18; 29-30
Residual effect	High	Medium
Significance of the residual effect	Important	Not important

Table 16 : Summary of common mitigation measures

No	Measure
1	A spill prevention and response plan will be prepared by TRPA and communicated to the contractor prior to the start of work. The contractor will be required to implement the plan in the event of a spill and post it in a location where it can be seen by all employees.
2	Prior to the start of work, a meeting will be held with site personnel to inform them of the contractual environmental and safety requirements, including the components of the contingency plan, and to ensure that employees assigned to the work know how to use emergency equipment in the event of a spill.
3	Machinery will be inspected by a qualified mechanic prior to the start of work to ensure that there are no breakdowns that could result in the loss of oil or any other contaminant. An inspection certificate will be presented to the site supervisor upon arrival of the machinery at the site. Machinery will also be inspected daily during the course of the work to ensure that it is in good condition, clean and free of leaks.
4	Conventional hydraulic oil will be replaced with biodegradable oil in all construction equipment operating within 30 m of a watercourse.
5	No machinery will be operated in the water, machinery and truck traffic will be restricted to the right-of-way of access roads and work areas, and no vehicle or construction equipment will be operated without cause within 30 m of the river.
6	If required, water flowing into ruts shall be diverted to prevent it from flowing directly into the river.
7	Storage, general maintenance and fuelling of machinery shall only be permitted in designated areas, which shall be located more than 30 m from a watercourse and storm sewer drains.
8	Containers containing hydrocarbons or other hazardous products shall be properly identified and comply with the laws and regulations in force, according to their type of use. Cans or containers containing hydrocarbons will be placed more than 30 m from the shoreline, while other hazardous products will be stored in a bin or between berms with the capacity to collect 110% of the stored reserves.
9	Handling of fuel, oil, other petroleum products or contaminants, including transferring, will be carried out under constant supervision to avoid accidental spills and to react promptly in the event of a spill.
10	Complete and readily accessible petroleum and hazardous material recovery kits will be available on the site at all times. They will include an adequate supply of absorbent materials and clearly marked, leak-proof containers for petroleum residues and other hazardous waste materials. Each piece of equipment will also contain a sufficient quantity of absorbents for rapid response. Contaminated soil, petroleum residues and other hazardous residual materials will be disposed of in accordance with the laws and regulations in force.
11	If generators are to be used, ensure that the fuel tank of each generator is double walled and that it is installed on an impermeable floor with a high edge to avoid any spill.
12	Any spill of contaminants will be responded to immediately to contain, recover and dispose of in accordance with applicable laws and regulations. Report any spill with environmental consequences to the following authorities: Environment Canada emergency service (1-866-283-2333), Urgence Environnement of Québec (1-866-694-5454) and Canadian Coast Guard - Marine Pollution (1-800-363-4735). Recover the contaminated materials, if any, and dispose of them with a company approved by the MELCC.
13	The contractor shall ensure that no gasoline-powered equipment remains within the 20 m riparian buffer strip of the watercourse during the hours of operation. If this requirement cannot be met, environmental protection measures (monitoring or other) shall be applied.
14	During construction or dredging activities, if the increase in TSS in the river water warrants it (increase greater than 25 mg/L), a turbidity curtain or other TSS reduction technique, such as modification of work methods, will be implemented to avoid altering the aquatic environment downstream of the work area. If no method is successful, work will be suspended until an effective method is implemented.
15	All machinery (excavator, crane, etc.) shall be inspected by a qualified mechanic prior to the start of work to ensure that there are no failures that could result in the loss of oil or any other contaminant and that mufflers are in good condition. Repair non-conformances as soon as possible. Submit an inspection certificate to the site supervisor.
16	Performs general maintenance and fueling of machinery at locations identified by the Site Supervisor.

Table 16 : Summary of common mitigation measures (continued)

No	Measure
17	Provide well-marked, leak-proof containers on site to hold petroleum products.
18	Confining heavy equipment traffic to preferred routes within the response area.
19	The Contractor shall manage contaminated soils in accordance with the Soil Protection and Contaminated Sites Rehabilitation Policy (hereinafter referred to as "the Policy"), the Regulation respecting the burial of contaminated soils and the Regulation respecting contaminated soil storage and contaminated soil transfer stations.
20	If excavated contaminated soils cannot be immediately transported off-site, they shall be stockpiled within the right-of-way and segregated into piles according to their level of contamination. An impermeable membrane will be placed under and over the piles of contaminated soils of Policy Criteria >B. In addition, the storage area shall be designed to contain any liquid that may spill from the soil.
21	The transportation of contaminated soils shall be in accordance with the Transportation of Dangerous Substances Regulations (provincial regulation) and the Transportation of Dangerous Goods Regulations (federal regulation).
22	The work must be performed by personnel with expertise in contaminated soil management. The analyses must be entrusted to a laboratory that is accredited by the Centre d'expertise en analyse environnementale du Québec (CEAEQ) for the parameters to be analyzed.
23	In case of accidental discovery of contaminated soils on the construction site, the Contractor shall stop work in the area and immediately inform the Consultant in order to know what actions he must take.
24	If the contaminated soils have a concentration of contaminants equal to or greater than the limit values set out in Schedule II of the Land Protection and Rehabilitation Regulation, the dumpster must be completely covered to prevent rain or snow from entering or the contaminant from escaping.
25	In the event that soil contamination in the affected areas results from activities related to the Project work, the site must be restored to its intended use and the contaminated soil must be disposed of at a site authorized for this purpose by the MELCC.
26	The materials used must be inert and free of contamination. For off-site soils, the Contractor shall inform the Consultant of the origin of these materials before their delivery to the site.
27	The machinery used shall meet the emission standards for on-road and off-road vehicles.
28	To minimize dusting during site preparation, grading or dynamic compaction, dewatered soils shall be watered as required to keep the surface moist.
29	To limit dust dispersal on unpaved roads, these will be watered with water and dust suppressants. The dust suppressant used shall be in accordance with the standard BNQ 2410-300.
30	Granular material handling operations will not be conducted in high winds or when the wind is blowing in the direction of the nearest vicinity; otherwise dust suppressants will be used to minimize dust generation.
31	Regular pre-inspection of machinery to ensure proper condition and operation, including exhaust and emission control systems, will be performed.
32	To reduce fuel consumption, the elimination of idling and the use of engine warmers will be considered. Idling time (running the engine unnecessarily) of machinery will be kept to a minimum. The use of electrical terminals for engine heaters and diesel ignition element feeders will reduce idling.
33	A mechanical sweep will be operated to reduce dust on the terminals and roads used.
34	Measures to improve pile management will be implemented (e.g., reducing pile height, moving piles to less windy areas, containment walls, etc.).
35	A site supervisor will be present to ensure that environmental requirements are met and that mitigation measures are applied.
36	Vehicle traffic will be restricted to a low speed to limit dust emissions and for safety reasons.
37	An air emission management plan will be produced including an air quality monitoring that will be put in place at the beginning of the construction activities. This monitoring will allow verification of the effectiveness of the management measures.
38	Maintenance measures to obtain energy savings through preventive maintenance of machinery and vehicles.
39	Consider the use of biofuel such as biodiesel in accordance with the recommendations of machinery manufacturers.

Table 16 : Summary of common mitigation measures (continued)

No	Measure
40	Optimize the use of electric machinery for port equipment, particularly cranes.
41	Train machinery operators in eco-driving.
42	Carry out work during the day between 7 a.m. and 7 p.m.
43	Produce an information bulletin on the work to inform local stakeholders (e.g., City of Trois-Rivières) and residents located near the work about the nature of the work and the schedule.
44	Implement a noise monitoring program at sensitive receptors at the beginning and during the work.
45	Place materials on the ground (instead of dropping them) to avoid impact noise.
46	Use mufflers or sound enclosures for compressors, concrete saws, generators or other equipment.
47	Install temporary noise barriers (portable or fixed) or noise cloths if necessary.
48	Locate fixed equipment in areas furthest from residential areas.
49	Choose motor equipment that is as quiet as possible, equipped with efficient silencers and in good condition.
50	Reduce, if possible, the number of noisy equipment used simultaneously in the same place.
51	Prohibit the use of engine brakes on the work site, access roads, as well as on and adjacent to the harbour, except in cases where safety may be compromised.
52	Ensure that the speed limit on the access road to the site is respected and, if necessary, reduce it (speed limits on the port territory is 30 km/h on the roads and 15 km/h on the wharves).
53	Use variable intensity or white noise back-up alarms.
54	Make workers aware of noise issues during safety meetings.
55	Construction work will be carried out between July 15 and March 31 to avoid mortality of eggs and fish fry from the spring breeding season.
56	Vibratory pile driving operations will be started gradually and continuously over a 30-minute period to allow fish to move away from the noise source.
57	Limit light output: • Direct and optimize streetlighting to illuminate only the area needed for the work. In addition, lighting should be directed at terminals to reduce the impact of light pollution. • Turn off distracting lighting at dusk if there is no nighttime operation in progress. • Turn off unnecessary lighting at night.
58	Favour the color yellow.
59	Control the duration of lighting.
60	Eliminate upward light emission.
61	Choose fixtures that focus light on the area to be illuminated.
62	Take advantage of blockage by obstacles such as trees or buildings.
63	Mark the boundaries of the work area prior to clearing. Supervisor's permission required before starting to cut trees.
64	Prevent trees from falling outside the boundaries of the clearing area or into the river. If trees accidentally fall into the river, remove them without disturbing the environment.
65	Take special care not to damage vegetation at the edge of the work area.
66	Avoid soil compaction, backfilling or storage of heavy equipment within the crown projection of trees not involved in the work.

Table 16 : Summary of common mitigation measures (continued)

No	Measure
67	Clean up construction equipment prior to arrival on site, as well as after any work performed in an area colonized by an IAS.
68	Plant debris, root systems and soils contaminated with an IAS may only be reused in an area already contaminated by the same IAS or disposed of in a licensed landfill.
69	Apply standard water quality mitigation measures to minimize the risk of accidental spills of petroleum products or other hazardous materials.
70	Re-vegetate the working buffer strip at the end of the work (except for the roadway at Kruger).
71	Plant a tree hedge along the property line.
72	Revegetate the riprap embankment at the southeast end of Pier 23, in its portion above the high water mark.
73	Compensate for the loss of wetlands (5,340 m^2) by developing equivalent areas.
74	The special-status mussels present within the work area will be recovered before construction begins and relocated to a reception site located upstream in the river.
75	The Department of Fisheries and Oceans Interim code of practice: routine maintenance dredging (DFO, 2020) will be applied to reduce impacts to fish habitat.
76	Good practices recommended by MDDELCC and ECCC (2016) to reduce TSS release during dredging will be applied.
77	Compensation for permanent encroachment into fish habitat (106,051 m^2), as prescribed by the Fisheries Act.
78	Minimize encroachment on the natural environment: mark the limits of the work areas prior to clearing; avoid the fall of trees outside the limits of the clearing or in the river, if necessary, remove them while taking care not to disturb the environment; pay particular attention to not damaging the vegetation at the limit of the work areas.
79	Clearing and filling of wetlands should be done outside of the migratory bird nesting season, which extends from mid-April to late August in the study area.
80	The loss of wetland habitat will be fully compensated by the development of equivalent areas.
81	Clearing and filling of wetlands will take place after the end of August. At this time of year, the young of most mammal species are weaned and will be able to move outside the work area.
82	An artificial "condo" type dormitory that can shelter several thousand individuals will be built on a sunny site near the river to compensate for the potential loss of daytime shelter.
83	Good practices related to light pollution already in place at the Port of Trois-Rivières will continue to be applied in order to minimize potential impacts on chiropterans (directed lighting, turning off lighting at dusk [except in the case of exceptional work schedules]).
84	Preserve the ability of First Nations members to assert their rights by maintaining current access to the river.
85	Invite the Nation to participate in the compensation plan and in the environmental follow-ups.
86	Discussions will be held to correlate the work schedule with the timing of traditional activities.
87	See biological component measures for more specific measures for aquatic and avian wildlife that are relevant to the mitigation of effects on First Nations harvested resources.
88	Invite the Nation to conduct site visits.
89	Maximize the economic benefits opportunities for First Nations, within the conditions of the TRPA Procurement Policy (TRPA C-09) and support the hiring of First Nations members.
90	Transmit to the Nation, for review, the procedural plan to be followed for the identification of archaeological resources, and in case of incidental discoveries. Comments and suggestions will be considered for the improvement of the plan.
91	If high potential areas are identified, they will be subject to an archaeological inventory prior to the work, archaeological monitoring during the work or another agreed upon follow-up method.
92	Stop construction work if an archaeological property or site is discovered and immediately notify the interested First Nations and the Ministère de la Culture et des Communications of the discovery of an archaeological property or site (s. 40 of the Cultural Property Act).

Table 16 : Summary of common mitigation measures (continued)

No	Measure
93	Avoid any intervention that could compromise the integrity of the property or site discovered.
94	Provide protection to sites by, among other things, adopting stabilization practices, fencing, monitoring, establishing buffer zones around the discovered archaeological site to ensure its integrity.
95	Conducting professional archaeological salvage activities to recover archaeological resources and relevant information before the resources are damaged or destroyed.
96	Affected First Nations have been invited to participate in the development of draft fish habitat compensation plans.
97	Produce an information bulletin on the realization of the work in order to inform the stakeholders (e.g.: City of Trois-Rivières), the residents, the First Nations communities and other users located in the vicinity of the work as to the nature of the work and the schedule for its realization.
98	Secure the work area by installing barriers on land or safety markers on the river.
99	Provide a plan that defines procedures for the identification and protection of wetlands and known historical, archaeological, cultural and biological resources on the site and/or defines other procedures to be followed in the event of unanticipated discovery of such items on or near the site during construction. The plan shall include methods to ensure the protection of known or discovered resources, as well as lines of communication between Contractor personnel and the Consultant.

Table 17 : Summary of specific mitigation measures

No	Measure
1	Operate the loading or unloading of dry bulk under supervision to avoid the dispersion of a dust cloud (field visual, dust monitor, surveillance camera, etc.) and intervene in a timely manner.
2	Review solid bulk loading/unloading practices when dispersion of a dust cloud is visible to reduce emissions (reduce speed of operations or number of machines in operation, change hold, etc.).
3	Use a mechanical sweeper to reduce dust on terminals and roadways.
4	Adopt dust suppression measures on roads (e.g., watering the roadway, paving, slowing down equipment and machinery, maintaining pavement, etc.).
5	Encourage employees to carpool when traveling on Port property.
6	Promote sustainable transportation for employees who come to work at the Port on a daily basis by encouraging them to carpool, installing bike racks, and encouraging them to use the public transportation offered by the Société de transport de Trois-Rivières (STTR).
7	Provide clear instructions to visitors to ensure that they arrive at the gate for check-in, have all the required documentation and know the area they are visiting to avoid congestion and traffic.
8	Implement measures to reduce congestion and wait times during high traffic hours, including the establishment of time slots for loading and unloading trucks.
9	Implementing other operational practices to reduce the impact of audible warning devices without compromising safety (e.g., adjusting the height or orientation of devices, modulating the frequency inside or outside buildings, etc.).
10	Regularly inspect noise-generating motorized equipment (boiler, fan, dust collector, generator, etc.) and repair promptly in case of breakage or failure.
11	Avoid rear panel impact when using dump trucks by reducing operating speed.
12	Maintain truck traffic on appropriate arteries during work.
13	Ensure the cleanup of truck routes used for activities within the Port.
14	Take the necessary measures not to interfere with the traffic of other road users.
15	Ensure that speed limits are respected on the access road to the site and, if necessary, reduce the speed limit
16	Post important information about the work site, such as the nature of the Project, the address of the Internet page dedicated to the Project and contact information, at appropriate locations around the work site.
17	Avoid work in the waters of the St. Lawrence River during holiday periods, when navigation other than commercial is more intensive.
18	Preserve as much vegetation as possible around the site, especially near the Notre-Dame boat ramps.
19	Ensure that access to the Notre-Dame boat ramps is maintained.
20	Ensure that a pleasant space is created around the boat ramps.
21	Carry out bathymetric monitoring after the implementation of the docks (years 1, 3 and 5) of Terminal 21 to verify the dynamics of sediment accumulation or erosion in this sector. This work is included in the monitoring and follow-up program.
22	Be in constant communication with the CCG to ensure vessel safety.
23	Communicate regularly with users through appropriate media to inform them of safety standards.
24	Areas of high potential, particularly in relation to the location of the shipyard and the beach to the west of the area, will be subject to archaeological survey or at least archaeological monitoring during construction.
25	Stop construction work if an archaeological property or site is discovered and notify the Ministère de la Culture et des Communications without delay of the discovery of an archaeological property or site (art. 40 of the Cultural Property Act).

Table 17 : Summary of specific mitigation measures (continued)

No	Measure
26	Avoid any intervention that could compromise the integrity of the property or site discovered.
27	Provide protection to sites by, among other things, adopting stabilization practices, fencing, monitoring, establishing buffer zones around the discovered archaeological site to ensure its integrity.
28	Conduct professional archaeological salvage activities to recover archaeological resources and relevant information before the resources are damaged or destroyed.
29	Plant a hedge of trees along the fence marking the property line between Terminal 21 and the Kruger property.
30	Revegetate the riprap slope at the southeast end of Pier 23 (riprap back to shore) in its portion above the high water mark to improve the visual appearance of the site. Shrubs (e.g. willows and dogwoods) will be planted in soil-filled pipes and staggered across the riprap.

16 MONITORING AND FOLLOW-UP PROGRAMS

The follow-up and monitoring programs for Terminal 21 that will be implemented during the different phases of the project. These programs will be adjusted and modified as necessary to accommodate new or unforeseen developments and to allow for improvements as various elements of the Project are implemented. Ultimately, these programs will establish the environmental guidelines to be followed from construction planning through to the operation of Terminal 21 for the life of the facilities.

16.1 ENVIRONMENTAL MONITORING PROGRAM

The primary objective of the environmental monitoring program is to ensure that appropriate measures and controls are in place to reduce the potential for environmental degradation. Environmental monitoring will be maintained at all stages of the Project by the TRPA during preparation, construction and for a period after completion (post-construction). A monitoring chain will be established to determine who will intervene and when, as well as action plans and emergency response procedures to protect the environment and human health and safety.

The development of this monitoring program and its full integration into the Project will ensure that the Project is carried out as proposed and that the mitigation and compensation measures planned to minimize the environmental effects are effectively implemented, as well as that the conditions set out in the authorizations obtained and the requirements of the relevant laws and regulations are complied with.

The monitoring program also verifies the proper functioning of structures, equipment and facilities. Finally, when necessary, the program will make it possible to redirect the work and, eventually, to make improvements during the construction and implementation of the various components of the Project. The application of the general environmental monitoring program for the Project is the responsibility of the proponent, in this case the TRPA. Environmental monitoring at the site will be carried out by an environmental officer designated for this purpose. The latter will be assigned to the site as soon as work begins. This person will be present on-site on a regular basis and will report directly to the TRPA.

16.2 FOLLOW-UP PROGRAM

The primary objective of the follow-up program is to verify the predictions of environmental effects and to verify the effectiveness of proposed mitigation measures (routine and specific) in the short, medium and long term on the adverse environmental effects of the Project. It also allows for a prompt response to the failure of a mitigation measure or to any new environmental disturbance, through the implementation of more appropriate measures to mitigate the effects not predicted at the outset in the assessment of the environmental effects. In addition to the general environmental management aspects, specific preliminary follow-up programs have been developed for some of the more sensitive environmental components that require further consideration and attention, namely:

- Water and sediment quality.
- Air quality.
- Noise level.
- Luminous environment.
- Vegetation.
- Benthic invertebrates.
- Pisces.
- Mammals (chiropterans).
- First Nations.