Environmental and Social Impact Assessment for the Troilus Mine Project

HEALTH CONDITIONS

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Acronyms and abbreviations

2SLGBTQI+	Two-Spirit Lesbian Gay Bisexual Transgender Queer Intersex +
AMW	Albanel-Mistassini-and-Waconichi Lakes
CBHSSJB	Cree Board of Health and Social Services of James Bay
CDIS	Cree Diabetes Information System
CoPC	Contaminants of Potential Concern
CRDS	Centre de répartition des demandes de service
CRSSS	Centre régional de Santé et de Services sociaux de la Baie-James
EQSP	Quebec Population Health Survey
GBA+	Gender-Based Analysis Plus
HHRA	Human Health Risk Assessment
HIA	Health Impact Statement
HQ	Hazard Quotients
IA	Impact Assessment
IAAC	Impact Assessment Act of Canada
INSQP	Institut national de santé publique du Québec
LICO-AT	Low-Income Cut-Offs, After Tax
LSA	Local Study Area
MELCCFP	Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs
MMIWG	Missing Murdered Indigenous Women and Girls
NFB	Nutritious Food Basket
PDA	Project Development Area
QPHS	Quebec Population Health Survey
RCMP	Royal Canadian Mounted Police
RSA	Regional Study Area
STI	Sexually Transmitted Infection
TIS	Tailored Impact Statement
TMF	Tailings Management Facility
VC	Valued Component
WHO	World Health Organization

22. Health Conditions

In 1948, the World Health Organization (WHO) defined health as “a state of complete physical, social and mental wellbeing, and not merely the absence of disease or infirmity” (WHO, 1948). The Impact Assessment Agency of Canada (IAAC), in developing the Tailored Impact Statement (TIS) Guidelines for the Project, also recognizes this broad definition of health. As such, assessing Health Conditions as a Valued Component (VC) through a holistic lens is integral to the federal impact assessment process. Accordingly, for this VC, health is defined as:

- Physical health: the state of the human body and how well it functions;
- Mental health and social wellbeing: an individual's psychological and emotional state, and how their influences their ability to communicate with others and build meaningful relationships in a community (i.e., community wellbeing); and
- Community safety, actual or perceived harm to an individual or community.

There are numerous factors that affect health, which are commonly referred to as determinants of health (Government of Canada, 2024a). In the Tailored Impact Statement Guidelines (TIS Guidelines) (Appendix A.2 of the Impact Statement), IAAC specifically refers to two general determinants of health: biophysical and social. Broadly defined, biophysical determinants of health refer to environmental conditions that can influence health (e.g., air and water quality, noise and vibration, light levels, and quality of country/traditional foods), while social determinants of health refer to social, cultural, and economic conditions associated with the circumstances in which people are born, grow, live, and work that can influence health (e.g., social inclusion/exclusion, housing value and availability, and access to health and social services) (National Collaborating Centre for Determinants of Health, 2022; Government of Canada, 2024a). Changes in these determinants of health can result in changes to people’s behaviours, biology, and wellbeing, each of which are interconnected, and all of which can result in a change to overall health and wellbeing.

As noted in the TIS Guidelines, the potential impacts of the Project on the health of Indigenous (and non-Indigenous) people must be assessed and interconnections between Health Conditions and other VCs, and the interactions between impacts, must be described. According to Health Canada’s interim Health Impact Assessment (HIA) guidance, HIA is a “systematic, objective, and specialized process that can be used to assess the potentially positive and adverse impacts of a designated project on wellbeing and health” (Health Canada, 2024). Consequently, an HIA was conducted to understand the potential impacts of the Project on the health of people, be it positive or negative, by evaluating the biophysical and social determinants of health.

According to the TIS Guidelines, an analytical process called Gender-based Analysis Plus (GBA Plus) should be applied to the assessment of Health Conditions. Changes to human health conditions can be different for diverse subgroups within the general population and within communities (e.g., by sex, gender, age, ethnicity, Indigeneity). GBA Plus can guide practitioners to identify who is affected by the Project and assess how they may experience impacts differently. Recognizing differential impacts of the

Project is important for understanding how it can lead to health inequities and for making appropriate mitigation or enhancement measures.

The interactions amongst the Project activities, biophysical and social determinants of health, physical, mental and social wellbeing, through the lens of GBA Plus, are illustrated on a generalized HIA diagram (figure 22.1).

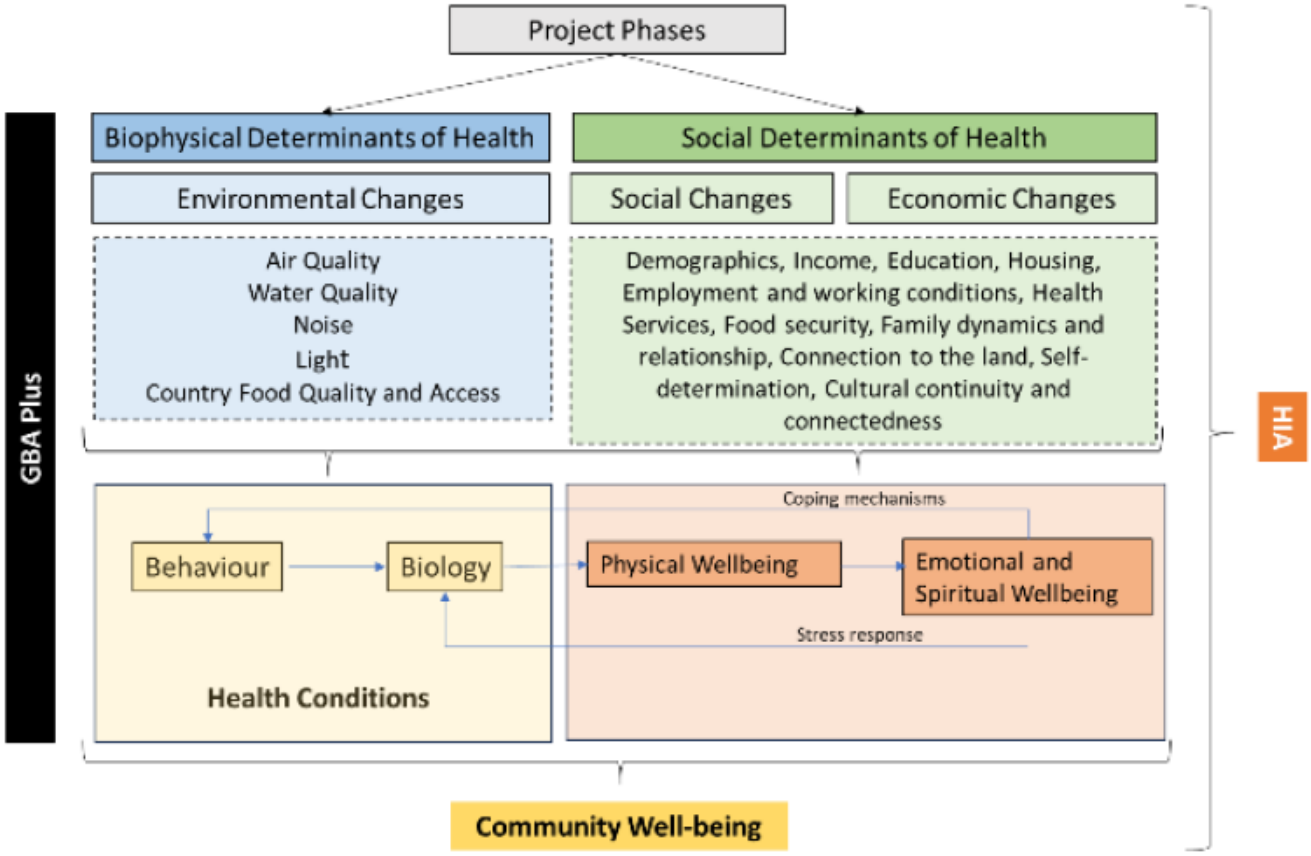


Figure 22.1 HIA Diagram

Health Conditions as a VC is linked to other VCs, including:

- Atmospheric Environment (Chapter 8) whereby changes in Project emissions and the associated ambient concentrations may increase the exposure of humans to air contaminants that may affect human health. The deposition of Project emissions to soil may affect soil quality which may, in turn, alter soil-related exposures for human receptors;
- Acoustic Environment (Chapter 9), whereby noise may affect human health by increasing levels of sleep disturbance and annoyance compared to existing conditions;

- Surface Water (Chapter 12), whereby surface water is a transport pathway to humans through the consumption of surface water and organisms that inhabit and/or use surface water;
- Economy (Chapter 21), whereby economic conditions contribute to the well-being of present and future generations. Additionally, potential affects of changes to social conditions on food security, income inequality, housing prices and accessibility, population changes, cost of living, work schedules, criminal activity or changes to the local economy. This chapter also evaluates the expected interactions between employees of the Project and community members during all phases of the Project;
- Land Use (Chapter 19), whereby uses of the land are described and contribute to the well-being of present and future generations.

For example, in terms of biophysical determinants of health, Project-related changes to chemical concentrations in air may affect people's health by increasing the amount of chemicals inhaled compared to existing conditions. Project-related changes to noise may affect people's health by increasing levels of sleep disturbance compared to existing conditions. In terms of social determinants of health, Project-related changes to the land may affect people's health due to perceived (or actual) changes in environmental quality and tranquility, and Project-related changes to community structure may affect people's health due to access to health and social services and community cohesion. A detailed list of possible Project interactions on health is provided in section 22.3.

22.1 Scope of Assessment

Based on the TIS Guidelines, it is understood that the Impact Statement must:

- Be sufficient to provide a thorough understanding of the health status of Indigenous peoples;
- Identify the determinants of health that may be affected by the Project and describe the pathways of impacts;
- Provide a comparison of data at the provincial, regional, or national level, where possible, to better interpret the baseline health conditions of potentially affected Indigenous peoples;
- Determine the area where the determinants of health could be influenced by the Project;
- Describe how Indigenous knowledge was used in establishing baseline health conditions, including input from diverse population groups;
- Describe baseline conditions and existing health inequities using disaggregated data for diverse population groups and their differing levels of access to resources, opportunities, and services within the community to support GBA Plus and;
- Apply an HIA approach.

While guidance documents from various regions exhibit minor variations in the steps of HIA, the underlying process remains consistent. Health Canada's interim HIA guidance (2024) outlines a seven-step process, paraphrased below, that begins with screening and culminates in evaluation.

- Screening: The purpose of the screening step is to explore a range of health determinants from both the biophysical and social determinant categories for their relevance to the health and well-being of potentially affected people, in relation to the designated project.
- Scoping: The purpose of the scoping step is to plan the overall approach to the HIA including methods, contents, and logistics.
- Assessment: This purpose of this step is to ascertain through qualitative and quantitative ways whether the project's components and activities could have direct or indirect impacts on the selected health determinants. In this step, project interactions, impact pathways, measurable qualitative and quantitative metrics, and significance criteria are defined and assessed.
- Recommendations: Based on the findings of the prior steps, recommendations are made with respect to potential adverse and positive health impacts of the project.
- Reporting: The documentation of the HIA process.
- Monitoring: Monitoring may be recommended as part of an HIA to track the identified determinant(s) of health, and potentially, the health-related impacts of the project and the effectiveness of proposed recommendations and mitigation measures. Monitoring generally involves data collection over time by the proponent or other interested parties.
- Evaluation: A retrospective lessons-learned step that can be used (but is not required) to demonstrate the effectiveness of HIA in the planning process by showing what the HIA achieved.

This VC chapter has been developed as the HIA for this Project. The scope of this HIA starts with the screening step and ends with the reporting step. If monitoring is required, the results should be included in any follow-up reports on matters used on to conduct the HIA, and the HIA implications should be updated accordingly.

Consistent with interim Health Canada guidance (2024), a checklist of the key activities for each step outlined above and references where the key activities have been included in this VC are provided in table 22.1 below. If an activity has not been completed, a rationale explaining why it was not completed has been included.

Table 22.1 Key Activity Checklist for the HIA

Key Activities	Reference to Application Where Information is Located
Step 1 Screening	
Provide appropriate context on the project type and a summary of background information.	Project background information is presented in Chapter 4 of the Impact Statement
Explore determinants of health to identify specific health determinants and corresponding indicators that could be of relevance to the health and well-being of potentially affected people in relation to the designated project. Consider where Indigenous-specific determinants of health and corresponding indicators are located within these general categories.	The determinants of health relevant to the Project are described in section 22.2 and potential impacts, measurable parameters and pathways are described in table 22.4. These pathways describe how the determinants of health influence measurable parameters.

Key Activities	Reference to Application Where Information is Located
Discuss opinions and concerns raised by local Indigenous nations, the general public; political interests; and/or media coverage about the designated project as this may reinforce the value of conducting an HIA	The influence of consultation and engagement is described in section 22.1.2, Chapter 4 of the Impact Statement describe public participation and view and engagement with Indigenous nations respectively.
Identify subpopulation(s) that may be disproportionately affected by the designated project (e.g., certain age groups, visible minorities, socially isolated groups, and people with diverse identities to be addressed).	An approach for GBA Plus is described in section 22.2.1 and pathways are described in table 22.6
Step 2 Scoping	
Define temporal and spatial boundaries of the HIA	Temporal and spatial boundaries are defined in section 22.1.4.
Engage with potentially affected communities, Indigenous nations, other stakeholders and decision-makers, and incorporate feedback.	Potentially affected Indigenous nations provided Traditional Knowledge Land Use Studies and Socioeconomic Studies. Information from these studies were integrated in this chapter. A description of how consultation and engagement has been incorporated into the VC is provided in 22.1.2.
Select all determinants of health relevant to the project.	Biophysical and social determinants of health relevant to the Project are described in section 22.1.3
Prioritize determinants of health using transparent methods.	Determinants of health relevant to the Project were based on the potential impacts, pathways and measurable parameters described in table 22.3 and further described in section 22.2.
Identify the type of data that will be required to conduct the HIA. Identify constraints in data collection (e.g., timing, resources).	Methods and limitations of the data are described in section 22.1.7.
Provide a rationale for included determinants as well as a rationale for those determinants that are being excluded from further assessment.	Determinants of health have been selected based on identified potential impacts, pathways and measurable parameters described in table 22.3. Determinants of health are described in section 22.2.2.
Summarize the scope of work, while defining roles and responsibilities.	The scope of the HIA is described in section 22.1 while Chapters 1 to 3 of the Impact Statement describe the introduction, proponent information, project description and project purpose and need respectively.
Step 3 Assessment	
Compile a Baseline Community Health Profile that includes adequate demographic and health-related data specific to each potentially affected community and appropriately scoped to the project context.	Baseline community health data are presented in section 22.2.3.
Include baseline information on health conditions and a summary of baseline information on social, economic, and environmental conditions from more detailed assessment reports.	Baseline community health data are presented in section 22.2.3. Determinants of health relevant to the Project are described in section 22.1.3.
Define the decision-support tool that will ensure transparency within the HIA process.	A specific decision support tool has not been included as part of this assessment of health. A rationale has been provided for the selection of determinants of health and indicators and for the scope of the assessment herein.
Assess separately each determinant of health identified in the scoping step as to whether it may be affected directly or indirectly by the designated project in a positive or adverse manner, taking into consideration its relative position along pathways of health effects.	Potential impacts, pathways and measurable parameters are described in table 22.3. Determinants of health relevant to the Project are described in section 22.2.2.

Key Activities	Reference to Application Where Information is Located
Illustrate cause-effect relationships and their interactions (effect pathways).	Impact pathways are described in section 22.1.3.
Describe project impacts, using standard effect characterization criteria (e.g., magnitude, likelihood).	Potential impacts are identified in section 22.1.3. Residual effects characterization is defined in section 22.1.5 and effects are assessed in section 22.4.
Document how the assessment is based on sound evidence, relevant data, and professional judgement.	Impacts are assessed in section 22.4. These sections document the use of evidence, relevant data and professional judgement in characterizing the effects.
Consider the information and data available in other sections of an impact assessment, or in any other applicable legislative instrument or regulatory requirement.	The impacts assessment relies on findings from other sections of the Application as identified in section 22.1
Identify uncertainties and limitations and discuss their relevance to the overall findings.	Uncertainties and limitations are described in section 22.7.
Consider cumulative impacts and intend to provide additional recommendations where potential cumulative impacts are moderate or severe.	Cumulative impacts are described in Chapter 25 of the Impact Statement
Step 4 Recommendations	
Link the recommendations to the findings in the assessment section	Recommendations (mitigation/enhancement measures) are described in section 22.4.1.2.
Provide recommendations to both enhance positive impacts and mitigate adverse impacts, as applicable.	Recommendations (mitigation/enhancement measures) are described in section 22.4.1.2.
Engage key stakeholders and Indigenous nations to ensure the proposed measures are socially acceptable and technically feasible.	Chapter 4 of the Impact Statement describe public participation and view and engagement with potentially affected Indigenous nations, respectively.
Consider the context of the recommendations and mitigation measures proposed throughout the broader impact assessment.	Recommendations (mitigation/enhancement measures) are described in section 22.4.1.2.
Describe the recommendations in enough detail, identify priority actions and propose timelines for implementation.	Recommendations (mitigation/enhancement measures) are described in section 22.4.1.2.
Assign each recommendation to a responsible party who has agreed to ensure it is implemented.	Recommendations (mitigation/enhancement measures) are described in section 22.4.1.2.
Step 5 Reporting	
The HIA includes appropriate reporting format(s) based on the intended audience.	This VC will be filed as part of a larger Application to the Impact Agency of Canada. While language in the VC is technical, the HIA is formatted to a VC template to maintain consistency among the Chapters of the Impact Statement. This VC provides a description of a transparent approach to data collection and assessment and where feasible, graphics have been included. As per the Impact Assessment (IA) process, this Application will be appropriately disseminated to rights holders, stakeholders and general public.
Translation of plain language summaries has been considered for potentially affected communities.	
The reporting includes all seven steps of the HIA process in adequate detail.	
A summary of engagement with key stakeholders and Indigenous nations is provided, if applicable.	
The report includes a section that describes the uncertainties and limitations of the HIA.	
A communications plan is developed to disseminate the HIA in a way that is accessible to all rights holders, stakeholders, and the general public (as necessary).	

Regulatory and Policy Setting

As noted in the TIS Guidelines, an HIA supported by a human health risk assessment (HHRA) is required to address the aforementioned requirements, both of which require input from many technical disciplines. Health Canada has been working with key partners and rights holders, including Indigenous organizations, federal partners, provinces/territories, and other key stakeholders, to develop HIA guidance and tools for a more comprehensive assessment of potential health effects of proposed projects. As a result of the Impact Assessment Act coming into effect, Health Canada released its interim guidance document (2024), which was prepared to support the use of HIA in Impact Assessment (IA):

- Interim Guidance Document for the Health Impact Assessment of Designated Projects under the Impact Assessment Act (Health Canada, 2024).

Health Canada also provides general guidance for conducting a HHRA and assessing human health effects in IA, namely:

- Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment (Health Canada, 2023a)
- Guidance for Evaluating Human Health Effects in Impact Assessment: Country Foods (Health Canada, 2023b)
- Guidance for Evaluating Human Health Effects in Impact Assessment: Noise (Health Canada, 2023c)
- Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality (Health Canada, 2023d)
- Guidance for Evaluation Human Health Effects in Impact Assessment: Drinking and Recreational Water Quality (Health Canada, 2023e)

Additional guidance to support the HIA includes:

- Analyzing Health, Social and Economical Effects under the Impact Assessment Act (IAAC, 2020)
- Guidance: Gender-based Analysis Plus in Impact Assessment (IAAC, 2021)
- Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities (Salerno et al., 2021)
- Intangible Impacts – More-than-mental health: Indigenous identity, culture, community and relationship with land are integral to Indigenous wellbeing (training manual) (Lewis et al., 2021).

22.1.1 Influence of Consultation and Engagement

Troilus Gold Ltd. (Troilus) has engaged with potentially affected Indigenous nations, regulators, the public, and other stakeholders. Between December 2018 and December 2024 specifically, consultation and engagement occurred with Jamesians and Cree people that live near the Project. Additionally, from November 5th-7th, 2024, an interview was performed by Stantec with Cree tallymen (i.e., family members managing traplines) of traplines to discuss concerns pertaining to the Project. A summary of key information, Indigenous knowledge, and concerns for the Project related to Health Conditions for the

Jamesian community and the Cree community, and the influence of that on this assessment are provided in table 22.2 and table 22.3, respectively.

Table 22.2 Summary of Key Information, Indigenous Knowledge, and Concerns for the Project Related to Health Conditions for Jamesian Community

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
Atmospheric Environment	Change in Air Quality (dust) Stakeholders expressed concerns about dust from the mine and the addition of dust through transport. They suggested using a bypass to avoid cities and taking steps to reduce emissions, such as cleaning roads and the applicant of dust suppressant.	Toxicological risks associated with changes to air quality have been assessed in the HHRA and Chapter 8 of the Impact Statement and perceived risks associated with these potential changes are addressed in this VC.	Chapter 8 and section 22.4.2.1.2 of this VC.
Noise	Stakeholders have expressed concerns about noise and vibration caused by transport. Cracks in the foundation of the houses were caused by the vibrations of the current traffic.	Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 9 of the Impact Statement (Acoustic Environment).	Chapter 9 and section 22.4.2.1.2 of this VC.
Surface water quality	Stakeholders expressed concerns about: -preservation of the quality of watercourses -water treatment for return to pre-operating conditions -water quality exceedances due to the historical project and restoration objectives	Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 12 of the Impact Statement (Surface Water).	Chapter 12 and section 22.4.2.1.2 of this VC.
Groundwater quality	Stakeholders expressed concerns related to the risk of contamination of drinking water	Risks from changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 14 of the Impact Statement (Groundwater quality).	Chapter 14 and section 22.4.2.1.2 of this VC.
Aquatic fauna	Stakeholders have expressed concerns related to the presence of contaminants in fish flesh (e.g., Lake A)	The assessment of toxic substances and how they can potentially affect wild foods is addressed in the HHRA and in this VC. The assessment of toxic substances and how they can potentially affect food	Chapter 18 and section 22.4.2.1.2 of this VC.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
		and medicinal plant quality, availability and usability is addressed in Chapter 18 of the Impact Statement.	
Infrastructure and services	Stakeholders expressed concerns about: -route and extent of road traffic in the operation phase -strict supervision of maximum weight and speed limits (trucks and shuttles) -monitoring of road conditions and application of the user/pay principle -difficulty in hiring staff in childcare services, promote the training of employees' spouses in the field. -discrimination by some building owners of disadvantaged people. Stakeholders suggested or recommended that Troilus: -use of an employee shuttle service -support and promote the teaching environment locally and regionally through training facilities/organizations.	Concerns regarding risk to community members due to influx of workers, as increased population growth may affect services related to health, safety, mental health, addiction and well-being are addressed in this VC and in Chapter 20 of the Impact Statement. Concerns regarding psychological health are assessed in this VC.	Chapter 20 and section 22.4.2.1.2 of this VC.
Health	Physical Health Stakeholders have expressed concerns about the monitoring of drinking water quality in the region and the presence of contaminants in fish flesh (e.g., Lake A).	Concerns of toxicological risks associated with changes to air quality have been assessed in the HHRA. Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 9, 12, 16 of the Impact Statement. The results of the assessment completed in this Chapter informed the assessment on Indigenous interests in Chapters 24 of the Impact Statement.	Chapter 9, 12, 16 of the Impact Statement and section 22.4.2.1.2 of this VC.
	Community well-being and social cohesion	These concerns of in and out migrations, including crime rates, addiction,	Chapter 22 and 24 of the Impact Statement, and section 22.4.2.1.3.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
	Stakeholders expressed concerns about: -risk of increased homelessness related to increased housing costs -discrimination against newcomers (immigrants) in communities. Stakeholders made the following recommendations to Troilus: -working conditions that accommodate women, the elderly, part-time work, health limitations, etc. -perform prevention for drug and alcohol use -be vigilant against manifestations of discrimination -to avoid the formation of ghettos in certain areas of cities and to promote social integration -working conditions that promote civic engagement and volunteer involvement in communities -encourage acclimatization, involvement and commitment of newcomers -provide for an effective system for receiving and handling complaints -consider working conditions (e.g., hours) adapted for under-workers (GBA+) (retirees who wish to continue part-time, spouses who wish to return to work following the departure of children, people with physical or mental health problems). Current shifts proposed are 7 days on 7 days off for those working in the mine or 4 days on 3 days off for those working in administration. -establish a monitoring committee that will verify	mental health, impacts to women, girls, and 2SLGBTQI+, and discrimination and violence towards Indigenous peoples are addressed in this VC. Concerns regarding human trafficking are assessed in this VC. The results of the assessment completed in this VC (Chapter 22 of the Impact Statement) informed the assessment on Indigenous interests in Chapters 24 of the Impact Statement	

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
	the adequacy of measures for women, non-binary people, and other minority groups. -provide employee housing that promotes personal life and privacy (mining camp). -prevent stigmatization of people with mental health problems (awareness program, implementation of the federal Working Mind program). -promote the presence of trained sentinels or scouts to monitor the site, detect staff members who may have anxiety problems or depression. Mental health sessions should be open to employees.		

Table 22.3 Summary of Key Information, Indigenous Knowledge, and Concerns for the Project Related to Health Conditions for Cree Community

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
Atmospheric Environment	Change in Air Quality (dust) Land users have expressed concerns about: -past experiences (former operations) where dust generation was an issue. Particular attention should be paid to certain facilities (tailings pond, crusher) -potential presence of silica and cyanide in the dust, and the dispersion radius. -nuisance from traffic on the Route-du-Nord and for the camps near the access road Land users suggested that Troilus install a dome over the crushed mineral pile and pave the access road.	Toxicological risks associated with changes to air quality have been assessed in the HHRA and perceived risks associated with these potential changes are addressed in this VC and Chapter 8 of the Impact Statement.	Chapter 8 and section 22.4.2.1.2 of this VC.
	Change in Brightness	Concerns regarding light pollution and brightness	Chapter 8 and section 22.4.2.1.2 of this VC.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
	Concerns about light pollution from the mining site on the Assinica reserve which is in the process of becoming a dark sky reserve	from the Project have been assessed in this VC.	
Noise	Land users have expressed concerns about noise and vibration nuisance for hunting and nearby camps (former mine operations). The sources identified include noise from heavy vehicles (reversing alarms, unloading, etc.). During blasting activities, vibrations could be felt at their camp located near Lake A.	Toxicological risks associated with changes to air quality have been assessed in the HHRA. Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 9 of the Impact Statement (Acoustic Environment).	Chapter 9 and section 22.4.2.1.2 of this VC.
Surface water quality	Land users and community members expressed concerns about: -preservation of the quality of watercourses - Drinking water supply -collection and treatment of water that has been in contact with mine tailings -spill Hazards -ensure good water retention in the tailings pond -impact of pit dewatering on water quality on other surrounding water bodies	Toxicological risks associated with changes to air quality have been assessed in the HHRA. Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 12 of the Impact Statement (Surface Water).	Chapter 12 and section 22.4.2.1.2 of this VC.
Groundwater quality	Land users expressed concerns about locating drinking water sources and monitoring their quality and quantity	Risks from changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 14 of the Impact Statement (Groundwater Quality).	Chapter 14 and section 22.4.2.1.2 of this VC.
Soils and sediments	Land users expressed concerns about the risk of spills and to take steps to prevent illegal disposal of hazardous material from suppliers and contractors.	Concern regarding potential contamination of environmental quality and toxicological risks were assessed in section 22.4.2.1.2 of this VC.	Chapter 15 and section 22.4.2.1.2.
Vegetation and wetlands	Land users have expressed concerns about:	Concern regarding perceived alterations to natural land are assessed	Chapter 16 and section 22.4.2.1.1.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
	-vegetation not returning to existing conditions after the restoration of the old mine -effects of tailings residue (thickened) from the concentrator on revegetation of tailings storage areas (MRAP) -brush clearing/pruning required along the Troilus access road (45 km) to ensure visibility, especially on curves. Land users have inquired about the possibility of carrying out a gradual revegetation	in section 22.4.2.1.1 of this VC. Concerns of traffic safety in natural areas due to vegetation growth are addressed in section 22.4.2.1.1.	
Aquatic fauna	Land users and community members expressed concerns about: -protection of aquatic fauna -maintaining connectivity between Lake Amont and Lake A -risks of species introduction depending on the source of pumping water -impacts of dewatering of pools on fish (especially walleye) -impacts of the Bibou Creek deviation on fish habitat Users have expressed a desire for Bibou Creek diversion to be maintained from construction to post-closure without modification.	The assessment of toxic substances and how they can potentially affect wild foods is addressed in the HHRA and in Chapter 18. The assessment of toxic substances and how they can potentially affect food and medicinal plant quality, availability and usability is addressed in the HHRA and in this VC.	Chapter 18 and section 22.4.2.1.2 of this VC.
Land Use	Land users have expressed concerns about: -taking into account the relationships between the land users -promote access to the territory in operation and restoration -ensure the safety of land users (access to the site, travel by access roads, blasting activities, etc.)	Concerns regarding land use are addressed in this VC in section 22.4.2.1.1.	Chapter 19 and section 22.4.2.1.1.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
	-reduce the impact on recreational tourism activities in the Assinica Wildlife Reserve (e.g., light pollution -vs- future status of a dark sky reserve) -developing/restoring facilities to allow for the resumption of traditional activities		
Economy	Economic benefits -ensure economic benefits are present for their communities, including contracts and procurement locally.	Concern regarding employment of local community members and fair employment opportunities was explored in section 22.4.2.1.3.	Chapter 21 section 22.4.2.1.3.
	Employment benefits -prioritizing hiring local. -will Cree workers be taxed on their income. -impact of the work rotation on the Cree cultural activities. -hiring process concern there would be preferential treatment or discrimination towards potential candidates and/or workers based on their gender, race, or background. Land users and community members made the following recommendations to Troilus: establishment of a relevant training program that is targeted specifically for minorities and Indigenous nations.	Concern regarding equal opportunity employment for Cree and non-Cree community members, and fair and equal treatment was evaluated in section 22.4.2.1.3.	Chapter 21 and section 22.4.2.1.3.
Health	Physical Health Land users have expressed concerns about the health impacts of proximity to mining infrastructure in Cree camps.	Concerns of toxicological risks associated with changes to air quality have been assessed in the HHRA. Changes in biophysical pathways like air, water, food and noise have been assessed in the HHRA and in Chapter 9, 12, 16 of the Impact Statement. The results of the assessment completed in	Chapter 22 and 24 of the Impact Statement, and section 22.4.2.1.3.

Topic	Comment, Issue or Concern	Influence on the Assessment	Chapter/section where the comment, issue or concern is addressed in the Impact Statement
		this Chapter informed the assessment on Indigenous interests in Chapter 24 of the Impact Statement.	
	Well-being Land users and community members have expressed concerns about: -importance of having fair compensation between the families affected by the project, history of disputes over the boundary of the traplines caused by the presence of the mine experience of racism in past operations -difficulty of long shifts in work for family life, especially for spouses	These concerns of in and out migrations, including crime rates, addiction, mental health, impacts to women, girls, and 2SLGBTQI+, and discrimination and violence towards Indigenous peoples are addressed in this VC. Concerns regarding human trafficking are assessed in this VC. The results of the assessment completed in this VC (Chapter 21 of the Impact Statement) informed the assessment on Indigenous interests in Chapters 24 of the Impact Statement.	Chapter 22 and 24 of the Impact Statement, and section 22.4.2.1.3.
Technological risks	Land users have expressed concerns about the stability of the tailings storage facility, considering that the infrastructure is more than 30 years old. It was expressed that health and safety procedures, and an emergency response plan (ERP) should be provided.		Chapter 12 and section 22.2.3.1

Where made available by Indigenous nations through engagement, information gathering, and voluntary information sharing, Indigenous knowledge has been considered and incorporated into the Impact Statement, as applicable. Refer to Chapter 24 of the Impact Statement (Description of Engagement with Indigenous Peoples) for detailed methods regarding the incorporation of Indigenous knowledge to the Impact Statement.

22.1.2 Potential Impacts, Pathways and Measurable Parameters

There are three main activities during the Project, that can lead to impacts on Health Conditions.

1. The physical presence of the mine;
2. The release of contaminants from mine activities (into air and water);
3. The influx of workers to communities and the worker camp.

There are a number of pathways that link these Project activities to potential impacts, each with its own set of measurable parameters, including health factors of interest or health outcomes of interest (figure 22.1; table 22.4). These parameters will be used to characterize the residual impacts with respect to direction, magnitude, geographic extent, duration, frequency and reversibility (Section 22.1.5). These potential impacts are changes in land use, changes in environmental quality and changes in population dynamics, which are relevant throughout all phases of the Project (i.e., construction through to decommissioning and closure) and interact with specific Project activities during these phases (Section 22.1.4). Each potential impact will be assessed individually with its own set of measurable parameters; however, they are interconnected and influence one another. For example, changes in physical health refers to changes to the human body that consist of infectious diseases, chronic diseases, toxicological effects, injuries, and suicides. These changes are directly influenced by factors such as diet/nutrition, food insecurity, physical activity and exposure to contaminants, which are influenced by the determinants of health and by other potential is (e.g., change in mental health and social wellbeing). The Project's impacts have the potential to disproportionately affect certain groups of individuals (e.g., gender, Indigeneity, sexual orientation, socioeconomic status, age). These impacts on disproportionately impacted groups will be evaluated through a Gender Based Analysis Plus (GBA Plus) process to provide a holistic evaluation of intersecting impacts.

A graphical representation of the interactions among Project activities, potential impacts and measurable parameters are shown in figure 22.2.

HEALTH CONDITIONS

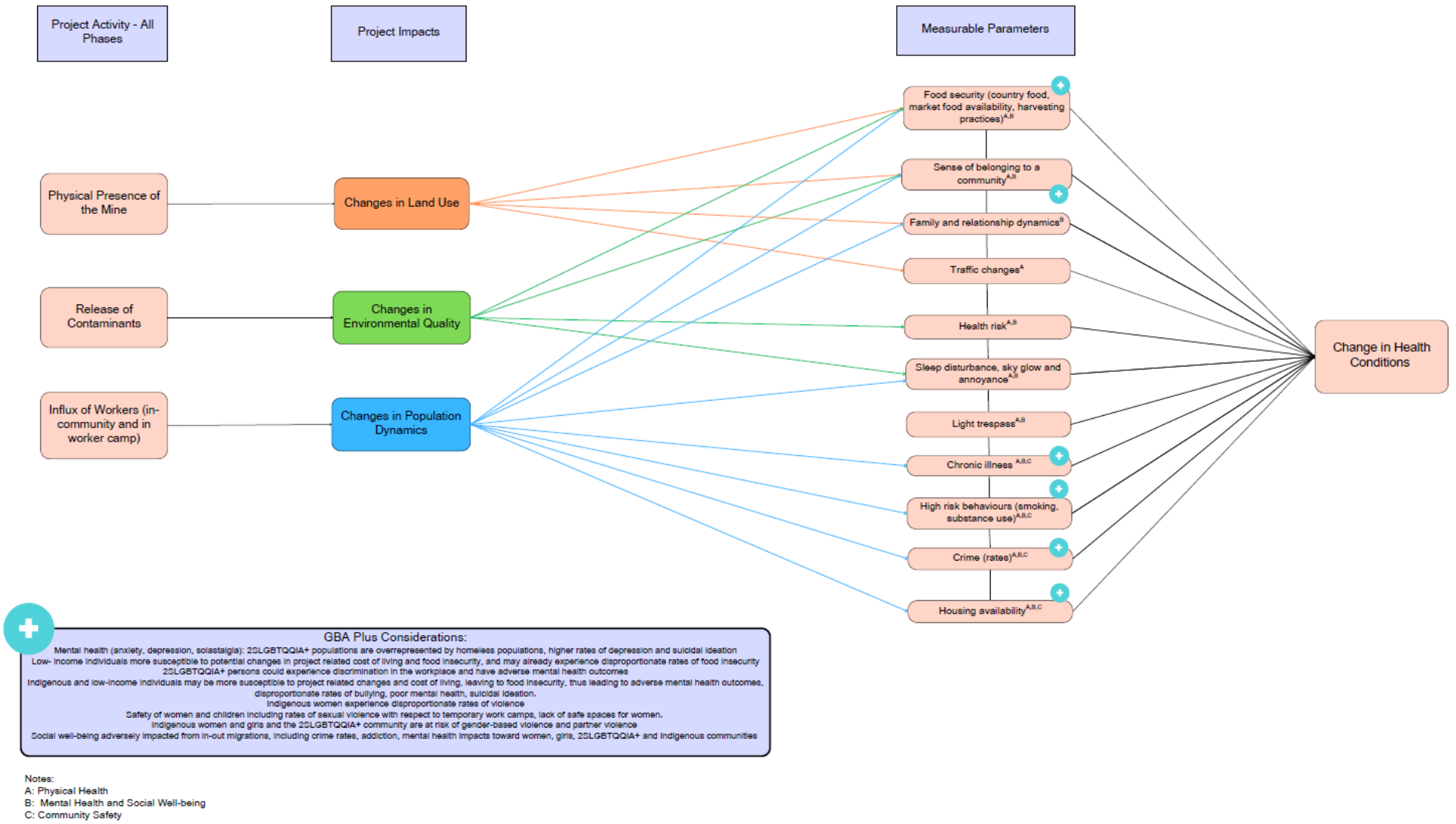


Figure 22.2 Graphical Representation of Potential Impacts and Impact Pathways for Health Condition

The potential environmental impacts of the Project on Health Conditions, impact pathways and measurable parameters are summarized in table 22.4. These potential impacts and measurable parameters were selected based on professional judgement, understanding of the Project, recent environmental assessments for mining projects in Canada, and comments provided during engagement.

Where feasible, the potential impacts will be quantified using measurable parameters. However, not all parameters can be quantified because:

- Social indicators may be informed by subjective information, perceptions, or opinions;
- Health Conditions and outcomes have confounding factors (e.g., genetics, other social issues); and
- there are data limitations (e.g., not recent data, data isn't specific to the assessment area, data may not be disaggregated for GBA Plus considerations) (further described in section 22.2.1).

Table 22.4 Potential Impacts, Impacts Pathways and Measurable Parameters for Health

Potential Impact	Impact Pathway	Measurable Parameters and Units of Measurement
Change in Health Conditions	Change in Land Use	Food security (country food, market food availability and harvesting practices) Sense of belonging to a community Family and relationship dynamics Traffic changes
	Change in Environmental Quality	Food security (country food, market food availability and harvesting practices) Sense of belonging to a community Traffic changes Annoyance (% Highly Annoyed [HA]) Health Risk (hazard quotients [HQs] and incremental lifetime cancer risks [ILCRs]) Sleep disturbance (noise levels) Light trespass (sky glow and light trespass limits) Chronic illness (rates)
	Change in Population Dynamics	Food security (country food, market food availability and harvesting practices) Sense of belonging to a community Family and relationship dynamics Traffic changes Sleep disturbance (noise levels) Light trespass (sky glow and light trespass limits) Chronic illness (rates) High risk behaviours (rates of smoking, substance use) Crime (rates) Housing (availability)

22.1.3 Boundaries

22.1.3.1 Spatial Boundaries

The **Project Development Area (PDA)** encompasses the Project footprint and is the anticipated area of physical disturbance associated with the construction, operations and decommissioning and closure of the Project.

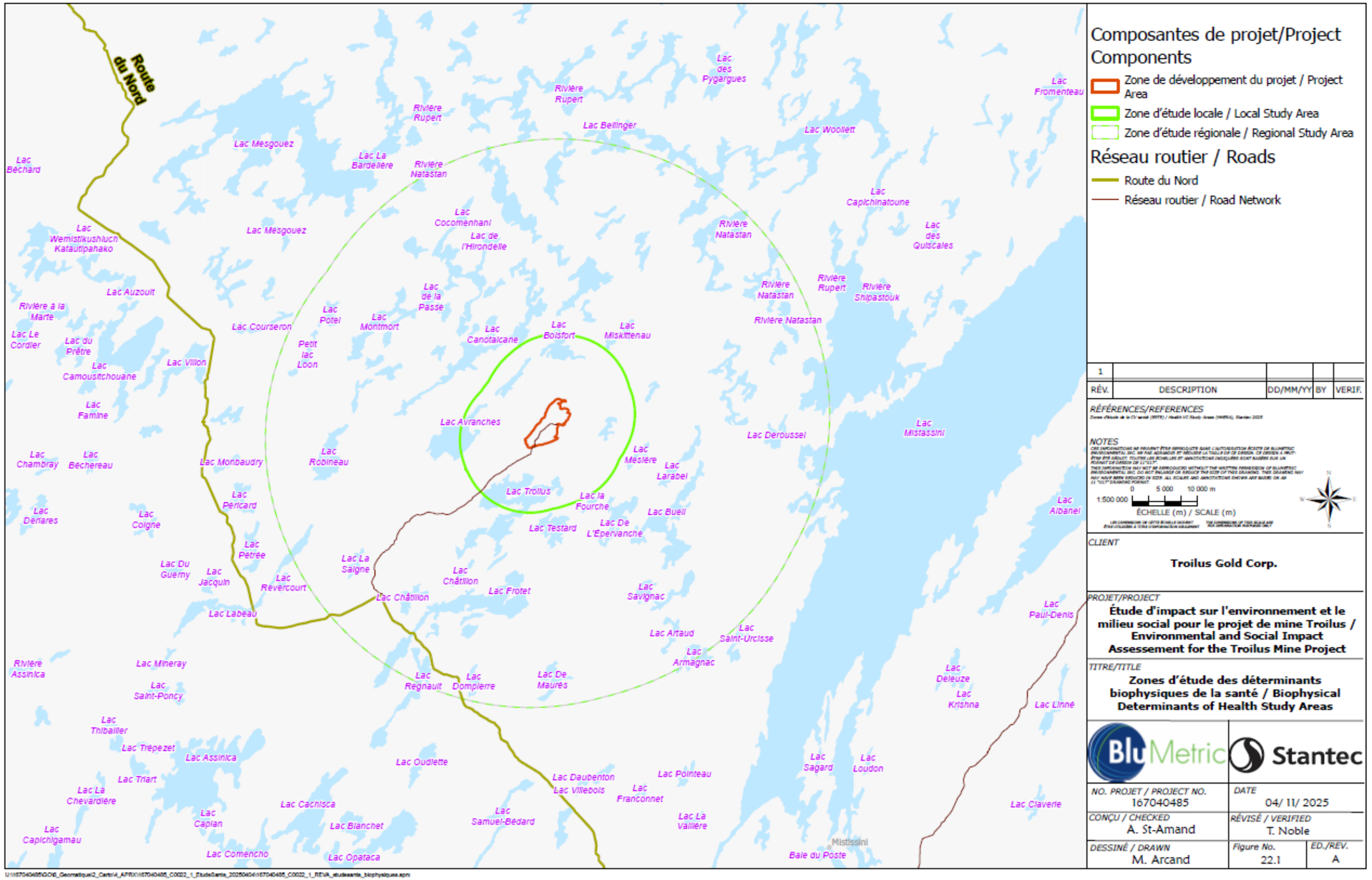
The **Local Study Area (LSA)** and **Regional Study Area (RSA)** are specific to biophysical determinants of health and social determinants of health. Each LSA encompasses the area in which Project-related impacts (direct or indirect) were estimated or measured with a level of confidence appropriate for the assessment and in which there is a reasonable expectation that the potential impacts in are of public interest.

To comply with provincial regulatory requirements and capture effects of the specific components being assessed, the biophysical determinants of health LSA includes the PDA and the outer spatial boundaries of the Surface Water LSA and Air LSA. Information from additional assessments' LSAs (the LSA of Noise, the LSA for Terrestrial Wildlife and the LSA for Vegetation) are also considered to support the overall assessment. The RSA includes the spatial boundaries outlined in the RSA for Air and the RSA for Surface Water as shown in Map 1. Information from additional assessments' RSAs (the RSA for Land Use, the RSA for Caribou, the RSA for Terrestrial Wildlife) are also considered to support the overall assessment. The RSA includes the area within which cumulative impacts on Health Conditions are likely to occur, depending on the location of other past, present or reasonably foreseeable future projects or activities. It includes the outer spatial boundaries of the aforementioned VCs. The biophysical determinants of health LSA and RSA are illustrated in Map 1.

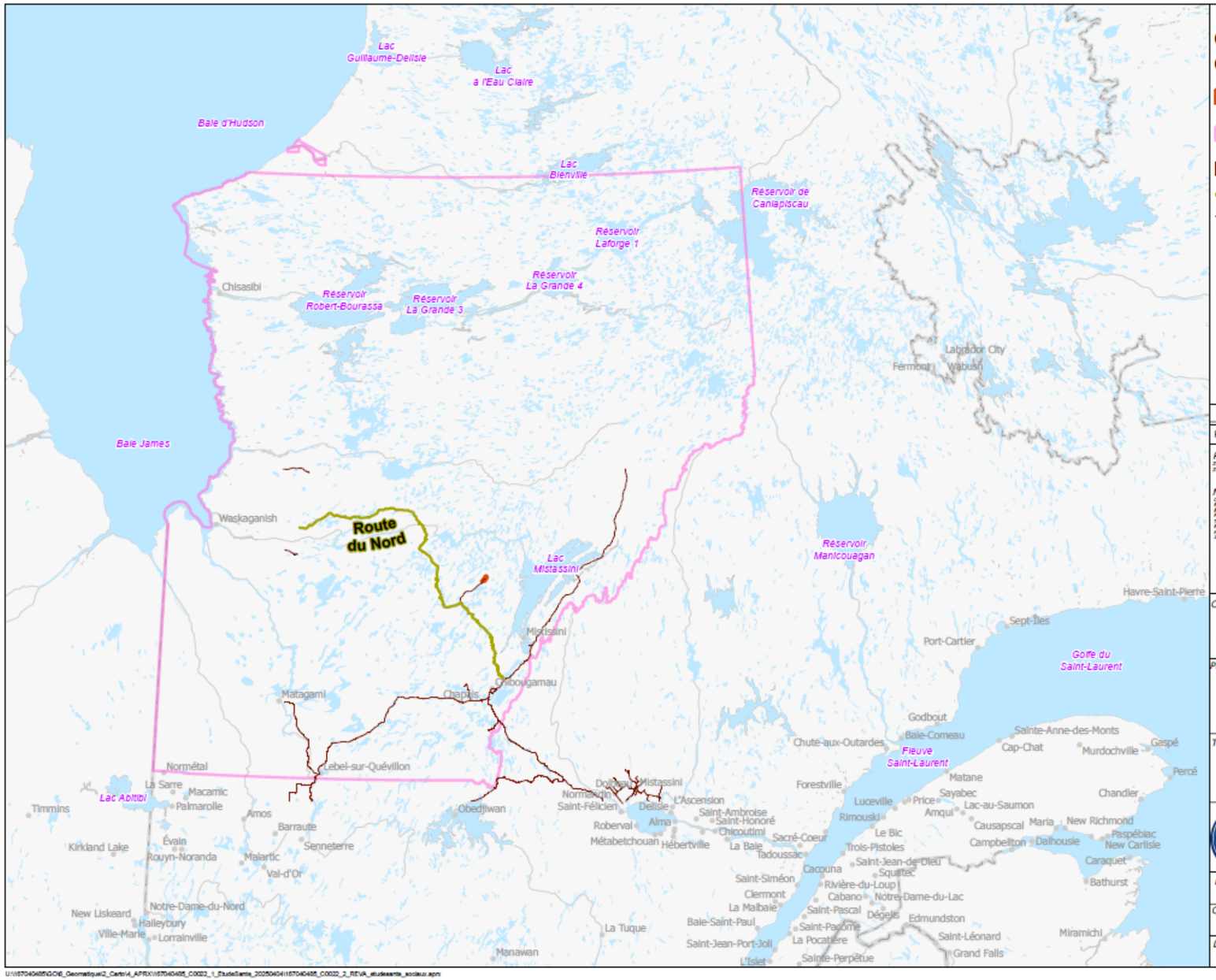
The social determinants of health for the LSA and RSA are the same and include the PDA. To comply with provincial regulatory requirements and capture the impacts of the specific components being assessed, the spatial limits are based on the two Cree communities of Mistissini and Oujé-Bougoumou, the two Jamesian communities of Chibougamau and Chapais, the Cree health region of Région des Terres-Cries-de-la-Baie-James, and the Région du Nord-du-Québec for the Jamesians.

The four communities are within the spatial boundaries of the Région du Nord-du-Québec, and the Région des Terres-Cries-de-la-Baie-James health region is contiguous with or within the Région du Nord-du-Québec health region. The social determinants of health LSA/ RSA are illustrated on Map 2 and include the area within which cumulative impacts on health conditions are likely to occur, depending on the location of other past, present, or reasonably foreseeable future projects or activities.

Map 22.1 Biophysical Determinants of Health Local Study Area / Regional Study Area



Map 22.2 Social Determinants of Health Local Study Area / Regional Study Area



Composantes de projet/Project Components

- Zone de développement du projet / Project Area
- Zone d'étude locale-régionale / Local-Regional Study Area

Réseau routier / Roads

- Route du Nord
- Réseau routier / Road Network

RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.
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RÉFÉRENCES/REFERENCES

NOTES

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ÉCHELLE (m) / SCALE (m)

CLIENT
Troilus Gold Corp.

PROJET/PROJECT
Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessement for the Troilus Mine Project

TITRE/TITLE
Zones d'études des déterminants sociaux de la santé / Social Determinants of Health Study Areas

BluMetric Stantec

NO. PROJET / PROJECT NO.	DATE	
167040485	04/ 11/ 2025	
CONÇU / CHECKED: L. Knopper	RÉVISÉ / VERIFIED: T. Noble	
DESSINÉ / DRAWN: M. Arcand	Figure No. 22.2	ED./REV. A

22.1.3.2 Temporal Boundaries

The temporal boundary of the assessment includes all Project phases from the start of construction through to the end of closure. Based on the current Project schedule, the Project phases include:

- Construction (Year -3 to Year -1)
- Operations
  - Operations phase 1 (Year 1 to Year 21): milling with ore extraction
  - Operations phase 2 (Year 22): milling with no ore extraction
- Decommissioning and closure
  - Active closure (Year 22 to Year 24)
  - Passive closure (Year 24+)

Refer to Chapter 3 of the Impact Statement (Project Description) for a detailed description of the activities anticipated to occur during each phase.

22.1.4 Residual Impacts Characterization

In table 22.5 are descriptions of how the residual impacts on health are characterized in this assessment.

Table 22.5 Characterization of Residual Impacts on Health

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual impact	**Positive –** a residual impact that moves measurable parameters in a direction beneficial to Health Conditions relative to baseline. **Adverse –** a residual impact that moves measurable parameters in a direction detrimental to Health Conditions relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**No Measurable Change** – no measurable change from existing conditions can be noted. **Low** – there is an estimated change in one or more determinants of health but the impact is indistinguishable from existing conditions. **Moderate** – there is an estimated change in one or more determinants of health that may affect individual or household health but in not expected to result in changes at the community level **High** – there is an estimated change in one or more determinants of health that may result in a change in health at the community level.
Geographic Extent	The geographic area in which a residual impact occurs	**PDA –** residual Impacts are restricted to the PDA **LSA –** residual Impacts extend into the LSA **RSA –** residual Impacts extend into the RSA
Timing	Not applicable	Not applicable

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual impact can no longer be measured or otherwise perceived	**Short-term** – the residual impact is restricted to the duration of the construction phase (<3 years). **Medium-term** –the residual impact extends through the duration of the operations phase and closure (3 to 41 years). **Long-term** – the residual impact extends beyond the life of the project (>41 years).
Frequency	Identifies how often the residual impact occurs and how often during the project or in a specific phase	Single event **Multiple irregular event** – occurs at no set schedule **Multiple regular event** – occurs at regular intervals **Continuous** – occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible** – the residual impact is likely to be reversed after activity completion and reclamation **Irreversible** – the residual impact is unlikely to be reversed

22.1.5 Significance Definition

The Impact Statement must characterize the extent to which adverse federal effects are significant., As defined in IAAC's Guidance: Describing Effects and Characterizing Extent of Significance (IAAC, 2023), an adverse federal effect is one which includes residual adverse effects within federal jurisdiction and any adverse direct or incidental effects. The extent to which any residual adverse effects on Indigenous health are considered significant is presented below.

- A residual adverse effect of negligible to low extent of significance is one that, following the application of avoidance and mitigation measures, would result in effects on Indigenous health such that changes in physical health, mental health and social wellbeing, and community safety are largely unchanged from baseline conditions.
- A residual adverse effect of moderate extent of significance is one that, following the application of avoidance and mitigation measures, would result in effects on Indigenous health such that changes in physical health, mental health and social wellbeing, and community safety may be reduced but not eliminated compared to baseline conditions.
- A residual adverse effect of high extent of significance is one that, following the application of avoidance and mitigation measures, would result in effects on Indigenous health such that changes in physical health, mental health and social wellbeing, and community safety may be meaningfully impaired compared to baseline conditions.

22.2 Existing Conditions for Health

In line with the TIS Guidelines, this section provides information on the overall health of both Indigenous nations and non-Indigenous communities, including urban populations, wherever data are available. Ultimately, this section constitutes a community health profile, which includes various health factors and

outcomes of interest commonly used to measure the health status of populations and outlined in the TIS Guidelines.

22.2.1 Methods

Data relevant to the community health profile were gathered from four communities and two health regions within the LSA/RSA. The four communities were represented by the census subdivisions for:

- Mistissini (Cree community);
- Oujé-Bougoumou (Cree community);
- Chibougamau (Jamesian community); and
- Chapais (Jamesian community).

The two health regions are:

- Région des Terres-Cries-de-la-Baie-James (Cree health region); and
- Région du Nord-du-Québec (Jamesian health region).

Data from the census subdivision and health region level were both incorporated where possible to capture comprehensive information about both Indigenous and non-Indigenous populations potentially affected by the Project. Data were incorporated at these levels to provide community context (demographics, education, housing, employment) and where possible compared to data from the Province of Quebec. As shown in figure 22.3, the Région du Nord-du-Québec (Jamesian region) is represented by region 2410, and the Région des Terres-Cries-de-la-Baie-James (Cree region) is represented by region 2418. As noted in section 22.1.4, the combination of the 2418 and 2410 health regions are what make up the LSA/RSA for this VC. In figure 22.3, it can be seen that health region 2418 comprises 13 communities, and only 2 of these communities are within the LSA/RSA for the Project. Although the Région des Terres-Cries-de-la-Baie-James represents the Cree communities of Northern Quebec, it does not necessarily differentiate between these two communities and the other Cree communities within the 2418 health region.

Figure 22.3 Quebec Health Regions

The Région des Terres-Cries-de-la-Baie-James receives care from the Cree Board of Health and Social Services of James Bay (CBHSSJB). This health unit provides health and social services to the following nine communities of the Cree nation of Eeyou Istchee: Chisasibi, Eastmain, Mistissini, Nemaska, Oujé-Bougoumou, Waskaganish, Waswanipi, Wemindji, and Whapmagoostui, with a head office for CBHSSJB in Chisasibi (CBHSSJB, 2024). For the purposes of this VC, and consistency amongst various data sources, individuals from the Région des Terres-Cries-de-la-Baie-James may hereafter be referred to as individuals of Eeyou Istchee, Eeyou/Eenou or Eeyouch/Eenouch. The Eeyou Istchee communities who may be impacted by the Project reside in Mistissini and Oujé-Bougoumou.

The Région du Nord-du-Québec is supported by the Centre Régional de Santé et de Services Sociaux de la Baie-James (CRSSS de la Baie-James). This health region provides health and social services to the Région du Nord-du-Québec for Jamesians, covering five health institutions, namely Chapais, Chibougamau, Lebel-sur-Quevillon, Matagami and the Municipality of James Bay with localities from Radisson, Valcanton and Villebois (CRSSS, 2025). Although the Région des Terres-Cries-de-la-Baie-James is largely representative of the Indigenous population of Northern Quebec, there are still some Indigenous peoples living within the Région du Nord-du-Québec or the Jamesian communities. The Jamesian communities who may be impacted by the Project reside in Chapais and Chibougamau.

Information provided from the CBHSSJB and CRSSS was used to identify the determinants of health, health factors, and health outcomes of interest to the communities within the LSA/RSA. Information from stakeholders and Indigenous nations engagement Traditional Land Use studies, and socio-economic reports submitted by participating Indigenous nations were integrated with health and wellbeing indicators. Other health factors were selected based on published literature related to the health impacts of large resource development projects. Secondary sources of information included government databases, such as census data from Statistics Canada. Where appropriate, Statistics Canada suppresses (e.g., selectively does not disclose) survey information to protect the identity of individuals and to address data quality issues. Some of the data from the 2021 Census of the Population (Census) that was used to establish existing conditions were subject to such suppression.

Key sources of data used in this community health profile are:

- Statistics Canada (2013, 2022a);
- Cree Board of Health and Social Services of James Bay (CBHSSJB) Annual Report 2023-2024 (2024);
- Public Health Plan (2016-2021) (Carlin, 2017);
- Centre régional de Santé et de Services sociaux de la Baie-James (CRSSS) (2025);
- Institut national de santé publique du Québec (INSPQ) (2023, 2024a, 2024b);
- Quebec Population Health Survey (EQSP 2014-2015) Results for Eeyou Istchee (CBHSSJB, 2017);
- Cancer in Eeyou Istchee: Morbidity and Mortality, 2018 (Lejeune, 2018);
- Report from the Cree Diabetes Information System (CDIS) 2017 Update (Dannenbaum et al., 2018);
- Access to a Nutritious Food Basket in Eeyou Istchee 2016 Update (Vinet-Lanouette and Godin, 2017).

After review of these data sources and the data they provide, certain data limitations were identified, namely:

- Some of the data are over 10 years old and may not reflect current conditions;
- Data were not consistently disaggregated by segments of the population including by gender, age, Indigeneity or socioeconomic status;

- Data only reflect reported or diagnosed cases and may not accurately reflect those who are living with an undiagnosed condition or unreported incidences (e.g., incidences of gender-based violence);
- In some cases, specific health data are lacking for the Indigenous nations;
- For the parameters assessed in this VC, when data comparisons between census subdivisions and health regions and province were reported, the sources did not report on statistical significance.

A GBA Plus process has been applied throughout section 22.2.1 and the remainder of the assessment. Where feasible and possible, indicators have been disaggregated by segments of the population (e.g., gender, Indigeneity, sexual orientation, socioeconomic status, age) to describe disproportionate health outcomes. A rationale has been provided in table 22.6 for populations that have been included as part of the GBA Plus process throughout the VC. In instances where information was not disaggregated by specific segments of the populations (e.g., intimate partner violence statistics), literature and national level reports were used to provide additional context to social considerations (e.g., Reclaiming Power and Place: the Final Report of the Nation Inquiry into Missing Murdered Indigenous Women and Girls [MMIWG] (2019)).

Table 22.6 GBA Plus population groups for consideration

Segment of the Population for Consideration	Rationale for Inclusion
Indigenous nations	On average, Indigenous populations experience poorer physical and mental health outcomes than non-Indigenous populations and unequal distribution of the social determinants of health, including income, education and employment opportunities, due in part to historical and ongoing structural and systemic inequities (Loppie and Wein, 2022). Mining outperforms other industries in terms of Indigenous representation, with Indigenous representation in mining tripling from 2007 to 2022. However, a high share of Indigenous workers does not necessarily indicate that occupation and skills outcomes are positive for those Indigenous workers in the industry (Mining Industry Human Resources Council, 2024). Indigenous persons may be disproportionately affected by resource extraction projects, including through changes to their connection to the land, cultural continuity, and food security.
Indigenous women and girls	Indigenous women experience disproportionate rates of being victims of violence, including intimate partner violence, physical and sexual assault, and homicide (Heidinger, 2022). Resource extraction projects can exacerbate the serious problem of violence against Indigenous women through gender-based violence, workplace harassment, sexual abuse, and communicable diseases (MMIWG, 2019). Indigenous women and girls are also most at risk for housing insecurity (Bleakyney and Melvin, 2022; MMIWG, 2019) and therefore may be disproportionately affected by any Project-related impacts to housing.

Segment of the Population for Consideration	Rationale for Inclusion
Women+	Women+ are underrepresented in mining sectors and occupations likely to be required for Project construction and operations. For instance, from 2007 to 2023, women+ representation in mining and quarrying averaged 13.6% and demonstrated no significant increases (Mining Industry Human Resources Council, 2024). Women+ in mining may experience lower pay compared to their male counterparts, gender-based discrimination, and sexual harassment (Kansake et al., 2021). As well, women+ are subject to higher rates of gender-based violence than men, including intimate partner violence (Government of Canada, 2020).
Men+	Men+ experience higher rates of substance use and suicide than other subpopulations and may experience higher rates of mental health stigma that could prevent them for seeking support (McKenzie et al., 2022). Men+ may be disproportionately affected by Project- related income, employment, and working conditions, which may improve or exacerbate existing health and wellness conditions in this subpopulation. Given the large presence of men+ in the mining workforce, an approach to understanding mining and mental health for men+ is crucial (Dignard et al., 2024). There is a need to identify factors contributing to mental wellbeing and tailor health promotion, treatment and policies in the workforce (Dignard et al., 2024).
Low-income individuals and households including persons with disabilities and lone-parent families	People with low income or living in low-income households experience worse health outcomes compared to higher income groups (Public Health Agency of Canada, 2018). Persons in lone-parent households headed by women, Indigenous people, visible minorities, recent immigrants, and persons with a disability were more likely to live in low-income households (Government of Canada, 2021). While some low-income households may benefit from economic opportunities associated with the Project, other low-income households may be disproportionately affected if there are Project-related increases in the cost of living.
2SLGBTQI+ Community	Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, and Asexual Plus (2SLGBTQI+) populations experience disproportionate poorer mental health outcomes than non 2SLGBTQQIA+ persons (Gilmour, 2019). Relative to their cisgendered counterparts, 2SLGBTQI+ people are more likely to experience homelessness, earn lower incomes, experience discrimination on the job, and encounter barriers in finding and advancing in employment (Government of Canada, 2024b). 2SLGBTQI+ people are also more likely to experience physical or sexual assault, inappropriate behaviours in public, online and at work, and violence and to engage in binge drinking and non-medicinal cannabis use (Jaffray, 2020).

Segment of the Population for Consideration	Rationale for Inclusion
Children and Youth	Children and youth are considered a particularly vulnerable segment of the population because there is strong evidence that this is a critical period for development and adverse social determinants of health (such as household income, food security, housing, and family stability) during this time can have lasting impacts on health and well-being into adulthood (Raphael et al., 2020). For instance, children living in poor quality housing conditions have a greater likelihood of poor health outcomes during childhood as well as adults (Raphael et al., 2020). Positive changes to housing may result in families who secure Project-related employment may experience to positive changes through higher disposable family income and access to better housing.

Notes:
"Men+" includes men (and/or boys), as well as some non-binary persons (Statistics Canada, 2022a)
"Women+" includes women (and/or girls), as well as some non-binary persons (Statistics Canada, 2022a)

22.2.2 Overview

The CBHSSJB's 2023-2024 Annual Report highlighted key health determinants, factors, and outcomes for the Cree communities of Northern Quebec. Similarly, the CRSSS's Summary Portrait State of Health and Well-Being focused on the Jamesian communities. These reports together formed the community health profile within the LSA/RSA. Indigenous knowledge from interviews was integrated with health indicators, while additional health factors were selected based on literature about the impacts of large resource projects. A graphical representation of the five categories addressed in this community health profile (Community Context [Section 22.2.3.1], Environmental Quality [Section 22.2.3.2], Physical Health [Section 22.2.3.3], Mental Health and Social Wellbeing [Section 22.2.3.4], and Community Safety [Section 22.2.3.5]), along with their respective biophysical and social determinants of health, health outcomes and health factors, are shown in figure 22.4.

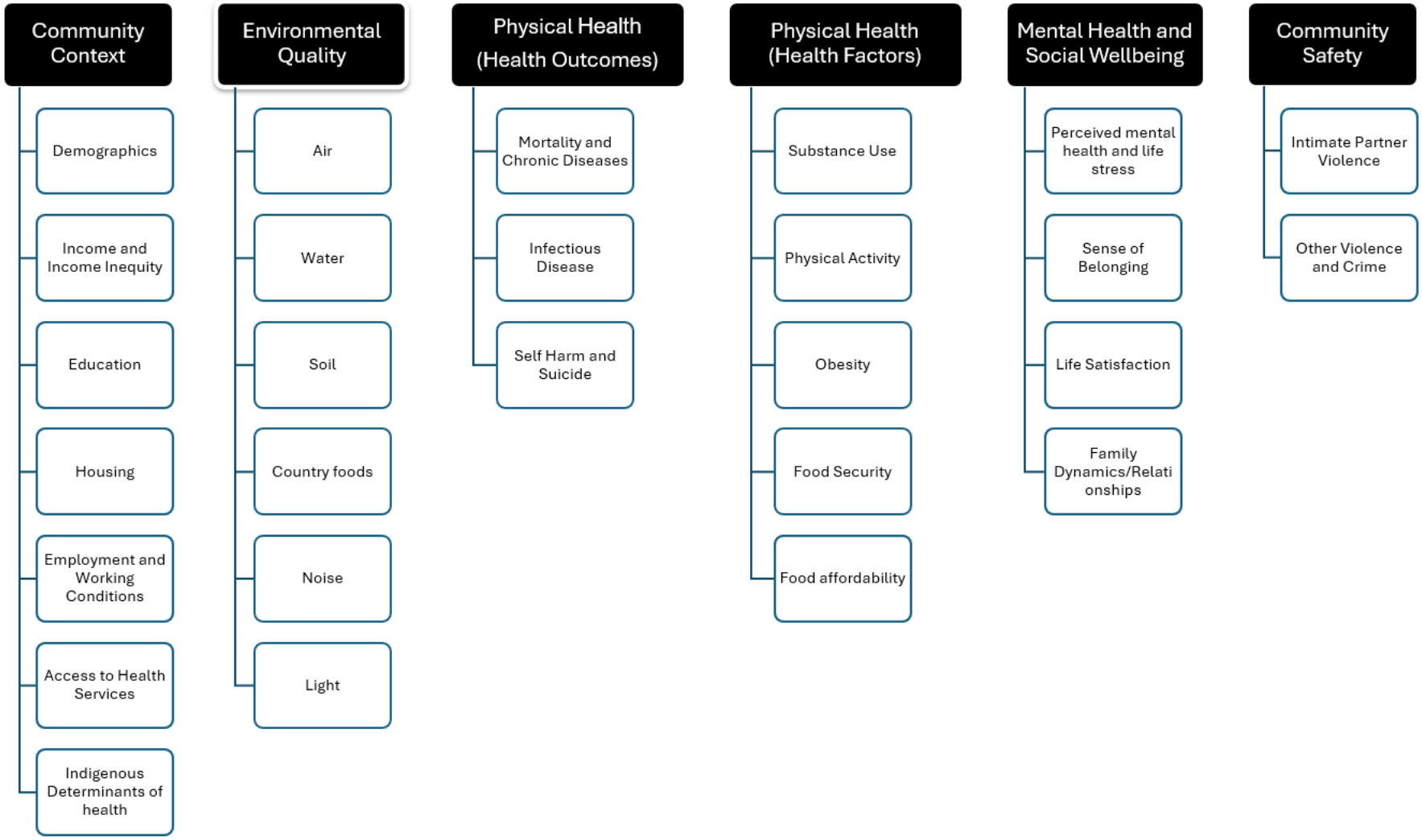

Figure 22.4 Graphical Representation of Components of the Community Health Profile

Detailed findings of the community health profile are provided in section 22.2.3. In general, the Province of Quebec tends to have better outcomes in terms of income levels, educational attainment and lower levels of psychological distress compared to the Jamesians and Cree. Although fewer Jamesians have low-income after tax, they spend more on housing, and experience higher rates of unemployment and chronic disease. The Cree experience higher levels of psychological distress and food insecurity but have lower rates of cancer mortality.

With a population of over 7,200, the Jamesian town of Chibougamau is almost ten times larger than the Cree community of Oujé-Bougoumou, approximately seven times larger than Chapais (Jamesian) and roughly double the size of Mistissini (Cree). At the health region level, both Région des Terres-Cries-de-la-Baie-James and Région du Nord-du-Québec are sparsely populated. The Région des Terres-Cries-de-la-Baie-James has a higher Indigenous population relative to the size of the total population. Very few individuals in the Région des Terres-Cries-de-la-Baie-James have French as a mother tongue (around 3% of population) compared to Région du Nord-du-Québec (approximately 85% of population) and the Province of Quebec (approximately 90% of population). Rates of low-income in the four census subdivisions and two health regions are generally similar, ranging between about 5 and 10%, which is lower than Quebec as a whole, which is approximately 13%.

Residents within the LSA/RSA attained lower levels of education, with approximately 33 to 55% attaining a postsecondary certificate, diploma or degree (the lowest in the Cree communities) compared to the Province of Quebec (60%). The average value of dwellings is about 1.7 times higher for Jamesians in Chibougamau than Chapais. At the health region level, the average value of dwellings in the Région du Nord-du-Québec was approximately half that in the Province of Quebec. Unemployment rates are similar amongst the two health regions and the province (~8%). Unemployment rates are also similar amongst the four census subdivisions (3.7%-6.2%), with the highest unemployment in Mistissini and lowest in Chibougamau.

Healthcare for Cree in Mistissini and Oujé-Bougoumou is vast, with many programs and centres for physical, mental spiritual wellbeing. Healthcare for Jamesians is widely accessible in Chapais and Chibougamau, with Chibougamau having the largest hospital in the region. For premature mortality, potentially avoidable mortality, mortality from preventable causes and mortality from treatable causes, these all followed a similar pattern. For the four mortality parameters, the age standardized rates are highest for the Région des Terres-Cries-de-la-Baie-James, followed by Région du Nord-du-Québec and the lowest rates of premature mortality in the Province of Quebec. Chronic diseases are prevalent in all three regions, where Nord-du-Québec has the highest cancer mortality rate, and Eeyou Istchee has the second lowest regional cancer rate in the province. Cancer mortality rates are high in the Province of Quebec, as the leading cause of death, according to the INSPQ. Infectious diseases such as sexually transmitted infections (STIs) were higher amongst the Cree of Eeyou Istchee than Jamesians in Nord-du-Québec or the rest of Quebec.

More individuals in Eeyou Istchee experience psychological distress compared to the rest of the province and Nord-du-Québec. Suicidal ideation and suicide attempt rates are similar between Région des Terres-Cries-de-la-Baie-James and the province, but higher for Jamesians in Région du Nord-du-Québec. Overall, mental health impacts are more pronounced for both Jamesians and Cree compared to the rest of Quebec. Rates of drug use overall are higher in Eeyou Istchee than in the rest of Quebec.

Physical activity rates are low in Eeyou Istchee compared to rates for Jamesians and the rest of the province. Food insecurity measured through costs of nutritious food is highest in Eeyou Istchee, more expensive than both Nord-du-Québec and the province. Food harvesting is important for the Cree people, who receive most of their diet through traditional food.

Attention deficit hyperactive disorder in Quebec has quadruped in the last 20 years and autism spectrum disorder has been “on the rise for several years” (INSPQ, 2024d). The INSPQ also highlights the fact that nearly one in three kindergarten children “are considered vulnerable in at least one area of development”. Health and wellbeing of children and youth are major priorities for the CBHSSJB, with support and rehabilitation emphasized in regional action plans for Cree youth.

22.2.3 Community Health Profile

22.2.3.1 Community Context

The community context describes the demographics, income and income inequality, education, housing, employment and working conditions, access to health services and programs, the Indigenous determinants of health (e.g., connection to the land, self-determination and cultural continuity) and environmental quality that contribute to health outcomes.

Demographics

As noted in table 22.6, certain segments of the population may experience different health outcomes than the general population. Demographic indicators relevant to the community health profile, provided at the census subdivision level (the Cree communities of Mistissini and Oujé-Bougoumou, and the Jamesian communities of Chibougamau and Chapais) and health region level (Région des Terres-Cries-de-la-Baie-James for Cree communities and Région du Nord-du-Québec for Jamesian communities) are presented in table 22.7 and table 22.8, respectively. Where available, demographic data are also provided for the Province of Quebec.

The Cree communities of Mistissini and Oujé-Bougoumou have higher levels of Indigenous identity (over 80% versus less than 5%), and mother tongues of non-official languages (about 50 to 75% versus 3 to 5%). Regarding official languages, a greater percentage of Cree community members speak English as a mother tongue (13 to 32%) than French (less than 5%) whereas in the Jamesian communities, most members speak French as a mother tongue (almost 90%). Between 2016 and 2021, the Cree communities experienced population growth while the population of the Jamesian communities declined. The Cree communities are more sparsely populated than the Jamesian communities.

Table 22.7 Selected demographic indicators, Mistissini, Oujé-Bougoumou, Chibougamau, Chapais

Indicator	Mistissini (Cree)	Oujé-Bougoumou (Cree)	Chibougamau (Jamesian)	Chapais (Jamesian)
Population, 2021	3,731	797	7,233	1,468
Population, 2016	3,523	747	7,504	1,499
Population growth rate (% change from 2016 to 2021)	5.9	6.7	-3.6	-2.1

Indicator	Mistissini (Cree)	Oujé-Bougoumou (Cree)	Chibougamau (Jamesian)	Chapais (Jamesian)
Population density per square kilometer	4.6	8.3	10.4	23.6
Land area in square kilometers	807.75	96.22	694.87	62.31
Indigenous identity (%)	92.5	92.5	7.8	6.9
Mother tongue – English (%)	13	31.9	3	3.7
Mother tongue – French (%)	4.9	3.1	92.5	89.5
Mother tongue – non-official languages (%)	75.4	51.3	3	5.1
Immigrants (%)	-	-	1.5	1
Total visible minority population (%)	1.5	2.5	3.9	1

Source: Statistics Canada, 2022a

Table 22.8 Selected demographic indicators, Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and Quebec, 2021

Indicator	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Quebec
Population, 2021	16,858	14,832	8,501,833
Population, 2016	-	-	8,164,361
Population growth rate (% change from 2016 to 2021)	-	-	4.1
Population density per square kilometer	-	-	6.5
Land area in square kilometers	-	-	1,298,599.75
Indigenous identity (%)	95.5	15.3	2.5
Mother tongue – English (%)	11.1	3.7	7.6
Mother tongue – French (%)	2.7	84.9	74.8
Mother tongue – non-official languages (%)	80.1	8.5	13.9
Immigrants (%)	0.9	1.7	14.6
Total visible minority population (%)	1.2	3.4	16.1

Source: Statistics Canada, 2022a

The Cree health region is composed of a high amount of people who identify as Indigenous (approximately 96%) compared to the Jamesian health region (approximately 15%), both of which are lower than Quebec (2.5%). The two health regions and the province have relatively low levels of English as a mother tongue (approximately 4 to 11%). A lower number of individuals in the Cree communities have French as a mother tongue (approximately 3%) compared to the Jamesians (approximately 85%). The Province of Quebec has similar rates of French as a mother tongue (approximately 75%) to that of the Jamesians. More Cree people have a mother tongue of a non-official language (approximately 80%) than Jamesians (approximately 9%). The Province of Quebec has similar rates of non-official languages as a mother tongue (approximately 14%) to the Jamesians. The total visible minority population is similar between the Cree and Jamesian health regions (between 1 and 3%) and is higher in the rest of the province (approximately 16%).

Income and Income Inequality

Low-income status and children living in low-income households are crucial indicators of income and income inequality. Individuals with low income or residing in low-income households tend to experience poorer health outcomes compared to those in higher income groups (Public Health Agency of Canada, 2018). The prevalence of low income for the four census subdivisions of Mistissini, Oujé-Bougoumou, Chibougamau, and Chapais can be seen in table 22.9, and low-income data for the Région des Terres-Cries-de-la-Baie-James and Région du Nord-du-Québec is shown in table 22.10.

The Cree communities of Mistissini and Oujé-Bougoumou have lower rates of low income after tax than the Jamesian communities of Chapais and Chibougamau. This trend is apparent at the level of the health region as well. The prevalence of low income for Jamesians that are 65 years and older, for both men+ and women+ is higher than other age categories at the census subdivision and health region level and is especially noticeable for women+. Chapter 21 of the Impact Statement evaluates income and income inequality for the LSA and RSA.

Table 22.9 Prevalence of Low Income, Mistissini, Oujé-Bougoumou, Chibougamau and Chapais (%), 2021

	Mistissini (Cree)			Oujé-Bougoumou (Cree)			Chibougamau (Jamesian)			Chapais (Jamesian)		
	total	Men+	Women+	total	Men+	Women +	total	Men+	Women +	total	Men+	Women +
Prevalence of low income based on the low-income measure, after tax (LIM-AT)	7.7	6.9	8.4	6.4	6.0	6.8	9.1	8.6	9.6	11.9	11.6	12.2
0 to 17 years	10.8	12.4	9.2	8.0	8.0	8.0	6.7	6.2	7.2	9.5	10.0	9.0
0 to 5 years	11.2	13.0	9.0	18.0	18.0	16.0	7.2	8.0	6.0	10.0	10.0	-
18 to 64 years	6.1	4.0	8.2	5.2	4.0	6.0	7.2	7.8	6.6	8.8	9.6	8.0
65 years and over	4.0	-	6.0	-	-	-	20.6	15.8	25.6	28.0	22.0	34.0

Source: Statistics Canada, 2022a
Notes: Low income is based on the Low-income cut-offs, after tax (LICO-AT). From Statistics Canada: “The Low-income cut-offs, after tax refers to an income threshold, defined using 1992 expenditure data, below which economic families or persons not in economic families would likely have devoted a larger share of their after-tax income than average to the necessities of food, shelter and clothing. More specifically, the thresholds represented income levels at which these families or persons were expected to spend 20 percentage points or more of their after-tax income than average on food, shelter and clothing. These thresholds have been adjusted to current dollars using the all-items Consumer Price Index”

Table 22.10 Prevalence of Low Income, Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and Quebec (%), 2021

	Région des Terres-Cries-de-la-Baie-James (Cree)			Région du Nord-du-Québec (Jamesian)			Province of Québec		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
Prevalence of low income based on the low-income measure, after tax (LIM-AT)	5.2	5	5.5	9.1	8.6	9.7	11.9	11.2	12.7
0 to 17 years	6.4	6.6	6.2	7.5	7.5	7.4	9.7	9.7	9.7
0 to 5 years	6.5	6.4	6.6	7.8	8.8	6.4	10.3	10.3	10.3
18 to 64 years	4.7	4.2	5.2	6.9	7.1	6.7	10.2	10.1	10.2
65 years and over	3.7	2.8	4.4	20.2	16.0	25.0	19.8	16.6	22.7

Source: Statistics Canada, 2022a
Notes: Low income is based on the Low-income cut-offs, after tax (LICO-AT). From Statistics Canada: "The Low-income cut-offs, after tax refers to an income threshold, defined using 1992 expenditure data, below which economic families or persons not in economic families would likely have devoted a larger share of their after-tax income than average to the necessities of food, shelter and clothing. More specifically, the thresholds represented income levels at which these families or persons were expected to spend 20 percentage points or more of their after-tax income than average on food, shelter and clothing. These thresholds have been adjusted to current dollars using the all-items Consumer Price Index"

Education

Educational attainment is correlated with other determinants of health such as income and employment, which can be tied to health literacy and being able to advocate for healthcare (Raphael et al., 2020). Education is one of the main drivers of stable employment, financial security, and social success, which are associated with higher levels of self-reported health and lower levels of morbidity and mortality (Public Health Agency of Canada, 2018).

Educational attainment indicators from the 2021 Census Profile are shown in table 22.11 for the census subdivisions, and in table 22.12 for the health regions. At the census subdivision level, a smaller proportion of individuals in Chapais and Mistissini have completed university-level programs compared to those in Chibougamau and Oujé-Bougoumou. In both census subdivisions, rates of women+ with a bachelor's degree or higher are higher than for men+. However, rates of apprenticeships and trades are higher for men+ in all census subdivisions than for women+. At the health region level, fewer residents of the Région des Terres-Cries-de-la-Baie-James and Région du Nord-du-Québec have completed university-level programs compared to the overall Quebec population. Similarly, in both health regions and the Province of Quebec, rates of women+ with a bachelor's degree or higher are higher than for men+. However, rates of apprenticeships and trades are higher for men+ in all census subdivisions than for women+. Chapter 20 of the Impact Statement provides a detailed assessment of educational

attainment in the LSA and RSA, as well as an evaluation of education and childcare infrastructure and services.

Table 22.11 Educational attainment rates in Mistissini, Oujé-Bougoumou, Chibougamau and Chapais (%), 2021

Indicator	Mistissini (Cree)			Oujé-Bougoumou (Cree)			Chibougamau (Jamesian)			Chapais (Jamesian)		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
No certificate, diploma or degree	51.0	52.1	50.2	41.0	47.2	34.6	23.3	26.6	19.8	35.8	36.3	33.3
High (secondary) school diploma or equivalency certificate	15.3	17.1	13.4	19.0	13.2	23.1	18.0	14.8	21.6	18.1	16.1	20.6
Postsecondary certificate, diploma or degree	33.6	30.7	36.5	40.0	37.7	42.3	58.7	58.7	58.8	46.5	46.8	46.1
Postsecondary certificate or diploma below bachelor level	23.7	23.3	24.2	30.5	30.2	30.8	46.3	48.9	43.4	43.8	46.0	41.2
Apprenticeship or trades certificate or diploma	6.4	9.7	3.2	9.5	15.1	3.8	24.0	31.4	16.1	31.0	34.7	26.5
Non-apprenticeship trades certificate or diploma	2.8	4.3	1.8	5.7	7.5	3.8	18.3	22.0	14.3	20.4	23.4	16.7
Apprenticeship certificate	3.6	5.1	1.8	3.8	7.5	0.0	5.8	9.7	1.6	10.2	12.1	7.8
College, CEGEP or other non-university certificate or diploma	15.0	11.7	18.1	18.1	13.2	23.1	18.8	15.6	22.3	11.9	9.7	13.7
University certificate or diploma below bachelor level	2.4	2.3	2.5	2.9	3.8	0.0	3.5	2.0	5.2	1.3	0.0	2.0
Bachelor's degree or higher	9.9	7.4	12.3	8.6	7.5	11.5	12.5	9.8	15.4	2.7	1.6	3.9

Source: Statistics Canada, 2022a

Table 22.12 Educational attainment rates in Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and Quebec (%), 2021

Indicator	Région des Terres-Cries-de-la-Baie-James (Cree)			Région du Nord-du-Québec (Jamesian)			Province of Québec		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
No certificate, diploma or degree	46.8	50.3	43.3	27.0	29.2	24.7	18.2	19.2	17.1
High (secondary) school diploma or equivalency certificate	18.1	16.7	19.2	19.1	15.4	23.2	21.4	21.1	21.8
Postsecondary certificate, diploma or degree	35.2	33.0	37.4	53.9	55.4	52.2	60.4	59.7	61.1

Indicator	Région des Terres-Cries-de-la-Baie-James (Cree)			Région du Nord-du-Québec (Jamesian)			Province of Québec		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
Postsecondary certificate or diploma below bachelor level	27.9	27.8	28	44.2	47.7	40.3	36.9	38.0	35.8
Apprenticeship or trades certificate or diploma	10.3	14.4	6.3	24.4	31.2	16.9	15.8	19.5	12.3
Non-apprenticeship trades certificate or diploma	5.1	6.9	3.4	18.3	21.6	14.6	11.5	12.5	10.4
Apprenticeship certificate	5.2	7.5	2.9	6.2	9.6	2.3	4.4	7.0	1.8
College, CEGEP or other non-university certificate or diploma	14.9	11.3	18.4	16.9	15.0	19.0	17.4	15.5	19.2
University certificate or diploma below bachelor level	2.7	2.1	3.2	2.9	1.5	4.3	3.7	3.0	4.3
Bachelor's degree or higher	7.3	5.1	9.4	9.6	7.7	11.9	23.5	21.7	25.3

Source: Statistics Canada, 2022a

Housing

Census subdivision data from Statistics Canada (2022a) on six housing indicators is shown in table 22.13 and in table 22.14 for the health regions. Although the data are incomplete for the Cree communities it is apparent from the available data that the percentage of occupied dwellings requiring major repairs is close to three times higher in these communities than in the Jamesian community of Chibougamau. This trend is similar at the health region, with the percentage of occupied dwellings requiring major repairs is almost three times higher for Région des Terres-Cries-de-la-Baie-James than in the Province of Quebec, and twice as many as those in the Région du Nord-du-Québec.

Table 22.13 Selected housing indicators of Mistissini, Oujé-Bougoumou, Chibougamau and Chapais, 2021

Housing Indicator	Mistissini (Cree)	Oujé-Bougoumou (Cree)	Chibougamau (Jamesian)	Chapais (Jamesian)
% of owner households with a mortgage	-	-	63.6	57.6
Average monthly shelter costs for owned dwellings ($)	-	-	1059	932
Average monthly shelter costs for rented dwellings (%)	-	-	630	670
Spending 30% or more of income on shelter costs only	0	0	8.8	14.6
Major household repairs needed only (%)	15.7	18.2	6.9	5.4
Average value of dwellings ($)	-	-	214,200	125,200

Source: Statistics Canada,2022a

Table 22.14 Selected housing indicators of Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and Quebec

Housing Indicator	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
% of owner households with a mortgage	-	58	62.2
Average monthly shelter costs for owned dwellings ($)	-	925	1,195
Average monthly shelter costs for rented dwellings (%)	-	616	886
Spending 30% or more of income on shelter costs only	0	6.7	14.3

Housing Indicator	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
Major household repairs needed only (%)	16.9	7.5	4.8
Average value of dwellings ($)	-	170,600	376,800

Source: Statistics Canada, 2022a

Employment and Working Conditions

Employment and working conditions are connected to other indicators such as income and education. People who are already most vulnerable to poor health outcomes due to their lower income and education are also the ones most likely to experience working conditions that also lead to poor health, such as low wages, job insecurity, exposure to hazards, and lack of autonomy (Raphael et al., 2020). Employment provides income, a sense of identity, and helps to structure day-to-day life while unemployment may lead to financial deprivation, psychological stress, unhealthy coping mechanisms (e.g., substance abuse), mental health issues such as depression, anxiety and increased suicide rates (Raphael et al., 2020). Census subdivision data from Statistics Canada (2022a) on labour force status is shown in table 22.15 for the census subdivisions and in table 22.16 for the health regions.

Table 22.15 Labour Force Status of Mistissini, Oujé-Bougoumou, Chibougamau and Chapais (%)

Labour Force Status	Mistissini (Cree)	Oujé-Bougoumou (Cree)	Chibougamau (Jamesian)	Chapais (Jamesian)
Employment Rate	56.4	55.2	66.7	60.6
Unemployment Rate	6.2	5.1	3.7	5.6

Source: Statistics Canada, 2022a

Table 22.16 Labour Force Status of Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and Quebec (%)

Labour Force Status	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
Employment Rate	56.0	58.5	59.3
Unemployment Rate	8.0	7.3	7.6

Source: Statistics Canada, 2022a

According to the 2021 Census by Statistics Canada (2022a), the unemployment rates in all four census subdivisions were under 10%, with the lowest being Chibougamau (3.7%), then Oujé-Bougoumou (5.1%), Chapais (5.6%) and highest in Mistissini (6.2). Employment rates are approximately 10% lower in Cree communities than employment rates in Jamesian communities, although this difference is not observed at the health region level. At the health region level, the unemployment rate in the Région des Terres-Cries-de-la-Baie-James is slightly higher than both the Région du Nord-du-Québec and the Province of Quebec as a whole. The Census reflects that at the health region level, the unemployment rates are all similar (about 8%) (Statistics Canada, 2022a).

Access to Health Services and Programs

Mistissini offers various health and social services within the CBHSSJB. The Mistissini Community Miyupimaatisiiun Centre provides Awash services for pregnant women, infants, and children up to age 9, and Uschiniichisuu services for youth aged 10-29. Chishaayiyuu services support mental health for adults over 30. Additionally, the Community Miyupimaatisiiun Centre includes dental care, x-ray and imaging, pharmacy, adapted transport, mental health services, and hemodialysis (CBHSSJB, 2025a). Mistissini also has a Multi-Service Day Centre with home and community care programs, allied health services, Youth Healing Services Regional Centre for Eeyou Istchee, and a Regional Public Health Department offering diverse health services (CBHSSJB, 2025a).

Additionally, the Oujé-Bougoumou Healing Centre offers emergency services, Awash services to improve the well-being of pregnant women, infants and young children up to 9 years of age, as well as Uschiniichisuu services for youth aged 10 to 29. The Oujé-Bougoumou Healing Centre offers Chishaayiiyuu services to improve the health and wellbeing for adults over the age of 30, dental services, pharmacy, home and community care, youth protection and mental health services (CBHSSJB, 2025b). Oujé-Bougoumou also offers a Multi-Service Day Centre with adapted transport and allied health services (CBHSSJB, 2025b).

In their 2023-2034 Annual Report, the CBHSSJB noted that Oujé-Bougoumou now has a pediatrician and Mistissini has a dedicated psychiatrist (CBHSSJB, 2024). According to this report, the Centre de répartition des demandes de service (CRDS) was used to confirm that patients were properly listed and that their consultations were necessary.

Jamesian residents of Chapais access healthcare at the Rene-Ricard Health Centre, which features five family physicians and an emergency department that also serves as a walk-in clinic. For specialized care, Jamesians often travel to Chibougamau Hospital or further to Saguenay-Lac-Saint-Jean (Tremblay-Boily and Couturier, 2025). Chibougamau offers the most comprehensive range of health services in the region, including an emergency department, 20 family physicians, obstetrics, acute inpatient care, and long-term care, although it faces recruitment challenges, particularly in psychosocial care (Tremblay-Boily and Couturier, 2025).

Indigenous Determinants of Health

The CBHSSJB celebrates family values originating from Eeyou/Eenou philosophy/ Iiyiyiuiyihtuwin (Eeyou/Eenou way of life), traditional values and customs that come from the land, birds, fish and animals harvested for food. These values are: courage, faith, good child rearing, happiness, harmony, honesty, hope, humility, kindness, kinship, love, obedience, patience, respect, safety, sharing, teaching, thankfulness and truth (CBHSSJB, 2024). Cree ancestors, grandmothers and grandfathers all had special relationships with animals, land, water and air. Similar to the animals they harvested, Cree ancestors roamed the pristine lands of the Eeyou/Eenou Istchee with respect and gratitude for what the Creator had to offer. Eeyou/Eenou family values and customs are the strength of the nation, teaching respect for one another and sharing of food (CBHSSJB, 2024).

As part of the Project, Stantec carried out consultation and engagement through interviews with tallymen and family members of tallymen, who use the traditional land around the Troilus Mine Project. Summaries of these interviews are discussed below.

Land and Resource

During consultations with members of the Cree nation, participants highlighted that they spend lots of time hunting and trapping on the land. The tallymen reported that while in the area of the mine, they predominantly hunt for moose, caribou, bear, goose, ptarmigan, rabbit and small birds, as well as trap beaver and fish for sustenance. Additionally, the land provides traditional medicinal resources, such as tree bark, tamarack and Labrador tea. The medicinal harvesting areas are not affected by the presence of the Troilus Mine Project.

Subsistence and Wild Food Consumption

The tallymen estimated that 70% of their food was wild, providing traditional food to family members. The other 30% of their food came from a store. The tallymen state that the majority of the trapline is remote and wild, with no roads leading to it, and thus the mine does not substantially impact the tallymen's sustenance.

Water Management and Quality

During consultation, local tallymen mentioned that Lake A was 'discoloured and sticky' due to flocculent, a product used for treatment of the tailings pond, during previous mine operations but returned to normal after the closure of the mine. Concern about the Troilus Mine Project include dewatering and monitoring of Bibou creek. Tallymen are concerned about water pumped from different sources, potentially altering the observed aquatic species in the area. In working with the Troilus environmental team, one of the tallymen's key concerns was iron. The tallymen recommended that the Troilus Water Management Committee attempt to reproduce the stream's natural flow to maintain oxygen levels for faster iron oxidation and dissipation. The tallymen called for monitoring and tracking of oil spills in the PDA and proper treatment of water from tailing ponds prior to release into the environment, where concern comes from the presence of mining infrastructure.

Dust Control and Management

The tallymen and land users recommended improvements for dust control to reduce avoidance of traditional activities near the mine which occurred during previous mine operations. Effective dust management will benefit both the tallymen and local wildlife.

Nuisances

Tallymen have shared that during previous mine project, families had to adapt to increased noise and traffic on their once-quiet trapline. Initially, there was cultural friction, causing discomfort that gradually improved over time. Land users also noticed that the influx of workers in the past led to increased theft in the area.

Accidents and Safety

The tallymen are concerned about some trapline locations near Troilus Mine Project's dynamite plant. The access road also requires brush cutting and wood chipping to widen the road and improve visibility, reducing hazard from reduced visibility and curvy sections.

Community Health and Well-being, Social Impacts

The consultation with tallymen and land users highlighted concerns about trapline boundaries and methods to mitigate related conflict. One tallyman recounted his previous experience working at the mine and witnessing instances of racial discrimination against Cree individuals. Several participants reported that Cree individuals were not afforded the same opportunities for career development as their colleagues and experienced an unhealthy social divide between groups. The tallymen noted that there was a lot of friction during the initial stages of the mine operations, though this improved over time.

22.2.3.2 Physical Health

As previously noted, physical health refers to the state of the human body and how well it functions. A useful indicator of physical health is self-assessed health, which measures an individual's perception of their overall health. Recent data with respect to perceived physical health is lacking for the four communities and at the level of the two health regions. The most recent apparent data come from the CBHSSJB with a Quebec Population Health Survey (QPHS) from 2014-2015 and published in 2017. From that study, one in five people who identified as Eeyou Istchee reported that they were not in good health (CBHSSJB, 2017). Conversely, Jamesians in Quebec perceive themselves to be in very good health, both physically and mentally (CRSSS, 2025).

In this section, existing conditions for physical health are described in terms of key health outcomes of interest and health factors of interest. However, as noted previously, physical health can also be influenced by mental health and social wellbeing, which will be further assessed in section 22.2.3.4.

Health Outcomes of Interest

Health outcomes of interest refer to the health outcomes and indicators that have been identified as most relevant to the Project through potential impacts and pathways identified in table 22.4. Health outcomes and conditions include rates of mortality and chronic diseases, infectious diseases such as infections STIs, injury rates, and intentional self-harm and suicide.

Mortality and Chronic Diseases

Chronic illnesses typically last a long time and develop gradually, affecting the quality of life. Based on data from 2021, the INSPQ (2024a) identified leading causes of death in the Province of Quebec:

- Cancer (31.0%)
- Other causes (37.2%)
- Heart disease (17.6%)
- Unintentional injuries (5.4%)

- Cerebrovascular disease (4.0%)
- COVID-19 (3.2%)

Based on the three-year average data from Statistics Canada for 2015, infant mortality rates per 1000 live births for the Région des Terres-Cries-de-la-Baie-James are lower than Quebec, but perinatal mortality rates are higher. Rates for both infant mortality and perinatal mortality are lower in Région du Nord-du-Québec than Quebec. Infant and perinatal mortality rates can be seen below, in table 22.17.

Table 22.17 Infant or perinatal mortality, three-year average (2015)

Selected Cause of Death	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
Infant mortality[a]	0	0	4.4
Perinatal mortality[b]	14.1	0	5.6

Notes:
[a] Infant mortality corresponds to the death of a child under one year of age. Expressed as a rate per 1000 live births
[b] Perinatal mortality includes late fetal deaths (stillbirths with a gestational age of 28 weeks or more) and early neonatal deaths (deaths of infants aged less than one week)
Source: Statistics Canada, 2018

Premature Mortality and Potential Years of Life Lost

Premature mortality and potential years of life lost help accurately assess the impact of diseases, injuries and risk factors on premature mortality (Martinez et al., 2019). Premature mortality refers to the deaths of those individuals who are younger than age 75 while the potential years of life lost is the number of years of potential life not lived when a person dies prematurely. Based on Statistics Canada data from 2019 to 2021, the age standardized rates of premature potentially avoidable mortality and mortality from preventable and treatable causes are highest for the Cree communities, followed by the Jamesian communities and the lowest rates are for the Province of Quebec.

Table 22.18 Age-standardized rates of premature and potentially avoidable mortality, three-year period, per 100,000 (2019-2021)

Selected Cause of Death	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
Premature mortality	450.6	339.4	245.1
Potentially avoidable mortality	327.3	248.6	171.5
Mortality from preventable causes	204.6	172.0	117.3
Mortality from treatable causes	122.7	76.6	54.2

Notes: Age standardized rates of premature and potentially avoidable mortality are per 100,000 population.
Source: Statistics Canada, 2023c

Mortality Due to Cancer

According to a study of “Cancer in Eeyou Istchee: Morbidity and Mortality” by Pierre Lejeune in 2018, crude rates of persons identified with cancer hospitalizations are second lowest for Eeyou Istchee amongst all Quebec health regions. However, rates of diagnoses of cancer were slightly higher in 2016 compared to previous years and are no longer significantly different than the rest of Quebec (Lejeune, 2018). Individuals in Eeyou Istchee are diagnosed with cancer at younger ages, and three-quarters of all people diagnosed with cancer in Eeyou Istchee are over the age of 50 (Lejeune, 2018). The most common cancer diagnoses in Eeyou Istchee are kidney, lung, colon and breast cancer. In the five-year study period leading up to 2016, the most common causes of cancer mortality were bronchus and lung cancer followed by kidney cancer (Lejeune, 2018).

INSPQ reported that the age-adjusted cancer mortality rate in Nord-du-Québec from 2017 to 2021 was 301.6 per 100,000 people, the highest among all health regions in Quebec, and higher than the provincial rate of 239.0 per 100,000 (INSPQ, 2024b). In the Jamesian population, lifestyle habits and working conditions significantly contribute to cancer development, indicating a need for preventative measures to reduce cancer deaths in the region (CRSSS, 2025).

The number of diagnoses of cancer in Quebec is on the rise, primarily due to aging and population growth (Quebec Cancer Foundation, 2024). The most common cancer diagnoses are lung cancer in men and breast cancer in women (Quebec Cancer Foundation, 2024). Although age-standardized cancer rates for men and women have been decreasing, cancer is still responsible for one in three deaths in Quebec (INSPQ, 2024b). Lung cancer is the leading cause of cancer mortality for both men and women (Quebec Cancer Foundation, 2024; INSPQ, 2024b).

Mortality Due to Other Chronic Diseases

Diabetes among young Eeyouch/Eenouch is a major concern. In 2017, one in five individuals were diagnosed under the age of 40, with many under the age of 20 struggling to manage the condition (Dannenbaum et al., 2018). Only a third of those under 20 had their glucose at target levels, and 60% showed early signs of kidney damage. Over a quarter of Eeyouch/Eenouch had diabetes. Rising rates highlight the need for education and understanding between patients and healthcare providers in the CBHSSJB (Dannenbaum et al., 2018).

Recent data from the CBHSSJB (2024) shows that the rate of diabetes among the Cree in Eeyou Istchee has been steadily increasing over the past decade. The prevalence of diabetes has surged from 1% in 1982 to 31% of those aged 20 and older, meaning one in three adults now has diabetes (CBHSSJB, 2024), up from 2017 for the same Cree health region. Chronic diseases are the leading cause of death among Jamesians, with cancers, cardiovascular diseases, chronic obstructive diseases, and type 2 diabetes accounting for 70% of deaths in the region (CRSSS, 2025). These chronic diseases are also the primary causes of hospitalization, with circulatory and respiratory system diseases being the top two reasons. Hospitalization rates for Jamesians are significantly higher than the rest of Quebec, a trend that persists over time (CRSSS, 2025).

Sexually Transmitted Infections and Blood-Borne Diseases

According to the CBHSSJB QPHS (2017) the rate of safe sex practices and condom use for protection against sexually transmitted infections or as a means of contraception for Cree in Eeyou Istchee are higher than in the rest of Northern Quebec. However, about four in ten sexually active individuals never used a condom in the past year. Approximately 5% of the sexually active population was diagnosed with a sexually transmitted infection, nearly five times higher than the rest of Quebec. Rates of sexually transmitted infections have likely been underestimated as some infections may be asymptomatic and may go undetected (CBHSSJB, 2017).

In 2022, INSPQ found that Eeyou Istchee had 1238 cases of chlamydia and 26 cases of syphilis while Nord-du-Québec had 120 cases of chlamydia, 22 cases of Hepatitis B, and no syphilis cases. The regions had similar numbers of gonorrhea cases (16 in Eeyou Istchee and 15 in Nord-du-Québec), while Eeyou Istchee had 5.3 cases of hepatitis C and Nord-du-Québec had none (INSPQ, 2025a).

Eeyou Istchee has higher rates of sexually transmitted infections and blood-borne diseases compared to the rest of the region. There is an increased emphasis on education and prevention for youth within the CBHSSJB, with the Chî Kayeh Iyâkwâmiih (You Too, Be Careful) school-based program aimed at promoting health and wellness connected to Cree values. The program provides information on the importance of healthy relationships, reproductive and sexual health, and sexually transmitted and blood-borne infections prevention (CBHSSJB, 2024).

Intentional Self-harm and Suicide

Mental health impacts are particularly pronounced in Cree and Jamesian communities, where levels of psychological stress, intentional self-harm, and suicide and suicide rates are higher compared to the Province of Quebec. Based on data from 2014-2015, nearly 6% of Eeyou Istchee's population seriously considered or attempted suicide within the last 12 months, double Quebec's rate (CBHSSJB, 2017). Half of those who had suicidal ideation received professional help, similar to the rest of the Province of Quebec. One-third of people in Eeyou Istchee experience high psychological distress, particularly women, indicating greater mental health challenges compared to the rest of Quebec (CBHSSJB, 2017). Additionally, a 2007-2008 study by the CBHSSJB for 506 adults showed high rates of mental health issues, 57% had a history of depression, 51% a history of anxiety, 31% violent behaviour and 17% suicide attempts. Additionally, 47% reported physical abuse, and 30% reported sexual abuse (Carlin, 2017). As of 2021, the suicide rate for Jamesians in Nord-du-Québec were 19.9 per 100,000 people, compared t 12.7 people per 100,000 in the Province of Quebec.

Health Factors of Interest

Substance Use

There are many reasons why people use substances including for medical purposes, religious or ceremonial purposes, personal enjoyment or to cope with stress trauma or pain (Government of Canada, 2024c). Substance use can fall on a spectrum that includes (Government of Canada, 2024c):

- Non-use (abstinence);

- Beneficial use, which can have a positive social, health or spiritual impacts (e.g., prescribed medication, religious use of tobacco);
- Lower-risk use (e.g., drinking or smoking cannabis following lower-risk use guidelines);
- Higher-risk use (e.g., illegal drugs, impaired driving, binge drinking);
- Addiction (e.g., compulsive and continuous substance use).

Based on data provided by the CBHSSJB for 2014-2015 (CBHSSJB, 2017), Cree people of Eeyou Istchee were reported to have higher drug use than the general population in Quebec. In general, approximately 33% of Eeyou Istchee Cree reported using drugs, compared to 17% for Quebec. For the Eeyou Istchee who were consuming drugs, 90% of cases were cannabis use. Drug use was a more common behaviour among men (CBHSSJB, 2017). Between August 2017 to April 2018, there were 97 instances of severe intoxication in Eeyou Istchee, mainly involving alcohol, cannabis, cocaine and amphetamines (CBHSSJB, 2018). Severe drug intoxication is defined as “the consumption of too much alcohol, cannabis, cocaine and/or other substances, leading to the body feeling overwhelmed and needing medical attention” (CBHSSJB, 2018). Drug use affects the whole community, but the most severe drug intoxications were witnessed in youth 15-29 (CBHSSJB, 2018). In Eeyou Istchee, less than 10% of intoxications were unintentional, and 1 in 3 were intentional often related to suicide or self-harm (CBHSSJB, 2018). The National Native Alcohol and Drug Addiction Program offers services and activities to support individuals struggling with substance abuse and reduction and prevention of alcohol and drug addiction in Eeyou Istchee (Rabbitskin Loon. J, 2025). The National Native Alcohol and Drug Addiction Program has preventative activities aimed primarily at youth, but also for the rest of the general population, anyone directly or indirectly affected by alcohol and drug use (Rabbitskin Loon. J, 2025).

In the Jamesian population, nearly 75% of individuals regularly consume alcohol. In the past 10 years, there has been a significant increase in abusive alcohol consumption (CRSSS, 2025). Jamesians are more likely to drink alcohol and start drinking at an early age compared to the rest of Quebec. Similar patterns are observed for drug use, and 30% of Jamesians smoke, raising concerns for chronic disease development (CRSSS, 2025).

In the Province of Quebec, 79.3% of individuals over the age of 15 have consumed alcohol, and out of those, 30% have consumed alcohol excessively. Excessive alcohol consumption is defined by INSPQ as “five or more drinks of alcohol (men) or four or more drinks of alcohol (women) drunk on one occasion, at least once a month” (INSPQ, 2024c) and is most prevalent for those between 18-44. The frequency of cannabis use is decreasing amongst high school youth throughout Quebec, falling from 23% to 17% between 2013 and 2019 (INSPQ, 2024c).

Physical Activity

In 2014-2015, over a third of people in Eeyou Istchee were sedentary (i.e., no activity or physical activity each week), with higher rates among women and total compared to the rest of Quebec (CBHSSJB, 2017). According to the CRSSS (2025), Jamesians sedentary levels (19%) were lower than that of the rest of Quebec (25%). In 2023, INSPQ released a “Health Report Card” for the Province of Quebec as a whole. According to this report card, the proportion of people who are active for recreation and transportation has decreased from 38% in 2014-2015 to 35% in 2020-2021 (INSPQ, 2023).

Obesity

In 2014-2015, two in three people in Eeyou Istchee were considered obese (body mass index of 30 and above) (CBHSSJB, 2017). Rates of obesity are higher for Eeyou Istchee (approximately 60-70%) when compared to the rest of Quebec (approximately 20%). Approximately 85% of individuals reported healthy weight loss methods, such as eating healthy, daily physical activity and drinking water. Over 30% of individuals reported attempting to lose weight within six months of the study (CBHSSJB, 2017).

Lavigne-Robichaud et al. (2017) noted that according to previous scientific literature, Indigenous communities (including the Eeyouch of James Bay) disproportionately suffer from obesity, abdominal fat levels, type 2 diabetes and metabolic syndrome than the general Canadian population. Information collected from 2005-2009 revealed that the prevalence of overweight Eeyouch adults was 91.6%, and the prevalence of obesity was 70.6%. Lavigne-Robichaud et al. (2017) and others have identified the primary reasons for this: loss of traditional practices, limited access to fresh and minimally processed food, and replacement of local foods with ultra process products.

Reports from the CRSSS (2025) support this scientific literature. From 2009-2010, one in five Jamesians was considered obese, and this trend has continued to rise over the past decade. Additionally, one in ten high school students in Jamesian was considered obese in 2010-2011 (CRSSS, 2025).

Obesity rates in Quebec have increased from 16% in 2008 to 23% in 2020-2021 (INSPQ, 2023). The prevalence of obesity in the province is comparable between men and women however, while 47% of Quebecer's say they are very or somewhat satisfied with their weight, a third of Quebecer's are dissatisfied with their weight, and dissatisfaction is more prevalent among women (INSPQ, 2023).

Food Security

In 2017, the CBHSSJB and the Montreal Diet Dispensary collaborated to evaluate nutritious food consumption and accessibility using the idea of the 'Nutritious Food Basket' (NFB), composed of 71 basic food items selected that are generally nutritious and generally low cost (Vinet-Lanouette and Godin, 2017).

What these authors noted is that in general having access to nutritious foods is essential for promoting health, attaining food security and preventing chronic disease. For the Cree people of Eeyou Istchee specifically, these authors found: "cost of basic nutritious foods remains higher in Eeyou Istchee than in any other studied region of Quebec; availability of basic nutritious foods improved since 2011, but nutritious food choices are still limited in certain communities; having access to a variety of low-cost nutritious foods is difficult in smaller stores; low-income and single-parent families need a large proportion of their income to purchase basic nutritious foods; eating well seems to be out of reach for low income families" (Vinet-Lanouette and Godin, 2017).

Another finding of this collaboration was that options for nutritious food were limited in certain Cree communities, and access to a wide variety of low-cost nutritious foods was difficult. Consumption of nutritious food appeared to be inaccessible for low-income and single parent families, and the cost of the NFB represented about 80% of revenue (Vinet-Lanouette and Godin, 2017).

The CRSSS (2025) states that Jamesians have improved their eating habits in the last decade, although consumption of fruits and vegetables is still low. Half of Jamesians consume nutritious fruits and vegetables less than five times a day.

Food Affordability

Based on the work by Vinet-Lanouette and Godin (2017), the median weekly cost for a NFB for:

- A family of 4 in Eeyou Istchee would be $321.93/ week;
- A family of 6 in Eeyou Istchee would be $430.0/week;
- A family of 4 in Oujé-Bougoumou would be $327.18/ (with multiple items missing);
- A family of 4 in Mistissini would be $312.35/ week.

Eeyou Istchee remains the most expensive region in Quebec, with food costs about 30% higher than Nord-du-Québec and 40% higher than Montreal (Vinette-Lanouette and Godin, 2017). Over the five years before the NFB study, food costs in Eeyou Istchee increased, where Mistissini saw a 28% rise. Nutritious food consumes a large portion of the income for single-parent and low-income families, making healthy eating unattainable for many. This is a concern, as one in four families in Eeyou Istchee live in low income.

Food Harvesting

The Eeyouch people rely on traditional foods that are hunted, fished, or gathered from the land. Key traditional foods include moose, goose, ptarmigan, caribou, and whitefish. A decline in traditional food consumption for Eeyouch is linked to increased intake of store-bought market food and greater sedentariness (Noreen et al., 2018). A large portion of the Eeyouch diet outside of traditional foods consists of ultra-processed products of poor nutritional quality. The prevalence of these processed products is likely due to their ubiquity in rural and remote stores, as well as the use of flavor enhancers, sugar, and sodium, which create cheap and highly palatable products (Noreen et al., 2018). Evidence of a compromised diet and increased sedentariness in Eeyou Istchee is reflected in the rise of nutrition-related chronic diseases such as insulin resistance, type 2 diabetes, and cardiovascular disease (Noreen et al., 2018). Factors influencing traditional foods consumption among Indigenous groups include community remoteness, having a hunter in the family, being physically active, participating in traditional activities, food sharing practices, and the high cost of market food (Noreen et al., 2018).

Furthermore, Baric et al. (2025) performed a cross-sectional analysis of the Canadian Health Measures Survey from 2016/2017 and 2018/2019. their results highlighted the fact that ultra processed food uptake is linked to unfavourable body mass index, waist circumference, diastolic blood pressure, blood glucose, and other cardiometabolic markers such as high-sensitivity c-reactive protein, white blood cells, fasting insulin and fasting triglycerides. The study by Baric et al. reflects the fact that there is a relationship between the consumption of ultra processed products and diet-related illnesses. For the Cree and Jamesians, a reduction in traditional activities can be linked to a decrease in traditional food consumption, which can increase the risk of diet-related illnesses.

Obstacles to procuring traditional foods may stem from a lack of transmission of traditional knowledge of hunting and preserving traditional foods, the time, cost, and energy associated with harvesting activities, the seasonal availability of game and fish, climate change, and labor opportunities (Noreen et al., 2018).

Children and Youth

The CBHSSJB Regional Action Plan, written by Dr. Robert Carlin in 2017 released in 2021 highlights alarmingly high rates of children and youth entering youth protection in Eeyou Istchee, significantly higher than any other region in Quebec, known to be a cause of later mental and behavioral problems. Although the proportion of youth in Eeyou Istchee leaving school before completion dropped from 90% in 2009-2010 to 55% in 2011-2012, it remains higher than the rest of Quebec at 16% (Carlin, 2017). From 2008-2012, nearly 1 in 5 babies was born to a teenage mother, and 33.5% of mothers had less than 11 years of schooling, compared to 6% in the rest of Quebec (Carlin, 2017). Teenage parenthood and lower levels of schooling for young parents can become risk factors for maternal and infant health.

The CBHSSJB 2023-2024 annual report highlights the various services being provided to support youth in the region (CBHSSJB, 2024). Youth Healing Services contributes to the protection, rehabilitation, and wellbeing of youth through programs offering safety, security, and treatment. Youth Healing Services facilities in Mistissini and Chisasibi are accessible to youth from all communities in Eeyou Istchee. The Department of Youth Protection provides protection for those under 18 whose security and development are compromised and strives to incorporate Eeyou-Eenou culture and language in their services. The Youth Protection and Youth Criminal Justice teams collaborate to provide legal, administrative, and liaison support, with the Youth Criminal Justice team visiting schools to promote awareness of Youth Criminal Justice laws, principles, and procedures (CBHSSJB, 2024). Although there is expansive data on Cree children and youth, data is lacking for Jamesian children and youth.

According to Statistics Canada, 16.4% of the Quebec population is composed of children 0-14 years of age (Statistics Canada, 2021). The prevalence of attention deficit hyperactive disorder for those aged 1-24 has quadrupled over the past 20 years and is twice as common in males compared to females (INSPQ, 2024d). Autism spectrum disorder has also been increasing in Quebec, with three to four times more boys than girls diagnosed with autism spectrum disorder (INSPQ, 2024d). The vulnerability of kindergarten children is also monitored to investigate youth development. In Quebec, 29% of kindergarten children are vulnerable in at least one area of development, where differences vary according to sex, age, level of deprivation, mother tongue, place of birth and childcare setting (INSPQ, 2024d).

22.2.3.3 Mental Health and Social Wellbeing

In addition to considerations to physical health, changes to overall “health conditions” can occur as a result of changes to mental health and social wellbeing. The state of mental health can be assessed by understanding the rates of mental illness, which is the reduced ability to function effectively over a prolonged period due to factors such as levels of distress, changes in thinking, mood or behaviour, feelings of isolation, loneliness or sadness and the feeling of being disconnected from people and activities (Government of Canada, 2017). Based on the definitions of mental health, indicators include mental illness conditions (e.g., rates of anxiety, depression and other mood disorders), sense of belonging, life satisfaction, perceived fear and substance use. Substance use is considered a mental health indicator because substance use is strongly influenced by mental health conditions (Mental Health

Commission of Canada, 2024). These factors may be caused by genetics and environmental influences on a fetus, early life experiences, stressful life events, and the social determinants of health (Government of Canada, 2017).

Mental health, mental illness and social wellbeing have overlapping indicators. For the purposes of this assessment, terms such as social wellbeing, social connectedness, and community cohesion among others, are used interchangeably and generally refer to the building of relationships and social networks to foster social integration into a larger community to feel connected and to have a community support system (Statistics Canada, 2022b). There are linkages between mental health conditions and physical health conditions; for instance, people who have chronic physical health conditions are at risk of developing mental illnesses (Canadian Mental Health Association, 2024).

The Quality-of-Life Framework for Canada identifies several indicators for social cohesion and connection including (Statistics Canada, 2023b):

- Sense of belonging to a local community;
- Someone to count on;
- Trust in others;
- Volunteering;
- Satisfaction with personal relationship (family and friends);
- Loneliness;
- Accessible environments.

Many of the aforementioned indicators are primarily reported at the provincial or national level and not disaggregated at the regional level. Due to the availability of data for the health regions, for the purposes of this assessment, mental health and social well-being are described in terms of perceived mental health and life stress, sense of belonging, life satisfaction and indicators related to family relationships (e.g., marital status).

The Ontario Ministry of Community Safety and Correctional Services (2021) defines community safety and well-being as “The ideal state of a sustainable community where everyone is safe, has a sense of belonging, opportunities to participate, and where individuals and families are able to meet their needs for education, health care, food, housing, income, and social and cultural expression.” Potential changes in community safety are inherently linked to changes in physical health and mental health and social wellbeing. As identified above, Project activities have the potential to lead to adverse and positive effects on physical health and mental health and social wellbeing.

Perceived mental health and life stress

Data regarding perceived mental health and life stress for the Région des Terres-Cries-de-la-Baie-James, Région du Nord-du-Québec and the Province of Quebec comes from the Statistics Canada 2011 (Table 22.19). There is not a large difference in perceived mental health between Région du Nord-du-Québec and Quebec. The 2011 Census has gaps in the data for the Région des Terres-Cries-de-la-Baie-James.

Table 22.19 Perceived health, very good or excellent, perceived mental health, very good or excellent, perceived life stress (%)

	Région des Terres-Cries-de-la-Baie-James (Cree)			Région du Nord-du-Québec (Jamesian)			Province of Québec		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
Perceived health, very good or excellent	-	-	-	59.1	59.7	58.4	59.5	59.9	59.2
Perceived mental health, very good or excellent	-	-	-	72.1	71.2	73.1	74.9	76.3	73.5
Perceived life stress	-	-	-	24.4	23.7	25.2	27.3	26.2	28.4

Source: Statistics Canada, 2013

Marleau (2024) prepared a health fact sheet summarizing the 2021-2021 QPHS data. It includes information on the health status and determinants of health for the province and the health regions. Physical and mental health status can be seen in table 22.20.

Table 22.20 Physical and mental health status, EQSP 2020-2021, Northern Quebec and Quebec as a whole

Physical and Mental Health Status	Nord-du-Québec (Jamesian)	Province of Québec
Not perceiving oneself as healthy (%)	11	11
Unintentional injury (%)	13	12
Psychological distress (%)	34	39
Generalized anxiety (%)	8	11
Considering suicide during one's lifetime (%)	11	10
Post-traumatic stress (%)	4	5

Source: (Marleau, 2024)

Nord-du-Québec and the province exhibit similar rates of perceived health as good, unintentional injuries suicidal ideation and prevalence of PTSD diagnoses. However, rates of psychological distress and rates of moderate or generalized anxiety disorder are lower in Nord-du-Québec (Marleau, 2024).

Sense of Belonging and Life Satisfaction

Data regarding a sense of community belonging and life satisfaction comes from the Statistics Canada 2011 Census, which can be seen in table 22.20. Sense of belonging in Nord-du-Québec (81.8%) is higher than that of the province (57.2%). Life satisfaction is comparable between the Région du Nord-du-Québec (96.8%) and the rest of the province (93.8%). The 2011 Census has gaps in the data for the Région des Terres-Cries-de-la-Baie-James.

According to the health report card, Quebecers' satisfaction with their social life is decreasing. In 2014-2015, 7% of people say they were dissatisfied with their social life, which rose to 15% dissatisfaction in 2020-2021 (INSPQ, 2023). This increase was observed equally amongst men and women, and very likely was impacted by COVID-19 (INSPQ, 2023).

Table 22.21 Sense of Community Belonging and Life Satisfaction, Satisfied or Very Satisfied (%)

	Région des Terres-Cries-de-la-Baie-James (Cree)			Région du Nord-du-Québec (Jamesian)			Province of Québec		
	total	Men+	Women+	total	Men+	Women+	total	Men+	Women+
Sense of community belonging (%)	-	-	-	81.8	83.3	80.3	57.2	56.3	58.1
Life satisfaction, satisfied or very satisfied (%)	-	-	-	96.8	97.0	96.5	93.8	93.6	94.0

Source: Statistics Canada, 2013

Family Dynamics/Relationships

Negative family dynamics can impact health, with children in such environments facing a higher likelihood of diseases like heart and lung conditions, obesity, and mental health issues, along with a propensity for substance abuse and addiction later in life. Additionally, these dynamics are linked to poor sleep, elevated heart rates and blood pressure, and potentially harmful coping strategies. Family-level environments are affected by separation, divorce, and lone-parent status.

Based on the Statistics Canada 2021 Census data, there is substantial variability amongst the health regions within the LSA/RSA with regards to the proportion of married couples (Table 22.2). The rates of individuals not married and not living common-law are higher in the Région des Terres-Cries-de-la-Baie-James (51.2%) compared to Québec (44.2%), the rates of the Région du Nord-du-Québec (23.3%) are lower.

The marital status within the LSA/RSA is slightly varied. The percentage of married individuals in both health regions and the Province of Quebec are all similar (approximately 30%). The percentage of people who are living common-law are the lowest for the Cree health region, followed by the Province of Quebec, and the highest amount of people living common-law is for the Jamesian health region. The percentage of people who are not married and who are not living common-law are the highest for the Cree health region, followed by the Province of Quebec and lowest for the Jamesian health region.

Table 22.22 Marital Status: Married, Common-law, not married and not common law (%)

	Région des Terres-Cries-de-la-Baie-James (Cree)	Région du Nord-du-Québec (Jamesian)	Province of Québec
Married	32.8	30.1	32.5
Living common-law	15.4	32.0	23.3
Not married and not living common-law	51.7	37.9	44.2

Source: Statistics Canada 2022a

22.2.3.4 Community Safety

Intimate Partner Violence

Intimate partner violence refers to multiple forms of harm cause by a current or former intimate partner or spouse (Government of Canada, 2020). Relationship violence can affect victims in multiple ways including damage to self-esteem, loss of sense of safety, financial instability, damage to personal development and ability to actively participate in society, physical injury, mental health and STIs (RCMP, 2021).

Based on data provided by the Government of Canada (2020):

- 79% of Canadians who experienced intimate partner violence in 2019 were women;
- Among Canadians who experienced intimate partner violence, women are four times more likely than men to have been afraid of a partner;
- Indigenous women in Canada (61%) were more likely to have experienced intimate partner violence in their lifetime than non-Indigenous women (44%);
- 2SLGBTQI+ persons and women living with disabilities also experience higher prevalence of intimate partner violence.

Other Violence and Crime

Although data on the specific LSA/RSA is lacking, the Royal Canadian Mounted Police (RCMP) led a study of reported incidents of missing and murdered Indigenous women across all police jurisdictions in Canada (RCMP, 2014). The study found that Indigenous women are at a greater risk of being victimized for violent crime, with 1,181 police recorded incidents of female homicides between 1980 and 2012, and cases of missing Indigenous women dating back to 1951 (RCMP, 2014). Of these reports, 164 missing and 1,071 homicide victims were Indigenous women and girls, making them over-represented amongst missing and murdered women in Canada (RCMP, 2014). The Statistics Canada Homicide Report from 2009 to 2021 found that Indigenous women are six times more likely to be the victim of a homicide than non-Indigenous women (Statistics Canada, 2023a). The most likely perpetrators of violent crime towards Indigenous women were acquaintances (30%) and spouses (29%), followed by family members and intimate relationships (RCMP, 2014).

22.2.4 Environmental Quality

The construction, operation, and decommissioning and closure of the Project has the potential to alter environmental quality. Consistent with the Tailored Impact Statement Guidelines for the Project, aspects of the biophysical environment associated with Health Conditions are:

- Air quality;
- Noise and vibration;
- Light;
- Quality of traditional foods taken from the wild; and
- Quality of water for drinking and recreational and cultural uses.

Evaluations of existing conditions with respect to atmospheric and acoustic conditions (i.e., air, and noise), abiotic media (soil and surface water), and country foods (fish, wild meat, and terrestrial and aquatic plants) are relevant to health. Detailed information about these evaluations is found in Chapter 8 (Atmospheric Environment), Chapter 9 (Acoustic Environment), Chapter 12 (Surface Water), and the inhalation Human Health Risk Assessment (HHRA) and a Human Health Risk Assessment Problem Formulation (Multimedia; Appendix H.7 and H.8, respectively) of the Impact Statement. A summary of these evaluations is provided below.

- Background air quality data published by the Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP) was used to characterize air quality in the LSA and to develop background concentration levels to be used in the assessment. Project-specific ambient monitoring was not conducted. Where background concentrations for contaminants of potential concern were not available from MELCCFP, representative ambient monitoring data from another proposed mining project located approximately 42 km north of the City of Timmins, Ontario, was used to estimate background contaminants of potential concern concentrations.
- Baseline noise data were collected at three receptor points during the month of October 2023, continuously over 72 hours, from 17 to 20 October from 12 noon to 12 noon. Specifically, the first point represents a main camp located on the shore of Lake A (according to Troilus, this camp will be relocated before construction of the mine begins), the second represents a main camp and secondary camps as well as an outfitter at the edge of Mine road and Troilus Lake, and the third represents a main camp located on the edge of the Route du Nord. Sound levels measured during this period ranged from 31 dBA (Leq) to 46 dBA (Leq).
- The ambient light environment in the Project and surrounding area was, depending on season, characterized as “dark” for skyglow, light trespass and glare.
- Soil and surface water: Baseline soil samples were collected in 2024, and baseline sediment and surface water samples were collected between 2019 and 2023.
- Country food: baseline country food information was collected through sampling of fish (lake whitefish, northern pike, walleye, and smaller forage fish) and terrestrial vegetation (blueberries, Labrador tea, and other plants) in 2024.

22.3 Project Interactions with Health

Table 22.23 identifies the physical activities that might interact with the VC and result in potential impacts. These interactions are indicated by a check mark or a dash and are discussed in detail in section 22.4, in the context of impacts pathways, standard and project-specific mitigation/enhancement, and residual impacts.

Table 22.23 Project Interactions with Health

Physical Activities	Change in Health Conditions (physical health, mental health and social wellbeing and community safety)
Construction	
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PDA.	√
Tree cutting, vegetation clearing, soil stripping and earthworks.	√
Handling and use of explosives, including blasting	√
Construction of temporary and permanent buildings, including wastewater treatment system and drinking water collection and distribution system.	√
Construction of mining infrastructures such as stockpiles, pits and the raising of tailings management facility (TMF).	√
Construction of roads and preparation of construction surfaces including the crushing of material used for construction. Relocation of a section of the access road and power line.	√
Construction of water management systems including ditches, diversion channel, sedimentation ponds and the water treatment plant.	√
Dewatering of natural water bodies and pits, lowering water level in tailings management facility and management of contact water.	√
Diversion of Bibou Creek (CE2).	√
Management of waste materials, including hazardous waste.	√
Purchases of goods and services	√
Employment	√
Operation	
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PDA.	√
Handling and use of explosives, including blasting	√
Ore extraction from pits including drilling and hauling of waste rock.	√
Ore, waste rock and tailings storage.	√
Ore processing including conveyor, crushing, loading and hauling on site.	√
Transportation of concentrate to a smelter or a wharf.	√
Management and treatment of water on the mine site and to the environment, including drainage and contact water.	√
Progressive reclamation of disturbed areas.	√
Management of waste materials, including hazardous waste.	√
Purchases of goods and services	√
Employment	√
Decommissioning and Closure	

Physical Activities	Change in Health Conditions (physical health, mental health and social wellbeing and community safety)
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PDA.	√
Decommissioning, dismantling and disposal of buildings and equipment.	√
Pits flooding, surface and groundwater management.	√
Reclamation of disturbed areas, including earthworks, placement of overburden and revegetation.	√
Management of waste materials, including hazardous waste.	√
Purchases of goods and services	√
Employment	√

Notes:
√ = Potential interaction
– = No interaction

22.4 Assessment of Residual Impact on Health Conditions

There are three main activities during the Project that can lead to impacts on Health Conditions:

4. the physical presence of the mine;
5. the release of contaminants from mine activities (into air and water);
6. the influx of workers to communities and the worker camp.

There are also three main pathways that link these Project activities to potential impacts, each with its own set of measurable parameters (figure 22.1; table 22.4). The pathways that link these Project activities (figure 22.2) to measurable parameters of Health Conditions are:

- Changes in land use;
- Changes in environmental quality;
- Changes in population dynamics.

22.4.1 Analytical Assessment Techniques

The assessment of residual impacts on Health Conditions draws on related VCs and uses analytical assessment techniques and assumptions identified in Atmospheric Environment (Chapter 8), Acoustic Environment (Chapter 9), Surface Water (Chapter 12), Economy (Chapter 21), Land Use (Chapter 19), of the Impact Statement. The assessment of residual effects on health is also supported by the inhalation HHRA and HHRA Problem Formulation (Multimedia) (Appendix H.7 and H.8, respectively of this Chapter).

The assessment of residual impacts on Health Conditions uses both quantitative and qualitative methods. For residual effects related to changes in environmental quality (those associated with biophysical determinants of health), the assessment was primarily quantitative in nature, with conclusions drawn from comparisons of estimated environmental changes to regulatory thresholds. For example, sleep

disturbance was assessed by comparing estimated nighttime noise levels (Ln) to Health Canada's annual limit of 40 dBA, and non-cancer risks (HQ) from exposure to chemicals in air were compared to Health Canada's threshold of risk acceptability. For residual effects related to changes on land use and population dynamics, (those primarily associated with social determinants of health), the assessment was qualitative in nature with conclusions drawn based on academic, government, and industry literature, input from potentially affected Indigenous nations and the public health unit, and professional judgment.

A GBA Plus process has been applied throughout the residual effects assessment by describing how different segments of the population identified in table 22.6 may disproportionately experience Project-related effects on health.

22.4.2 Change in Health Conditions

22.4.2.1 Project Pathways

Change in Land Use

Change in land use can be linked to Health Conditions through the following measurable parameters:

- Food security (country food, market food availability and harvesting practices);
- Sense of belonging to a community;
- Family and relationship dynamics;
- Traffic changes.

Food Security (Country Food and Market Food Availability and Harvesting Practices)

Land use changes associated with the Project may impact food security for Indigenous and non-Indigenous peoples by affecting country and market food availability and harvesting practices. As noted in section 22.1.2, Troilus engaged with potentially affected Indigenous nations, regulators, the public, and other stakeholders. From November 5-7, 2024, Stantec led discussions with tallyman that rely on traplines near and around the PDA and within the LSA. Interviewees stated that they predominantly hunt in the area around the Project for moose, caribou, bear, goose, ptarmigan, rabbit and small birds, as well as beaver trapping and fishing for sustenance. One interviewee estimated that 70% of his food is wild caught, and that this food is used to feed approximately 60 people. The remainder (30%) of their food comes from the store. Another interviewee mentioned that there used to be a lot of moose in the previous mine area, but during the operation of the previous mine, no moose were seen. It was also stated that moose are now coming back to the area.

Shafiee et al. (2022) explained that when traditional foods are limited, there is a shift from locally procured foods to a greater reliance on market foods. In general, market foods tend to be lower quality and nutrient poor compared to locally grown foods, and specifically in remote areas where Indigenous communities are often located, the quality of market foods is even worse (Shafiee et al., 2022). What is more, Indigenous communities often lack grocery stores, resulting in people shopping at local convenience stores, where the likelihood of consuming ultra-processed products is high (Shafiee et al., 2022). As shown in section 22.2.3.3, the cost of nutritious food in Eeyou Istchee is higher than any other region in

Quebec, and nutritious food choices are variable within the communities (Vinette-Lanouette and Godin, 2017). Lavigne-Robichaud et al. (2017) conducted a study about diet quality and physical health of Indigenous Cree in northern Quebec from seven James Bay communities. Based on results from 811 adults older than 18 years of age, findings revealed that metabolic syndrome (type II diabetes and cardiovascular disease) was prevalent in approximately 57% of participants, which is approximately 2.7 times higher than the rest of the Canadian population (as cited by Lavigne-Robichaud et al.). In this cohort, metabolic syndrome was statistically associated with the consumption of ultra-processed products. A diet primarily made of market foods can lead to a loss of health benefits associated with a traditional food diet. For example, a traditional food diet offers protection from insulin resistance, a precursor to diabetes (Noreen et al., 2018), and Shafiee et al. (2022) states that the "intake of traditional foods, even in limited amounts, improves diet quality of Indigenous peoples".

Project-related income and employment opportunities may also alter food security for Indigenous and non-Indigenous community members or employees. This could lead to an increase in market food and subsequent consumption of ultra-processed products, which as mentioned above and in section 22.2.3, is linked to negative physical health outcomes. Conversely, Project-related income could also benefit low-income families in the area by affording them with healthier food options and decreased risk for diet related chronic illnesses.

Potential changes in land use can also impact harvesting practices such as Indigenous people's ability to hunt and gather traditional food because of reduced areas available for hunting and fishing and possible changes in animal presence. Traditional food is consumed by 99.7% of the population in Eeyou Istchee (Noreen et al., 2018). The CBHSSJB states that for Cree peoples, "what we eat – where it comes from, how it is cooked – affects our health in many ways. Traditional Cree diets, where people still mostly eat what they hunt, trap, fish, and gather, have been found to promote health and long life" (CBHSSJB, 2015).

Sense of Belonging to Community

Changes in land use resulting from the Project's presence may affect the sense of belonging to community for Indigenous and non-Indigenous members of the community. During interviews conducted with members of the Jamesian community (see Chapter 4 for details), individuals in the area identified the importance of community involvement in the Project. They noted the benefit of promoting volunteerism and community engagement amongst employees, which would help facilitate a sense of belonging to the community.

Additionally, engagement with the Cree community members highlighted the importance of ongoing engagement, regular consultations, and protection of areas of environmental importance - such as rivers that are used for harvesting and drinking water.

According to Norreen et al. (2018) "The Eeyouch First Nations in the northern part of the Province of Quebec are still reliant on foods that are hunted, fished, trapped or gathered from the land, for sustenance and to provide a sense of cultural connectedness, spirituality, social cohesion, cultural identity and physical activity through procurement activities". Interviews of local community members conducted by Stantec support the statement of Norreen et al. (2018), highlighting the continued importance of traditional food harvesting and other land-based practices.

Mining, like many other projects (e.g., oil and gas extraction, hydroelectric power generation), can be associated with various mental wellness impacts, including fear, anxiety, depression, anger, a sense of loss (solastalgia), loss of self-esteem, loss of agency, feelings of injustice, domestic issues and reduced social cohesion (Salerno et al., 2021). The loss and alteration of culturally important sites may reduce opportunities for knowledge transmission, adversely affecting cultural continuity. This disruption is connected to the mental and social well-being of Indigenous peoples (Salerno et al., 2021). A decline in land-based activities such as harvesting (as noted above) and cultural events may impact cultural continuity, as these events are known to positively affects mental health outcomes such as identity and self-esteem and coping skills (Loppie and Wien, 2022). Aalhus et al. (2018) further support this connection, stating that “resource development projects can negatively impact important cultural and spiritual connections to land and water suggest that these connections cannot be remedied through economic compensation alone.

For Indigenous and non-Indigenous community members, there are a variety of outdoor recreational land uses and water-based activities in the LSA that can contribute to a sense of community belonging and can be affected by the physical presence of the Project. For example, recreational land use that involves sport and traditional fishing, sport and traditional hunting, camping, snowmobiling, all terrain vehicle use, and hiking) could be affected. Construction, operations, and decommissioning and closure phases of the Project can reduce the available land base for these recreational activities, and recreational users in the LSA may also be affected by sensory disturbance (e.g., noise, visual) resulting from Project activities. These include outfitters which offer lodging and fishing packages, as well as snowmobile and all terrain vehicle trails. Timber areas within the PDA would be cleared as part of site preparation, as well as through the construction of mine facilities, TMF (Tailings Management Facility), linear facilities, and diversion of Bibou Creek. These land use changes could alter how people use traditional lands, thereby affecting their activity levels and food security and potentially resulting in changes to behavioural and physical health.

Family and Relationship Dynamics

In the Stantec led engagement with community members from November 5th-7th, 2024, participants highlighted concerns of trapline boundary disputes that introduce the potential for conflict within and between families. As well, some participants noted that the physical presence of the previous Troilus mine resulted in friction “between cultures” and expressed concern about the potential for the Project to divide families. The potential hostility amongst Indigenous communities can lead to potential changes to relationship dynamics. Some community members noted that the physical presence of the previous Troilus mine resulted in friction “between cultures” and expressed concern about the potential for the Project to divide families.

According to Salerno et al. (2021), for many Indigenous peoples, cultural practices are intertwined with social practices. Sharing of foods harvested and hunted, traditional medicine, ceremonial and spiritual traditions and knowledge transfer are all centred on the idea of family and community, and their collective wellbeing. The ability to rely on family and friends for support is a common societal norm for Indigenous communities. There is an emphasis on balance between the individual and the community, and the integration of oneself into broader social and cultural groups being integral to one’s health (Salerno et al.,

2021). Changes in land use have the potential to alter these family and relationship dynamics by creating land and nuisance related changes that disrupt the cohesion of cultural practices and community.

Traffic Changes

The influx of people and vehicles associated with the Project has the potential to cause changes in traffic patterns.

The PDA is served by three main roads:

- Route-du-Nord: a local unpaved road, 405 km long, providing access to the southeastern portion of Eeyou Istchee. It was used during previous Troilus Mine operations;
- Route 167: a national highway, fully paved, connecting the Saguenay-Lac-Saint-Jean region. It links Mistissini and Saint-Felicien via Chibougamau;
- Route 113: another national highway, forming the east-west road transport corridor between Lebel-sur-Quévillon and Route 167 near Chibougamau.

The PDA is accessible by road from Chibougamau, Chapais and Mistissini. The junction to the Project is located around kilometer point 108 on Route-du-Nord. In Eeyou Istchee, the most heavily used roads are between Chibougamau and Chapais.

During interviews conducted with members of the Jamesian community (see Chapter 4 for details), participants requested the potential use of bypasses to avoid towns, and to prohibit use of personal vehicles at the mine site to minimize traffic. Additionally, Jamesian individuals requested that the Troilus team keeps a close eye on shuttle drivers to ensure that they are complying with speed limits. Interviewees also mentioned to Troilus that there is a telephone gap on the road, and requested that they take steps to fill the phone gap. Community members expressed a desire to be kept informed about daily truck activity, anticipated increases in construction traffic, and the establishment of agreements to minimize road damage caused by non-standard trucks.

As of 2024, the most heavily used road segments were between Chapais and Chibougamau. The average daily flow on the Route-du-Nord of the forest road L-229 and access road to the Troilus mine saw a rise in traffic flow from 100 vehicles per day in 2017 to 250 per day in 2018 (150% increase). Between 2018 to 2022, traffic volumes remained relatively stable, fluctuating slightly between 250 and 260 vehicles per day between 2018 and 2022 (~4% increase) (see Chapter 20)..Traffic volumes are higher on major roads such as Route 167 South from the southern limit of the city of Chibougamau and Route 113, which leads to Chapais and Oujé-Bougoumou increased from 14% in 2022 to 20% in 2023 (LGA, 2024). These communities have sufficient infrastructure to support an influx of traffic, with various major roadways. Additionally, numerous logging roads across the LSA/RSA connect to the Route-du-Nord, enhancing traffic capacity throughout all phases of the Project.

As noted in Chapter 3 (Project Description), employee transport to the Troilus mine site will be done by road (as was the case during the historical operation of the mine). Employees will travel by bus from one of three hubs in the surrounding communities of Mistissini, Chibougamau and Chapais. As well, copper-gold concentrate will likely be transported from the mine by closed 40-tonne trucks to the Horne smelter.

Assuming 40-tonne trucks are used, Troilus estimates that the transport of the concentrate will represent 6 trips per day. The distances and estimated durations of the proposed routes are 551 km and 7 hours for the transport of concentrate to the port of Saguenay and 691 km for an estimated duration of 8 hours and 30 minutes for the transport of concentrate to the Horne Factory.

The physical presence of the mine, across all phases of the Project, may result in changes in land use and traffic patterns. Project-related traffic and changes in land use can cause movement and habitat alterations due to increased worker presence. These changes are linked to changes in food security, sense of belonging and family dynamics, as discussed above.

GBA Plus Considerations

As described in section 22.2.1, a GBA Plus process has been applied throughout this VC to the extent possible given available information. Where feasible, indicators have been disaggregated by segments of the population (e.g., gender, Indigeneity, sexual orientation, and socioeconomic status) to describe disproportionate changes in Health Conditions.

Project-related changes in land use could disproportionately impact Indigenous communities, particularly women, who rely on traditional lands for harvesting (i.e., gathering food), recreation and sustenance (i.e., consuming food). As mentioned in section 22.4.2.1.1, Indigenous peoples' sense of belonging, community, and primary means of sustenance are deeply intertwined with a connection to the natural land. Potential disruptions to Indigenous peoples harvesting practices due to the physical presence of the Project could lead to adverse physical and mental health outcomes.

The physical presence of the Project can also result in changes to Health Conditions based on changes to family and relationship dynamics, disproportionately impacting Indigenous communities. Through engagement with tallymen, a common concern was adverse impacts on trapline boundaries that results in conflict and altered community dynamics, dividing neighbouring tallymen, and creating an unhealthy atmosphere. The concerns expressed by the participants can have disproportionate impacts on the Indigenous communities in the area. Changes to trapline boundaries and altered family and relationship dynamics are closely linked to sense of belonging, wellbeing and mental and social wellbeing within Indigenous communities, was explored in section 22.4.2.1.

22.4.2.1.2 – Change in Environmental Quality

Changes in environmental quality can be linked to Health Conditions through the following measurable parameters:

- Food security (country food, market food availability and harvesting practices);
- Sense of belonging to a community;
- Traffic changes;
- Annoyance;
- Health risk;
- Sleep disturbance;

- Light trespass; and
- Chronic illness.

Food Security (Country Food and Market Food Availability and Harvesting Practices)

The release of Project-related contaminants could result in changes in environmental quality, which may impact food security for Indigenous and non-Indigenous peoples by affecting country and market food availability and harvesting practices. During interviews conducted with members of the local Jamesian and Cree community (see Chapter 4 for details), people highlighted concerns regarding the importance of preserving aquatic and terrestrial wildlife, protecting status species, ensuring water quality for drinking supplies, and prioritizing the return of flora and fauna from past and future Troilus mine activities. Community concerns about changes to environmental quality related to the Project include metal exceedances in water (e.g., aluminum, cadmium, copper and zinc) and contamination of aquatic life such as fish due to mercury and other metals from previous mining activities in Lake A.

Additionally, members of the Cree community also expressed concerns about potential cyanide and silica emissions from Project-related dust. Community members are also worried about previous and potential future loss of flora and fauna from Project activities and environmental contamination. Loss of flora and fauna is directly related to decreased country food security and availability.

A reduction in consumption of harvested foods as a result of actual or perceived changes in changes in environmental quality may contribute to a change in dietary practices as households may seek alternative sources that can be less nutritious, contributing to an increased risk of diet-related chronic diseases (refer to section 22.4.2.1.1 for additional details). Project-related changes in environmental quality can also impact mental health and well-being due to the complex integration of traditional foods to a sense of belonging.

Sense of Belonging to Community

The Project's physical presence can alter environmental quality, affecting the sense of belonging for both Indigenous and non-Indigenous peoples. Changes in air, water, soil, and country foods, along with increased noise and light, may cause stress. This stress can lead to unhealthy coping mechanisms like smoking, drinking, drug use, and social isolation, which can diminish a person's sense of community. Additionally, real or perceived Project-related contamination can limit activities like harvesting, hunting, and trapping, reducing connections to the land. Together, these environmental changes can decrease people's sense of community and overall health and wellbeing.

A case study about the Pictou Landing First Nation, summarized by Lewis et al. (2021), illustrates how changes in environmental quality by an industrial project can affect health and wellbeing. Community members were concerned about contamination in a culturally significant water body due to the long-term release of pulp and paper mill effluent. Lewis et al. (2021) found that:

- 88% of participants reported good to excellent physical health when they were not fearful of their environment, compared to only 45% when they were fearful,

- 84% of participants felt depressed when fearful, whereas 63% felt depressed when not fearful. Fear of the environment did not seem to affect happiness, which Leweis et al. hypothesized might be a coping strategy,
- 85% of those fearful of their environment considered spirituality important, compared to 67% of those who were not fearful.

This study suggests that physical and mental health outcomes are directly linked to a fear of degradation of the environment. Physical and mental health outcomes are discernably linked to a reduction in sense of belonging. This change in sense of belonging can lead to a reduction in activities that help people feel connection to the land (e.g., harvesting, trapping). The altered sense of community belonging can then impact physical health through a decreased connection to land and availability of traditional food, as well as mental health and wellbeing.

Health Risk

Physical health can be affected by Project-related changes in environmental quality. Actual or perceived changes in chemical concentrations in air, water, soil, and country foods, and alterations in noise and light levels, can lead to toxicological and behavioural changes. For example, chemicals (referred to as contaminants of potential concern or CoPCs), associated with construction, operations, and decommissioning and closure phases of the Project can be released to the air and subsequently inhaled by people in the LSA. Additionally, chemicals in air can be deposited onto soils and vegetation that people within the LSA might consume. As mentioned in section 22.4.2.1.1, tallymen interviewed in the community expressed concerns related to chemical exposure from Project activities. In particular, the interviewees were concerned about water quality with regards to metals such as aluminum, cadmium, copper and zinc, and concern for individuals drinking this water. They were also concerned about mercury and other metals in fish and cyanides and silica in dust.

Through engagement with local Jamesian individuals, people expressed concern regarding dust, noise and vibrations coming from Project-related transportation. Jamesian individuals expressed concern for wildlife who may incidentally ingest dust or sand, and subsequent risk to humans from consumption of affected wildlife. Regarding community concern from Project-related transportation, in all phases of the Project, an increased vehicular presence can lead to environmental changes through increased vehicle emissions.

During engagement with local community members, the tallymen expressed the importance of harvesting, hunting and trapping year-round, where harvesting occurs for food and traditional medicine. In an interview with tallymen of a nearby trapline, they spoke of harvesting large game for family and friends for sustenance through the winter. Another tallyman expressed concerns about potential contamination of nearby waterbodies. Furthermore, he expressed that in previous mine operation, Lake A changed in colour and was “sticky” due to flocculent, deterring people from drinking from this lake, as well as an increased presence of iron in the water.

The concerns from the Indigenous community regarding perceived risk may result in decreased harvesting due to fear of contamination. Changes in land use may result in changes to physical health as

well as mental health and well-being for Indigenous peoples due to the intrinsically linked relationship between the health of the environment and the wellbeing of the Cree people.

The Project has the potential to alter baseline conditions with respect to the concentrations of chemicals in air, soil, water, and biota (country foods) in the LSA and RSA. As such, and as noted above, an inhalation HHRA and an HHRA Problem Formulation (Multimedia) (Appendix H.7 and H.8, respectively of this Chapter) were conducted to characterize risks associated with these potential changes to the environment. In the context of this Impact Statement, HHRA evaluates the potential change in health risk to people that may occur between baseline environmental conditions and estimated future conditions, during the various phases of the Project.

Based on information about human activities in the LSA, three potential human receptor groups were identified to represent human receptors within the HHRAs.

- **Indigenous Receptors:** This group includes Indigenous people who may live within the LSA or use the lands within the LSA for harvesting of country foods, or for recreational, ceremonial or spiritual purposes. This receptor group encompasses individuals of all ages - infants, toddlers, children, teens, and adults.
- **Recreational Receptors:** This group includes non-Indigenous people who may use the lands within the LSA for harvesting country foods or engaging in recreational activities. This receptor group also includes all ages - infants, toddlers, children, teens, and adults.
- **Off-Duty Worker Receptors:** This group includes workers who are present in the worker camp during their off-duty period. These receptors are evaluated only while they are in the worker camp.

Where applicable, three scenarios were considered for potential changes in risk for these receptor groups.

- **Baseline Scenario:** evaluates the existing exposures and health risks based on existing chemical concentrations in environmental media.
- **Project Alone Scenario:** evaluates health risks associated with exposure to estimated chemical concentrations in environmental media that are attributable only to project activities (i.e. these do not consider the contribution that Baseline Scenario concentrations make to overall exposure).
- **Baseline Plus Project Scenario:** evaluates the future health risks based on the estimated chemical concentrations in environmental media, as determined through detailed modelling from other Valued Component chapters (e.g. air quality). These modelling results are used to estimate the future chemical concentrations in exposure media that human receptors may be exposed to (e.g., air).

In the HHRA Problem Formulation (Multimedia), baseline conditions and Project-related changes of metals (i.e., CoPCs) in soil, vegetation, groundwater, surface water, and fish were characterized based on deposition. Based on this characterization, consumption of fish by Indigenous and Recreational Receptors was identified as the only complete exposure pathway (figure 22.5) requiring more detailed assessment from predicted Project-related changes (refer to Appendix H.8 and section 22.2.2.3 below).

In the inhalation HHRA, baseline conditions and Project-related changes of several CoPCs were characterized, namely the criteria air contaminants coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$) and nitrogen dioxide (NO_2); the volatile organic compounds 1,3-butadiene, acetaldehyde, benzene and formaldehyde; diesel particulate matter; 11 polycyclic aromatic hydrocarbons; and five metals and minerals (including quartz). The CoPCs requiring more detailed assessment as a result of predicted Project-related changes are addressed in Appendix H.7 and summarized below is section 22.2.2.3.

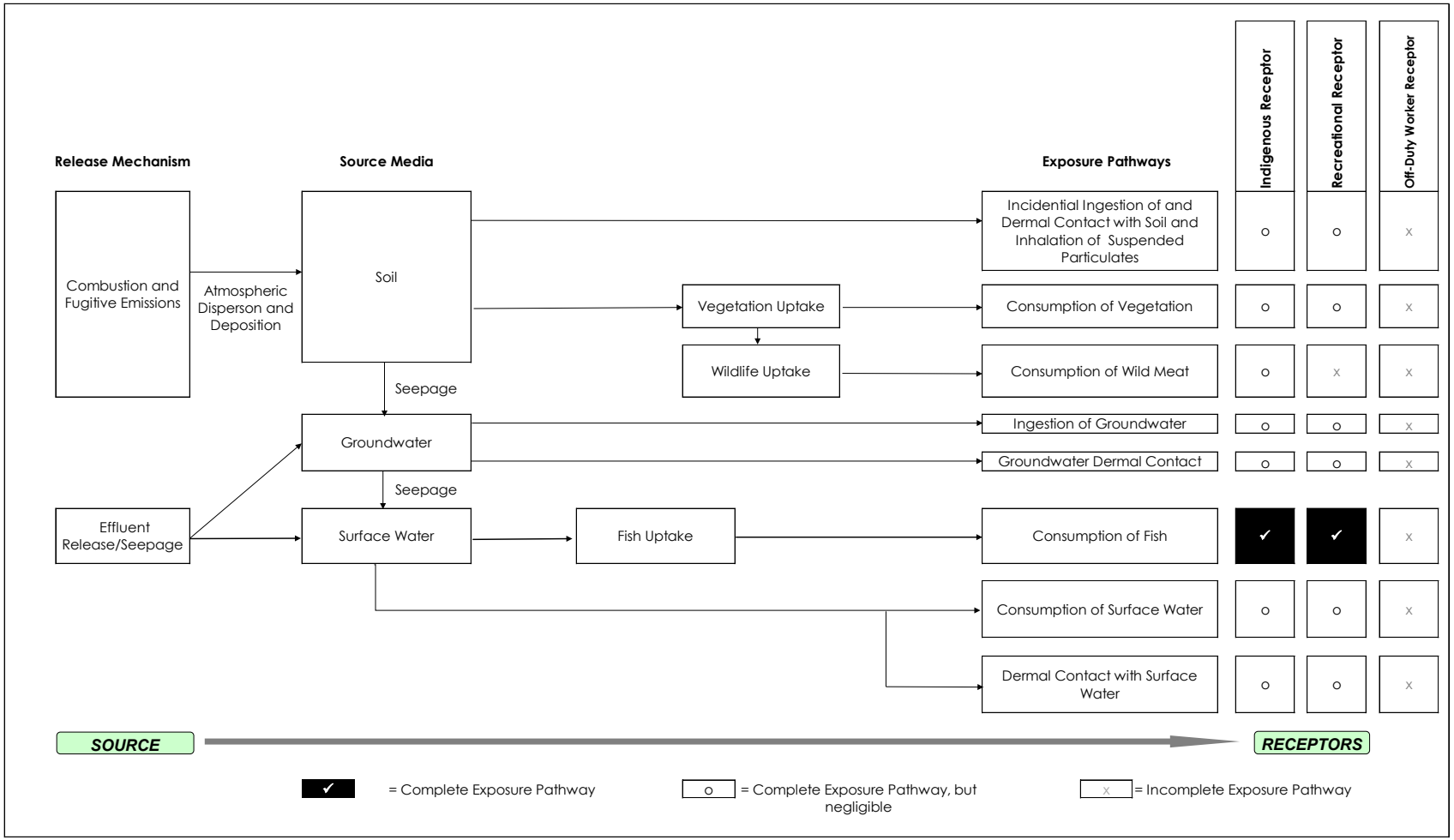

Figure 22.5 Conceptual Site Model for Human Health Risk Assessment (Multimedia)

Sleep Disturbance, Sky Glow and Annoyance

In Stantec led engagement with community members from November 5th-7th, participants highlighted concerns linked to previous Troilus mine operations, nuisances related to the Project (e.g., noise and traffic) led to an adjustment period for tallymen and their families. During interviews with the tallymen of nearby traplines, one interviewee stated that the previous mine caused a disconcerting shift from an area that was once described as “so nice and quiet”. Another tallyman reported to Stantec that there were elevated noise levels from trucks and vibrations in cabins due to blasting during the previous mining project. This experience has raised concerns about similar issues at future mine sites. Community members also expressed concerns about constant noise from heavy vehicles backing up and unloading materials. During historical operations, this noise persisted for 24-hours a day and was an annoyance. Cree community members highlighted that the Assinica reserve is in the process of becoming a Dark Sky Reserve, and thus light pollution from the Project is also a concern.

Noise emissions from Project equipment and activities associated with construction, operations, blasting and vehicle traffic could affect quality of sleep, which in turn could affect biological health (e.g., change in cardiovascular activity, waking) (WHO, 2009).

Potential Project-related changes to light could affect people directly and indirectly through:

- Light trespass (the transmission of light from fixtures within the Project to the environment and receptors outside the facility);
- Glare (intense, harsh or contrasting lighting conditions reduce humans’ ability to see); and
- Sky glow (the illumination of the sky and/or clouds by Project light sources).

Aside from the potential impacts noted above in the section about Health Risk, noise and light can lead to an increase in potential community annoyance (which can also affect sense of belonging in a community), and the ability to enjoy nighttime views because of increased sky glow and light trespass in an already dark area. As noted by Whitfield Aslund et al. (2013), noise-related annoyance is described as a “feeling of displeasure evoked by a noise” (Berglund and Lindvall, 1995), and although annoyance is considered to be the least severe potential impact of community noise exposure (WHO, 2009), it has been hypothesized that sufficiently high levels of noise-related annoyance could lead to negative emotional responses (e.g., anger, disappointment, depression, or anxiety) and psychosocial symptoms (e.g., tiredness, stomach discomfort and stress)). Noise and light can also affect quality of sleep, which in turn can affect mental health and well being (e.g., sleep disturbance, use of sedatives, insomnia) (WHO, 2009).

GBA Plus Considerations

As described in section 22.2.1, a GBA Plus process has been applied throughout this VC to the extent possible given available information. Where feasible and possible, indicators have been disaggregated by segments of the population (e.g., gender, Indigeneity, sexual orientation and socioeconomic status) to describe disproportionate mental health and social well-being outcomes.

In terms of assessing residual impacts on Health Conditions, GBA Plus is considered in the evaluation of the environmental quality impact pathway by incorporating conservative assumptions toward protecting sensitive receptors (e.g., because of genetic makeup, age, health and nutritional status, behaviour). For example, toxicity reference values used in the human health risk assessment and noise limits used in the Noise Assessment [Appendix H.2] and VC [Chapter 4 of the Impact Statement] take into account sensitive individuals like children and the elderly. In addition, human receptors were selected such that these sensitive individuals and individuals having the greatest potential for exposure to chemical changes and adverse responses from such exposures were represented (e.g., Indigenous toddler).

Changes in environmental quality and fears of wildlife contamination can reduce the availability of traditional foods. For those whose diet primarily consists of traditional foods, this fear may lead to a shift towards less nutritious, processed market foods. Increased consumption of processed foods can result in higher rates of diet-related illnesses, as mentioned in section 22.4.1.2. This fear of environmental contamination may disproportionately affect Indigenous groups who rely heavily on traditional foods.

Project-related changes in environmental quality could disproportionately impact Indigenous communities, and women and children within these communities, that rely on traditional lands for harvesting, recreation and sustenance. As mentioned in section 22.4.2.1.1, Indigenous peoples' sense of belonging, community, and primary means of sustenance are deeply intertwined with a connection to the natural land. Potential disruptions to Indigenous peoples' harvesting practices due to the physical presence of the Project and the release of contaminants from mine activities into air and water could lead to adverse physical and mental health outcomes.

Change in Population Dynamics

Changes in population dynamics, resulting from an influx in employees in the LSA/RSA, can be linked to Health Conditions through the following measurable parameters:

- Food security (country food and market food availability and harvesting practices),
- Sense of belonging to a community,
- Family and relationship dynamic,
- Sleep disturbance,
- Chronic illness,
- High risk behaviours (smoking, substance use),
- Crime (rates),
- Housing availability.

Food Security (Country Food and Market Food Availability and Harvesting Practices)

An influx of workers in the community due to the presence of the Project can result in changes in population dynamics, which can lead to subsequent changes in Health Conditions. During interviews conducted with members of the Cree community (see Chapter 4 for details), people expressed the importance of considering relationships between the land users and promoting access to the territory

during operation and restoration. Interviewees also mentioned developing or restoring facilities to allow for resumption of traditional activities to protect harvesting practices and food security.

As noted in Chapter 3 (Project Description), during the 21 years of operation planned, the Project will generate an average of more than 420 jobs. Troilus will promote local employment. During the construction phase, approximately 1100 workers will be employed for the construction and development of the mine site. In the operation phase, about 450 workers will be employed. The site will be staffed continuously, with personnel present 24 hours a day, seven days a week, throughout the year. The working hours will be organized into 12-hour shifts, with a rotation of 7 working days followed by 7 days of rest, or the option of 14 days on, 14 days off. For some management positions, office staff, environmental and other support staff, the hours are 4 days of work followed by 3 days of rest. As discussed in Chapter 21, the mining workforce has a vacancy rate of 46%. Despite the low employment in the mining sector, given the size of the labour force within the LSA and RSA, it is likely that the vacancy rates will not be fulfilled by the local workforce and that the incorporation of people outside of the region will be necessary. During operations, Troilus will prioritize hiring workers from the region and offer incentives for those relocating from outside the area. During closure and post-closure environmental monitoring, the focus will be on maintaining employment for workers based in the region.

The influx of workers during the construction and operation phase of the Project could lead to changes in the availability of sufficient and nutritious foods for lower-income households. It could also lead to those with employment opportunities to afford a well-balanced diet and make nutritious diets more available.

Project-related population growth and the employment of temporary workers, especially during the construction phase, may increase competition for food harvesting due to a potential increase in recreational hunting. However, the Project is located within two wildlife reserves: Albanel-Mistassini-and-Waconichi (AMW) Lakes Wildlife Reserve, Quebec's largest wildlife reserve, and the Assinica Wildlife Reserve. As noted in Chapter 19 (Land Use), the Nibiischii Corporation maintains the protection of Indigenous communities' rights and the conservation of wildlife within the territories of these two wildlife reserves. Hunting practices in these areas are reserved exclusively for Indigenous peoples. As such, the increased competition for traditional food is expected to be limited. Regardless, deviation from traditional food consumption has the potential to have negative implications on physical health due to changes in diet and potential diet-related illnesses.

The influx of people in the LSA/RSA could impact food security and physical health. Lower-income households to struggle to afford sufficient and nutritious food, while those with employment opportunities might be afforded the opportunity to maintain a balanced diet. As stated in above, increased market food consumption could also result in diet-related illnesses, subsequently affecting physical health.

Sense of Belonging to Community

Through community engagement interviews over multiple years, Cree community members have highlighted the prevalence of endemic racism during past mine operations. Interviewees stated that during the operations phase of the Project, Cree employees and employees from outside of the community lived separately, and there was an impression of camouflaged racism. They also expressed concerns about career advancement opportunities for Cree people. Historically, they have been overlooked for promotions, resulting in tension and frustration amongst the different groups. This lack of

equal opportunity employment for Cree people for resulted in poor employee retention. Cree interviewees stated that having Cree employees improved community communication about the company. An influx of workers from out of the region has the potential to lead to inequality and racism between groups, reducing community belonging.

These experiences of Cree community members are not isolated. Based on the literature, workplace cultures often perpetuate negative stereotypes held by non-Indigenous workers towards Indigenous workers, particularly women (Salerno et al., 2021). This negative work culture can continue the cycles of trauma, racism and violence. For example, according to Salerno et al. (2021), racism or discriminatory behaviour in the workplace can result in adverse changes to sense of belonging to a unique culture with meaningful connections to the land. Changes in identity can arise in individuals due to altered ability to carry out traditional activities, practice native languages and share knowledge and skills. Often tied to this loss of identity comes a sense of injustice and powerlessness to protect collective interests and maintain cultural continuity (Salerno et al., 2021).

This is not to say that positive social wellbeing and sense of belonging for employees and communities cannot be achieved with mining projects. Being part of a community provides several important benefits that contribute to positive mental health and social well-being which are directly related to community safety, and positive mental health and social well-being are closely linked to community safety and crime reduction. Workers' and communities' sense of belonging and life satisfaction may also positively change as a result of the Project. Examples of positive social wellbeing have been observed through improvements or additions of new infrastructure or community investments because of other resource extraction projects (Prospectors & Developers Association of Canada, 2022).

As noted above, though Troilus plans to hire primarily from local communities and Indigenous nations, additional workers from outside of the region will be needed to meet the workforce demands of the Project. During operations, it is expected that workers will be employed full-time through the life of the Project, with a goal that the majority of workers will reside in surrounding communities. Community involvement boosts mental health and social well-being, enhancing safety. Strong social bonds and engagement foster belonging and support, deterring crime. Employment and fair wages reduce stress and desperation, lowering criminal activity.

Family and Relationship Dynamics

During interviews conducted with Jamesian community members (see Chapter 4 for details), some people highlighted the importance of addressing childcare services as a major issue in the area. These individuals expressed a desire to create a childcare educator position and to encourage training for employees' spouses in this field.

Cree community members of the also highlighted that the previous Troilus mine's 14-days on 14-days off work schedule had a negative impact on families, particularly with children, who were affected emotionally by having a parent away for long periods of time. However, during consultations for the current mine, Cree individuals expressed that this schedule was better for traditional activities.

It is expected that employees will be housed at the mine site camp, which will be built in two phases. During construction the camp will accommodate up to 530 people; during operation, some of the camp's

infrastructure is expected to be dismantled which will to reduce the camp's capacity to approximately 275 to 300 workers. According to Gibson et al. (2017), resource extraction occupations are often associated with long hours, demanding work environments, and insufficient self-care within worker camps for extended periods. This environment can lead camp workers to develop a "blow off steam" mentality at the end of their work week, which is often characterized by a culture of hyper-masculinity, sexism, homophobia, apathy towards self-care, and disconnection from the local community, commonly referred to as "rigger culture" (Gibson et al., 2017). Rigger culture stems from isolation, distance from social and family relationships, stigmatization of self-care and sexually transmitted infection checks, and long work hours. Consequently, workers are often not invested in the community and lack relationships with local residents. The new community and work environment can result in fragmented family and relationship dynamics due to excess time apart, varying work hours and increased fatigue.

Resource extraction-based jobs requiring shift work often create a dichotomy between the professional and familial sphere. According to an article by Labra et al. (2024), for many men who choose this type of labour-intensive work, their family and work lives become entirely separated, with different roles and responsibilities. For men who enter this field single, it is difficult to start and maintain new relationships, as traditionally these new relationships are more likely to face divorce and infidelity. Furthermore, Labra et al. (2024) state that partners of those with a fly-in fly-out jobs experience higher rates of psychological distress than that of the general population. Family and relationship dynamics can be affected when one partner is working a fly-in fly-out job caused by the shift in roles, responsibilities and parenting tasks, and the disproportionate division of labour. These imbalances within the family and relationship dynamics can negatively affect well-being (Labra et al., 2024).

Sleep Disturbance

During interviews conducted with Jamesian community members (see Chapter 4 for details), some individuals emphasized the need for different schedules for older employees and women. They also highlighted the importance of adapting working conditions to specific subgroups, noting that a 14-days on, 14-days off schedule may not suit everyone. Interviewees indicated a preference for flexibility for all groups employed in the Project and suggested consulting specialists to minimize the impact of varying schedules and prioritize stable day and night shifts.

Knowing the importance of sleep for cognitive performance, attention, language, reasoning, decision-making, learning and memory, Zhao et al. (2021) explored the relationship between shift work and sleep and cognitive function in male miners from 2013 to 2015. The study found that cognitive decline occurred in night shift workers compared to day shift workers, regardless of sleep quality, and that cognitive decline occurred in individuals with lower levels of education (after accounting for other variables).

The anticipated work force of 450 to 1110 employees is expected to work 12-hour shifts (7-days on, 7-days off or 4-days on, 3-days off). Workers with night shifts could experience sleep disturbance and subsequent cognitive declines compared to day shifts.

Chronic Illness

While there are many factors that can contribute to the onset of chronic illness, lifestyle behaviours, exposure to environmental conditions and the influence of the social determinants of health are those that are relevant to the Project. For example, smoking and substance use could increase among temporary employees and their families related to a variety of factors such as stress, isolation, and boredom, which could in turn impact chronic illness. Long working hours and work stress may lead to a reduction in physical activity related to work fatigue. As noted in Chapter 3, the Project is anticipated to have seven recreation centre units; however, due to the nature of shift work and work rotations, Project construction workers are unlikely to have time to use local recreational facilities. There is a growing literature base that suggests that working conditions such as shift work may contribute to chronic conditions and health factors such as sleep disorders, cancers, gastrointestinal disorders, cardiovascular disease, metabolic disturbances and obesity (Northern Health, 2018).

As well, during construction, out-of-region workers may interact with local community members, potentially contributing to changes in transmission of infectious disease. There is some evidence in the literature that out-of-region and temporary workers may participate in high-risk behaviours that can result in increased rates of STIs in communities, and that Indigenous women may be most affected by these behaviours (Northern Health 2018, Prospectors & Developers Association of Canada, 2022). For example, Northern Health (2018) summarized studies from Canada and around the world that have highlighted the negative impacts of resource development on STIs, sexual health, and sex work at the community level. These impacts are often associated with remote projects with worker camps, and those communities affected by 'boom and bust cycles' often associated with remote infrastructure projects.

High Risk Behaviours (Smoking, Substance Use)

During interviews conducted with members of the Jamesian community (see Chapter 4 for details), these individuals expressed concern regarding the importance of drug and alcohol prevention in the community. In similar interviews with the Cree community members, individuals mentioned that employees working at the mine and receiving such high wages may struggle with financial responsibility. The Cree interviewees recommended financial education on how to save money in preparation for mine closure. This financial education may help these communities to prevent excessive spending or spending money on high-risk behaviours to "blow off steam" after long and laborious work weeks.

Project-related changes in population dynamics may result in increased high-risk behaviours such as smoking and substance use. According to Gibson et al. (2017), in prior resource extraction projects, community members and healthcare workers expressed concern about increased alcohol and drugs entering Indigenous communities due to increased disposable income for those working on major projects. Gibson et al. (2017) highlighted the importance of maintaining clear policies on substance use and ensuring that workers are regularly reminded of these policies, as an increase in addictive substances in communities will cause strain on local services.

Dignard et al. (2024) explored the implications of the mental health and well-being of mining workers. Key findings of their research are:

- There is a higher prevalence of mental health issues among mining workers compared to the general working-age Canadian population; and
- Significant predictors of stress, anxiety, and depression include: demographic factors (e.g., gender, age); psychosocial factors (e.g., interpersonal relationships, lifestyle choices); health-related factors (e.g., physical health); and work-related factors (e.g., job security, work environment).

Based on the literature cited by Dignard et al., problematic drug and alcohol consumption is prevalent among mining workers, and the results of the Dignard et al. study support this: they found risky alcohol consumption was significantly more prevalent in their study population than in the general population. They also found that high-risk behaviours such as alcohol consumption was found to be a significant correlate of stress, and drug use a significant correlate of anxiety (Dignard et al., 2024).

During construction of the Project, when there is an influx in workers who may be from out-of-region, they may interact with local community members, potentially contributing to changes in transmission of infectious disease. There is some evidence in the literature that out-of-region and temporary workers may participate in high-risk behaviours that can result in increased rates of STIs in communities, and that Indigenous women may be most affected by these behaviours (Northern Health, 2018, Prospectors & Developers Association of Canada, 2022). For example, Northern Health (2018) summarized studies from Canada and around the world that have highlighted the negative impacts of resource development on STIs, sexual health, and sex work at the community level. These impacts are often associated with remote projects with worker camps, and those communities affected by 'boom and bust cycles' often associated with remote infrastructure projects.

Men have disproportionate rates of alcohol and substance abuse, and trade workers (who are predominately male) are more impacted by substance use and addiction than other fields of work due to physically demanding work and pain management (Government of Canada, 2023).

Housing Availability

The hiring protocol for the Project is expected to follow a hierarchical order: workers from families impacted by the Project, the Cree community of Mistissini, other Cree communities, non-Indigenous communities potentially impacted by the project (Chapais, Chibougamau), Quebec, elsewhere in Canada, and abroad. As noted before, workers will be housed directly at the mine site camp, but Troilus will collaborate with local communities to increase affordable housing and housing availability for those wishing to relocate to the region.

The flexibility of accommodation at the worker camps and the encouragement to move to local communities contribute to a reduced likelihood that individuals with lower socioeconomic status will experience exacerbated poverty or housing insecurity due to the competitive rental market and housing costs. Although the worker camp provides flexibility, it does not completely eliminate the risk associated with increased rental markets, which may cause financial strain on vulnerable populations and heighten their risk of food insecurity. Conversely, employment opportunities may alleviate financial pressures, thereby mitigating housing concerns. Workers will be housed directly at the Troilus site; however, Troilus will collaborate with local communities to enhance the availability of affordable housing for workers who wish to relocate to these regions.

Crime

The influx of workers has the potential to increase crime rates in the LSA/RSA. According to Gibson et al. (2017), there are linear relationships between the presence of highly paid individuals at industrial camps, the hyper-masculine culture, and an increase in crime, sexual violence and trafficking of Indigenous women. Indigenous women are particularly susceptible to being victimized by sexual assault, especially when industrial camps are located in remote areas. Gibson et al. (2017) reports that there are many stories of men using influence or position to leverage sexual favours from women, promising better shifts or avoidance of particular jobs. There tends to be very low reporting of sexual assaults in industrial camps, and low reporting of sexual assaults in areas surrounding the camps due to stigmas and fear of prosecution (Gibson et al., 2017).

Physical and psychological abuse and racism towards Indigenous men in hyper-masculine work camps, or the values promoted within them, may be a catalyst for an indirect culture of violence towards Indigenous women and children (Gibson et al., 2017). The intergenerational and historical trauma faced by Indigenous communities may contribute to high rates of domestic and community violence (Gibson et al., 2017).

The sex trade and sex trafficking have both increased around sites of resource extraction. This is usually attributed to a rise in disposable income for usually young men, social isolation from families and relationships, and the hyper-masculine context of these work camps (Gibson et al., 2017). The hyper-masculine values associated with industrial camps may serve to perpetuate cycles of violence that were already present due to colonization and allow industrial camp workers to seek out sex-work and contribute to sex trafficking. Sex trade work and sex trafficking has been shown to follow the boom-and-bust cycles of extractive industry projects (Gibson et al., 2017). In human rights studies carried out in Canada, in some areas of the country, Indigenous women and youth represent between 70-90% of the sex trade, despite Indigenous people making up less than 10% of the population in these areas (Gibson et al., 2017). The disproportionate impacts of increased crime rates on Indigenous communities in areas pertaining to resource extraction is an important consideration.

As noted in the National Inquiry into Missing and Murdered Indigenous Women and Girls (2019), crime can increase due to the influx of workers (i.e., temporary) and in migration (i.e., out of region) non-local workers required to satisfy Project-employment demands. Examples of community safety concerns published in the literature include organized gang, sex-trade related activities and drug-related crime, increasing assault rates, including sexual assaults, and missing persons reports (summarized in Northern Health 2018). These impacts are often associated with remote projects with worker camps, and those communities affected by ‘boom and bust cycles’ often associated with remote infrastructure projects. An increase in population in a community may correlate with an increase in the number of individuals involved in criminal activity. However, this does not inherently indicate that overall community safety will be compromised, as individual actions do not necessarily result in significant changes within the community.

Being part of a community provides several important benefits that contribute to positive mental health and social well-being, which are directly related to community safety. For example, strong social bonds and community engagement foster a sense of belonging and mutual support, which can deter criminal behavior. Employment and living wages are known to reduce the stress and desperation that can lead to

criminal activities. And as noted before, access to health care (through Troilus) and the communities where people reside can lead to safer communities.

GBA Plus Considerations

As described in section 22.2.1, a GBA Plus process has been applied throughout this VC. Where feasible and possible, indicators have been disaggregated by segments of the population (e.g., gender, Indigeneity, sexual orientation and socioeconomic status) to describe disproportionate mental health and social well-being outcomes.

2SLGBTQI+ populations are overrepresented by the homeless population and have higher rates of suicidal ideation (Government of Canada, 2024b). This general trend may also occur within the RSA, and potential Project-related income and employment conditions could affect these populations disproportionately. 2SLGBTQI+ communities may be at an increased risk of adverse mental health outcomes as a result of Project-related work conditions. This group often experiences disproportionate rates of bullying, poor mental health, and suicidal ideation (Government of Canada, 2024b). As well, 2SLGBTQI+ persons employed by the Project could experience discrimination in the workplace and in the community and in turn may have increased rates of adverse mental health outcomes.

Indigenous peoples and households with low-income (including persons living with a disability or lone parent families) may be more susceptible to potential Project-related increases in food insecurity as these populations already experience disproportionate rates of food insecurity, as discussed in section 22.4.2.1.1. Therefore, associated food insecurity may place these populations and their families at a disadvantage and risk becoming food insecure, which would lead to disproportionate negative changes in mental health and wellbeing, and adverse physical health outcomes due to diet and nutritional changes.

During interviews conducted with members of the Jamesian community (see Chapter 4 for details), several individuals emphasized the importance of preventing stigmatization of people experiencing mental health challenges. They suggested the presence of trained sentinels or scouts who could monitor the site and identify staff members who may be experiencing anxiety or depression. The interviewees also expressed that mental health sessions should be open to employees.

Indigenous women and girls experience disproportionate rates of violence compared to the general population. For instance, 46% of Indigenous women experience sexual violence in their lifetime compared to 33% non-Indigenous women (Heidinger, 2021). In response to the disproportionate rates of violence experienced by Indigenous women and girls, including the 2SLGBTQI+ peoples, the National Inquiry into Missing and Murdered Indigenous Women and Girls (MMIWG) was launched in 2016 (Government of Canada, 2020b). The National Inquiry into MMIWG discussed how the dehumanizing process and structure of colonization has contributed to discrimination, racism and is foundational to the social inequities that contribute to the disproportionate rates of National Inquiry into Missing and Murdered Indigenous Women and Girls 2019). As discussed in section 22.4.2.1.3, the disproportionate levels of sexual violence towards Indigenous women and girls means an elevated risk of chronic illness transmission for this group as well.

Jamesian community members highlighted the importance of establishing a monitoring committee to verify the adequacy of safety measures for women, non-binary people and other minority groups. Given

the influx of workers for the Project, there remains a degree of safety concerns related to sexual behaviours in the community. Indigenous women and girls and the 2SLGTBQIIA+ community are particularly at risk of being victims of gender-based violence as there is an overrepresentation of intimate partner violence and gender-based violence among these populations (described in section 22.42.1.3.)

22.4.2.2 Mitigation and Enhancement Measures

Troilus is committed to implementing the following codes of conduct and policies related to diversity, inclusion, and safety for its workforce. A complete description of these can be found in Chapter 3 (Project Description).

- Supplier Code of Conduct;
- Whistleblower Policy;
- Code of Business Conduct and Ethics;
- Sustainable Development and Policy;
- Drug and Alcohol Policy;
- Environment and Health and Safety Policy;
- Anti-bribery and Anti-corruption Policy;
- Local Procurement Policy;
- Occupational Health and Safety Prevention Program;
- Employee Family Assistance Program;
- Cultural Awareness Training.

The assessment of residual impacts on Health Conditions draws on related VCs and uses analytical assessment techniques and assumptions identified in Atmospheric Environment (Chapter 8), Acoustic Environment (Chapter 9), Surface Water (Chapter 12), Economy (Chapter 21), Land Use (Chapter 19) of the Impact Statement.

The following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on atmospheric and light conditions (see Chapter 8) as they pertain to potential changes in Health Conditions:

- Troilus will develop a Dust Management Plan;
- Troilus will develop an Air Quality Follow-up Monitoring Program to monitor selected CoPCs that may include dust (PM and/or $PM_{2.5}$), metals in PM, quartz and NO_2 at selected offsite locations during construction and operation. This program will specify the proposed ambient air quality monitoring program including the type of monitoring, the CoPCs to monitor and the frequency of monitoring;
- Troilus will optimize the road network design and the mining schedule to reduce haulage distances;
- Project lighting (locations, intensity) will be limited to that which is necessary for safe and efficient Project activities;

- Lighting fixtures that limit or concentrate the lighting to targeted areas and avoid light spilling out of the spaces to be illuminated will be used;
- Troilus will limit the projection of light toward the sky by using fixtures that meet actual lighting needs;
- Troilus will avoid the emission of light at more than 90 degrees, using luminaires with known cut-off specifications;
- Mobile and permanent lighting will be located such that unavoidable light spill off the working area is not directed toward receptors outside of the PDA, to the extent practicable;
- Troilus will design the exterior lighting systems for Project operations to include directional lighting to limit light trespass and to avoid glare. Downward directed, full cutoff luminaires will be incorporated into the Project lighting plan (where practical) and portable lighting will be positioned to limit visibility outside the PDA;
- Lighting during closure will follow the same principles as for the Project construction phase.

The following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on noise (see Chapter 9) as they pertain to potential changes in Health Conditions:

- Noise monitoring should be carried out at the sensitive receptors closest to the mine during each phase of the project, construction (year -1) and operation (year +6);
- When possible, equipment that generates the lowest noise levels should be selected and silencers used where possible;
- Respect travel speeds during transport activities;
- Blasting operations must be optimized to minimize the quantity of explosive to be detonated simultaneously such that vibrations at the nearest receptors are barely perceptible;
- Blasting operations must be carried out during daylight hours and at fixed times;
- Use electronic detonators that allow for high-precision timing between explosive charges and better detonation control;
- Follow an optimized mining protocol to limit major seismic events while adapting it as needed.

The following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on surface water (see Chapter 12) as they pertain to potential changes in Health Conditions:

- Road crossings will be put in place to ensure a continuous flow of the Bibou Creek diversion channels. On the DC1 canal, arched culverts will be designed to improve fish passage;
- Surface water and groundwater monitoring stations will be established to collect water quantity and quality data for regulatory compliance monitoring;
- At the end of operations, an emergency spillway will be installed at the tailings storage site to control the water level to an outlet channel directed north to the future pit lake. The spillway will be operated in a way that can respond to extreme flood scenarios without risk to the safety of the tailings storage

site's dikes. Waste dumps, overburden piles and tailings beach will be covered and reprofiled to promote efficient and erosion-resistant drainage routes;

- At the end of the Project, a permanent 5.2-kilometer watercourse will be maintained upstream of the Bibou Creek diversion channel. The channel will be designed to allow for the establishment of aquatic habitat in this section of the channel during operations.

The following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on the economy (see Chapter 21) as they pertain to potential changes in health conditions:

- Troilus is committed to hiring people from local communities and the region, pending the availability of qualified applicants;
- Troilus is in regular communication with local training/education institutions regarding existing, upcoming and potential courses and training offerings, and how this aligns with Troilus' anticipated needs. Troilus continues to explore education and training opportunities. It will also develop hiring practices that encourage the employment and retention of qualified Indigenous peoples and local community members, including opportunities targeted towards youth;
- Troilus will explore opportunities to support training, education and scholarship programs that improve employment opportunities. This includes participation in and contribution to local training networks, which are targeted at diverse groups such as Indigenous nations, local youth, and various relevant subgroups, such as the Indigenous Skills and Employment Training Program;
- Troilus will take into consideration traditional and cultural activities to propose measures to enable the continued participation of Indigenous employees;
- Employees' schedules will be adapted to community needs and work-life balance;
- Troilus will develop and implement a Diversity and Inclusion Policy, which encompasses respectful workplace behaviours for diverse groups such as Indigenous nations, local youth, seniors, 2SLGBTQI+, visible minorities, persons with disabilities and other members of the GBA Plus community. Such a policy and subsequent training consist of awareness training for non-Indigenous employees to foster a respectful working relationship with Indigenous employees and contractors;
- Troilus will put in place measures to encourage and increase women's participation in the mining industry, such as targeted training opportunities and job offers for women, as well as work policies to eliminate harassment and discrimination;
- An integration committee will be put in place with the Jamesian communities (Chapais/Chibougamau) to address issues and opportunities pertaining to employment;
- An advisory committee has been established with the Cree Nation of Mistissini to address issues such as employment;
- Troilus will prepare and implement plans, programs and policies to encourage contracting and procurement opportunities for Indigenous and local businesses. Such plans will include the enhancement of supplier network development initiatives, including keeping a repository of local and Indigenous suppliers with potential to bid on the Project. Troilus will establish a clear communication procedure to establish procurement opportunities for Cree and Jamesian communities. Where

feasible, Troilus will also address potential barriers to bidding (such as the need for translation services) to support inclusive participation.

The following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on land use (see Chapter 19) as they pertain to potential changes in Health Conditions:

- Limit deforestation to the areas required for development;
- Prevent the introduction of invasive plant species during all phases of the Project;
- Plan for revegetation and reclamation of the site at the end of the operating period.

As well, the following measures will be incorporated into the design of the Project to avoid or reduce Project-related effects on services and infrastructure (see Chapter 20) and will pertain to potential changes in Health Conditions:

- Health and emergency services will be available at the mine site, similar to that of historical mine operations;
- A nurse will be present on site 24 hours/day and will be assisted, if necessary, by a doctor assigned to the Project;
- Coordination with emergency infrastructure will be put in place during the development of the Troilus Occupational Health and Safety Prevention Program to unify disaster response efforts;
- Employees will not be allowed to use their vehicles to get to the mine site. Transportation services will be provided by Troilus from one of the docking points located in the neighbouring communities of Mistissini, Oujé-Bougoumou, Chapais and Chibougamau;
- Troilus will continue to work with the Ministry of Transport and Sustainable Mobility, and the communities concerned to select the least impactful route for the transportation of copper-gold concentrate;
- Troilus will ensure that the transportation standards (load and dimensions) of the various roads in place crossed by the Project are respected and will coordinate with the Ministry of Transport and Sustainable Mobility in the event of a surplus of standards;
- Standard road safety measures will be put in place such as speed regulations, especially when passing through communities, radio communications, escorting non-standard transport and optimizing copper-gold concentrate transport schedules;
- The movement of trucks can be grouped into convoys and the schedules can be adapted to the summer periods and greater frequentation of the main roads such as the Northern Road;
- Health and safety training will be offered to employees to make them aware of safe driving (compliance with speeds, traffic speeds, signs);
- A concern management mechanism will be put in place and will be available on the Troilus website.

22.4.2.3 Project Residual Impact

Project residual impacts on Health Conditions with the aforementioned mitigation and enhancement measures in place are assessed below in terms of direction, magnitude, geographic extent, duration, frequency, and reversibility, particularly concerning the health of Indigenous peoples and the public.

In terms of changes in land use due to the presence of the Project, possible impacts on food security, sense of belonging to community, family and relationship dynamics and traffic changes, can be reduced in part with the implementation of mitigation and enhancement measures. For example, expected changes in country food availability and harvesting effects are limited. Troilus will take into consideration traditional and cultural activities, promoting the continued participation of Indigenous employees. Employees' schedules will be adapted to community needs and work-life balance to reduce familial imbalances such as disproportionate levels of work on either the spouse staying home, or the spouse away at work.

Communities' and workers' sense of belonging and life satisfaction may positively change as a result of the Project. Examples of positive social wellbeing in communities have been observed through improvements or additions of new infrastructure or community investments as a result of other resource extraction projects (Prospectors & Developers Association of Canada, 2022). Resource extraction jobs correlate with higher salaries, which can help communities with the cost of living and food affordability (for example jobs afford people the opportunity to reduce consumption of ultra processed products).

As a member of a community, a sense of belonging and ability to connect with others is necessary for psychological well-being. By strengthening community and social bonds, community members can experience feelings of emotional support, learn about shared values and beliefs, and limit their isolation and loneliness (Stein, 2023). These sources of support are particularly critical during times of crisis to prevent declines in mental health, increased stress and anxiety, and social disconnection (Bowe et al., 2022). Project-related well-being and sense of belonging among workers in remote camps are closely tied to the quality of their living and working environments, as is discussed below.

Workers' sense of belonging and life satisfaction can be shaped by their working and living conditions within the worker camp. With protocols such as the Code of Business Conduct and Ethics and the Occupational Health and Safety Prevention Program in place, Troilus provides a strong foundation of support and security for its employees. These measures foster social cohesion and help build a sense of community where all workers are treated with equal support and consideration. In the event of work/life stressors, Troilus offers additional support through policies like the Whistleblower Policy, on-site nurses, and access to doctors. The presence of healthcare professionals and structured support systems enhances the sense of safety and community, reinforcing social bonds and contributing to a stronger sense of belonging amongst workers at the worker camp. While workers housed in remote worker camps may experience increased stress due to separation from their families, employment in the mine offers the potential for economic growth. The higher income and associated opportunities can contribute to improving their overall quality of life.

For traffic, health and safety training will be offered to employees to make them aware of safe driving (compliance with speeds, traffic speeds, signs) and a concern management mechanism will be put in place and available on the Troilus website.

As noted in Chapter 17 (Terrestrial and Avian Wildlife), direct and indirect activities associated with construction, operation, and decommissioning and closure of the Project could result in changes in movement corridors and changes in wildlife movement patterns. Even with mitigation and enhancement, movement of moose and caribou away from the mine and away from traditional hunting areas, as was reported by tallymen regarding the previous mine, cannot be ruled out. As such, the displacement of key food species can reduce a communities' ability to hunt and trap, potentially leading to conflicts between tallymen over trapline boundaries and land use.

In terms of changes in environmental quality, possible impacts on food security, sense of belonging to community, family and relationship dynamics, sleep disturbance, chronic illness, high risk behaviours, housing availability, and crime can be minimized in part with the implementation of mitigation and enhancement measures. Although Troilus will implement policies and programs to address concerns, some pathways are beyond its direct control. Consequently, certain endemic issues remain outside Troilus' influence. For example, Troilus has a Code of Business Conduct and Ethics, provides cultural awareness training, and will develop and implement a Diversity and Inclusion Policy, but even with these in place, discrimination within the workforce can likely never be eradicated. The Project is located within two wildlife reserves: Lacs AMW Wildlife Reserve, Quebec's largest wildlife reserve, and the Assinica Wildlife Reserve. As noted in Chapter 19 (Land Use), the Nibiischii Corporation ensures the protection of Indigenous communities' rights and the conservation of wildlife within the territories of these two wildlife reserves. Hunting practices in these areas are reserved exclusively for Indigenous peoples. In the case of the Assinica Wildlife Reserve, this exclusive right is further reinforced by its location within a large beaver reserve. According to Article 11 of the Act respecting hunting and fishing rights in the James Bay and New Quebec territories, only the Cree are permitted to exercise their rights to hunt, fish, or trap in these areas. As such, Project-related population growth and the employment of temporary workers, especially during the construction phase, should not increase competition for food harvesting and consumption of traditional foods by Indigenous communities.

Based on an assessment of baseline conditions and Project-related changes to metal concentrations in soil, water (groundwater and surface water) and country food (vegetation, wild meat, and fish) (Section 22.4.2.1.2), consumption of fish by Indigenous and Recreational Receptors was identified as a complete pathway. Changes in surface water quality due to Project-related activities are uncertain at this time and could result in increased concentrations of metals in fish tissues:

- The presence of mercury in fish is a regional concern in Quebec, even without the Project. The Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP) has fish consumption advisories in place throughout the province due to the presence of mercury in fish. Health Canada has set a maximum limit of 0.5 parts per million (ppm; or 0.5 mg/kg) total mercury in retail fish, with few exceptions (Health Canada 2020). Of the 30 angling fish samples collected to determine baseline conditions, three samples (i.e., two walleye samples and one northern pike sample collected from Lake Amont) had maximum concentrations of mercury (0.54 mg/kg, 0.54 mg/kg and 0.51 mg/kg), which with numerical rounding, are equal to the Health Canada limit. The remaining samples had concentrations lower than the Health Canada limit. Regardless, monitoring of Project-related changes to surface water and fish quality in the PDA is recommended during key project phases. Although the Project's impact on soil quality, vegetation, and wild meat is anticipated to be minimal and limited in scope, overcoming perceived concerns about chemical

contamination may prove challenging. Troilus will hold regular community meetings to address people's concerns. A country foods monitoring program should also be implemented during Project phases, and based on measured levels, adaptive mitigation may be required;

- Also as noted in section 22.4.2.1.2, inhalation of CoPC was identified as a complete pathway needing a more detailed assessment. Results of the risk characterization suggest that the assumed background concentrations of $PM_{2.5}$ and NO_2 for short-term and long-term exposures periods are at or above health-based exposure limits throughout the LSA/RSA. Based on the Project Alone scenario: the NO_2 exposure ratios (ERs) for short-term exposure durations at one or more special receptor locations during construction and operation are higher than the acceptable limit. These are locations frequented by Indigenous Receptors and Recreational Receptors. The NO_2 ERs for short-term and long-term exposure durations at the worker camp during construction and operation are higher than the acceptable limit. The $PM_{2.5}$ ERs for short-term exposures (during construction and operations) and long-term exposure (during operations) at the worker camp are higher than the acceptable limit. This location is frequented by Off-Duty Workers. These two CoPC are non-threshold contaminants for which any increase in exposure could result in increased risks. What these results suggest is that NO_2 and $PM_{2.5}$ emissions will need to be actively monitored and mitigations employed should actual emissions approach predicted concentrations. As described in Appendix H.1 of the Impact Statement (the Air Quality Assessment), mitigation measures have been proposed to reduce potential air emissions during construction (and operation) and the development of both a dust management plan and an Air Quality Follow-up Monitoring Program will be developed for the Project. The proposed mitigation, management, and monitoring programs are expected to reduce CoPC emissions from the Project to less than the modelled concentrations, which would consequently reduce potential risks to human health.

As noted in Chapter 9 (Acoustic Environment), given the distance between the mining facilities and the nearest human receptor locations, residual impacts are expected to be low, short-lived and reversible after the end of Project activities. Predicted worst-case sound levels at night (and assumed to be a steady state level throughout the year) during construction and operation (modelled for year six of operation, which is expected to be the highest noise generating period) were lower than the Health Canada limit of 40 dBA (annual average) and the percent highly annoyed metrics.

There are few light sensitive receptors in the LSA, and all are distant from the Project with intervening forested areas that will obstruct Project lighting, as noted in Chapter 8 (Atmospheric Environment). No adverse light trespass impacts at the receptors are anticipated. With the proposed mitigation to limit sky glow, the residual environmental effects of the Project on a change in lighting are rated as negligible.

In terms of changes population dynamics, as noted in Chapter 21 (Economy), the Project is anticipated to result in both positive and adverse effects on employment, business, and the economy during all Project phases (construction, operations, and decommissioning and closure). While the Project is expected to generate economic benefits, it may also bring challenges, particularly for local businesses and the labour market. Positive effects from the Project are in the form of direct, indirect, and induced employment and labour income in the LSA and other parts of Quebec and Canada and contributions to local, regional, provincial, and federal gross domestic product and government revenues stem from Project demand and expenditures on labour, goods, and services. Additionally, the Project can have a positive effect on unemployment rates, increase income levels for individuals (and families) who secure employment with

the Project and can also provide valuable employment experience which can be leveraged by workers to secure employment with other projects/employers following completion of Project-related work. However, the Project may also have adverse effects, including increased competition for labour and upward pressure on wages, which could negatively impact existing businesses in the region. Adverse effects stem from Project-related wages being greater than existing conditions, albeit consistent with wages in the mining industry, and due to the potential for Project employment to be deemed more desirable than other forms of employment in the LSA. This can result in increased competition for labour and upward pressure on wages (to attract and retain workers). Mitigation and enhancement measures will be implemented to increase participation among underrepresented groups on the Project; however, given the estimated size of the Project's workforce, measurable changes in employment equity across the LSA are not expected.

For those successful in securing Project employment, working conditions such as shift work and stressful working conditions in areas where employees fly in and are housed in worker camps, often accompanied by high wages, may contribute to adverse coping mechanisms such as substance abuse (National Inquiry into Missing and Murdered Indigenous Women and Girls, 2019; Northern Health, 2018). Shift work associated with the Project may adversely contribute to family dynamics given that workers may be away from their families for longer periods of time and many household responsibilities may fall on the partner who is at home, leading to potential loneliness and stress, family instability, abandonment and divorces and child neglect (Northern Health, 2018). As well, because the Project is in a relatively remote and isolated northern environment associated with a "fly-in" workforce, an influx in workers could lead to altered rates of infectious disease, including sexually transmitted infections and changes to sexual health. As noted in section 22.2.3, existing rates of sexually transmitted infections are higher amongst the Cree of Eeyou Istchee than Jamesians in the Region du Nord-du-Québec and the rest of Quebec, which has the potential to lead to adverse changes in sexual health for community members and employees. Troilus will have an Employee Family Assistance Program and a nurse present on site 24 hours/day that can be used to offer support, and healthcare for Cree in Mistissini and Oujé-Bougoumou is vast, with many programs and centres for physical, mental spiritual wellbeing. Healthcare for Jamesians is widely accessible in Chapais and Chibougamau, with Chibougamau having the largest hospital in the region.

Overall, the residual impact of the Project to Health Conditions, as a result of potential changes in the three Project Pathways (land use, environmental quality, population dynamics) are expected to be positive or adverse in direction, of low to moderate magnitude, limited to the LSA (biophysical changes) and RSA (social changes), short-term to medium-term in duration, irregular to regular events, but reversible.

22.4.3 Summary of Project Residual Impacts

Table 22.2 summarizes project residual impacts on Health Conditions.

Table 22.24 Project Residual Impacts on Health Conditions

Residual Impact	Residual Impact Characterization							
	Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Health Conditions	C,O,D	P, A	L, M	LSA, RSA	NS	ST, MT	IR, R	R

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning

Direction:
P: Positive
A: Adverse

Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LSA: Local Study Area
RSA: Regional Study Area

Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous

Reversibility:
R: Reversible
I: Irreversible

22.4.3.1 Significance of Adverse Federal Effects

In terms of changes in Health Conditions of Indigenous peoples, residual adverse effects are estimated to have low or moderate significance, because depending on the aforementioned effect pathways, Health Conditions may be largely unchanged from baseline conditions or reduced but not eliminated compared to baseline conditions.

22.4.3.2 Summary of Adverse Residual Impacts

In general, adverse residual impacts on Health Conditions are as follows:

- Based on an assessment of baseline conditions and Project-related changes to metal concentrations in soil, water (groundwater and surface water) and country food (vegetation, wild meat, and fish), consumption of fish by Indigenous and Recreational Receptors was identified as a complete pathway. Changes in surface water quality due to Project-related activities are uncertain and could result in increased concentrations of metals in fish tissues. The presence of mercury in fish is already a regional concern in Quebec fish consumption advisories are in place throughout the province due to the presence of mercury near the Project. While baseline fish tissue measured to characterize baseline conditions were generally lower than the Health Canada commercial fish limit;

- Results of the risk characterization for inhalation risk suggest that modelled concentrations of NO2 and PM2.5 are predicted to be above health-based thresholds in certain cases. These two CoPC are non-threshold contaminants for which any increase in exposure could result in increased risks. What these results suggest is that NO_2 and $PM_{2.5}$ emissions will need to be actively monitored and mitigations employed should actual emissions approach predicted concentrations;
- Direct and/or indirect activities associated with construction, operation, and decommissioning and closure of the Project could result in changes in movement corridors and changes in wildlife movement patterns, even with mitigation and enhancement measures in place. This change in movement patterns could alter food security and harvesting practices, which could lead to impacts to many social determinants of health such as sense of belonging and community cohesion;
- Actual or perceived changes in food quality, land use, and aesthetics in the LSA/RSA, could lead to reductions in country food availability, accessibility and consumption that may affect physical health through diet and nutritional changes. These changes could also lead to changes in physical health due to reduced recreational experiences and spiritual and cultural practices;
- Negative aspects associated with worker camp culture could be experiences in the LSA/RSA, such as increased sexually transmitted infections, increased discrimination or rigger culture that even with mitigation and enhancement measures in place (e.g., policies, training), cannot be ruled out. However, many negative aspects (e.g., racism, discrimination) are outside the control of Troilus.

22.4.3.3 Summary of Positive Residual Impacts

In general, positive residual impacts on Health Conditions are as follows:

- Being part of a community provides several important benefits that contribute to positive mental health and social well-being which are directly related to community safety. Positive mental health and social well-being are closely linked to community safety and crime reduction;
- The Project is anticipated to result in positive effects on employment, business, and the economy, and increased employment rates are linked to better states of health.

22.5 Prediction Confidence

The level of confidence in the assessment of residual environmental effects on the Atmospheric Environment (Chapter 8), Acoustic Environment (Chapter 9), Surface Water (Chapter 12), Economy (Chapter 21) and Land Use (Chapter 19) of the Impact Statement, upon which the assessment of health is based, are either moderate or high. As such, the level of confidence in the inputs used in the assessment of residual effects on health is also moderate to high.

The assessment of residual effects on Health Conditions uses both quantitative and qualitative methods:

- For residual effects related to changes in environmental quality (those associated with biophysical determinants of health), the assessment was primarily quantitative in nature, with conclusions drawn from comparisons of estimated environmental changes to regulatory thresholds. The level of confidence in the assessment of residual effects on health based on quantitative evaluations is high.;

- For residual effects related to changes on traditional land use, population dynamics, and employment conditions (those primarily associated with social determinants of health), the assessment was qualitative in nature with conclusions based on professional judgement informed by academic, government and industry literature, as well as input from potentially affected Indigenous nations. The level of confidence in the assessment of residual effects on health based on qualitative evaluations is moderate to high.

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