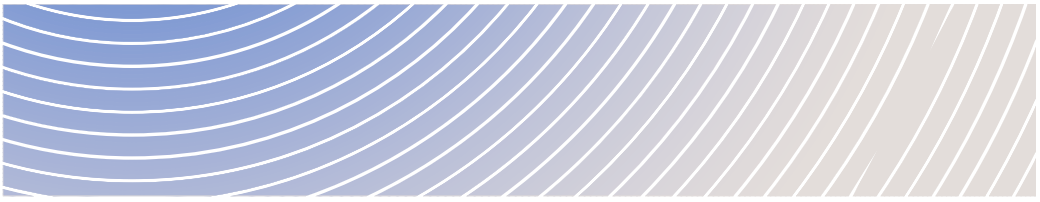
Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

Grand Council of the Crees (Eeyou Istchee) | Grand Conseil des Cris (Eeyou Istchee)

Cree Nation Government | Gouvernement de la Nation Crie

Tailored Impact Statement Guidelines

TROILUS MINING PROJECT



Final version

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50 YEARS OF ASSESSMENTS

Canada

Contents

Abbreviations and Short Forms

Term	Definition
the Act	*Impact Assessment Act*
the Agency	Impact Assessment Agency of Canada
BAT/BEP	Best Available Technologies / Best Environmental Practices
BCRs	Bird Conservation Regions
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
COPC	Contaminant of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
GBA Plus	Gender Based Analysis Plus
the Guidelines	Tailored Impact Statement Guidelines
GHG	Greenhouse gas
HHRA	Human Health Risk Assessment
Minister	Minister of Environment and Climate Change
OHWM	Ordinary High Water Mark
PAH	Polycyclic aromatic hydrocarbons
Registry	Canadian Impact Assessment Registry
SARA	*Species at Risk Act*
SACC	Strategic Assessment of Climate Change
VC	Valued component
VOC	Volatile organic compound

1. Introduction

The federal impact assessment process serves as a planning tool that considers a broad range of potential environmental, health, social and economic effects of designated projects identified by regulation or designated by the Minister of Environment and Climate Change (the Minister). The Joint Assessment Committee (the Committee), composed of representatives from the Impact Assessment Agency of Canada (the Agency) and the Cree Nation Government, uses the proponent's impact statement and other information received during the impact assessment process to prepare an impact assessment report. At the end of the impact assessment process, the decision is whether the potential adverse effects within federal jurisdiction, and any direct or incidental adverse effects, are in the public interest. Under section 2 of the *Impact Assessment Act* (the Act), the effects within federal jurisdiction are defined as:

a) a change to the following components of the environment that are within the legislative authority of Parliament:
   (i) fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*,
   (ii) aquatic species, as defined in subsection 2(1) of the *Species at Risk Act*,
   (iii) migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*, and
   (iv) any other component of the environment that is set out in Schedule 3;
b) a change to the environment that would occur
   (i) on federal lands,
   (ii) in a province other than the one where the physical activity or the designated project is being carried out, or
   (iii) outside Canada;
c) with respect to the Indigenous peoples of Canada, an impact — occurring in Canada and resulting from any change to the environment — on
   (i) physical and cultural heritage,
   (ii) the current use of lands and resources for traditional purposes, or
   (iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
d) any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada; and
e) any change to a health, social or economic matter that is within the legislative authority of Parliament that is set out in Schedule 3 of the Act.

The direct or incidental effects are defined as effects that are directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of a physical activity or designated project, or to a federal authority's provision of financial assistance to a person for the purpose of enabling that activity or project to be carried out, in whole or in part.

The public interest determination must be based on an Impact Assessment Report from the Committee and consider the factors set out in section 63 of the Act:

a) the extent to which the project contributes to sustainability;
b) the extent to which the adverse effects within federal jurisdiction and the adverse direct or incidental effects that are indicated in the Impact Assessment Report in respect of the project are significant;
c) the implementation of the mitigation measures that the Minister or the Governor in Council, as the case may be, considers appropriate;
d) the impact that the project may have on any Indigenous peoples and any adverse impact that the designated project may have on the rights of the Indigenous peoples[1] of Canada recognized and affirmed by section 35 of the *Constitution Act*, *1982*; and
e) the extent to which the effects of the project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change.

A key element for the impact assessment process is the preparation of Tailored Impact Statement Guidelines[2] (the Guidelines), which provide the proponent with directions and requirements for the preparation of an Impact Statement. These Draft Guidelines for the Troilus mining project (the project), proposed by Troilus Gold Corporation (the proponent), were adapted by the Committee during the Planning phase of the impact assessment. The tailoring was based on the nature, complexity and context of the project, and was informed and guided by consultation and engagement of the proponent, the public, the Indigenous groups and the federal authorities.

1.1. Factors to be considered in the impact assessment

The Guidelines correspond to factors to be considered in the impact assessment. These factors are listed in subsection 22(1) of the Act and prescribe that the impact assessment of a designated project must take into account:

a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by the carrying out of the designated project, including:
    i. the effects of malfunctions or accidents that may occur in connection with the designated project;
    ii. any cumulative effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out; and
    iii. the result of any interaction between those effects.
b) mitigation measures that are technically and economically feasible and that would mitigate any adverse effects of the designated project;
c) the impact that the designated project may have on any Indigenous group and any adverse impact that the designated project may have on the rights of the Indigenous peoples of Canada recognized

[1] These guidelines use the term "Indigenous peoples" to represent the "aboriginal peoples of Canada" which includes Indian, Inuit and Métis peoples as defined in subsection 35(2) of the *Constitution Act, 1982*, and "rights of Indigenous peoples" is used to reflect the full scope of Aboriginal and Treaty rights recognized and affirmed by section 35 of the *Constitution Act, 1982*.
[2] As set out in paragraph 18(1)(b) of the Act.

and affirmed by section 35 of the *Constitution Act, 1982;*

d) the purpose of and need for the designated project;
e) alternative means of carrying out the designated project that are technically and economically feasible, including through the use of best available technologies, and the effects of those means;
f) any alternatives to the designated project that are technically and economically feasible and are directly related to the designated project;
g) Indigenous knowledge provided with respect to the designated project;
h) the extent to which the designated project contributes to sustainability;
i) the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change;
j) any change to the designated project that may be caused by the environment;
k) the requirements of the follow-up program in respect of the designated project;
l) considerations related to Indigenous cultures with respect to the designated project;
m) community knowledge provided with respect to the designated project;
n) comments received from the public;
o) comments from a jurisdiction that are received in the course of consultations conducted under section 21 of the Act*;*
p) any relevant assessment referred to in sections 92, 93 or 95 of the Act*;*
q) any assessment of the effects of the designated project that is conducted by or on behalf of an Indigenous governing body and that is provided with respect to the designated project;
r) any study or plan that is conducted or prepared by a jurisdiction—or an Indigenous governing body not referred to in paragraph (f) or (g) of the definition *jurisdiction* in *section 2* of the Act—that is in respect of a region related to the designated project and that has been provided with respect to the project;
s) the intersection of sex and gender with other identity factors; and
t) any other matter relevant to the IA that the Agency requires to be taken into account.

The scope of the factors in paragraphs 22(1)(a) to (f), (h) to (l), (s) and (t) that are to be taken into account, including the extent of their relevance to the impact assessment, is determined by the Agency and is outlined in the Guidelines.

1.2. Gender-based Analysis Plus (GBA Plus)

To account for the interaction of sex and gender with the other identity factors (paragraph 22[1] [s] of the Act), the guidelines will refer to the Gender-based Analysis Plus (GBA Plus). Gender-based Analysis Plus (GBA Plus) is an analytical tool that may help the practitioners identify the people affected by the project and assess how they can undergo the impact differently to improve the project's design and develop mitigating measures to address these differential impacts. These Guidelines refer to "various population groups" in the context of GBA Plus, by accounting for many identity factors in (e.g. according to sex, gender, age, ethnic origin, membership in an Indigenous group, socioeconomic status, state of heath and any other identification factor relevant to the community) and their intersection (e.g. Indigenous and racialized women and young men who recently immigrated to a rural region) with the context and lived experiences to have an impact on

how people may live the project. The Agency's Guidance Document: Guidance: Gender-based Analysis Plus in Impact Assessment, Tool - Assessing the Quality of a GBA Plus in the Impact Statement, provide guiding principles to enable the proponents to use this analytical framework in their Impact Statement.

To support GBA Plus, the information provided in the Impact Statement must:

- be disaggregated enough to support the analysis of the disproportionate effects according to a GBA Plus. Whenever possible, the data should be broken down by identity factors (e.g. age group, sex, gender, ethnic origin, membership in an Indigenous group, aptitudes and any other identification factor relevant to the community), and by cross identity factors (intersectional approach) and be identified distinctly for each subgroup;
- describe how the community knowledge and Indigenous knowledge of the populations affected, including the indicators developed by the community and the data collected locally, were used to establish the baseline conditions and orient the analysis of the effects;
- describe the differences in access to resources, accessories and services for various population subgroups;
- describe the circumstances in which various population subgroups could suffer more adverse effects or receive fewer benefits related to the project than others, and how they could respond differently to the potential effects; and
- describe mitigation or enhancement measures to address these differential effects.

The quantitative information, including sensitive data on gender, diversity and inclusion (e.g. gender-based violence, participation in the economy and prosperity, discrimination, unfair treatment and any other data relevant to the community), should be completed with qualitative observations taken from studies or consultations, and other sources. The description of the effects must be based both on the data collected and on the concerns expressed in the context of the dialogue with the Indigenous groups and the members of the communities concerned.

1.3. Preparing the Impact Statement

In the preparation of the Impact Statement, the proponent must adhere to relevant ethical guidelines and cultural protocols governing research, data collection and confidentiality. This aspect is especially important if the information is collected from various subgroups and the studies are conducted with these population groups. The proponent must respect the obligation of protecting personal information and adopt the established standards for the management of Indigenous data (e.g. the First Nations principles of Ownership, Control, Access and Possession (OCAP) or standards adopted by an Indigenous group) and disaggregated data from small or unique populations.

The proponent may present the information in the Impact Statement in the manner it deems most appropriate. While the Guidelines do not prescribe a preferred structure for the Impact Statement, it is recommended to follow a structure similar to the Guidelines in order to facilitate the review of the Impact Statement and participation in the process. In order to facilitate the review of the Impact Statement, the

proponent must provide a table of concordance that indicates where each requirement of the Guidelines is addressed.

The Impact Statement must address the requirements described in the Guidelines. Where the proponent is of the opinion that the information is required, it should contact the Committee to confirm the rationale for its exclusion prior to submitting the Impact Statement. The rationale for not including this information must also be provided in the Impact Statement. The proponent should also notify the Committee of any changes made to the project as originally proposed in the Detailed Project Description that could result in a different set of effects and require a reconsideration of information requirements.

The Committee is available to support the proponent during the preparation of the Impact Statement and may establish technical advisory groups, composed of Federal Authorities and others, as appropriate. The proponent is encouraged to engage the Committee early in the process to clarify requirements and expectations as presented in the Guidelines. The proponent should also consider submitting documents for review (e.g. work outline for preparation of the Impact Statement, proposed study plan, draft sections of the Impact Statement) before submitting the formal Impact Statement. Active engagement will support early identification and resolution of issues.

The Committee will review the submitted Impact Statement, and will engage with FAs, jurisdictions, Indigenous groups and other participants to identify any deficiencies in the information provided, in comparison to the Guidelines, which the proponent must address. When the Committee is satisfied that the proponent has provided it with all of the required information or studies, it will post a notice on the *Canadian Impact Assessment Registry* (the Registry). The proponent must provide the Committee with the information or studies within three years after the day on which a copy of the Notice of Commencement is posted on the Registry. The time limit will include the time required for the review of the Impact Statement and for the proponent to address any deficiencies. On the proponent's request, the committee may extend the time limit by any period that is necessary for the proponent to provide the Committee with the information or studies. If the proponent does not provide the Committee with the information or studies within the three year time limit, or within any extension of that time limit, the impact assessment is terminated.

1.4. Format and accessibility

The impact assessment must be based on information that is publicly accessible, within the limitations of confidentiality and ethical constraints, such as in relation to Indigenous and community knowledge, business confidential information, and intellectual property. The proponent must provide a summary for the documents that served as key references in the Impact Statement that are not otherwise publicly accessible, or consider appending them to the Impact Statement. Any information provided by the proponent in the Impact Statement must be in machine-readable, accessible format.

Where information is required or is provided as a map in the Impact Statement, the proponent must also provide the Committee with the corresponding electronic geospatial data file(s). The Committee will make the geospatial data files available to the public under the terms of the Open Government License –

Canada. Geospatial data files must include metadata that is compliant with the ISO 19115 standard and, at a minimum, provides:

- Title
- Abstract or summary of what is contained in the data file
- Source of the data
- Date of creation for the data
- The point of contact and originator
- Confirmation that there are no restrictions or limitations on sharing the data.

The proponent should review the Agency's Guidance on submitting geospatial data for more information.

The proponent should curate all data collected and analyses performed in such a way that it may be made available to participants or the committee upon request. The committee may require specific data sets to support review of the Impact Statement or for the impact assessment.

The proponent should be prepared to provide:

- all biophysical survey data in a well-documented data file which provides information on the site, site visits and individual observations or measurements (georeferenced where possible);
- individual results of all laboratory analysis, including methods, standards or references followed, detection limits, controls, and quality assurance and control procedures.
- socioeconomic data in a well-documented data file;
- input and output data from modeling; and
- documentation and results of analysis that allow for a clear understanding of analytical methods and for replication of results.

These requirements will support of the Government of Canada's commitment to Open Science and Data and would facilitate the sharing of information with the public through the Registry and the Government of Canada's Open Science and Data Platform. The proponent should contact the committee to obtain additional direction regarding the format and distribution of the Impact Statement.

2. Proponent information

2.1. The proponent

The Impact Statement must:

- provide contact information for proponent representatives for the project (e.g. name, address, phone, email);
- identify the proponent(s) and, where applicable, the name of the legal entity(ies) that would develop, manage and operate the project;
- describe corporate structure, including roles and responsibilities of key personnel;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the Impact Statement.

2.2. Qualifications of individuals preparing the Impact Statement

In support of transparency, the Impact Statement must:

- provide information on the individuals who prepared the sections within the Impact Statement; and
- demonstrate that qualified individuals have prepared the information or studies. Where possible, the proponent should use experts who are members of a professional body or recognized association.

A qualified individual would include someone who may be relied on by the proponent to provide advice within their area of expertise, as demonstrated by:

- formal education, training or certification;
- experience in relevant area;
- credibility or standing as a holder of Indigenous or community knowledge;

The committee also expects proponents to demonstrate scientific integrity in their preparation and delivery of Impact Statements by

- following existing standards and best practices for the responsible conduct of scientific research;
- declaring and managing any real or perceived conflict of interest for individuals involved in preparing the Impact Statement;
- eliminating, controlling for, or appropriately managing potential biases; and

- characterizing all potential sources of scientific uncertainty, including their magnitude and any differences in the interpretation of scientific results.

Proponents are expected to demonstrate their adherence to these methods and processes within their Impact Statement. For example, it is expected that proponents provide information on data collection methods, sources of information and knowledge, and the completeness of the data provided, including any identified gaps and the nature of these gaps. Furthermore, proponents are expected to identify how they have responded to scientific uncertainty and potential bias in their Impact Statement.

3. Project Description

3.1. Project overview

The Impact Statement must describe the project, key project components and ancillary activities, scheduling details, the timing of each phase of the project, the total lifespan of the project and other key features.

The Impact Statement must also present the key environmental (e.g., dust), health, social, and economic issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010). The Impact Statement must explain how these issues were resolved and highlight lessons learned that may be useful for this project. For assistance, the proponent may refer to the case study *Implementing the Troilus Agreement: A Joint Study of Cree Employment and Service Contracts in the Mining Sector* (2008).

3.2. Project location

The Impact Statement must describe the location of the project and the geographic and socioecological contexts in which the project will be carried out. The description should focus on aspects of the project and its setting that are important in order to understand the potential environmental, health, social and economic effects and impacts of the project. The following information must be included and, where appropriate, located on map(s):

- geographic coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the main project site;
- project footprint, including the extent of the tenure;
- surface areas, location and spacing of project components;
- the services and infrastructures and the uses of the land and water in the region, including:
  - roads;
  - municipalities and administrative regions;
  - resource development projects already underway in the study area (e.g. mines and forestry operations); and
  - local businesses and industries such as fisheries and outfitters, and any other relevant uses;
- primary, secondary and tertiary watersheds;
- all the bodies of water, the watercourses (permanent and intermittent) and the watersheds affected directly or indirectly and their location on a map;
- the description and location of all the drinking water sources (natural, municipal, Indigenous or private);
- the waterways used by the Indigenous peoples;
- landcover in the area; including important or critical habitats;

- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Land Classification3;
- the ecosensitive zones (e.g. national, provincial, territorial and regional parks, protected and Indigenous conservation areas, ecological reserves, vulnerable or important ecological and biological sites, wetlands, estuaries, habitats of species at risk at the federal levels and any other protected area;
- lands subject to conservation agreements;
- description of local community and Indigenous groups;
- Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, Indian Reserve lands, Indigenous harvesting regions (with permission of Indigenous groups), Métis settlements;
- culturally sensitive areas, as identified by Indigenous communities; and
- culturally important features of the landscape.

3.3. Regulatory framework and the role of government

The Impact Statement must identify:

- any federal power, duty or function that may be exercised that would permit the carrying out (in whole or in part) of the project or associated activities;
- legislative or regulatory requirements that are applicable to the project at the federal, provincial, regional and municipal levels or from any body, including a co-management body, established under a land claim agreement referred to in section 5 of the *Constitution Act, 1982*, or from an Indigenous governing body as defined in the Act that has powers, duties or functions in relation to the environmental effects of a project;
- a list of any federal, provincial, or territorial greenhouse gas (GHG) legislation, policies, or regulations that will apply to the project, explaining any impacts on the project, in accordance with the Strategic Assessment of Climate Change (SACC) and Section 3.5.4 of the Draft technical guide related to the strategic assessment of climate change: Guidance on Quantification of Net GHG Emissions, Impact on Carbon Sinks, Mitigation Measures, Net-Zero Plan and Upstream GHG Assessment (hereinafter "technical guide," released in draft form in August 2021);
- government policies, resource management plans, planning or study initiatives relevant to the project and/or the impact assessment, including relevant regional studies, regional assessments and strategic assessments;
- any treaty or self-government, land claims or other agreements between federal or provincial governments and Indigenous peoples that are pertinent to the project or the impact assessment;
- any relevant land use plans (including Indigenous lands), land zoning, or community plans;

[3] Introduction to the Ecological Land Classification (ELC) 2017 and *An Introduction to Canadian Ecozones of the* Canadian Council on Ecological Areas (CCEA)

- information on land lease agreement or land tenure, when applicable; and
- municipal, regional, provincial and/or national objectives, standards or guidelines, by-laws or ordinances that have been used by the proponent to assist in the evaluation of any predicted environmental, health, social or economic effects or impacts.

3.4. Project components and activities

The Impact Statement must:

- describe the project components, associated and ancillary works, and other characteristics to assist in understanding the potential environmental, health, social and economic effects, and impacts on Indigenous peoples and rights of Indigenous peoples. Project components that should be considered in this description are outlined in Appendix 1- List of Project Components;
- describe project activities to be carried out during each project phase, with a focus on activities with the greatest potential to have environmental, health, social and economic effects, or impacts on Indigenous people and their rights. Project activities that should be considered in this description are outlined in Appendix 1 - List of Project Activities;
  - describe the location, methods used, schedule (including expected start date, time of year, duration and frequency), magnitude and scale for each project activity;
  - highlight activities that involve periods of increased disturbance to environmental, health, social and economic conditions or impacts on Indigenous peoples;
- provide a summary of any change made to the project as originally proposed in the Detailed Project Description, including the reasons for these changes;
- provide sufficient detail to support analysis regarding the project's impacts on valued components (VCs) in the context of potential interaction between VCs;
- detail how input from diverse population groups was used to identify potential components or activities of concern; and
- include maps illustrating the boundaries of the proposed site (with supporting geographic coordinates), the main components of the project, main existing infrastructures, proponent lands, leased properties or lands, adjacent resource lease boundaries, adjacent land uses and any important environmental features.

3.5. Workforce requirements

The Impact Statement must describe the anticipated labour requirements, employee programs and policies, and workforce development opportunities for the designated project, including:

- opportunities for employment outlining the anticipated number of full-time and part-time positions to be created, and time line for when they will be created. Positions should be presented using the National Occupational Classification system.
- the region of origin of the projected workforce (Indigenous, local, regional, out-of-province or foreign employees), including the projected scenario and a qualitative summary of the other plausible scenarios, for each phase of the project;
- the skill and education levels required for the positions;
- anticipated hiring policies and programs;
- investment in training opportunities;
- the projected working conditions and schedule for construction and operation (e.g. working hours, rotating shifts);
- the planned modes of travel for employees to and from the mine (e.g., commuting by air or bus);
- housing and accommodation needs of the workforce for the duration of the project;
- workplace policies and programs for Indigenous employment, and employment of other underrepresented groups;
- workplace policies and programs, including codes of conduct, workplace safety programs and cultural training programs; and
- employee assistance programs and benefits programs.

The workforce requirements must account for GBA Plus. The information provided must be detailed enough to allow analysis of how the historically excluded or underrepresented groups will be taken into consideration, including Indigenous peoples or other relevant population subgroups.

4. Project Purpose, Need and Alternatives Considered

The proponent must identify the purpose of and need for the project. The proponent must also analyze alternative means of carrying out the project. The proponent should consult the Agency guidance documents Guidance: "Need for", "Purpose of", "Alternatives to" and "Alternative Means" and Policy Context: "Need for", "Purpose of", "Alternatives" and "Alternative Means"

4.1. Purpose of the project

The Impact Statement must outline what is to be achieved by carrying out the project. The Impact Statement should broadly classify the project (e.g. transportation, electricity supply, mineral extraction) and indicate the target market (e.g. international, domestic, local), where applicable. The *purpose of* statement should include any objectives the proponent has in carrying out the project.

The proponent is encouraged to consider the perspectives of participants (i.e. public, Indigenous groups, governments) in establishing objectives that relate to the intended effect of the project on society.

4.2. Need for the project

The Impact Statement must describe the underlying opportunity or issue that the project intends to seize or solve and should be described from the perspective of the proponent. In many cases, the need for the project can be described in terms of the demand for a resource. The information provided should make it possible to reasonably conclude that there is an opportunity or issue that warrants a response and that the proposed project is an appropriate approach.

The description must include:

- the reasons for the closure of the former Troilus mine by Inmet Mining Corporation (1996–2010);
- supporting information that demonstrates the need for a project.
- any comments or view of Indigenous peoples, the public and other participants on the proponent's need statement.

4.3. Alternative means of carrying out the project

The Impact Statement must identify and consider the potential environmental, health, social and economic effects and the impacts on the rights of Indigenous peoples of alternative means of carrying out the designated project that are technically and economically feasible.

For the selection of the alternative means of carrying out the project, the Impact Statement must describe:

- the criteria to determine technical and economic feasibility of possible alternative means;
- the best available technologies considered and applied in determining alternative means;
- those alternative means that are technically and economically feasible presented in sufficient and appropriate detail; and
- the particularities for each alternative mean and their potential adverse and positive environmental, health, social and economic effects, and their impacts on the Indigenous peoples and their rights as identified by Indigenous peoples.

The Impact Statement must then describe:

- the methodology and criteria that were used to compare the alternative means, to determine the preferred means of carrying out the project, and to justify the exclusions of other solutions, based on the trade-offs associated with the preferred and other alternative means;
  - environmental criteria should include effects to air quality, water quality, all wildlife and associated habitat (including wetlands), risk from accidents and malfunctions;
  - the health and social criteria should include effects resulting from potential or perceived changes to the environment (e.g., avoidance of traditional food, potential exposure to contaminants through consumption of traditional food, and access to traditional food);
  - potential effects to species at risk as per the *Species at Risk Act* (SARA), including any critical habitat, must be considered in alternative assessment, including a description of how avoidance of effects was considered and how it may be achieved through alternative means;
  - the potential effects on GHG emissions and the way these emissions must be considered as a criterion in the selection of the alternative. Refer to Section 4.1.3 of the SACC. The storage potential of potential carbon sinks in the local study area should be considered;
- the preferred means of carrying out the project and the rationale for the selection based on the consideration of environmental, health, social and economic effects, the impacts on the rights of Indigenous peoples, technical and economic feasibility, and the use of best available technologies, and consideration of the sustainability principles (described in Section 14, Extent to which the project contributes to sustainability);
- application of GBA Plus to the analysis of alternative means of carrying out the project to inform how effects may vary for diverse subgroups; and
- how concerns, views and information provided by Indigenous peoples, the public and other participants were taken into account in establishing criteria and conducting the analysis.

In its alternative means analysis, the Impact Statement must address key project elements, including, but not limited to, the following, where relevant to the project:

- the location of the project and its main components;
- the schedule for the components and phases of the project;
- off-site transportation for:

  - gold and copper concentrate;
  - oil and gas;
  - employees;
- employee lodging;
- the route of the site access road;
- the energy sources to supply the project and other stationary sources to supply heat or steam;
- the relocation of a powerline;
- the supply of drinking water, industrial water, surface water, groundwater);
- the location and sources of aggregates used in construction and maintenance of infrastructure;
- the activities attached to the mining facilities:
  - open pit mining, including the pit development phases;
  - the location and design of the processing facility (crushing, separation, concentration and dehydration);
  - the mine waste management facilities (tailings storage facility, waste rock piles, overburden piles and low-grade ore piles);
  - mine waste management (tailings, waste rock, overburden, low-grade ore, effluents):
  - excavated materials, including their location, the choice of management methods, the duration of storage (short- and long-term), potential use as backfill for pits if applicable, and analysis of acid mine drainage, neutral mine drainage, and/or metal (metalloid) leaching potential of all excavated materials;
  - the location of the tailings storage facility, accounting for the groundwater flow directions and the local groundwater users;
  - tailings storage methods (e.g. dry pile facility or classical sludge facility, co-deposition, reuse as underground fill, etc.);
- diversion of the Ruisseau Bibou Creek, either to Lake A (same watershed) or to another watershed;
- the location, construction and crossing methods for bodies of water, watercourses, wetlands and other obstacles;
- water retaining structures, such as dams, dikes, berms and others;
- water and wastewater management:
  - the location of the final effluent discharge points, including the temporary discharge sites during the construction phase and the permanent discharge sites during the operational phase;
  - the effluent treatment and quality control technologies and techniques;
  - reuse of water;
- waste management, including household waste and hazardous waste; and
- suspension and closure options.

For mine waste management facilities, the alternatives must be assessed so as to demonstrate clearly that the chosen location (tailing management, waste rock, overburden potentially leachable and/or acid generating on the surface or in the pit) is most suitable for mine waste disposal from the environmental, technical, economic, social and health points of view. The report for the assessment of alternatives pertains to the following phases and includes all supporting documents and references. Refer to Guidelines for the assessment of alternatives for mine waste disposal.

1. Determination of possible alternatives, including the criteria related to the threshold. For the possibility of managing potentially acid-generating mine waste, justify clearly the necessity of operating three pits simultaneously instead of in sequence to free one pit for management of potentially acid-generating and/or leachable mine waste or for tailings and waste rock management in co-disposal.
2. Pre-screening assessment
3. Alternatives characterization (including environmental, technical, economical and social considerations)
4. Multiple accounts ledger (including the determination and evaluation of impacts generated by each option)
5. Value-based decision process
6. Sensitivity analysis

As relevant, the alternatives to and alternative means assessments should be informed by, but not limited to, the following:

- any study or plan that is conducted or prepared by a jurisdiction—or an Indigenous governing body—in respect to the region related to the designated the project and that has been provided with respect to project;
- any relevant assessment of the effects of the designated project that is conducted by or on behalf of an Indigenous governing body and that is provided with respect to the designated project;
- Indigenous knowledge, community knowledge, comments received by the public, comments received from a jurisdiction; and
- other studies or assessments realized by the proponent or other proponents.

5. Description of Public Participation and Views

The proponent must engage with local communities and stakeholders. Engagement activities should be inclusive and ensure that interested members of the public have an opportunity to share their views. Engagement must also consider the language needs, with regard to official languages and the Indigenous languages spoken in the region. Special attention must be paid to the participation of individuals and communities that have rights and interests in the lands affected by the project.

The proponent should consult Agency guidance documents on this topic, particularly: Framework: Public Participation Under the *Impact Assessment Act*, and Guidance: Public Participation under the *Impact Assessment Act*.

5.1. Summary of public engagement activities

The Impact Statement must describe the proponent's public engagement activities regarding the designated project, including;

- the efforts deployed to disseminate information regarding the project and the information and documents disseminated during the consultation process;
- the methods used (e.g., community education, community-based research and development of solutions), the consultation site, the people, including those from various subgroups, and the organizations consulted;
- a report on the commitments made, describing all the efforts, whether fruitful or not, deployed to obtain the public's opinion on the project;
- the efforts deployed to obtain public participation in the preparation and revision of the proponent's Impact Statement, including collection and incorporation of community knowledge; and
- a description of the efforts conducted to engage various population subgroups in order to support the collection of the necessary information to produce GBA Plus.

5.2. Analysis and response to questions, comments and issues raised

The Impact Statement must:

- summarize the key issues related to the project and raised through public engagement, as well as the eventual environmental, health, social and economic effects, including the disproportionate effects for various population subgroups and how they were integrated into the Impact Statement.

- describe any questions and comments raised by the public and how they influenced the design, of the project;
- identify the alternative means, mitigation measures or the monitoring and follow-up programs identified to deal with public uncertainties;
- identify public concerns that have not been addressed, if any, and provide the reasons why they have not been; and
- provide details and commitments regarding how the public will be kept involved if the project were to be approved and were to proceed, such as public involvement in follow-up and monitoring programs.

6. Description of Engagement with Indigenous Groups

The proponent must engage with Indigenous groups at the earliest reasonable opportunity, in order to identify and understand the potential impacts of the project on Indigenous peoples and their rights, including their lands, territories and resources, and to incorporate Indigenous knowledge throughout the Impact Statement, in the same way as Western scientific information. Engagement with Indigenous groups is required to inform the impact assessment and identify measures to avoid or minimize potential impacts on Indigenous peoples and their rights from the project. This engagement may also identify potential positive outcomes, including measures that could improve the underlying baseline conditions that support the exercise of rights. In its Impact Statement, the proponent must demonstrate how the project will be designed, not only to minimize its adverse effects, but to maximize the positive impacts on the quality of life of Indigenous peoples.

As part of an impact assessment process under the Act, the proponent must collaborate with Indigenous groups in completing its Impact Statement. For the purposes of the Impact Statement, the proponent must:

- gather Indigenous knowledge and expertise and integrate them into the Impact Statement, on the same basis as scientific knowledge, in accordance with any existing community protocol and any direction provided by the Committee;
- share project information frequently and transparently with Indigenous peoples;
- cooperate with the Indigenous groups to define the VCs and the indicators to be preferred in the Impact Statement;
- support the participation of Indigenous groups in the completion of the Impact Statement, which could include funding studies conducted by potentially affected Indigenous groups who will have demonstrated interest in this regard;
- support the participation of Indigenous groups in carrying out the Impact Statement, which may include funding for studies conducted by potentially affected Indigenous groups who have demonstrated an interest, or funding for participation in surveys, consultations, and other forms of participation; and
- cooperate with Indigenous groups to identify preferred measures to avoid, minimize, offset or otherwise accommodate for potential adverse impacts on Indigenous peoples or their rights, as well as to optimize the project's benefits for their communities.

The engagement efforts should be consistent with the Government of Canada's commitment to implement the United Nations Declaration on the Rights of Indigenous Peoples (the Declaration) as a comprehensive international human rights instrument and Canada's roadmap for reconciliation. The Declaration emphasizes the importance of recognizing and upholding the rights of Indigenous peoples and ensuring that there is effective and meaningful participation of Indigenous groups in decisions that affect them, their communities, and territories. The Declaration also emphasizes the need to work together in partnership and respect, as articulated through the principle of free, prior and informed consent. This principle reflects working together in good faith on decisions that impact Indigenous peoples, with the intention to achieve consensus.

Engagement should also be consistent with jurisprudence and best practices in respect of implementing the common law duty to consult. The Indigenous Engagement and Partnership Plan identifies Indigenous communities that the Crown will consult with to understand the concerns and potential impacts of the project on their exercise of potential or established Aboriginal or Treaty rights and, where appropriate, make accommodations. The degree of engagement with each community will vary and in general, will be proportionate to the evidence provided by Indigenous groups regarding potential pathways of impact from the project on Aboriginal or treaty rights. Engagement is also conducted for other purposes, including as an opportunity to learn about and further explore Indigenous community interests in a project, or to understand other potential project effects not directly related to the exercise of Aboriginal or treaty rights. As a minimum, the proponent must commit to the Indigenous communities designated[4] by the Crown in the *Indigenous Engagement and Partnership Plan*. For the Indigenous communities that must be informed of the project at key phases of the impact assessment process, as indicated in the Plan, the proponent must provide project updates at these times and document the notices in the Impact Statement. To facilitate each Indigenous community's participation in the preparation of the Impact Statement, the proponent is required to work with each Indigenous community named in Section 4 of the Plan to establish a mutually agreed approach for their participation, if they wish to participate.

Engagement with Indigenous groups must involve ongoing information sharing and collaboration between the proponent and Indigenous groups to contribute to the development and validation of conclusions and assessment findings related to potential impacts and pathways of effects to Indigenous peoples and impacts on the rights of Indigenous peoples. The results of any engagement with each Indigenous group must be presented in the Impact Statement, and, as best as possible, convey the perspective of the Indigenous groups being engaged. The record of engagement and inclusion of Indigenous knowledge in the Impact Statement should demonstrate that the proponent sought to build consensus and obtained the agreement from specific Indigenous groups regarding information specifically pertaining to those Indigenous groups that is presented in the Impact Statement.

The committee notes that not all Indigenous groups may be willing to collaborate with the proponent, therefore the proponent must demonstrate they have made best efforts at collaboration, and provide the committee with an explanation regarding circumstances where collaboration was not possible. The proponent should continue sharing information and analyses with the Indigenous groups, to use publicly available sources of information to support the assessment, and to document their efforts in that respect.

The proponent must consult the Agency's guidance documents on Indigenous participation and engagement throughout the Impact Statement, which are available on the Agency's website and are listed in Appendix 2 – Indigenous engagement resources.

[4] The list of peoples, groups or communities identified in the Planning phase may change as knowledge is acquired on the potential effects of the project, or if the project or its components are altered during the impact assessment. The Committee reserves the right to amend the list of the *Indigenous Engagement and Partnership Plan* based on the additional information collected during the impact assessment and will inform the proponent.

6.1. Indigenous knowledge considerations

Indigenous knowledge[5] is holistic and when integrated in impact assessment, it informs the assessment on areas including the biophysical environment, as well as social, cultural, economic, and health aspects, Indigenous governance, resource use, and mitigation. Indigenous knowledge must be brought together on an equal footing with scientific or technical aspects to inform the impact assessment, including the assessment of potential impacts on the biophysical environment; health, social, and economic conditions; Indigenous peoples; and best practices and mitigation measures. It is important that Indigenous knowledge, where available to the proponent, be included for all of these aspects in the impact assessment, not only to look at potential impacts of the project on Indigenous groups and their rights. It is also important to capture the context in which Indigenous groups provide their Indigenous knowledge and to convey it in a culturally appropriate manner.

Community-specific engagement protocols and procedures around Indigenous knowledge in assessment processes should be understood, respected, and implemented. The Impact Statement must indicate where input from Indigenous groups, including Indigenous knowledge, has been incorporated and how it was considered. Information should be specific to each population subgroup of the Indigenous groups participating in the assessment, and provide contextual information about the members of a population subgroup of the Indigenous groups (e.g. women, 2SLGBTQI+ people, men, elders and youth, with the possible intersection of gender and age).

The proponent must indicate where Indigenous knowledge that was provided was not included in the assessment and provide a rationale. Where conclusions differ between Indigenous knowledge and scientific or technical studies, the proponent must clearly present how both have been considered in the Impact Statement.

Indigenous knowledge, whether publicly available or directly shared with the proponent, should not be included without written consent and validation from the Indigenous community, regardless of the source of the Indigenous knowledge. The guidance document Protecting Confidential Indigenous Knowledge under the *Impact Assessment Act*, to which the proponent must refer, describes the approaches to be favoured. Appropriate, culturally-based Indigenous methodology for integrating Indigenous knowledge and community input into the impact assessment is necessary to appropriately and ethically assess potential effects and significance of those effects from an Indigenous perspective.

[5] The Government of Canada recognizes that Indigenous Peoples refer to their knowledge in different ways, characteristic of their unique languages. Within the context of these Guidelines, the term Indigenous knowledge is used to refer to all Indigenous ways of knowing. The proponent is encouraged to respect the terminology preferences of the Indigenous communities involved in the assessment.

6.2. Record of engagement

The Impact Statement must provide a record of engagement that describes all efforts, successful and unsuccessful, taken to seek the views of each potentially affected Indigenous group with respect to the designated project. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement.

At a minimum, the proponent must engage with the Indigenous groups identified[6] by the Crown in the Indigenous Engagement and Partnership Plan issued along with the Notice of Commencement for the project. The purpose of this engagement is to gain an understanding of the issues and concerns of potentially affected Indigenous groups, and to inform an assessment of the potential adverse impacts of the project on Indigenous peoples and their rights.

If the Proponent learns of potential adverse effects on an Indigenous community that does not appear in Section 4.1 of the *Indigenous Engagement and Partnership Plan*, this community must also be involved, and the proponent is required to notify the Committee as soon as possible.

The record of engagement in the Impact Statement must include:

- the proponent's policy on Indigenous engagement, and the policies and statements of principle established in the collection of traditional knowledge and information on the use of lands and resources for traditional purposes;
- the list of Indigenous groups engaged by the proponent, including those that the proponent was unsuccessful in engaging;
- the list of Indigenous groups or communities wishing to be engaged but omitted by the proponent from engagement and the reasons for their omission;
- where applicable, each community-specific engagement plan developed collaboratively by the Indigenous community and the proponent for the project. If only one engagement plan was developed by the proponent for engagement with all Indigenous groups, provide a rationale for this approach);
- the engagement activities undertaken with each Indigenous group, including the date, means and results of engagement;
- a description of the outcomes of conversations with each Indigenous group about how they wish to be engaged by the proponent;
- the results of any engagement and the perspectives of the Indigenous peoples involved;
- the list of the consultation or engagement protocols adopted by each Indigenous group, if applicable. The protocols must be included when available in writing;
- an explanation for cases where engagement efforts have proven unsuccessful;

[6] The list of Indigenous peoples, groups or communities identified during the Planning phase may change as knowledge of the effects and potential impacts of the project is gained, or if the project or its components are modified during the impact assessment. The committee reserves the right to modify the list in the Indigenous Engagement and Partnership Plan based on additional information gathered during the impact assessment.

- a description of how project information is frequently and transparently shared with Indigenous peoples;
- a description of the preferred methods for sharing information, including alternative solutions implemented for people and locations where technological resources are limited or language barriers exist (i.e., translation of written documents, toponomy or provision of summaries in Indigenous languages);
- a description of how Indigenous groups were provided with a reasonable opportunity to review draft sections of the Impact Statement prior to them being filed, where disagreements occurred, and how disagreements were considered;
- a description of how Indigenous expertise will be sought to assist with the carrying out of the project, should it be approved;
- a description of the effects deployed to engage diverse subgroups of each Indigenous group in a culturally appropriate manner, including various population subgroups of the Indigenous groups broken down by culturally appropriate factors (e.g. age groups, sex, gender) and by other relevant factors for the community (e.g. hunters, trappers, elders) to support the collection of information necessary to complete GBA Plus;
- a description of how engagement activities enable Indigenous groups to assess the project's positive and adverse effects on their members, communities, activities and rights, as identified by these Indigenous groups; and
- any agreements pertaining to engagement that are finalized or in progress, with anticipated timelines to complete.

The record of engagement must demonstrate that the capacity needs of Indigenous groups were taken into account, and that timelines have been adequately communicated and flexible enough to ensure Indigenous groups had the ability to review and gain understanding of information in the Impact Statement, including, where applicable, specific procedures for contributing information for sections of the Impact Statement.

It is expected that the engagement activities for the preparation of the Impact Statement will be carried out with integrity and transparency, without conflicts of interest, in good faith, and conducted in a manner that is attentive to the concerns of Indigenous groups and committed to producing mutually beneficial outcomes.

6.3. Analysis and response to questions, comments, and issues raised

The Impact Statement must provide an analysis of any potential effects to Indigenous groups and impacts on the rights of Indigenous peoples and of all the input received from Indigenous groups with respect to the project, including its contribution to cumulative effects. This analysis is to include all input received by Indigenous groups prior to, and since commencing, the impact assessment process. This analysis should serve to inform the identification of potential effects and impacts on any applicable VCs, impacts on Indigenous peoples and their rights, and proposed measures to mitigate or accommodate for adverse impacts, enhance or optimize positive effects.

The analysis may be summarized in the relevant section on effects to a VC. The location and level of detail of the information in the Impact Statement will depend on its importance to the selected VCs.

It is recommended that the proponent organize and analyze information relevant to Indigenous groups in separate sections for each one potentially affected by the project. Where applicable, the information and analysis must also be sufficiently disaggregated to support the GBA Plus analysis of disproportionate effects. In all cases, ethical guidelines and culturally appropriate protocols governing research, data collection and confidentiality must be followed. Overlaps may occur between the information required in the Guidelines and the sections devoted to Indigenous groups. The location and the level of detail of the information presented in the Impact Statement will depend on its significance for the chosen VCs, and some repetition between the sections is possible.

The Impact Statement must:

- consider and incorporate Indigenous knowledge, spiritual practices, cultural beliefs, laws and norms in the assessment, including whether the project would be inconsistent with Indigenous laws and norms;
- describe the type of information received from Indigenous groups (observations, questions, issues, comments, knowledge, expertise or other);
- describe the potential positive and negative effects to environmental, health, social, cultural and economic conditions of each Indigenous group, informed by the Indigenous group(s) involved in the assessment and must include both adverse and positive effects;
- describe the rights or interests of each of the Indigenous groups, which the groups themselves have identified and agreed to include in the Impact Statement, and which may be affected by the project:
- describe the potential effects and impacts to lands in a reserve within the meaning of subsection 2(1) of the *Indian Act*. Note that section 2 of the Act defines federal lands as including “reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and that are subject to the *Indian Act*, and all waters on and airspace above those reserves or lands”;
- provide an analysis of the extent of the potential effects on each Indigenous community, and the views of Indigenous communities regarding the extent of impact on the exercise of rights as well as how these effects or impacts may be avoided, managed, mitigated, or accommodated;
- detail the main issues, questions and comments raised by each Indigenous group during engagement activities and the proponent’s responses, including how matters have been addressed in the Impact Statement or will be addressed in the future;
- append any specific studies or assessments provided by Indigenous groups, if permission has been obtained to publish them;
- identify the sources of information used in the analyses of potential impacts to exercise of rights, as well as assumptions and methodologies used for the analyses;
- integrate the perspectives of the various population subgroups, such as youth, women, elders, two-spirited persons, persons with disabilities, and individuals identified according to other identify factors relevant to the community, if applicable;

- indicate where and how Indigenous groups' perspectives and input were integrated into or contributed to decisions regarding the project or its impact assessment, including:
  - construction, operations, closure, and restoration plans, including final land use plans for the site (e.g., decommissioning of on-site water management infrastructure);
  - assessment of the alternatives to carry out the project (e.g., selection of the location of the effluent discharge point);
  - developing the assessment including setting spatial and temporal boundaries, identifying and selecting VCs, location of sensitive receptors and collection of baseline information;
  - validation of model assumptions (e.g., the rate of consumption of traditional foods);
  - characterization of potential environmental, health, social and economic effects of the project for each Indigenous group;
  - cumulative effects assessment;
  - measures to mitigate the effects or enhance or optimize the potential benefits of the project, including the compensation plans listed in Appendix 1 – Compensation Plans;
  - determining the extent to which the effects are significant;
  - follow-up and monitoring activities and adaptive management strategies, should the project be approved;
- describe how the information gathered during the Planning phase of the impact assessment of the project was included, including the documents uploaded to the Registry by Indigenous groups during that phase of the impact assessment.

6.4. Collaboration with Indigenous peoples following the submission of the Impact Statement

The proponent must explain in the Impact Statement how it plans to continue to work with affected Indigenous peoples during subsequent phases of the impact assessment process and throughout the lifecycle of the project, if it is allowed to proceed. For this section, the proponent may refer to information presented in other sections of the Impact Statement.

The Impact Statement must:

- describe the type of work the proponent intends to accomplish with Indigenous groups during subsequent phases of the impact assessment process;
- set out any proponent commitments for engaging affected Indigenous groups, where appropriate;
- describe how Indigenous peoples will be involved in decision making processes related to the project throughout the lifecycle of the project; and
- describe how Indigenous expertise and knowledge would be considered in carrying out the project.

7. Assessment Methodology

7.1. Baseline methodology

The Impact Statement must provide a description of the baseline for the environmental, health, social, and economic conditions related to the project. This should include the existing environmental, health, social and economic conditions, interrelations and interactions among them, and the variability in these conditions over time scales and spatial boundaries appropriate to the project. Meaningful, two-way dialogue with communities and Indigenous groups can provide input that may describe how environmental, health, social and economic conditions are interrelated.

Baseline data must be collected in a manner to allow for reliable analysis, extrapolation and predictions. The baseline data should be suitable to estimate pre-project baseline conditions, to predict effects from the project, and to evaluate post-project changes in the conditions within and across the project, local and regional study areas. For the field surveys, the proponent must provide for the inclusion of several sampling locations and multiple visits to each location to support all the assessment analyses required. Further data requirements are included in the specific baseline conditions sections for biophysical environment (Section 8), for the health, social, economic conditions (Section 9) and for impacts on Indigenous peoples (Section 10) in the Guidelines.

For the baseline conditions, the Impact Statement must:

- describe the baseline for the environmental, health, social and economic conditions related to the project, and the interrelations and interactions among them;
- describe potential changes in the baseline conditions that are likely to occur in the future, if the Project was not carried out, including changes due to climate change.
- include baseline data in a way that makes analyses, extrapolations and reliable predictions possible. Across the project and the local and regional study areas, the data should make it possible to:
  - perform analyses to estimate pre-project baseline conditions;
  - predict the effects of the project;
  - evaluate and compare of post-project conditions;
- describe in detail the data sources and data collection methods, including sampling, survey and research protocols, modelling methods, sources of uncertainty, estimates of errors, and any assumption or bias to corroborate the validity and accuracy of the baseline information collected;
- be supported by modelling and simulations to assess the necessary sampling effort and quantitatively determine the comparative analysis of design options. Models that are developed should be validated using field data from the appropriate local and regional study areas;
- if existing data sources are used, provide a justification to show that the data sources are relevant in the project's spatial and temporal coverage. Certain data sources may have targeted coverage in areas

near the road networks or contain biases that should be noted and discussed before they are considered reliable;

- show that the data sources are relevant to and representative of conditions within the established spatial and temporal boundaries and account for natural variability, especially if surrogate data from representative sites are used rather than specific measurements at the project site;
- indicate if baseline data gaps exist and additional steps taken to address gaps in information;
- describe where and how community or Indigenous knowledge, feedback, and research were considered in determining the baseline conditions;
- pay special attention to the wish of Indigenous groups to regain a site where the conditions approach the pre-mining baseline and justify the selection of the baseline conditions and data used in this perspective;
- describe how GBA Plus was applied to examine the differences in the baseline conditions among the various subgroups and provide disaggregated data, as needed; and
- include a bibliography of all documents and information sources consulted.

Proponents are encouraged to consult with the committee during the development and planning of baseline studies. Relevant sources of baseline information are listed in Appendix 1 - Sources of baseline information.

7.2. Selection of valued components

The Impact Statement must identify the valued components (VCs) that will serve as the focal points for the impact assessment. VCs are of particular concern or value to participants and may be affected by the project. The value of a component not only relates to its role, but also to the value people place on it.

The Guidelines, in Sections 8-13, provide information requirements organized in categories that may be considered as VCs, or may be considered as intermediate components to inform the assessment of VCs, depending on the project. The VCs will help to organize the description of the effects of the project required by the Guidelines. In some sections, the Guidelines identify specific sub-VCs (e.g. specific fish species within fish and fish habitat). The proponent may also identify additional VCs beyond those included in the Guidelines in consultation with Indigenous groups and other participants.

Indigenous groups may identify holistic VCs that encompass the effects on a number of individual environmental, health, social, or economic value components. Where identified, the proponent should structure analysis and presentation of individual VC into an assessment of the overarching Indigenous VC. Proponents are encouraged to work with Indigenous groups to identify holistic VCs, which may increase the efficiency of the assessment and clarity of presentation. In the event that a VC is suggested by an Indigenous group but is excluded from the Impact Statement, the proponent must provide a justification for its exclusion.

In selecting a VC to be included, the following factors should be considered:

- the presence of VCs in the study area, or in the watersheds affected;

- the extent to which the effects of the project and related activities have the potential to interact with the VC;
- the extent to which the VC may be affected by other past, existing or future projects and activities and natural processes;
- the extent to which the VC is linked to Indigenous interests or rights of Indigenous peoples and whether an Indigenous group has requested the VC;
- the extent to which the VC is linked to a federal, provincial, territorial or municipal government priority;
- the possibility that an adverse or positive effect on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and
- whether the potential effects of the project on the VC can be measured and/or monitored or would be better ascertained through the analysis of a proxy VC.

The Impact Statement must:

- describe the VCs and provide a rationale for the selection of VCs in sufficient detail to allow the reviewer to understand their relevance to the assessment;
- indicate the source and reasons of the concerns or interests considered in the selection of VCs, including from the public, provincial or federal authorities, Indigenous groups, and other participants; and
- describe how community and Indigenous knowledge and the perspectives were considered in selecting VCs.

Based on participant feedback during the preparatory phase, the following were some of the issues identified as important to consider in the assessment:

- transportation options for gold and copper concentrate, including rail;
- fish and fish habitat, including:
  - the diversion of Bibou Creek;
- terrestrial wildlife, including:
  - species at risk (e.g., caribou);
  - large wildlife (e.g., moose, bear) and their habitat, including the health of bears feeding near the tailings storage facility;
- air quality due to dust on the mine site and roads;
- social and economic conditions of Indigenous and local communities, including:
  - local economic benefits;
  - the settlement and retention of future mine employees in the area;
  - the negative effects of work schedules (e.g., 7/7, 14/14) and fly-in/fly-out, particularly on family cohesion;
  - the low availability of housing in Indigenous and local communities;

- workforce shortages and measures to address them, in the context of competition for workers in local businesses and organizations;
- the need for collaborative agreements between the municipalities and the proponent to ensure the social acceptability of the project;
- the need to establish measures to redirect the local economy and jobs when mining operations cease;
- the proponent's financial contribution to municipal infrastructure and its involvement in the community;
- advance planning for workforce training;
- the possibility of a bus commute from Mistissini for Cree workers;
- hiring targets for Indigenous employees;
- the inequalities that could be created between population groups;
- the possible increase in alcohol and drug use;
- the concerns associated with discrimination against Indigenous workers in the workplace and the importance of taking concrete action on this issue;
- the importance of fostering collaboration between Indigenous and non-Indigenous workers, particularly in communications (in Cree, French, and English);
- workforce inclusiveness and well-being in the mining industry;

- the relationship between the proponent and the Cree Nations:
  - the importance of hiring a Cree liaison officer early in the impact assessment process;
  - the establishment of a liaison office in Mistissini;
- the practice of traditional activities (e.g., hunting, fishing) and concerns about contamination of traditional foods; and
- the cumulative effects of other projects in the area (forestry, mining exploration).

Concerns and interests pertaining to these components have been considered in the Guidelines and are reflected in the information requirements. The proponent is expected to finalize the selection of VCs in consultation with Indigenous groups and other participants. The proponent should engage with participants and refer to comments received in relation to the project on the Registry for additional information to support the selection of VCs.

7.3. Spatial and temporal boundaries

The Impact Statement must establish appropriate spatial and temporal boundaries to describe the baseline conditions for, and to guide the assessment of, each VC. The spatial and temporal boundaries will vary depending on the VC and must be considered separately for each VC.

The proponent must engage with Indigenous groups when defining spatial and temporal boundaries for VCs that are identified by, or related directly to, Indigenous peoples. The Impact Statement must explain how the proponent considered the information received from Indigenous groups in its definition of spatial and temporal boundaries, particularly for VCs related to effects to Indigenous peoples. The proponent is also encouraged to consult the municipalities concerning the spatial and temporal limits of the socioeconomic VCs.

The Impact Statement must explain how the proponent considered the information provided by Indigenous groups in its definition of spatial and temporal boundaries, particularly for VCs related to effects on Indigenous peoples.

The proponent should consider additional guidance for assigning appropriate study areas or boundaries provided in Appendix 1 - Establishing spatial and temporal boundaries.

7.3.1. Spatial boundaries

Generally, it is recommended that the proponent establish three spatial boundaries of study areas to assess the impacts on each VC:

- Project Area: defined as the project footprint including all temporary and permanent areas associated with the project, and alternatives considered;
- Local Study Area: defined as the area beyond the project footprint where project effects may extend;
- Regional Study Area: defined as the larger area around the local study area, (delineated by ecological, social, economic or other appropriate boundaries) including the region where cumulative effects may extend.

The Impact Statement must:

- describe the spatial boundaries for each VC and provide a rationale for each boundary. Spatial boundaries must be shown on maps;
- define spatial boundaries by taking into account:
  - scale and spatial extent of potential effects and impacts of the project. For example:
    - the spatial extent of potential contamination in the receiving aquatic environment resulting from the deposit of effluent;
    - the extent of groundwater contamination resulting from tailings and accumulation areas;
    - the extent of deposition of contaminated dust.
  - the physical location of potential receptors, including, where applicable, the movement patterns of potential receptors;
  - relationships between VCs (e.g. interaction between wildlife and vegetation);
  - the knowledge and concerns of the Indigenous and local communities, including the users of the territory;

- current or traditional land and resource use by Indigenous groups;
- rights of Indigenous peoples, including treaty lands, traditional territories and areas or sites used for cultural and spiritual practices;
- any archaeological site;
- physical, technical, ecological, social, health, economic and cultural considerations; and
- size, nature, location and known effects of past, present and foreseeable projects and activities, particularly for the regional study areas.

7.3.2. Temporal boundaries

The Impact Statement must:

- describe the temporal boundaries for each VC and provide a rationale for each boundary;
- define temporal boundaries by taking into account:
  - schedule of phases of the project;
  - past conditions and historical context;
  - community knowledge and Indigenous knowledge;
  - current or traditional land and resource use by Indigenous groups;
  - rights of Indigenous peoples, including treaty lands, traditional territories and areas or sites used for cultural and spiritual practices;
  - relevant physical, technical, ecological, social, health, economic and cultural considerations;
  - the foreseeable period during which temporary impacts are expected (e.g., changes in groundwater quality after closure); and
  - timing of past, present and foreseeable projects and activities.

7.4. Effects assessment methodology

The Impact Statement must describe the changes to the environment or to the health, social or economic conditions and the positive and negative consequences of these changes (the effects) that are likely to be caused by the carrying out of the project, and the results of interactions among the effects. This includes the effects to Indigenous peoples' physical and cultural heritage, current use of lands and resources for traditional purposes, any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada. The overall effects assessment methodology must also consider the project's potential interference with the exercise of rights of the Indigenous peoples of Canada as further detailed in Section 10, Indigenous Peoples. The description must include the information requirements detailed in specific effects sections in the Guidelines.

The assessment of effects must be based on a comparison of baseline conditions and the predicted future conditions with the project. These conditions must be well defined by the proponent. The effects must be assessed without the implementation of mitigation measures. In some cases it may be appropriate to determine future conditions both with, and without, the project, in order to account for potential changes in baseline conditions (e.g. due to climate change or to anticipated changes in socio-economic conditions). The assessment of effects should also provide the probability or likelihood of that effect occurring, and the degree of confidence in the analysis. The assessment of effects must use methods that are statistically and scientifically defensible and must describe the degree of uncertainty related to the data and methods used and reflect community and Indigenous knowledge.

After completing the assessment of the effects, the technical and economically feasible mitigation measures must be considered (see Section 7.5, Mitigation and enhancement measures). The Impact Statement must describe any residual environmental, health, social or economic effects of the project. The assessment of residual effects must also take into account interactions between the project and past, existing and reasonably foreseeable projects or physical activities to be carried out, as described in Section 7.6, Cumulative effects assessment.

Depending on the VC, the description of the effects can be either qualitative or quantitative, taking into account any important contextual factors, as appropriate. The Impact Statement must describe the effects in terms of magnitude, geographic extent, timing, duration and frequency, and whether effects are reversible or irreversible. For some effects, it may be more appropriate to use other criteria, such as the nature of the effects, directionality, causation and probability. The ecological and socio-economic context should also be provided. The perception of the same effect may vary among different individuals, groups and communities. Consequently, the effect assessment should take into account views and concerns expressed through engagement with Indigenous peoples and community members.

The Impact Statement must:

- discuss in detail the potential direct and indirect, positive and adverse effects for each phase of the project (construction, operation, restoration and post-restoration);
- identify and describe measures that are technically and economically feasible and that would mitigate the project's adverse effects or enhancements to increase positive effects (see Section 7.5, Mitigation and enhancement measures for more details);
- describe any residual effects of the project;
- identify the effects falling within federal jurisdiction and the direct or incidental effects, as defined in section 2 of the Act;
- describe how baseline data was used to inform this analysis;
- describe the analytical methods selected to assess effects, including clearly stated assumptions for all predictions and how each assumption has been tested;
- describe the degree of uncertainty related to the data and methods;
- for quantitative predictions based on models, detail model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained, including an explanation of model calibration, validation and model performance metrics used;

- discuss the degree of confidence in the predictions and conclusions of the effect assessment;
- if a detailed description of effects cannot be provided, provide a rationale for the absence of details and a general description of the potential effects and related project activities (e.g. activities and effects related to closure and reclamation). The proponent should confirm the rationale with the committee before submitting the Impact Statement;
- for predictions that may be affected by climate change, discuss how the range of potential climates informed the assessment, including predicted changes in climate extremes;
- consider and describe the interactions among the environmental, health, social and economic effects and impacts on Indigenous peoples and their rights;
- consider and describe the perspectives, concerns, and tolerance levels of Indigenous groups and other participants, including consideration of other regional activities that have had an impact on Indigenous people;
- describe where and how Indigenous and community knowledge and input were considered and incorporated into effects assessment; and
- describe how GBA Plus was applied to examine differences in effects among the various subgroups and provide disaggregated data where necessary.

7.5. Mitigation and enhancement measures

The Impact Statement must identify measures that are technically and economically feasible and that would mitigate the project's adverse environmental, health, social and economic effects. The proponent may also identify enhancement measures to increase positive effects, such as local and regional training efforts, investment in infrastructure and services, and projects to rehabilitate degraded environments.

For more guidance on developing mitigation measures see Appendix 1 - Developing mitigation measures and enhancements.

The Impact Statement must:

- describe mitigation measures that are specific to each environmental, health, social or economic effect identified in the effects assessment including:
  - practices, polices and commitments that are part of the project design and that are required to achieve the predicted effects (e.g. project design elements that were accounted for in the effects assessment);
  - standard mitigation practices, policies and commitments that constitute proven technically and economically feasible mitigation measures and that are to be applied as part of standard practice; and
  - any new or innovative mitigation measures being proposed.
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on the various vulnerable population subgroups, or they are not disadvantaged in

sharing any advantages and development possibilities resulting from the project. These mitigation measures should be developed in cooperation with the people from various subgroups who are adversely affected, and the people holding positions with these organizations that share the interest of these groups, to maximize the diversity and depth of the perspectives and understanding;

- draft mitigation measures, such as specific commitments that clearly describe how the proponent intends to implement them and the desired results. The measures must be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation.
- identify and describe the use and application of best available technology and best environmental practice in identifying, assessing and implementing mitigation measures;
- describe any environmental protection plan(s) for the project and, if applicable, the environmental management system through which the proponent will deliver this plan. The plan(s) must provide an overall perspective on how potentially adverse effects would be minimized and managed over time;
- identify the party responsible for the implementation of mitigation measures and the system of accountability;
- discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with any commitments;
- describe the approach that would be taken if a mitigation measure is no longer feasible while the project is carried out;
- describe how, throughout the project's duration, the lessons learned through follow-up programs will be used to continually improve mitigation measures;
- where appropriate, describe any adaptive management plans that will be implemented to address uncertainties associated with the effectiveness of mitigation measures included in a follow-up program (see Section 15.4, Adaptive Management Plan) including:
  - identifying the expected outcomes and targets that the Adaptive Management Plan will address;
  - describing the uncertainties that the Adaptive Management Plan will address;
  - developing hypotheses aimed at reducing the uncertainties described above;
  - describing the relevant baseline(s) for the Adaptive Management Plan; and
  - describing mitigation measures to be employed and alternatives.
- where components are to be decommissioned and abandoned, include planned activities to do so. Project components that may be abandoned and decommissioned during the construction or operation phases may include access roads, temporary laydown areas, aggregate extraction sites and other temporary sites;
- where appropriate, provide details regarding financial liability and compensation in place as required by regulation or the proponent's commitments in relation to closure;
- document specific suggestions raised by Indigenous groups for avoiding, mitigating or otherwise accommodating the project's environmental, health, social and economic effects, including potential

effects and impacts on Indigenous peoples and their rights and describe whether and how these measures will be incorporated in the project design;

- identify opportunities for enhancing positive effects, such as creation of local employment and infrastructure improvements; and
- indicate other technically and economically feasible mitigation measures that were considered but are not proposed for implementation, and explain why they were rejected. Justify any trade-offs between cost savings and effectiveness of the various forms of mitigation measures.

For each mitigation measure identified, the Impact Statement must:

- provide an assessment of the anticipated effectiveness and resulting residual effects;
  - to the extent possible, provide relevant information to demonstrate anticipated mitigation effectiveness, including technical information from analogous projects and projects in the region, peer-reviewed studies, and local Indigenous and community knowledge
- describe all relevant uncertainties and assess how they could affect predicted residual effects;
- if there is little experience or some doubt as to the effectiveness of a measure, describe the risks and potential effects should these measures not be effective or malfunction;
- for those mitigation measures intended to address effects to the environmental, health, social and economic conditions of Indigenous peoples or impacts on rights of Indigenous peoples, provide a description of the consultation with Indigenous groups regarding the residual effects;
- assess any potentially adverse environmental effects associated with the mitigation method itself; and
- describe how disproportionate effects that were identified in the GBA Plus results were used to inform mitigation and enhancement measures.

The project's remaining effects after application of other mitigation measures might have to be offset by implementation of compensatory measures. Where compensatory measures are proposed as measures to mitigate residual effects on species at risk and their critical habitats, fish and fish habitat, or wetland functions, the Impact Statement must include offsetting or compensation plans for consideration during the impact assessment process. Directions relating to the preparation of offsetting plans are presented in Appendix 1 – Offsetting Plans.

In addition to the general requirements above, additional requirements and recommended mitigation measures are shown in the specific mitigation sub-sections that follow. The proponent may propose measures that differ from the specific requirements and recommendations. In which case, the proponent must provide a rationale. For example, the proponent could propose measures viewed as better suited to the anticipated effects than those listed in the Guidelines.

7.6. Cumulative effects assessment

The proponent must assess the project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative effects. The proponent should consult Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*.

Cumulative effects are defined as changes to the environment, health, social, cultural and economic conditions, as a result of the project's residual effects combined with the effects of other past, existing and reasonably foreseeable projects and physical activities. Cumulative effects may result if:

- the implementation of the project may cause residual adverse effects to the VC; and
- the same VC has been or can be affected by other past, existing or future projects or physical activities.

A cumulative effect on an environmental, health, social or economic component or an Indigenous community or the rights of Indigenous peoples may be important even if the project's incremental effects to these components by themselves are minor. Activities from the project itself that generate multiple emissions and discharges (e.g. simultaneous operations) may also need to be considered in the cumulative effects analysis to understand synergistic, compensatory, masking or additive effects.

The Impact Statement must:

- identify the VCs that will be subject to the cumulative effects assessment, including;
  - VCs for which the proponent anticipates residual effects from the project (must be considered in the cumulative effects assessment);
  - VCs considered as being of particular concern in the context of cumulative effects by the public and Indigenous groups, including but not limited to:
    - Air quality;
    - Surface water and groundwater quality;
    - Fish and fish habitat;
    - Wetlands;
    - Migratory birds and their habitat, including bird species at risk;
    - Woodland caribou;
    - Bat species at risk; and
    - Current use of lands and resources for traditional purposes by the Cree Nations;
    - VCs where the predicted residual effects might not indicate the need for a cumulative effects assessment, but rely heavily on uncertain mitigation measures;
- include a rationale if VCs are excluded from the cumulative effects assessment;
- identify and justify the spatial and temporal boundaries for the cumulative effect assessment for each VC selected, taking into account:
  - boundaries may differ for each VC and should not be constrained by jurisdictional boundaries;
  - spatial and temporal boundaries will generally be larger than the boundaries for the project effects alone, and may extend beyond Canada's jurisdiction;
  - temporal boundaries should account for potential effects throughout the lifecycle of the project, including closure or abandonment; and
  - spatial and temporal boundaries for VCs related to effects and impacts on Indigenous peoples defined in collaboration with the Indigenous groups concerned;

- identify the sources of potential cumulative effects. Specify which other projects or activities that have been or will be carried out that could have resulted or could result in effects on the selected VCs within the defined boundaries and whether those effects could interact with the residual effects of the project. Clearly explain and justify the rationale for selecting other past, existing or future projects or activities to include in the cumulative effects assessment. Project activities to be considered include, but are not limited to:
  - include a list of projects and activities to be considered in the assessment of cumulative effects, if known, particularly:
    - past, existing or future mining activities or projects;
    - mineral exploration activities near the project;
    - hydroelectric development and power transmission lines;
    - diversion of watercourses;
    - forestry operations;
    - protected areas and biodiversity reserves;
- describe how the selection of boundaries and other past, existing or future projects or activities for cumulative effects assessment were informed by consultations with the public, Indigenous peoples, jurisdictions, federal authorities and other participants.
- assess the cumulative effects for each selected VC;
  - the analysis must include the effects of past, existing and future projects and physical activities in combination with the residual effects of the project, taking into account how the effects may interact (additive, synergistic, compensatory, and masking effects);
  - the analysis of the effects of future projects and physical activities must include a comparison of possible future scenarios with and without the project, but must reflect the full range of cumulative effects and not just the project's contribution;
  - the effects of past and existing projects and physical activities can be used to put the current state of the VC into context, but must be included in the cumulative effects analysis; and
  - cumulative effects for the same VC may need to be assessed using a hierarchy, e.g. effects on local populations of certain species and on the larger populations.
- describe technically and economically feasible mitigation measures proposed for cumulative environmental, health, social and economic effects, as well as potential impacts on the rights of Indigenous peoples, including:
  - an assessment of the effectiveness of the measures applied to mitigate the cumulative effects; and
  - in cases where measures to mitigate these effects are beyond the control of the proponent, identify any parties that have the authority to act on these measures. In such cases, the Impact Statement must summarize any commitments by the other parties regarding implementation of the necessary measures and any associated communication plans;
- assess the regional implications of applying project-specific mitigation and enhancement measures, taking into account any reasonably foreseeable development in the area; and

- develop a follow-up program to verify the accuracy of the assessment and the effectiveness of mitigation measures for cumulative effects (see Section 15, Follow-up Programs).

The cumulative effects assessment must include consideration of cumulative effects in relation to the ability of Indigenous peoples to exercise their rights and culture. Both the content and means of presenting this information is to be developed in consultation with each potentially impacted Indigenous group. Proponents must collaborate with Indigenous groups in assessing the cumulative effects of the project on the rights and interests of Indigenous peoples. If Indigenous groups do not wish to participate in the cumulative effects assessment, the proponent should continue sharing information and analyses with the Indigenous groups, to use publicly available sources of information to support the assessment, and to document their efforts in that respect.

The Government of Canada has developed the Open Science and Data Platform as a means to access science, data, publications and information about development activities to better understand cumulative effects. Proponents are encouraged to make use of this resource in their cumulative effects analysis.

7.7. Extent to which effects are significant

For adverse effects within federal jurisdiction and the adverse direct or incidental effects, as defined in s.2 of the Act, the Impact Statement must:

- characterize the residual effects, even if deemed small or negligible, and cumulative effects, using criteria and language most appropriate for the effect;
- consider using the following criteria for residual effects, as appropriate:
  - magnitude;
  - geographic extent;
  - timing;
  - duration;
  - frequency;
  - reversibility; and
  - the environmental, health, social and economic context within which potential effects may occur.
- Context should be described and applied as part of the key criteria above, for example:
  - the sensitivity and importance of affected aquatic and terrestrial species, including species at risk and species of importance for Indigenous peoples;
  - the sensitivity and importance of affected habitats and their functions for wildlife;
  - the existence of standards, guidelines, tolerance levels and other sources of information to assess effects; and
  - potential disproportionate residual effects for various population subgroups, in accordance with GBA Plus;

- describe the extent to which the adverse cumulative effects within federal jurisdiction, and the adverse direct or incidental effects, are significant;
- justify the approach and choice of qualitative and quantitative criteria used to determine the extent to which the effects are significant;
- identify and explain relevant sources of information that were used to characterize the extent to which those effects are significant, including how the perspectives, concerns and tolerance levels of Indigenous groups and other participants were considered; and
- describe how the probability or likelihood of that effect occurring and the degree of scientific uncertainty related to the data and methods used in the effect assessment, where considered in determining the extent of significance.

The information provided must be clear and sufficient to enable the committee, review panel, Indigenous groups, and other participants to evaluate the proponent's characterization of residual effects and the analysis of the extent to which effects are significant.

The Proponent should consult Guidance: Describing effects and characterizing extent of significance and the Summary of this Guidance.

8. Biophysical Environment

In describing effects to the biophysical environment, the Impact Statement must take an ecosystem approach that considers how the project may affect the structure and functioning of biotic and abiotic components within the ecosystem using scientific, community and Indigenous knowledge. The Impact Statement must consider the resilience of relevant species populations, communities and associated habitats to the effects of the project. Ecological processes should be evaluated for potential susceptibility to adverse effects from the project. Considerations include but are not limited to patterns and connectivity of habitat patches, continuation of key natural disturbance regimes, structural complexity, hydrogeological patterns, nutrient cycling, abiotic-biotic and biotic interactions, population dynamics, genetic diversity, as well as Indigenous knowledge relevant for the conservation and sustainable use of relevant species populations, communities, and associated habitats.

The presence of endangered ecosystems, rare, limited, or important habitat (e.g., federal, provincial, or Indigenous protected areas, wildlife sensitive areas, and critical habitat RAMSAR sites identified or proposed in recovery strategies or action plans) potentially affected by the project should be included in the description of the biophysical baseline conditions. The following must be included in the relevant sections of the biophysical environment, both in the written description and on the maps:

- primary, secondary and tertiary watersheds;
- waterbodies and watercourses, including intermittent streams;
- wetlands;
- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Landscape Classification (see Introduction to the Ecological Land Classification (ELC) 2017).

8.1. Meteorological environment

The Impact Statement must:

- describe the local and regional climate in sufficient detail to highlight weather variations and characteristics of the regions affected by project activities and components, including historical meteorological data;
- provide summary data and the reference to underlying data source, including unique weather stations identifiers for:
  - monthly mean, maximum and minimum temperatures;
  - monthly mean, maximum and minimum precipitation;
  - typical wind speed and direction;

  - standard meteorological measurement to provide estimates of evaporation (e.g. using the Penman, Morton or Meyer Methods) or estimates of monthly (or daily) evapotranspiration. The use of the pan evaporation measurements is not recommended;
- provide reference to sources (and unique weather station identifiers) for hourly meteorological data (wind speed and direction, air temperature, dew point temperature or humidity, air pressure and precipitation data) from a minimum of one year to support dispersion modelling that captures the normal variability of meteorological conditions;
- identify the impact of permafrost melting or loss, if needed; and
- describe the influence of climate change on the local and regional climate and in the risks of extreme weather events.

8.2. Geology and geological hazards

8.2.1. Baseline conditions

The Impact Statement must:

- describe the surficial and bedrock geology the regional and local scales. Include a table of geological descriptions, geological maps, and hydrostratigraphic cross-sections to illustrate the different hydrogeological settings;
- present on maps the spatial and compositional representativeness of all mine rock samples collected and the expected tonnage for each lithology or geological layer. Present cross-sections or block model images at an appropriate scale that include all mine rock samples, geology, mineralized zones, approximate locations of all open pit developments, drill locations and identification numbers, and a scale and legend;
- identify on geological maps the location of areas of bedrock outcrops that will require blasting;
- identify the geological zones likely to contain asbestos fibres;
- identify any geological hazards that exist in the areas planned for the project facilities and infrastructure, including:
  - history of seismic activity in the area, including instabilities caused by mining activities, induced earthquakes, and secondary effects such as the risk of seismic-generated landslides and liquefaction. Indicate the potential for seismicity induced by mining in the project area;
  - evidence of active faults;
  - isostatic rise or subsidence;
  - history of landslides and slope erosion;
  - the potential for ground and rock subsidence, instability, or sliding during and following project activities.

8.2.2. Effects to geology and geological hazards

The Impact Statement must describe the effects of the project on geology and geological hazards, including:

- if applicable, describe the issues related to geology and geological hazards encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe potential effects of the project in areas of geological instability caused by historical mining activities.

8.3. Geochemistry of mined or excavated materials

8.3.1. Baseline conditions

The Impact Statement must:

- provide a geochemical characterization of leaching and acid mine drainage potential. This should include overburden, waste rock, ore (including off-site), low grade ore, pit wall materials, tailings, and potential construction materials (e.g., non-acid generating or non-leachable waste rock, quarries, and unconsolidated materials). Analytical methods used should be described and include major and trace elements, minerals, acid-base accounting, and leachate tests to assess the potential for acid rock drainage, neutral drainage and/or metal(loid) leaching;

In particular:

- provide a detailed summary of analytical methods used to evaluate mineralogy, acid rock drainage potential, neutral mine drainage potential, and metal(loid) leaching. The Mine Environment Neutral Drainage (MEND) report 1.20.1 is recommended as guidance to support study design;
- describe the representativeness of samples collected for acid rock drainage and metal(loid) leaching assessment. Present cross-sections or block model images at an appropriate scale that include mine rock samples, geology, mineralized zones, the approximate location of all open pit and underground mine development, borehole traces and identification numbers, and a scale and legend;
- describe the representativeness of tailings solids and process water. Provide a schematic process flow chart including the location that each tested sample represents if various processing streams are tested. In addition to the considerations listed for the mine rock, cyanide and its degradation products must be considered in the analytical testing program;
- include a detailed approach to assessing the potential for acid rock drainage and metal(loid) leaching from waste rock and tailings. Provide initial leaching potential results based on short-term leach tests and an analysis of the representativeness of laboratory and field kinetic tests based on static tests results. The kinetic tests should include both the mean and upper quartile potential for the parameters of concern.

8.3.2. Effects to chemical release rates

The Impact Statement must describe the effects of the project on the rate at which chemicals may be released from mined materials. This helps guide the assessment of effects on groundwater and surface water quality (Section 8.6.2, Effects to groundwater and surface water), which is then used to inform necessary mitigation measures.

The Impact Assessment must include:

- if applicable, a description of the issues related to the geochemistry of mined or excavated materials encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- a presentation of chemical release rates from all major sources of mine or excavated materials and mine waste to be used as source terms in an integrated chemical mass balance model described in Section 8.6.2, Effects to groundwater and surface water, for all phases of the project, considering:
  - the results of the geochemical characterization study that evaluated the potential for acid rock drainage, neutral mine drainage, and metal(loid) leaching for all materials described in Section 8.3.1, Baseline conditions;
  - potential release of cyanide;
  - exposure of potentially acid generating and metal(loid) leaching rock in pit walls;
  - baseline groundwater and surface water quality as described in Section 8.6.1, Baseline conditions.
  - potentially acid-generating rock volumes and tonnage for the life cycle of the project; and
  - mine waste disposal, management and mitigation methods and their affects on acid rock drainage and/or metal(loid) leaching potential
- include a detailed approach to assessing the potential for acid rock drainage and metall(oid) leaching from waste rock and tailings. Provide initial leaching potential results based on short-term leach tests and a description of the representativeness of laboratory and field kinetic tests based on static test results. The kinetic tests should include both the mean and upper quartile potential for the parameters of concern;
- provide a clear description and rationale for all input parameters and assumptions;
- provide base case (i.e. most likely, mean, median) and worst case (e.g. 75th to 90th percentile) scenarios, plus applicable sensitivity scenarios;
- evaluate different methods of separating potentially acid-generating waste and/or leaching metal(loids) from non-potentially acid-generating waste during the project life cycle, if required for construction materials or separate waste management;
- if applicable, describe potential effects to groundwater and surface water and sediment quality from acid rock drainage, neutral mine drainage, and/or metal(loid) leaching, as described in Section 8.6.2, Effects to groundwater and surface water.

8.3.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the conceptual approach to operational testing to identify and manage potentially acid generating and/or metal(loid) leaching mine waste during mine construction and operations, if applicable;
- describe methods for the prevention, monitoring, management and control of acid rock drainage, neutral mine drainage, and/or and metal(loid) leaching during all project phases.
- describe the acid rock drainage and metal leaching potential monitoring program. Include plans for the continuation of the geochemical characterization program to support ongoing improvements in project development. This should include additional testing to fill data gaps, ongoing kinetic testing, including field testing, and development of an environmental geochemistry block model, if necessary.

8.4. Topography, soil and sediment

8.4.1. Baseline conditions

The Impact Statement must:

- describe the terrain, soils, and sediments within the local and regional study areas;
- describe and map landforms associated with important wildlife habitat features including elevated land forms, eskers, ridges, cliffs, rock outcrops, exposed bedrock, talus, and other karst topography caves;
- provide a description and location of any erosion-sensitive soils and areas of ground instability;
- describe the suitability of topsoil and overburden for use in the reclamation of disturbed areas and then provide an assessment of the acid generation and metal(loid) leaching potential of the overburden to be used;
- describe the historical land use and the potential for contamination of soils and sediments;
- describe any known or suspected soil or sediment contamination within the study area taking into account historical land use; and
- identify areas or ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants.
- describe permafrost conditions including distribution of frozen and unfrozen ground, if applicable;
- describe the interactions between permafrost, surface water and groundwater, and topography, as well as rock fractures and talik zones between different surface-groundwaters; and
- describe the potential for thaw settlement and terrain instability associated with ground thawing in permafrost areas, if applicable.

8.4.2. Effects to Topography, soil and sediment

The Impact Statement must describe all effects of the project on topography, soil and sediment including:

- if applicable, a description of the topography, soil, and sediment issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- the potential for changes in soil quality, loss, compaction, or erosion due to movement or redistribution of soil and overburden, clearing of vegetation, and diversion of watercourses;
- potential and likelihood of re-suspended, releasing or otherwise disturbing known or suspected soil or sediment contamination;
- the potential for soil change through the deposition of dust generated by project activities.

8.5. Atmospheric, acoustic, and visual environment

8.5.1. Baseline conditions

The Impact Statement must:

- characterize the ambient air quality in the project's local and regional study areas and identify existing emissions and contaminant sources. Include a description of the impact of forest fires by referring to the *Portrait statistique des feux de forêt of the Ministère des Ressources naturelles et des Forêts du Québec*;
- provide baseline ambient air concentrations for contaminants, in particular near key receptors (e.g. traditional land users) and quantify emission sources for the following:
  - total particulate matter;
  - particulate matter less than 2.5 microns ($PM_{2.5}$);
  - particulate matter less than 10 microns (PM_{10});
  - carbon monoxide (CO);
  - sulphur dioxide (SO_2);
  - nitrogen dioxide (NO_2) and nitrogen oxides (NOx);
  - ozone (O_3);
  - volatile organic compounds (VOCs), individual or an appropriate subset;
  - polycyclic aromatic compounds, including polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, PAH transformation products, including nitro and oxy-PAHs, and dibenzothiophenes (DBTs);
  - metals (e.g., cadmium, lead, mercury, manganese, arsenic, nickel, sulfur, copper, cobalt, zinc);
  - specific aldehydes contained in the products of diesel fuel combustion (e.g., acetaldehydes, formaldehydes, 1,3-butadiene, acrolein, benzene, diesel particulate matter [DPM]);

- any other relevant air pollutants from mobile, stationary, or fugitive sources (e.g., crystalline silica);

- compare ambient air quality results with applicable provincial, and federal standards. For air pollutants subject to standards, the proponent must use the averaging period and statistical format associated with each numerical value;
  - standards include: Canadian Ambient Air Quality Standards (CAAQS), National Ambient Air Quality Objectives (NAAQO), or relevant provincial standards. The proponent must refer to the new CAAQS established by the Canadian Council of Ministers of the Environment (CCME) for PM2.5, O_3, SO_2 and NO_2 for 2020 and 2025;
- describe dust and acid deposition through either existing long-term or new monitoring data for a minimum of one year
- describe the data source(s), including data validation and quality assurance and quality control methods;
- identify and address issues related to the quality of the monitoring data and seasonal variability in the baseline survey and determine ambient contaminant concentrations using complete, exhaustive, and representative monitoring data, collected over an appropriate duration (multi-year) and geographic scope;
- if modelling is undertaken to understand baseline ambient air quality, then describe direct and indirect sources of baseline air emissions, including mobile, stationary and fugitive;
- describe existing radon gas conditions;
- provide current ambient noise levels at key receptor points (e.g. traditional land users, sensitive human receptors, and wildlife), including the results of a baseline ambient noise survey and permissible noise levels for each receptor. The information on usual noise sources (natural or anthropogenic), their geographic extent and temporal variations must be included. At the time of collecting baseline data for the study on ambient noise where there are human receptors, it is recommended that the following aspects be considered:
  - natural sounds;
  - soundscapes (see ISO 12913-1:2014. Acoustics — Soundscape — Part 1: Definition and conceptual framework);
  - expectations regarding quiet conditions in specific places or at specific times;
  - usual sleeping hours (the default assumption is 10 p.m. to 7 a.m.); and
  - degree of baseline annoyance attributable to existing noise sources (e.g. vehicle traffic, aircraft, other industrial noise);
- justify the selection of and provide information on all noise sensitive receptors in the study area, including any foreseeable potential receptor and the distance between the receptors and the project;
- describe existing ambient night-time light levels at the project site and at any other areas where project activities could have an effect on light levels;
- describe night-time illumination levels during different weather conditions and seasons; and,

- describe landscapes of interest, visual screens and other components of the visual environment, and locate them on maps.

The proponent should consult the additional guidance for atmospheric environment provided in Appendix 1 - Additional guidance for biophysical components.

8.5.2. Effects to the atmospheric, acoustic, and visual environment

The Impact Statement must describe the effects of the project on the atmospheric, acoustic and visual environment, including:

- if applicable, a description of the atmospheric, acoustic, and visual environmental issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- provide a detailed description of emission sources of air pollutants from the project listed under 8.4.1.Baseline conditions
- provide a detailed methodology and assumptions used to estimate emissions of air pollutants released at all stages of the project.
  - all relevant emission factors should be provided and referenced (provide their source);
  - for all applicable emission sources, include the Group (Tier) and the emission standard;
  - provide details of the achievement of emission standards for all mobile and stationary engines used in the project;
- use atmospheric dispersion modelling to predict the fate of emissions resulting from project-related sources and provide appropriately scaled contour maps plotting the predicted emission concentrations and the location of the most sensitive human receptors (see Appendix 1 - Additional guidance for biophysical components for guidance on dispersion modelling);
  - determine whether the formation of secondary pollutants (pollutants which are not directly emitted but form when other primary pollutants react in the atmosphere) resulting from the project under assessment has the potential to raise concentrations above baseline levels – if so, identify and characterize these pollutants;
- provide the rationale for the choice of the atmospheric dispersion model, including the type and magnitude of emissions, source, terrain, and meteorological characteristics. If modelling is not considered necessary, justify the reasons;
- justify the effectiveness of the mitigation and control measures used to reduce the emission rates of contaminants from the sources, including details of any assumptions associated with the related mitigation measures, and their feasibility;
- assess the uncertainty in the modeled air pollutant concentrations using relevant range of model inputs. All sources of uncertainty should be taken into account, including:

- model uncertainty, including a consideration for how uncertainty in modelled predictions may vary spatially and temporally;
- uncertainty in baseline concentration estimates, in the estimates of meteorological inputs, and in estimates of source emissions (from sources attributable to the project, and externally);

- conduct a source contribution analysis to assess the relative contributions of project and non-project emission sources on pollutant concentrations at key receptors. The source contribution analysis must be conducted for all pollutants that exceed 10% of the relevant guidance or standard. Emission sources should be grouped into appropriate categories;
- assess effects to receiving environment through:
- include the frequency of exceedances over the modelled periods (e.g., the frequency of exceedances would be 100 days over a five-year period);
  - compare predicted air pollutant levels with the most stringent federal or provincial air quality standards, including the CAAQS and NAAQO (Where applicable, include regional and community air quality guidelines). The assessment against CAAQS should be based on the principles of "keeping clean areas clean" and continuous improvement, and in the context of air sheds and air zones with the Air Quality Management System;
  - comparison with critical thresholds (consider current, historical loadings, buffering capacity, including Acid Deposition Critical Loads);
  - compare with applicable thresholds for dust deposition taking into account current deposition, if any. It should be noted, however, that there are no longer thresholds for dust deposition in Quebec. It is possible to use the thresholds of the former Quebec regulation or the current Ontario regulation 419/05;
  - comparison with sensitive ecological receptors (consider effects thresholds of species in question); analyze and describe changes to air quality and noise environment at a scale and resolution that allows the results to be applied to the assessment of interdependent VCs, including human health;
- describe changes in ambient vibration and sound levels resulting from the project during the construction and operational phases at potential receptor locations, including changes in the perception of non-anthropogenic sounds and the predicted area of influence of project acoustic effects;
- where there is public concern about increased noise levels during construction and operation, provide a vibration and sound impact assessment, including an overview of the concerns;
- if the project has the potential to result in increased noise emissions during construction, operation, or closure:
  - quantify sound levels at appropriate distances from any project facility and/or activities and describe the frequency, duration, and characteristics of the sound, including the frequency spectrum;
  - provide the hourly distribution of baseline night-time sound events compared to the individual night-time sound events expected at each receptor location;
  - describe the locations and characteristics of sensitive receptors, including species at risk;
  - describe consultation with regulators, stakeholders, community groups, landowners and Indigenous groups about potential effects to the acoustic environment;

  - identify and justify the approach to determine the extent to which sound effects resulting from the project are adverse;
- provide a description of any changes in nighttime light levels resulting from the project;
  - quantify light levels at appropriate distances from any project facilities, including the timing (e.g. night hours), frequency, duration, distribution and character of light emissions;
  - describe the locations and characteristics of the most sensitive receptors, including species at risk and areas favoured by Indigenous peoples for the practice of traditional activities;
  - describe consultations and, where appropriate, provide a record of engagement with regulators, stakeholders, community groups, landowners and Indigenous peoples regarding potential effects on the visual environment; and
- describe any positive changes.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise and Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality to ensure that it provides the information and analysis considered necessary to assess the project's impacts on human health in relation to changes to the sound environment and air quality. It is requested that the proponent complete the checklists provided in these guides (Appendix B in the noise guide and Appendix A in the air quality guide) to assist participants in verifying that the main elements of a noise or air quality impact assessment have been completed and in identifying the location of this information in the Impact Statement. These checklists will facilitate the review of the Impact Statement and will be particularly useful if analyses on these aspects are found in several sections of the Impact Statement.

8.5.3. Mitigation and enhancement measures

The Impact Statement must identify mitigation measures for adverse changes to the atmospheric, acoustic, and visual environment or any enhancements for positive effects.

In particular, the Impact Statement must:

- provide a dust management plan, including sources of air pollution, common air pollution mitigation measures (including a detailed complaint resolution process), air pollution control performance effectiveness, best practices and continuous improvement programs. The plan should identify the need for follow-up monitoring for model validation purposes or as a result of any concerns raised by participants, and describe opportunities for Indigenous knowledge holders to participate in the development of the dust management plan;
- provide a description of existing and planned measures to reduce odours and dust, including a description of improvements to existing infrastructure, as applicable;
- provide a description of any ambient air quality monitoring to be implemented to verify the predictions of the modelling results and to confirm the effectiveness of the mitigation measures. Ambient air quality monitoring must, at a minimum, consider the contaminants listed in Section 8.5.1, Baseline conditions;
- provide a description of participation in national or regional air emission tracking and reporting programs (e.g. National Pollutant Release Inventory) or provide rationale why participation is not required;

- develop and implement strategies compliant with regional and national commitments, such as the CCME's commitment regarding pollution prevention;
- provide a noise management plan, including identification of the noise sources, consideration of any applicable noise adjustments (e.g., community type, time of day, tonal or impulsive noise), common noise mitigation measures (including a detailed complaint resolution process), performance effectiveness of noise control devices, best practices programs, and continuous improvement programs. The plan should establish the need for follow-up monitoring for model validation or any concerns raised by participants, as well as describe opportunities for Indigenous knowledge holders to participate in the development of the noise management plan;
- provide a lighting management plan, including the planning and management of lighting and of the ambient light for every activity site and the consideration of measures for the reduction of excessive light during construction and operation. Consider the following options of measures for lighting management:
  - avoid or minimize the use of artificial light;
  - select low-intensity lighting;
  - use lighting fixtures that limit or concentrate the lighting to targeted areas and avoid light spilling out of the spaces to be illuminated;
  - limit the projection of light toward the sky by using fixtures that produce dark, uniform lighting that meets actual lighting needs;
  - avoid the emission of light at more than 90 degrees; and
  - avoid lights that emit blue/green/white/UV wavelengths.

8.6. Groundwater and surface water

8.6.1. Baseline conditions

Requirements for the characterization of baseline groundwater and surface water conditions in an Impact Statement will vary depending on the type of project. They will be commensurate in emphasis and detail with potential effects on groundwater and on surface water. Requirements listed here are in a sequence corresponding to the steps of a generic groundwater–surface water characterization study.

The Impact Statement must:

- provide hydrometeorological (temperature, precipitation, evapotranspiration) and hydrological information and discuss how the selected data sets are applicable to the project in terms of
  - geographic proximity;
  - similarity of sites (e.g., watershed size, elevation, and wetlands);
  - record period (e.g., more than 30 years, if possible);
  - applicability to the project period (e.g., timeliness of data, presence of trends or cyclicity);

- any trade-offs between the above;

- describe and illustrate on one or more topographic maps, at appropriate scales, the drainage basins in relation to key project components. On the map(s), identify all waterbodies and watercourses, including intermittent streams, flood risk areas, wetlands, watershed and sub-watershed boundaries, and direction of flow;
  - if applicable, indicate the intended locations of water crossing and watercourse diversions;
- provide a list of all water bodies and watercourses (permanent and intermittent) that may be directly or indirectly affected by the project. Existing pits are considered to be water bodies. Provide a table that groups water bodies and watercourses by sub-watershed and provides the following information about each:
  - type of watercourse impacted (e.g. lotic or lentic system, lake, river, pond, temporary or permanent stream);
  - size of the waterbodies and watercourses, as applicable (e.g. width at the natural high water mark, length or area);
- provide flow hydrographs and corresponding water levels for nearby streams and rivers showing the full range of seasonal and inter-annual variations including base flow and low flow. Particular attention should be paid to the impacts of the Bibou Creek diversion and the receiving watershed. Describe the water levels and flow velocities, average, low and high flows, before and after the diversion;
  - hydrographs may be based on data from nearby or on-site hydrometric stations if appropriate justification is provided as to its applicability;
  - approach used should take into account the need to provide information for use in fish habitat characterization and effects assessment in accordance with the Canadian Science Advisory Secretariat's Science Advisory Report, Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada;
- provide stage hydrographs for lakes expected to be affected by the project showing the full range of seasonal and inter-annual water level variations;
- for each waterbody and watercourse potentially affected by the project, provide a description of ice cover, thickness and conditions and the timing of freeze-thaw cycles;
- provide for each waterbody potentially affected by the project, bathymetry, maximum and mean depths, vertical profile information, information on stratification and turnover, and sediment composition (e.g. particle size analysis and sediment quality);
- using traditional field and mapping techniques, provide a delineation and characterization of groundwater–surface water interactions, including an identification of groundwater-dependent ecosystems, wetlands, and discharge and recharge areas that are potentially affected by the project;
  - use this information to calibrate and verify numerical flow modelling;
  - consider the potential effect of changes in groundwater-surface water interactions on fish and fish habitat;
- in northern regions, describe permafrost conditions and their influence on groundwater–surface water interactions with consideration to potential for effects on surface water quality;

- develop a quantitative surface water balance for watersheds potentially affected by the project, detailing water intake and outflow to the new project environment as well as those made for site restoration;
- describe the surface water, ground water and sediment quality baseline characterization program, including sampling site selection and locations, monitoring duration and frequency, sampling methodology, and analytical protocol, including quality assurance and quality control measures. The characterization should include sampling sites influenced by the former mine;
  - describe the incorporation of any applicable historical data or existing information;
  - characterization program should include sampling locations within the project area, the local and regional study areas, and should include reference locations that are unlikely to be impacted by the project;
- provide baseline data for relevant physicochemical parameters and chemical constituents for surface water, groundwater and sediment quality;
  - physicochemical parameters may include temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, total dissolved solids;
  - relevant chemical constituents may include major and minor ions, total and dissolved trace metals, radionuclides, total mercury, methylmercury, polycyclic aromatic compounds, nutrients, organic and inorganic compounds, or other compounds of potential concern, including those present as a result of the former mine;
  - water sample collection and analysis should use appropriately sensitive detection limits and the data should illustrate the seasonal and inter-annual variability in surface water quality with sufficient years of baseline data to fully characterize natural variability, including possible variabilities due to groundwater–surface water interactions.
- describe baseline concentrations for relevant physicochemical parameters and chemical constituents in relation to applicable water quality and sediment guidelines;
- identify springs and any other potable surface water resources within the local and regional project areas and describe their current use, potential for future use, and whether their consumption has Indigenous cultural importance;
- identify domestic, communal, or municipal water wells within the local and regional areas, and provide information on their depth, distance from the project, stratigraphy, screened hydrostratigraphic unit and piezometric level and capacity, and describe their current use, potential for future use, and whether their consumption has any Indigenous cultural importance;
- identify groundwater-producing strata (coarse-grained sediments and permeable bedrock) that may be affected by the project. Where current domestic, communal, or municipal water wells access these strata, their distance from the project must also be marked and added to the map;
- provide a summary of key groundwater monitoring wells within the regional study area used to inform the conceptual model, and identify their location, groundwater quality information, and monitoring frequency. Provide representative hydrographs showing the range of seasonal and inter-annual water level variations and indicate any spatial variation in the local study area to support the assessment of groundwater effects with respect to fish and fish habitat. Information in the regional study area should be provided, if necessary, to support the development of the conceptual groundwater flow model;

- provide a groundwater level and quality follow-up plan with monitoring wells in bedrock upstream and downstream of each potential source of contamination, taking into account the flow directions according to mine phase (initial state, operation, and end of reclamation period - steady state). It is important to link the observation wells to the flow directions to better understand the origin of potential contamination. The use of a numerical model with particle tracing (inverse) could be useful. The same is true for particle tracing (direct) from potentially polluting locations;
- describe the hydrostratigraphic units (aquifers, aquitards, aquicludes) of the hydrogeological environment in both bedrock and overburden. Provide a piezometric map showing heads groundwater elevations, sources and the direction of groundwater flow for the various hydrostratigraphic units, including pre-project, operation, and post-closure (steady state). For each stage, include particle tracing directly from potentially polluting locations and inversely for sensitive environments;
- describe the structural geology of the hydrogeological environment, including major faults, fracture density and orientation with respect to groundwater flow directions;
- describe the groundwater flow boundaries of the hydrogeological environment, including groundwater divides and boundaries with surface water;
- provide the hydraulic properties of the hydrostratigraphic units, including data on hydraulic conductivity, specific storage, transmissivity, saturated thickness, porosity, and free-flow capacity data, as applicable, and provide 3D statistical and spatial variability in hydraulic conductivity for each unit;
- provide hydrogeological maps and cross-sections of the study area showing hydrostratigraphic units, water table elevations, potentiometric contours, interpreted groundwater flow directions, groundwater divides, and areas of recharge and discharge for different hydrogeologic settings;
- present a conceptual model of the hydrogeological environment, including a discussion of geomorphic, hydrostratigraphic, hydrologic, climatic, and anthropogenic controls on groundwater flow;
- present a 3-dimensional numerical groundwater flow model developed for the project area based on the conceptual model of the hydrogeological environment;
    - state limitations and assumptions in the modelling approach, including calibration methods, model validation, and accuracy, describe and justify the model boundary and initial conditions, and then validate the model on water levels and base flows;
    - calibrate the numerical model to baseline hydrogeological conditions using groundwater level and stream flow monitoring data, along with the delineation and characterization of groundwater-surface water interactions from the field data. Provide metrics and graphs describing the quality of the calibration that was achieved and discuss how spatial variability is considered in model calibration;
    - analyse the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge. Quantify the uncertainty of modelling results;
    - using the calibrated numerical model, provide a baseline groundwater budget including baseflow discharge to wetlands, groundwater discharge to / recharge from waterbodies and watercourse, particularly those identified in the delineation of groundwater-surface water interactions, and any anthropogenic withdrawals;
- present a conceptual model for the hydrological environment, as appropriate, to describe baseline conditions for surface waters (the hydrologic model may be integrated with the hydrogeologic model).

The model should be developed to support the assessment of potential changes to water and sediment quantity and quality in water bodies, waterways, and wetlands, with input from regulators and Indigenous groups; and

- explain how baseline data was gathered, and modelling developed, at a scale and resolution that allows for the application of results about groundwater and surface water to the assessment of interrelated VCs, notably for fish, birds and other wildlife, their habitat and their health, human health as well as the current use of land and resources for traditional purposes..

8.6.2. Effects to groundwater and surface water

The Impact Statement must:

- if applicable, describe groundwater and surface water issues (e.g., water quality in Lake A) observed during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe the effects of the project on surface and ground water (quality and quantity), including effects related to:
  - project use of surface water or groundwater resources;
  - changes to water flow as a result of the diversion of Bibou Creek and the diversion of other watercourses, if applicable;
  - discharge of water, effluent, wastewaters or other substances to the environment;
- provide a project-specific water use assessment. Identify and describe the quantity and quality of resources likely to be affected by the project, including any water withdrawal requirements from local water bodies and watercourses used as a source of supply, the flow rate or volume of water available in water bodies, and how and where wastewater would be disposed of;
- describe the effects of concrete-related activities, including those from the discharge of wash water from concrete mixers or concrete preparation equipment, if applicable;
- quantify project effects on surface water bodies and watercourses, and on resources at each phase of the project, including effects resulting from the use or diversion of water for the project on seasonal watercourse flows and local water body and watercourse levels and temperatures. Quantification of project effects should include water intake and discharge to the environment, change in surface water use, and watercourse diversion, and should consider how and where wastewater and diverted water would be discharged;
- describe how the effects of climate change are taken into account in the evaluation of the project effects;
- discuss changes to watersheds, including alignment and condition of water bodies, watercourses, and wetlands, whether permanent or temporary, including those created, destroyed, or altered by the project;
- discuss the effect on the watershed of the overprinting of surface water characteristics by the project infrastructure, i.e., percent change in instantaneous flows, and on water flows and levels (e.g., high water, low water, average, monthly);

- quantify the extent of hydrological changes that will result from disturbances to aquifers and surface water features, taking into account climate change (see also Sections 8.12 Climate change and 12 Effects of the environment on the project). This includes changes to the quantity or timing of surface flow, water levels, ice thickness or extent, sediment input, and channel regime in watercourses, and water levels in affected waterbodies;
- present an integrated site water balance model incorporating surface and groundwater fluxes to or from all major project components, for all project phases. Include estimates of surface water runoff rates for major project components;
- indicate the groundwater and surface water withdrawal requirements during all phases and specify:
  - the timing, quantity and quality of water withdrawn from the environment (flow rates and annual volumes);
  - any treatment carried out on these waters (e.g. addition of a tracer); and
  - the conditions under which this water is released into the receiving environment;
- present key flow rates for all project components and water management structures, including inflow, outflow, or surface run-off from pits, storage piles, contaminated material storage, and tailings management facilities;
- determine temperature changes in surface waters due to groundwater-surface water interactions;
- determine and characterize current and projected water levels and flows in Bibou Creek, as well as in water bodies upstream and downstream of Bibou Creek, including any water bodies that may be affected by the future diversion;
- present a water balance and comprehensive site water management plans considering the entire mine site operations for the entire life cycle of the project, including the major phases of the construction phase. This should include, but not be limited to:
  - water inflows and outflows from project site;
  - water diversion;
  - watering of roads;
  - the concrete plant, if applicable;
  - truck washing;
  - process water;
  - stormwater;
  - water within the project site;
  - mine water;
  - pit flooding strategies including determining the watercourse to which the pit water will flow after filling;
  - any water input or loss at the site (evaporation and precipitation, including snow accumulation);

- present a 3-dimensional numerical groundwater flow model of the hydrogeological system that incorporates all major project features such as open pits, underground workings, waste rock piles, tailings management facilities, dewatering wells, and water diversion ditches:
  - the model should be based on the calibrated model used to describe baseline conditions;
  - the use of telescopically refined groundwater flow models is recommended in the vicinity of open pits and tailings management facilities;
- using the 3- dimensional numerical groundwater flow model,
  - estimate key project fluxes, including open pit or mine inflow rates, pit or mine dewatering rates, pit or mine flooding rates, and tailings seepage rates during operations and the post-closure period;
  - use the numerical groundwater flow model to estimate changes to surface and groundwater flow regimes during facility operations and the post-closure period, including effects of mine dewatering on lake levels, effects on watercourse baseflow, effects on wetlands, effects on perennial flow and discharge, effects on drinking water supplies, and effects on natural flow divides;
  - estimate seasonal changes to surface water and groundwater regimes during operations and the post-closure period, including effects of depressurization of the basal aquifer and dewatering of surficial deposits, effects on baseflow in rivers and streams, effects on wetlands, effects on groundwater-surface water interactions related to fish habitat, drinking water supply, and natural flow divides;
- describe the contaminants associated with the project, their spatial and temporal locations and their potential flow paths (e.g. groundwater seepage pathways and how they relate to potential receptors). Characterize how they could affect surface and groundwater quality, including information on the source(s) of any contaminants, and their transport and fate in the water environment;

describe the downgradient flow of groundwater affected by the project, with the use of figures showing groundwater piezometric contours and particle tracking results,

- describe the potential effects on surface water flow or water levels caused by groundwater drawdown;
- describe the contaminant attenuation capacity within the hydrogeological units in the project area. With this input, assess the potential for off-site groundwater and surface water contamination. Alternatively, the proponent may conservatively assume no attenuation capacity, but must still describe, in detail, potential degradation products that may result from attenuation and other processes during groundwater flow;
- describe the potential changes to surface water, groundwater or sediment quality related to the project including;
  - potential changes to surface water quality due to surface erosion and sedimentation, from the removal of vegetation and changes to riparian, wetland, and terrestrial environments;
  - potential changes to surface water quality due to aerial deposition of fugitive dust and particulate matter and any contaminants they contain, such as metal(loids), mercury, and methylmercury;
  - changes to surface water and groundwater quality due to all discharges and effluents from the project, including changes to physicochemical parameters, and relevant chemical constituents;

  - changes in surface water quality, including changes due to project discharges and effluents, as well as changes due to project acidifying emissions and acid deposition, using the information provided to meet the requirements under Section 8.5.2, Effects to Atmospheric, Acoustic and Visual environment;
  - potential changes in sediment quality and composition due to effluent discharge and other project-related wastewater discharges to surface waters;
- compare any changes to surface or groundwater quality to applicable guidelines, objectives or standards;
- describe the quantity and quality of all effluent streams from the site and going to the receiving environment, including effluent from treatment facilities (e.g., process water, mine water), seepage, and surface run-off from project components and site. Include the location of the effluent discharge point(s);
  - compare the quality of all effluent streams to applicable guidelines, objectives or standards to better identify possible adverse effects on the receiving environment;
- using the integrated chemical mass balance model, at a minimum for the worst-case scenario, describe the predicted worst case, base case, and sensitivity scenario changes caused by project activities to surface water, groundwater, and sediment quality in the receiving environment, for both physicochemical parameters and chemical constituents, including but not limited to:
  - chemical loadings associated with acid rock drainage, neutral mine drainage, and/or metal(loid) leaching described in Section 8.3.2, Effects to chemical release rates;
  - seepage from piles of material and tailings (including cyanide for gold mines);
  - watercourse and waterbody crossings, blasting, diversions, dewatering, water withdrawal, wastewater return, overflows from excavation, and surface runoff;
- compare the predicted worst, base, and sensitivity case scenario changes to groundwater, surface and sediment quality to baseline and applicable guidelines, objectives or standards;
- provide an assessment for off-site migration pathways for impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units of the project study area;
- describe locations at which potential changes to water or sediment quality will be assessed, including:
  - all point and diffuse sources of discharges;
  - immediate receiving environment for any point of diffuse sources of discharges from the project;
  - at outer boundary of mixing zone;
  - where the water quality from the immediate receiving environment begins to meet Water Quality Guidelines, or background levels for that contaminant
  - at project boundary;
  - at Local Study Area boundary,
  - at Regional Study Area boundary; and
- analyze and describe changes to surface and groundwater at a scale and resolution that allows for the application of results to the assessment of interrelated VCs, notably for fish and fish habitat and human

health. Carry forward the assessment of potential changes in water quality, as required in the following sections of the Guidelines.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Drinking and Recreational Water Quality to ensure that it provides the information and analysis considered necessary to assess the project's effects on human health in relation to changes to water quality. It is requested that the proponent complete the checklist provided in this guide (Appendix A) to assist participants in verifying that the main elements of a water quality impact assessment have been completed and in identifying the location of this information in the Impact Statement. This checklist will facilitate the review of the Impact Statement and will be particularly useful if analyses on this aspect are found in several sections of the Impact Statement.

8.6.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the mitigation measures for the possible effects on the quantity and quality of surface water, groundwater and sediment, including water supply wells and provide a rationale with quantitative and qualitative evidence that explains the effectiveness of proposed measures;
- describe any applicable water quality treatment measures and provide evidence supporting the effectiveness of these measures (refer to MEND report 3.50.1), including predicted inflow and outflow concentrations for relevant water quality parameters;
- provide the details of mitigation measures comprised in water management plans proposed for water bodies and watercourses likely to be affected during all phases of the project, including measures applicable to water use minimization. The proponent may also identify alternative sources of water (e.g., recycled water) for the project and consider the possibility of water reuse;
- describe any specific monitoring program planned during construction, including assessment of effects before and after construction activities in order to optimize or adapt mitigation measures at the time of their application;
- describe and justify water use for the project and the measures that will be taken to eliminate or reduce the adverse effects, including the supply and discharge of water, and potential exchanges between watersheds;
- The proponent may also indicate other water sources (e.g. recycled water or brine) for the project and consider the possibility of reusing the water;
- If the final details of the hydrostatic[7] tests have not been confirmed yet, the proponent nonetheless must specify the expected requirements, the options available and the criteria it intends to apply to assure protection of water resources;

[7] The term "hydrostatic testing" is being used in this case in a general sense to mean any form of hydraulic testing, and could include on-site pump tests, slug tests, packer tests and others or various laboratory tests of field samples, to assess the bulk permeability of a geologic material.

describe any surface water and groundwater monitoring programs during all relevant stages of the project, including:

- the proposed monitoring points to assess changes to surface water quality, which should include monitoring at all point and diffuse sources of discharge and in the immediate receiving environment and at the boundaries for the outer mixing zone, the project, the local and regional study areas;
- the proposed monitoring points to assess changes to groundwater quality, which should include well locations and depths; and
- the parameters that will be measured, the duration and frequency of the monitoring, the sampling and analytical protocols, and the applicable quality assurance/quality control measures and comparison criteria. Include the description of the measures that will be implemented if the criteria are exceeded;

- identify and justify measures to protect groundwater beneath the accumulation areas based on the acid generation and metal leaching potentials of the stored mine waste;
- describe methods for managing the seepage and runoff from mine infrastructure, including waste rock, tailings, overburden and ore stockpiles, and haul roads, and indicate how it will be collected, managed and monitored, during all phases;
- provide a waste rock and tailings management plan and monitoring program during construction, operation and closure. Describe the conceptual approach to identifying the potential for acid generation and metal(loid) leaching during mine construction and operation. It is suggested that the use of exploration analysis data, actual mine excavation product and advanced statistical methods be considered to support the development of an environmental geochemistry block model. In the event of segregation, describe operational test methods to support segregation.

8.7. Vegetation, riparian and wetland environments

The proponent should consult the additional guidance on wetland requirements provided in Appendix 1 – Guidance for Biophysical Components.

8.7.1. Baseline conditions

The Impact Statement must:

- provide a description of the biodiversity, relative abundance and distribution of vegetation species and communities of ecological, economic or human importance with the local and regional study areas of the project; including:
  - rare plant communities and communities of limited distribution;
  - old growth forests;
  - species or communities of importance to Indigenous peoples, including for traditional, medicinal and cultural purposes;

- describe the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection;
- provide maps, at an appropriate scale, of the vegetation species and communities of importance within the local study area, and where available, the regional study area;
- describe the current level of both anthropogenic and natural (fire, flood, drought, etc.) disturbance associated with vegetation, including a description of level of habitat fragmentation and loss, historical and current disturbance regime, any proximate activities that have resulted in changes to fire regimes (e.g., fire suppression, flooding, insect infestations, etc.);
- describe shorelines, banks, current or future flood risk areas, and watershed boundaries associated with wetlands;
- quantify, describe and map riparian areas within the local and regional study area potentially affected by the project;
- quantify, describe, and map wetlands (bogs, fens, marshes, swamps, and shallow water bodies) potentially affected by the project, in the context of:
  - wetland class, ecological community type and conservation status;
  - biodiversity;
  - abundance at local, regional and provincial scales;
  - distribution; and
  - current level of disturbance;
- determine whether these wetlands are within a geographic area of Canada where wetland loss or degradation has reached critical levels, or considered ecologically or socially or economically important to a region;
- identify and map wetlands potentially affected by the project and within the scope of federal permits, authorizations, or other approvals;
- identify and describe wetland and riparian environment capacities to perform hydrological and water quality functions, provide for wildlife and wildlife habitat or other ecological functions;
- provide a wetland functions assessment in accordance with the guiding principles of Wetland Ecological Functions Assessment: An Overview of Approaches or any subsequent approved guidelines by which to determine the most appropriate functions assessment methodology to use (see Appendix 1 - Additional Guidance for Biophysical Components for more guidance on conducting a wetland function assessment);
  - provide a rationale for the wetland functions assessment method chosen and submit complete data sets from any survey sites, including geospatial data files;
- determine if other wetland conservation policies, regulations or wetland compensation guidelines apply (contact provincial and/or local government authorities);
- establish a local study area that considers the size of the watershed and the hydrologic connectivity of wetlands within or crossed by the project area;

- identify a regional study area of sufficient size to capture effects to wetlands within the larger drainage area and include wetlands located outside of the local study area that may be affected by hydrological changes as a result of cumulative effects;
- provide a rationale for how the selected local and regional study areas meet the above criteria.

8.7.2. Effects to vegetation, riparian and wetland environments

The Impact Statement must describe the effects of the project on vegetation and the riparian and wetland environments, including:

- if applicable, a description of the issues related to vegetation and to riparian and wetland environments encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how these issues were resolved, and present lessons learned that may be useful to this project;
- describe all potential effects due to the project, for all phases, to vegetation and to the riparian and wetland environments;
- describe the key indicators used to assess project effects and the sensitivity of vegetation communities, wetlands, and riparian and terrestrial environments to disturbance, including the rationale for their selection, and how they relate to the indicators used to characterize baseline conditions;
- quantify the area of vegetation communities and riparian, wetland, and terrestrial environments that may be cleared or otherwise disturbed within the study area during all phases of the project, including a description of the disturbance, and consider:
  - changes in habitat ratios between the project area and the periphery;
  - changes in the availability of rare habitats;
  - changes in function within the remaining vegetation or wetland complex;
- describe changes related to landscape disturbance, including habitat loss and fragmentation, alteration of riparian areas, including buffers and setbacks, and project effects on areas of soil instability;
- describe effects onto the biodiversity of riparian, wetland and terrestrial environments, including effects from fragmentation, and changes to regional biodiversity;
- describe the potential effects of project emissions that may result in contamination and acidification of surrounding lands and water bodies, if any, including consideration of the sensitivity of vegetation communities, wetlands, and riparian and terrestrial environments to disturbance;
- describe any hydrological or water flow changes, either permanent or temporary, that could alter moisture regimes or drainage conditions, including the indirect effects of pit dewatering. Describe the effects on vegetation and wetlands, including effects on fish and fish habitat, if any;
- describe potential changes to riparian, wetland, and terrestrial environments due to activities that could affect topography, erosion, soil compaction and productivity, contamination, bank slopes, and sediment suspension, or due to any contaminants of concern potentially associated with the project that could affect vegetation, soil, sediment, or water;

- describe any changes to or loss of wetland function, including consideration of ecological (e.g. hydrological, biogeochemical cycling, habitat and climate functions) and socio-economic functions of wetlands. Describe and justify the methodology used to assess the effects.

8.7.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation measures for the potential effects on vegetation and on riparian and wetland environments.

In particular, the Impact Statement must:

- describe and justify the construction methods used to cross wetlands and other sensitive habitats, and the criteria for determination of techniques proposed for each crossing, including the locations where trenchless crossing methods will be employed;
- describe and justify ways to avoid or reduce the temporary or permanent adverse effects on vegetation, wetlands and riparian habitats;
- describe and justify the width of the construction right-of-way and the permanent right-of-way, including the locations where the right-of-way will be narrowed to eliminate or reduce the adverse effects;
- describe and justify the necessity of temporary construction sites, and the considerations taken for minimizing the adverse effects, namely the location choice and management measures;
- describe and justify the proposed measures to mitigate bank erosion, including measures to eliminate the potential for erosion, such as bank stabilization using vegetation;
- describe the vegetation standards and controls that will be deployed during construction and operation of the project;
  - describe and justify the measures allowing identification of invasive species or other undesirable introduced species, avoid their propagation and control them during all phases of the project, including the necessity of preconstruction surveys to identify any high density areas;
  - identify the criteria and circumstances of application of chemical, biological or mechanical control methods as well as the relevant regulations and determine the adverse effects associated with control methods; and
  - describe the selection of plant species to be conserved and planted in order to promote vegetation communities with low natural growth;
- concerning wetlands:
  - explain how avoidance of wetlands was considered, namely by considering other locations for project components and activities;
  - explain how mitigation measures consider the natural succession and the variability of the environment over time; and
  - describe proposed compensation measures (see Appendix 1 - Compensation and offset plans for relevant guidance);

- describe any reclamation and revegetation procedures to be implemented as part of the project or as additional mitigation measures, including:
  - the locations where they would be implemented;
  - selection of plant species to be maintained and planted to promote return to a natural ecosystem, including consideration for Indigenous use and the presence of species at risk such as the boreal woodland caribou population, during operation and upon reclamation, and integration of the reclaimed landscape with the regional landscape;
  - the expected timelines, from an ecological perspective, for establishment and recovery of vegetation communities and the expected differences in community composition and structure. Identify the information sources on which the predictions rely, such as evidence from peer-reviewed scientific literature;
  - any sources of uncertainty with respect to the anticipated effectiveness of reclamation. Explain how uncertainty was taken into account in the predictions; and
  - reclamation standards to be used to evaluate ecological equivalency of post-operation reclaimed landscapes, in consultation with Indigenous groups;
- describe and justify how to locate pre-existing soil or sediment contamination, the mitigation and monitoring measures that will be undertaken in this regard, and the applicable regulatory restoration measures.

8.8. Fish and fish habitat

The proponent should consult the additional guidance for requirements pertaining to fish and fish habitat provided in Appendix 1 – Guidance for Biophysical Components.

8.8.1. Baseline conditions

For all water bodies and watercourses (permanent and intermittent) that are likely to be affected (directly or indirectly) by project implementation, the Impact Statement must:

- provide a description of the aquatic environment;
  - for watercourses, a characterization approach by homogeneous segment is recommended. The parameters that must be measured include, but are not limited to, length, width at natural high water mark (NHWM), width at bankfull discharge (WBD) at potential watercourse crossings, the depth, the flow facies (type) and its characteristics (velocity, turbidity, peak and low water flow), the type of substrate (bank and bed) aquatic (herbarium) and riparian vegetation, natural (high gradient, waterfall, long-distance subsurface flow, beaver dam) or existing barriers (watercourse crossing) that impede or limit free fish passage. Obstacles must be documented (size, condition, photos) and their passability by fish assessed;
  - for water bodies, but not limited to: bathymetry, maximum and average depths, seasonal water level fluctuations, substrate type (sediment), aquatic (submerged, floating, and emergent) and riparian

vegetation, and water quality parameters (temperature and dissolved oxygen profile, turbidity and transparency, pH).

- provide a description of fish populations in terms of species and life stages based on inventories conducted in the field (standardized test fisheries) and available data (e.g., government and historical databases, fisheries data, information from consultation and engagement activities, and traditional knowledge of Indigenous peoples affected by the project). Data sources should be identified and information related to the fisheries conducted should be presented in detail (e.g., description of gear and catch methods, location of sampling stations, date of surveys, species surveyed, size and developmental stage, catch per unit effort). It is recommended that the information be compiled in a tabular format;
- provide the location and total area of potential or confirmed habitat in or near the work area and describe fish use in terms of habitat function (spawning, nursery, rearing, feeding, movement and migration, shelter and resting, thermal and overwintering refuge) and habitat quality for species present. It is recommended that the information be compiled on one or more maps at appropriate scales, as well as in tabular form, and to provide photos.

The Impact Statement must also:

- provide a description of baseline habitat information that includes overall sediment composition (e.g., sediment quality, particle size analysis, and total organic carbon);
- include measures of biological productivity, including characterization of the benthic invertebrate community and planktonic communities, and associated variability;
- for each potentially affected water body or watercourse, provide the location and area of encroached habitat. This area must include all habitats within the NHWM of the plan or stream. Present information as maps using satellite imagery overlaid with relevant information and text description, with associated summary tables. Relevant physical and biological habitat characteristics for fish habitat include:
  - surface and ground water characteristics requested in Section 8.6.1, Baseline Conditions*;*
  - fish habitat characteristics presented earlier in this section;
  - baseline extent of habitat disturbance (e.g. fragmentation);
  - habitat use or suitability for fish and aquatic species present and the function of the habitat (e.g., spawning, nursery, rearing, growth, prey, invertebrate population, food availability, foraging, migration, cover habitat, thermal and overwintering habitat, etc.) and sensitive times for these activities;
- identify and describe the data sources used, including information on data collection (e.g. gear and catch methods, location of sampling stations, date of catches, date of surveys, species surveyed, size and life cycle stage, catch per unit effort). It is recommended that the information be presented in the form of tables;
- provide baseline measurements of contaminants in fish and aquatic species;
- describe the use of fish and aquatic plants used as foods taken from the wild or for other traditional purposes, including a description of the particular species of importance and whether its consumption has cultural importance for Indigenous peoples, including medicinal use. All sites used in the study area

or historically important sites for the collection of traditional foods must be identified and mapped, such as important fishing sites;

- provide a summary of existing studies and research on potential effects of noise and vibrations on potentially affected aquatic species, including behavioural impacts;
- identify and describe sensitive habitat areas (e.g., Ecologically and Biologically Sensitive Marine Areas) within the local and regional study areas and include maps that demonstrate proximity of these areas.

Certain intermittent and ephemeral watercourses or water bodies, as well as some wetlands (marshes, bogs, ponds, etc.), may constitute fish habitat or contribute indirectly to fish habitat for a period of time. The absence of fish or water at the time of the survey does not irrefutably indicate an absence of fish and/or fish habitat (e.g. migratory corridor). Similarly, beaver dams and accumulations of woody debris are not considered impassable barriers to fish.

8.8.2. Effects to fish and fish habitat

The Impact Statement must describe the potential effects (positive and negative, direct and indirect, temporary and permanent) on fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act,* for all stages of the project and for all life stages of fish. Refer to Section 8.6, Groundwater and surface water for water quality requirements to inform the assessment.

For each water body and watercourse affected by the project, the following must be documented and considered in the determination of effects:

- if applicable, describe fish and fish habitat issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- geomorphological changes and their effects on hydrodynamic conditions and aquatic habitats (e.g. modification of substrates, dynamic imbalance, long term bank instability, silting of spawning grounds), including direct and indirect effects from habitat fragmentation;
- changes in hydrological and hydrometric conditions and their effects on aquatic habitat and life cycle activities (e.g., spawning, nursery, feeding, movement, migration, winter or summer thermal refuge) and any changes to aquatic invertebrate communities, including, where appropriate, aquatic species at risk;
- changes in fish passage conditions (upstream and downstream movement) as a result of construction (crossing structures) and operation of structures (hydraulic barriers);
- anticipated changes in the composition and characteristics of populations of various fish species, including shellfish and forage fish;
- changes to riparian areas that could affect fish and fish habitat, aquatic species at risk and productivity;
- potential work-related effects on riparian areas that could affect fish and fish habitat within and beyond these areas. For example, removal or alteration of shoreline vegetation at water body and watercourse crossings could affect fish and fish habitat by increasing run-off and sediment transport;

- any alteration to accessibility or use of habitat, including residence and critical habitat of aquatic species at risk;
- effects on primary and secondary productivity of water bodies and how mining-related effects may affect fish food sources;
- the potential for fish mortality caused by project activities in or near the aquatic environment (e.g., associated with noise and vibration during blasting), or by entrainment of fish during water pumping or water withdrawal activities;
- the risks of introducing aquatic invasive species, including pathogens, through project activities, including discussion of the frequency of those activities;
- risks associated with the introduction of deleterious substances into the aquatic environment frequented by fish (e.g., sedimentation). The focus should be on prevention;
- for watercourses with temporary hydraulic controls (e.g., beaver dams), the impact of the removal of the structure on fish and fish habitat must be assessed (e.g., reduction in habitat area, reduction in flood routing, and increased effect of low flow);
- changes in potential contaminant levels in harvested species and their prey, with a focus on traditional foods harvested by Indigenous peoples;

The Impact Statement must:

- describe any need for a *Fisheries Act* authorization or SARA licence and describe any review of Fisheries and Oceans Canada guidance documents;
- assess, where applicable, fish kills as well as anticipated habitat losses (temporary or permanent) in terms of area, sensitivity of lost habitat (e.g., resilience of affected species and their dependence on habitat, habitat rarity, habitat resilience, contribution to fisheries productivity, and species at risk), and significance (e.g., magnitude, intensity, and persistence). The entire affected fish habitat, i.e., the habitat delineated by the NHWM of the water body or watercourse, must be assessed. Impacts on habitat (degradation, destruction, and disturbance) should be clearly located and described. It is recommended that the information be compiled in map form at appropriate scales, as well as in tabular form;
- include an examination of the correlation between construction periods and sensitive periods for fish (specific times to conduct projects in or near DFO waters), key fishing windows for freshwater species, and any potential effects due to overlapping periods;
- describe potential effects to fish and aquatic plants from contaminants, including from bioaccumulation downstream of the project. Include a comparison of predicted water quality for all project phases at all key locations in the receiving environment to applicable water quality guidelines, site-specific objectives or benchmarks, and relevant toxicity test results (either site-specific or published), or other applicable methods. Describe potential effects from contamination on fish and other aquatic species' behaviour, distribution, abundance, and migration patterns;
    - effects should be predicted or modelled using baseline measurements of contaminants in the complete food web (including water, invertebrates and prey fish), and by carbon and nitrogen stable isotope measurements in fish and the complete fish food web;

- describe how the project's effects on aquatic biodiversity may contribute to changes in regional biodiversity and effects on local and regional ecosystems;
- any modifications in migration, local movements (e.g. upstream and downstream migration, and lateral movements) or stranding of fish, following the construction, operation or closure of works (e.g. physical, chemical and hydraulic barriers);
- describe potential effects on the ecosystem from introduction of aquatic invasive species, including pathogens, through project activities;
- describe tolerance thresholds for potential adverse effects that the Indigenous peoples have identified, and how they were considered in the assessment;

Additional guidance that should be referenced to support the effects assessment and associated follow up include:

- A framework for assessing fisheries productivity for the Fisheries Protection Program
- A Science-Based Framework for Assessing the Response of Fisheries Productivity to State of Species or Habitats

For projects requiring the use of natural water bodies frequented by fish for the disposal of mine waste[8] and/or for the management of process water, an amendment to the *Metal and Diamond Mining Effluent Regulations* (MDMER) will be required. For further guidance, the proponent should consult Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal.

8.8.3. Mitigation and enhancement measures

The Impact Statement must describe avoidance and mitigation measures for potential effects on fish and fish habitat, including:

- all standard measures, policies, and commitments regarding mitigation that constitute technical and economically feasible proven mitigation measures and that will be applied in common practice, regardless of the location, as well as any new or innovative mitigation measure proposed;
- describe measures to prevent and mitigate the risk of harmful, destructive, or disruptive activities during sensitive periods and in sensitive locations (e.g., spawning and migration) for fish, in water, or in places frequented by fish, such as the consideration of sensitive periods for fish;
- measures applicable to all water crossings, intakes, and outflows including how they would be maintained following construction of the project. Watercourse crossings must be constructed in accordance with the Guidelines for Watercourse Crossings in Quebec (DFO, 2016) to ensure free passage of fish;
- describe the conditions on which crossings of watercourses and riparian areas would be restored and maintained after construction of the project;

[8] For the purposes of this document, mine waste refers to waste rock and effluent as set out in Section 5(1) of the MDMER.

- measures to mitigate sensory disturbance and functional fish habitat loss that it may cause;
- measures recommended to avoid fish mortality, for example, during use of explosives in the aquatic environment or nearby, or by fish impingement and entrainment during pumping and water withdrawal operations (e.g. during the construction of temporary structures and of hydrostatic tests);
- measures to prevent the deposition of substances harmful to fish and the aquatic environment;
- measures for the restoration of impacted riparian or aquatic environments,
- criteria for assessment of the successful restoration of fish-bearing watercourses, as well as the mode and timing and the conditions of documentation of this assessment;
- measures to prevent the introduction and intrusion of invasive aquatic species during work in or near the aquatic environment;
- describe compensatory measures and plans to offset residual adverse effects on fish populations and fish habitat as a result of the project (see Appendix 1 - Compensation and offset plans, for relevant guidance);
- describe how environmental protection plans will address any applicable federal and provincial policies with respect to fish habitat; and
- describe how the mitigation measures are consistent with any applicable recovery strategy, action plan or management plan.

The proponent must refer to Fisheries and Oceans Canada guidance and explain how it was applied to the assessment, including the references provided in Appendix 1 - Additional guidance.

8.9. Birds, migratory birds and their habitat

The proponent should consult the additional guidance for requirements pertaining to birds provided in Appendix 1 – Guidance for Biophysical Components.

8.9.1. Baseline conditions

The Impact Statement must:

- provide studies representative of current conditions and provide a rationale for doing so;
- identify bird species or groups that may be affected differently by the project and may require different mitigation measures, and where possible should not collapse data into diversity metrics or narrow focus to an indicator species;
- the following groupings should be considered as unique VCs with rationale provided where groups are not included as unique VCs:
  - waterfowl;
  - aquatic birds and seabirds (other than waterfowl);
  - land birds, including songbirds;

- identified species at risk under federal jurisdiction;
- important habitats associated with species at risk;

- identify any applicable Bird Conservation Regions (BCRs) and BCR strategies;
- describe the biodiversity[9] of bird species and their habitats that are found or are likely to be found in the local and regional study areas, based on available information from a literature review, supplemented by field data as necessary to build confidence in the assumptions;
- establish biotic and abiotic parameters and indicators to be used to characterize baseline conditions and discuss the rationale for their selection;
- identify and describe the species, communities, or groups of birds that use the study areas at any time of the year that are likely to be directly or indirectly affected:
  - abundance (including relative abundance in each habitat type) and population status;
  - distribution (from desktop analysis supplemented by field data as necessary to build confidence in overall conclusions);
  - life cycle;
  - seasonal ranges, migration, movements;
  - frequency and timing of occurrence;
  - habitat association(s) and requirements for all relevant life cycle stages; and
  - sensitive periods (e.g. seasonal, time of day);
- provide an estimate of year-round bird use of the area (e.g., winter, spring migration, breeding season, fall migration), based on data from existing sources and surveys to provide current field data if required to generate reliable estimates. In each portion of the year, the estimate of area use by birds must account for differences in species movements, including winter usage of highly habitat reliant species and highly mobile species that will accurately characterize the use of a site;
- identify, and show on maps, areas of concentration of migratory birds, including sites used for, breeding, feeding, wintering, resting, staging and migrating;
- describe the habitat and habitat features found in the study areas that are associated with the presence of those bird species that are likely to be affected, based on the best available existing information (e.g. land cover types, vegetation, marine elements) (can refer to information provided in previous sections). Provide maps showing the location of identified habitat and habitat features associated with the presence of those bird species that are likely to be affected;
  - should there be anticipated displacement of nesting birds, baseline habitat data should provide evidence that there is enough equivalent habitat for birds to be displaced to and that the habitat being removed is not unique to the project study area or region;

[9] A description of biodiversity can include the species or communities found, abundance, density, species richness and evenness, species distribution within the study area; their ecological role or position in food webs, their ecological or population health (e.g. breeding status, population trends, movement, habitat availability or connectivity, reproductive status or health, food availability or limitations).

- describe food webs and trophic linkages to summarize biotic interactions, where applicable, that are relevant to the study areas;
- for avian species at risk, locate on an appropriately scaled map the potential habitats, survey locations, records of the species, residences and critical habitat, except where locations and records are considered sensitive information;
  - identify all species at risk or critical habitat of species in the study area that are listed on Schedule 1 of the SARA and those with COSEWIC status;
  - identify any sites that are likely to be sensitive locations and habitat for birds or environmentally significant areas. These include National Parks, Areas of Natural or Scientific Interest, Migratory Bird Sanctuaries or other priority areas or sanctuaries for birds, National Wildlife Areas or World Biosphere Reserves;
  - illlustrate on the map the project's footprint, identifying temporary and permanent infrastructure;
  - locate the highest concentrations or areas of use by species;
- describe the use of (magnitude, timing) birds as a source of traditional foods (traditional foods) and whether consumption has Indigenous cultural importance;
- describe the source of the data, data collection methods, and provide a rationale for any modelling approaches chosen. The baseline data must be sufficient to account for natural variability in populations (generally at least two years of field data) and have been collected by well designed studies (see Appendix 1 - Additional Guidance for Biophysical Components for more guidance on collecting baseline data); and
- where predictive modelling is required, provide the explanatory data (e.g. covariables such as associated land cover) required to predict effects on birds (e.g. changes in abundance, distribution or other relevant effects) collected in such as way as to represent the following sources of variation where applicable: spatial variation in land cover composition, soil type, geomorphology, hydrological processes, and inter-annual and intra-annual climate variability.

8.9.2. Effects to birds, migratory birds and their habitat

The Impact Statement must:

- if applicable, describe the issues related to birds, migratory birds, and their habitat encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe the interaction between the project and birds, migratory birds, and their habitat, for all phases, including from:
  - site preparation, vegetation removal, particularly of habitats important for nesting, foraging, staging, overwintering or that act as movement corridors;
  - deposit of harmful substances in waters that are frequented by birds and changes to water quality;
  - changes to the aquatic flow regime and sediment load;

- construction and operation of tailings disposal facilities (i.e. tailings ponds), wastewater ponds, or other ponds containing process liquids or substances harmful to birds;
- construction and operation of structures, including power transmission and distribution lines
- changes to the atmospheric, acoustic, and visual environment (e.g. noise, vibration, lighting, air emissions and dust);
- site reclamation; and
- any project activities that may occur during critical periods and/or restricted activity periods for migratory and non-migratory birds, including species at risk;

- describe the key indicators used to assess the effects of the project and the sensitivity of avian communities to disturbance, including the rationale for their selection and their relationship to the indicators used to characterize baseline conditions;
- describe the potential effects of the project on migratory and non-migratory birds, their nest and eggs, including, but not limited to, from:
  - short- and long-term changes in habitats important for nesting (including forests, riparian areas, grasslands, old-growth forests, wetlands, open waters, eskers, and similar geological formations), foraging, staging, overwintering, rearing, and moulting, changes to movement corridors between habitat, and changes due to habitat loss, fragmentation, and structural reasons. Any assumptions regarding temporary or permanent relocation should be justified using scientific evidence that there is available habitat to accommodate relocation under a variety of population scenarios. For example, it should be clear that a growing population will not be limited by habitat loss in the study area;
  - changes in food sources in terms of types, quality, quantity, availability, distribution and function, including short term and long term changes;
  - changes to bird-habitat relationships; the change in biodiversity, abundance, and density of the avian community that utilise the various habitat types or ecosystems;
  - changes to mortality risk, including as a result of collision of birds (migratory and non-migratory) with project infrastructure, buildings, flaring gas, overhead lines, vessels and vehicles, as a result of light attraction and from indirect effects, such as increased movement of predators or access to hunting;
  - increased disturbance (e.g. sound, artificial light, presence of workers) considering the critical periods for the birds, including breeding, migration and overwintering;
  - describe the activities most likely to result in disturbance, injury, or take of birds (migratory and non-migratory), their nests and eggs, such as vegetation clearing and increased noise from industrial machinery. Indicate the time windows for these activities, the amount, duration, frequency, and timing of disturbance. Specify whether or not the impacts of these activities would be permanent;
  - contaminants and bioaccumulation of contaminants, including those that may be consumed by Indigenous peoples.
- analyze the predicted effects for (1) migratory birds, (2) non-migratory birds, (3) each VC, including each species at risk and (4) priority BCR species. Include separate analyses for each activity, component and project phase.

If a temporary relocation assumption is made during the project phases, support the assumption with scientific evidence that there is available habitat in the local or regional study area to allow for relocation under various population scenarios, supported by monitoring in the applicable study areas as the project progresses. For example, it should be clear that an increasing population will not be limited by habitat loss (direct or indirect due to sensory or other detour) in the study area.

The proponent should refer to the Government of Canada's guidance on this topic, including:

- Avoiding harm to migratory birds
- A framework for the scientific assessment of potential project impacts on bird
- Migratory birds environmental assessment guideline

8.9.3. Mitigations and enhancement measures

The Impact Statement must:

- describe the measures to mitigate adverse effects to migratory and non-migratory birds and their habitat, including their eggs and nests;
- describe the measures to prevent and mitigate the risk of harmful, destructive or disruptive activities during sensitive periods and in sensitive locations (e.g. breeding bird season, migration and nesting) for birds, their nests and their eggs, or areas frequented by birds, such as avoiding lights at night during key migration peaks, avoiding excessive loud noises, vibration or blasting during breeding season;
- demonstrate how the proponent considered the timing of vegetation removal and construction to be outside the main breeding season.
- describe measures to mitigate sensory disturbance and the functional habitat loss it may cause;
- describe measures for preventing the deposit of substances harmful to migratory birds in areas frequented by migratory birds;
- describe technologies and approaches to minimize the impacts of tailing ponds on migratory birds that maybe come into contact with process affected waters; and
- describe how mitigation measures for effects on eskers serve as mitigation measures for birds, since this type of geological formation presents a type of land cover that is not widespread and is of great value to forest birds during migration and reproduction.

The proponent should refer to the Guidelines to reduce risk to migratory birds and to the General nesting periods for migratory birds, which provide estimates of the major nesting periods for migratory birds and provide advice for reducing the risk of nest or egg destruction. This recommendation does not authorize the disruption, destruction, or taking of a migratory bird, its nest, or its eggs outside these periods.

8.10. Terrestrial wildlife and wildlife habitat

The proponent should consult the additional guidance for requirements pertaining to wildlife provided in Appendix 1 - Guidance for biophysical components.

8.10.1. Baseline conditions

The Impact Statement must:

- provide studies representative of current conditions and provide a rationale for doing so;
- describe and map the biodiversity of terrestrial wildlife species (amphibians, reptiles, mammals) and wildlife habitats that are found or are likely to be found in the study area, based on available information from desktop analysis supplemented by field data as necessary to build confidence in the overall conclusions;
- identify wildlife species, other than avian species, important to Indigenous traditional practices in the study area that may be affected, directly or indirectly, by the project and describe, in general, for each species or group:
  - distribution and location;
  - abundance and population status;
  - life cycle;
  - known residences;
  - seasonal ranges, migration and movements;
  - areas of seasonal wildlife concentration (e.g., breeding areas, mature forest stands, and animal movement corridors);
  - habitat requirements;
  - sensitive periods (e.g. seasonal, diurnal and nocturnal); and
  - provide a map showing the highest concentrations or areas of use by species and important habitats;
- identify the metrics and biotic and abiotic indicators that are used to characterize the baseline conditions (e.g. population size, recruitment rates, etc.) and discuss the rationale for their selection;
- describe the use of wildlife as a source of traditional foods (traditional foods) and whether its consumption has Indigenous cultural use and value, including for medicinal purposes;
- describe the use and harvesting of fur-bearing species and whether its harvesting has Indigenous cultural use and value;
- describe, quantify and show on maps the habitat type for animal species, including its: function; location; suitability; structure; diversity; relative use, natural inter-annual and seasonal variability, and; abundance as it existed before project construction;
- describe any locations within the study area that might constitute sensitive areas for terrestrial wildlife, and show on maps, such as:
  - ecological reserves; wildlife management areas, established or proposed sanctuaries and protected areas, in proximity to the project location or that could be affected by routine project operations;
  - any lands in the study area that might constitute sensitive areas and habitat for wildlife,

  - nearby environmentally significant areas such as National Parks, areas of natural or scientific interest, National Wildlife Areas, World Biosphere Reserves, and areas under consideration for such designation;
- describe the levels of disturbance currently affecting wildlife and wildlife habitat, such as habitat fragmentation and the extent of human access and use;
- describe the natural disturbance regimes and their sources (e.g. fire, floods, droughts, diseases, insects and other pests, etc.); and
- describe the source of the baseline data, data collection methods, and provide a rationale for any modelling approaches chosen, and describe how community and Indigenous knowledge was incorporated. (see Appendix 1 - Additional Guidance for Biophysical Components for more guidance on collecting baseline data);
- consider accepting wildlife observations (photographs with dates, times, and locations), or the use of citizen science, from the public.

8.10.2. Effects to terrestrial wildlife and their habitat

The Impact Statement must:

- if applicable, describe terrestrial wildlife and wildlife habitat issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how these issues were resolved, and present lessons learned that may be relevant to this project;
- describe the potential effects of the project on wildlife and wildlife habitat of importance to Indigenous peoples, including effects at the population, regional, or local subpopulation level, considering, but not limited to:
  - site preparation, vegetation removal, particularly of habitats important for breeding, overwintering or that act as movement corridors;
  - noise, light and sensory disturbances;
  - water and air emissions or dust;
  - bioaccumulation of contaminants in wildlife;
  - habitat loss and fragmentation;
  - introduction of invasive species;
  - altered predator-prey relations, such as increased wildlife predation;
  - increased access by hunters; and
  - increase in the spread and prevalence of diseases and other health concerns;
  - key indicators used to assess project effects and wildlife sensitivity to disturbance. Provide a rationale for their selection, including a clear link to the indicators used to characterize baseline conditions;
- provide an evaluation of the effect of the project, including any new road access, transmission line or other rights of way on wildlife mortality risk and movement patterns;

- provide an assessment of effects on wildlife and wildlife habitat that are directly related or necessarily incidental to other federal licensing decisions for the project (this would include an assessment of how changes to water bodies and fish habitat could affect wildlife and wildlife habitat);
- describe effects to wildlife biodiversity, considering biodiversity metrics and the biotic and abiotic indicators selected, including changes to regional biodiversity and local and regional ecosystems;
- describe and quantify, where possible, the potential effects to wildlife, including acute and chronic effects to wildlife health, of changes to air and water quality (e.g. from contaminants, effluents, atmospheric emissions, dust deposition, and bioaccumulation);
- describe and assess the resilience and recovery capabilities of wildlife populations and habitats to disturbance, including the anticipated potential for the project area to be returned to its existing state with respect to wildlife populations and their habitat following operations;
- describe the potential adverse effects of the project on species noted as important to Indigenous groups and local communities, and their habitat;
- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous groups have identified;
- describe changes to important habitat for species important to current use of lands and resources for traditional purposes;
- if applicable, describe the replacement habitat available in the local and regional study areas for species that must relocate;
- describe how Indigenous groups were consulted to provide their knowledge about valued wildlife species. Indicate how concerns have been addressed, including any studies required to assess potential impacts, and develop mitigation strategies if required.

The provincial government should be considered a source of information on appropriate methodologies to predict impacts to wildlife.

8.10.3. Mitigation and enhancement measures

The Impact Statement must describe the measures for mitigating potential effects on terrestrial wildlife and wildlife habitat, including:

- describe all feasible measures to avoid or mitigate potential adverse effects to wildlife and their habitat, including residences and critical habitat. Include a description of the effectiveness of each measure in avoiding negative effects;
- provide the best technically and economically feasible approaches for mitigating effects on habitat, aligned with the hierarchy of mitigation measures, and justify moving from one mitigation option to another;
- describe and explain the condition in which the temporary construction areas and right-of-way will be restored or maintained following construction, and explain the mitigation measures considered including possible revegetation, obstruction of the sightline, restoration of wildlife corridors and habitat connectivity, reduction of fragmentation and reduction of long-term cumulative effects;

- describe and explain the measures to control the use of the right-of-way and new access roads to access areas that were previously difficult to reach, including by wildlife predators as well as by hunters, off-roading recreationalists, and other users;
- describe the deterrent systems that will be used to mitigate impacts to wildlife and species at risk due to, for example, the attractiveness of the project site and/or the components and activities associated with the project;
- describe wildlife friendly road-design principles and features, which may include underpasses and wildlife bridges (as well as monitoring to estimate bat and other wildlife mortality);
- describe measures to prevent the release of harmful substances into waters or areas frequented or occupied by wildlife;
- describe measures to address sensory disturbance and the resulting functional loss of wildlife habitat;
- describe technologies and approaches to mitigate the negative effects of the tailings storage facility and ponds on wildlife that may come into contact with the water from these facilities;
- provide details on the implementation of a logbook for reporting accidents and malfunctions, including recording wildlife mortality at the site, and how this logbook will inform monitoring approaches. Provide details on how the information from this log will be shared with Indigenous partner groups;
- provide details of any compensation or offsetting plans proposed following guidance in Appendix 1 – *Compensation and offset plans* and available guidance documents, if effects cannot be otherwise avoided or mitigated; and
- describe mitigation measures applicable to wildlife habitat and other biodiversity metrics that will be implemented through reclamation, including timelines and targets that will be used to assess effectiveness.

8.11. Species at risk and their habitat

The proponent should consult the additional guidance for requirements pertaining to Species at Risk provided in Appendix 1 - Guidance for biophysical components.

8.11.1. Baseline conditions

The Impact Statement must:

- justify how the studies used for baseline conditions are representative of current conditions;
- consider each species at risk as a valued component;
- provide a list of all species at risk that are likely to be in the project area and the study area, including:
  - species listed in Schedule 1 of the federal SARA;
  - species assessed by COSEWIC as extirpated, endangered, threatened or of special concern. It is recommended to refer to the most recent COSEWIC annual report for the list of assessed wildlife species posted on its website;

- for each species at risk identified in the list above:
  - assess their potential presence in the study area. This analysis must consider the potential habitats and ecological requirements of species whose distribution overlaps the study area. This analysis may consider species records in existing databases and results of inventories conducted as part of the project;
  - describe abundance (including relative abundance in each habitat type), population status, and distribution;
  - describe seasonal and annual variations in abundance, distribution, and habitat use;
  - provide map(s) at an appropriate scale showing potential habitats, inventory sites, species sighting reports, highest concentrations or areas of use by species, residences, and critical habitat, unless such information is considered sensitive;
  - provide information and/or mapping at an appropriate scale for residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified or proposed Critical Habitat and/or recovery habitat (where applicable);
  - describe the general life history (e.g. breeding, foraging) that may occur in the project area, or be affected by the project;
  - identify critical periods (e.g. denning, rutting, spawning, calving, breeding, roosting), setback distances, or other restrictions related to these species;
  - provide a description of critical habitat as described in final or draft recovery strategies or action plans for species at risk;
  - provide a description of wetland habitat that meets the needs of species at risk;
- provide any published studies that describe the regional importance (including economic), abundance and distribution of species at risk, including recovery strategies or plans;
- describe the source of the Species at Risk data, including survey design, sampling protocols, and data handling;
  - when using recognized standards, provide details of any modifications to the recommended methods and rationale for these modifications;
  - indicate who was consulted in the development of the baseline surveys (e.g. federal/provincial wildlife experts, specialists and local Indigenous groups); and
  - describe how community and Indigenous knowledge was incorporated.

With respect to northern myotis and little brown myotis, the Impact Statement must:

- identify potential regional migration corridors, site-specific travel corridors and movement patterns.

With respect to woodland caribou and its habitat, the Impact Statement must:

- with respect to defining the local study area:
  - include potential areas of woodland caribou use considering best available data. Best available data includes, but is not limited to:

    - any recent and historical observations, surveys (aerial, fecal), telemetry data, and Indigenous Knowledge;
    - home range size estimates for the local population if available, or provincial/national estimates as a proxy. Any buffer size chosen should encompass the maximum home range size estimate;
    - consult with expert advisors with the Government of Quebec and ECCC and provide a justification of the extent of the local study area;
- provide the best information available from the Government of Quebec and ECCC regarding population size, habitat condition, level of disturbance (anthropogenic vs. fire), trends, in the absence of the Project, within the study areas;
    - in some instances, provincial methodologies may differ from federal recommendations. Consider both methodologies in order to apply the federal 35% habitat threshold, and to determine the amount of habitat disturbance. If provincial disturbance information applies more recent information (i.e., best available), this information should also be considered;
- provide the best available information about use of the study areas by woodland caribou (e.g., distribution, movement, timing) over project timelines; and supplement this information with data from additional baseline studies where there are gaps in information, as necessary to build confidence with conclusions (having consulted the Government of Quebec and ECCC on the state of existing data, survey methodology, and the development of any study plans);
- evaluate whether woodland caribou have potential to interact with the Project or be impacted by the project activities during sensitive periods associated with woodland caribou life stages, such as calving, overwintering, and any seasonal movements over project timelines;
- describe, over project timelines, the type and spatial extent of biophysical attributes and permanent alterations present in the project area and local study area, as defined in Appendix H of the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada;
- describe the current state of connectivity of woodland caribou habitat within the range including the corridors between important habitat features, as determined appropriate through technical discussions with the committee and federal expert advisors prior to submitting the Impact Statement, and the projection of woodland caribou habitat connectivity in the absence of the Project over project timelines.

See Appendix 1 - Additional Guidance for Biophysical Components for more guidance on collecting baseline data. The proponent should contact provincial or local government authorities to determine additional data sources and survey methods. A permit under the SARA must be obtained prior to conducting surveys on federal lands that are likely to harm, harass, capture, or kill species at risk other than migratory birds.

8.11.2. Effects to species at risk and their habitat

The Impact Statement must:

- if applicable, describe the issues related to species at risk and their habitat encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe the potential effects of the project on species at risk listed under Schedule 1 of the SARA, and its critical habitat (including its extent, availability and presence of biophysical attributes). The analysis of potential effects should be provided separately for each species at risk, including separate analyses for each activity, component and phase of the project;
- describe the potential effects of the project on species assessed by the COSEWIC as extirpated, endangered, threatened, or of special concern (flora and fauna), as well as on the potential habitat of these species that are not currently listed under SARA. Each of these species should be considered separately as a VC;
- identify provincial or federal permits or authorizations that may be required in relation to the species at risk, and describe discussions with the appropriate authority regarding permits or authorizations;
- describe the area, biophysical attributes and location of habitat including critical habitat affected (e.g., destroyed, permanently altered, disrupted), including direct and indirect effects due to vibration and artificial light in the project area on usage patterns and migratory behaviour of species at risk; and
- describe the residual effects that are likely to result from the project after avoidance and minimization measures have been applied, including the extent, duration and magnitude of the effects on:
  - number of individuals killed, harmed, harassed;
  - number of residences damaged or destroyed;
- describe potential effects while considering the objectives of management plans, recovery strategies, and action plans, such as:
  - potential losses of individuals and the relationship to population density and population resilience;
  - effects on populations due to increased access or traffic in the area (e.g., increased fishing access) caused by the project;
- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous groups have identified.

With respect to northern myotis and little brown myotis, the Impact Statement must:

- provide an assessment of potential adverse effects on bat individuals;
- describe the potential effects to hibernacula in the project area, local an regional study areas including the percentage lost in each study area.

With respect to woodland caribou, the Impact Statement must:

- provide an assessment of potential adverse effects on woodland caribou habitat from the project activities;

- determine whether the Project will remove or alter any biophysical attributes necessary for woodland caribou, and provide an explanation for the conclusion;
- with respect to effects on existing habitat at the scale of the range:
  - provide an account (and GIS file if available) of existing habitat affected using the following formula: (Project footprint + 500-metre buffer) – overlapping (permanent alteration(s) + 500 m buffer) (see glossary in the federal recovery strategy);
  - determine whether the Project is expected to compromise the ability of the range to be restored to the undisturbed habitat threshold, and provide a rationale
- evaluate effects to habitat quality and habitat connectivity at the local, regional and range scales using quantitative methods (e.g., habitat quality analysis);
- evaluate the effects on the status of woodland caribou populations at the range scale by providing:
  - the best available information regarding population size and trend;
  - an assessment of the potential adverse effects of the Project on the population condition of the range (i.e., size and trend);
  - an assessment of the potential adverse effects on woodland caribou (e.g., sensory disturbance, mortality, pollution);
- describe and map how the landscape will provide for future woodland caribou habitat during the decommissioning and abandonment phases, including how much of the project footprint will be available for woodland caribou use, and approximately when the restored habitat is expected to age to preferred woodland caribou habitat; describe how reclaimed habitat may compare to baseline conditions.

The provincial government should be considered a source of information on appropriate methodologies to predict impacts to wildlife species at risk. With respect to effects on bird species at risk, the information required is presented in Section 8.9, Birds, migratory birds and their habitat.

8.11.3. Mitigation and enhancements measures

The Impact Statement must:

- describe proposed mitigation measures for potential adverse effects on species at risk and critical habitat, include a full, science-based rationale for the proposed measures
- provide an account of how the project and mitigation measures are consistent with the recovery strategy, action plan, or management plan for the species. Mitigation measures must be compatible with any applicable recovery strategy and action or management plan and be described in terms of the effectiveness of each measure in avoiding negative effects.
- describe mitigation measures to reduce the risk of harmful, destructive or disruptive activities in sensitive times and places of importance to species at risk;
- describe measures to prevent the release of harmful substances into waters or areas frequented or occupied by species at risk; and

- provide mitigation measures for effects on habitat, aligned with the hierarchy of mitigation measures and justify moving from one mitigation option to another.

With respect to the northern long-eared bat and the little brown bat:

- describe the effectiveness of the mitigation measures, taking into account the configuration of the resources in the environment and how local bat populations use these resources;
- describe how bat behaviour (differentiated by species) has been taken into account, based on the geographical location and time period;
- at minimum, the following mitigation measures should be implemented:
  - spatial avoidance:
    - a buffer zone of 120 m is recommended;
    - for resting areas and nurseries in trees, apply a buffer zone to all resting sites (including nursery colonies);
    - for hibernacula, apply the buffer zone to the entire underground cave and mine system;
  - temporal avoidance (timing of disruption, destruction of resting areas or exclusion):
    - avoid disturbance to maternity colonies and hibernacula (or areas likely to contain maternity colonies or hibernacula) during sensitive periods. Consider the following general sensitive periods when developing plans :
      - hibernacula : from October 1 to March 31
      - maternity colonies: from June 1 to July 31
  - lighting:
    - avoid or minimize the use of artificial light in bat habitats;
    - select low-intensity lighting;
    - use lighting fixtures that restrict or focus illumination to target areas;
    - avoid lights that emit blue/green/white/UV wavelengths.
  - follow the Canadian National White-nose Syndrome Decontamination Protocol for entering bat hibernacula (Canadian Wildlife Health Cooperative); and
  - other compensation measures.

With respect to woodland caribou:

- describe all reasonable alternative means of carrying out the project that would avoid the adverse effects of the project on woodland caribou;
- describe how these alternative means have been considered, and provide a rationale to confirm that the best solution has been adopted to mitigate adverse effects on woodland caribou; and
- describe and demonstrate that all feasible measures will be taken to minimize the adverse effects of the project on boreal woodland caribou population and its critical habitat, such as:

- minimize the footprint of the development and consider locations where the habitat is already disturbed;
- restore the habitat to provide availability of undisturbed habitat over time;
- minimize noise, light, smell and vibrations;
- develop a traffic management plan;
- develop an action plan should caribou be present in the vicinity of the mine or during the transport of gold and copper concentrate;
- use techniques to prevent predators from using the corridor;
- develop a compensation plan for potential habitat losses that cannot be avoided;

- design and implement a follow-up program in accordance with Section 17, Follow-up programs including but not limited to:
  - monitoring effects on boreal caribou (if present or if individuals become present) and their critical habitat;
  - monitoring the efficacy of offsetting;
  - include methodology to allow for a quantitative assessment, a monitoring schedule, performance indicators, thresholds for adaptation, and contingency measures;
- report on how the project and mitigation measures are consistent with the recovery strategy, action plan, or management plan for the boreal woodland caribou population.

8.12. Climate change

The following requirements are based on the Strategic Assessment of Climate Change (SACC), developed by Environment and Climate Change Canada (ECCC). The SACC provides guidance on climate change information requirements during the impact assessment process. More details are provided in the Draft Technical Guide Related to the Strategic Assessment of Climate Change: Guidance on quantification of net GHG emissions, impact on carbon sinks, mitigation measures, net-zero plan and upstream GHG assessment (hereinafter referred to as the "Technical Guide", released in draft form in August 2021). The proponent shall keep abreast of updates to the SACC Technical Guides issued by ECCC.

8.12.1. GHG emissions

With regards to GHG emissions, the Impact Statement must provide:

- if applicable, a description of GHG emission issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- a description of each of the project's main GHG emission sources and their estimated annual GHG emissions over the lifetime of the project;

- net GHG emissions per year for each phase of the project based on a project's maximum throughput or capacity (refer to Section 2.1 of the Technical Guide);
- each term of Equation 1 of the Technical Guide (direct GHG emissions, acquired energy GHG emissions, avoided domestic GHG emissions, and offsets, if applicable) per year for each phase of the project (see Section 2.1 of the Technical Guide);
- emissions intensity (equation 4 of Technical Guide) for each year of the operation phase of the project (refer to Section 2.1.5 of the Technical Guide);
- the quantity and description of "units produced" (tonnes of ore) from Equation 4 for each year of the operation phase of the project (refer to Section 2.1.5 of the Technical Guide);
- methodology, data, emission factors and assumptions used to quantify each element of the net GHG emissions (refer to Section 3.1.1 of the SACC and Section 2 of the Technical Guide). Where applicable, a description of significant sources of GHG emissions that may result from accidents or malfunctions;
- a discussion on the development of emissions estimates and uncertainty assessment (refer to Section 3.3 of the SACC).

8.12.2. Carbon sinks

For carbon sinks, the Impact Statement must provide a qualitative and quantitative description of the project's positive or negative impacts on carbon sinks, as outlined in Section 5.1.2 of the SACC. Additional guidance on the methodology for estimating losses or increases for carbon sinks is provided in Section 4 of the technical guide. The Impact Assessment must also provide any mitigation measures planned to restore disturbed carbon sinks, as described in Section 3.4.3 of the technical guide.

8.12.3. Impact of the project on federal emissions reduction efforts and on global GHG emissions

For the project's impact on federal efforts to reduce emissions and on global GHG emissions, the Impact Statement must include an explanation of how the project may impact Canada's efforts to reduce GHG emissions, as well as a discussion of how the project may impact global GHG emissions. Additional information is provided in Section 5.1.3 of the SACC.

8.12.4. Mitigations for climate change and greenhouse gas emissions

With respect to mitigation measures, the Impact Statement must include a determination of Best Available Technologies and Best Environmental Practices (BAT/BEP) as described in Section 3.2 of the technical guidance. This BAT/BEP determination process will evaluate potential mitigation measures throughout all phases of the project with an emphasis on reducing absolute emissions as early as possible in the life of the project, as described in Section 5.1.4 of the SACC. Additional guidance is provided in Sections 3.4.1 and 3.4.2 of the technical guide. The BAT/BEP determination should be updated during the operation phase in the event that the proponent need to acquire new equipment (e.g., fleet renewal).

If designated project activities, including closure and post-closure activities, occur after 2050, the Impact Statement must include a credible plan describing the mitigation measures that will be taken to minimize GHG emissions during all phases of the project and achieve net zero emissions by 2050 (see Sections 5.1.4 and 5.3 of the SACC). The plan should follow the principles and include the information described in sections 3.5.1 and 3.5.2 of the technical guide.

8.13. Ambient radioactivity

8.13.1. Baseline conditions

For projects or project-related physical activities that potentially could change the radiological conditions within the study area, the Impact Statement must:

- describe the ambient radiological conditions at the project site and within the local and regional study areas. The Impact Statement must provide information on existing conditions including an inventory of sources, activity levels and origin for all environmental components including air, soil, food, water, aquatic sediments, plant and animal tissue;
- describe human and non-human biota exposed to ambient radioactivity, including information on radiation levels to which workers and members of the public are exposed;
- describe traditional food exposure pathways, taking into account cultural norms and traditional activities of Indigenous peoples; and
- describe current radiological monitoring, management programs and any special studies, including detailed results from these programs.

8.13.2. Changes to radiological conditions

For all phases of the project, and where appropriate and integrated into other appropriate sections within the Impact Statement, the Impact Statement must:

- if applicable, describe the issues related to ambient radioactivity encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe changes to radiation and radioactivity present in the terrestrial and aquatic environment, the atmosphere, and to workers or nearby communities; and
- document plans and strategies for assessing the effects of the project related to the release of radionuclides to the environment, including sampling media and/or indicator species, measured parameters, sampling methodologies, locations and frequencies.

9. Health, Social and Economic Conditions

9.1. Health conditions

9.1.1. Baseline conditions

The Impact Statement must describe the current state of physical, mental and social well-being, and activate an activated approach on the determinants of health to go beyond biophysical considerations of health. Determinants of health are personal, social, economic, and environmental factors that influence health status. In line with the World Health Organization's (WHO) expanded definition of health, a determinants of health approach recognizes that health is more than the absence of disease, but rather a state of physical, mental and social well-being. The selection of determinants should be guided by the references provided in the Appendix 2 - Human health.

The Impact Statement must, but is not limited to:

- 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 effects;
- 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; and
- 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.

To understand the context and develop the baseline health profile for Indigenous communities, the Impact Statement must, but not be limited to:

- develop community health profiles that reflect the overall health of each potentially affected Indigenous community, where information is available. These profiles must focus on current community vulnerabilities and resilience, including:
  - health elements of interest, such as injuries, chronic diseases, gender-based violence rates, mental health status, suicide rates, substance abuse, and other health information relevant to the community;

  - health factors of interest, such as health behaviours (e.g., dietary intake, physical activity, problematic substance use) and mental well-being (e.g., level of depression or anxiety experienced toward real or perceived health risks;
  - where known, secondary sources of information (e.g., Public Health Agency of Canada, Statistics Canada, Indigenous Services Canada, Indigenous health authorities, provincial health agencies);
- describe any context-specific definitions of health and physical well-being, with an emphasis on the perspective of relevant Indigenous cultures and communities;
- describe the relevant history or context of Indigenous peoples, including historical impacts on health;

To identify the determinants of health relevant to the project, the Impact Statement must:

- illustrate the interconnections between project components and activities (e.g., project location, workforce recruitment) and social, cultural, and economic factors, as well as the links between these factors and individual health factors (e.g., food consumption, problematic substance use, mental well-being), or health inequities more generally;
- describe the selected determinants of health for the various population groups within each potentially affected Indigenous community. Background information on the social determinants of health that may be relevant to the project is discussed in 9.2, Social conditions and 9.3, Economic conditions;
- document and describe the relevant protection factors specific to Indigenous communities that contribute to community well-being and resilience (e.g., sense of belonging, cultural continuity, language, family supports);
- provide the approximate location and distance of likely human receptors, including foreseeable future receptors, which could be affected by changes in air, water, traditional food quality, and noise and light levels. Include gathering, hunting, trapping, and fishing areas, permanent, seasonal/temporary and recreational land uses (e.g., outfitters, cottages, and Indigenous camps identified in collaboration with Indigenous peoples) and sensitive human receptors near the project;
  - traditional foods refer to all foods that do not come from commercial systems. It includes all food that is trapped, fished, hunted, harvested, or grown for subsistence or medicinal purposes or has Indigenous cultural value;
- describe and characterize the existing health services and programs, including health care provider capacity;
- describe drinking water sources, both surface and/or groundwater (permanent, seasonal, periodic or temporary), including approximate wellhead capture zones and the distance from project activities;
- describe the water sources used for recreational purposes (swimming, canoeing, etc.) that may be affected by project activities;
- identify areas used or potentially used for traditional purposes in the immediate vicinity of the relocated powerline;
- describe access to traditional foods, and their consumption, by Indigenous peoples as a health-related behaviour, including what species are used, quantities, frequency, harvesting locations, and how the data were collected (e.g., site-specific consumption surveys; First Nations Food, Nutrition, and Environment Study);

- provide baseline contaminant concentrations in ambient air, drinking water, and tissues of traditional foods used and consumed by Indigenous peoples. The proponent should work with local Indigenous groups to collect these tissue samples where appropriate;
- describe the level of food security and food sovereignty within Indigenous communities. Refer to the Public Health Agency of Canada's website on food security and to the First Nations Food, Nutrition, and Environment Study for more information; and
- provide a summary of identified data and explain the selection of methods for statistical analysis of available data, including identifying uncertainties and limitations of proposed methods and available data. If surrogate data from reference sites are used rather than project site-specific measurements, demonstrate how the data are representative of site conditions.
- describe baseline conditions using disaggregated data for various population groups in potentially affected Indigenous communities (e.g., women, youth, and elders) to support GBA Plus.

Guidance for developing the appropriate baseline information relevant to human health is identified in Appendix 2 – Human Health. The proponent should refer to the Health Canada guides to ensure that best practices are followed in collecting baseline information for assessment of the project's impacts on human health caused by changes in air quality, noise levels, the quality of drinking water and water used for recreational purposes, traditional foods and the multiple contaminant exposure routes. The proponent must justify any omission or deviation from the recommended baseline characterization approaches and methods, including the Health Canada guidelines.

9.1.2. Effects to human health

The proponent must assess the potential effects of the project on the health of Indigenous peoples. It must describe the interconnections between the project and the determinants of human health, as well as the interactions between these determinants, along the pathways identified in Section 9.1.1, Baseline conditions. Applying a determinants of health approach in the assessment of health effects will support the identification of these linkages as well as of disproportionate effects across population groups.

A dedicated health impact assessment should demonstrate an understanding of the project's health, social, and economic impacts on Indigenous groups, and will contribute to understanding the project's impacts on rights and culture. The proponent should refer to the Agency's guidance on Analyzing Health, Social and Economic Effects under the *Impact Assessment Act* and to guidance from Health Canada regarding Human Health Impacts and best practices for conducting a Health Impact Assessment in Appendix 2 – Human Health. A rationale must be provided if the sponsor indicates that the use of a health impact assessment is not warranted. In addition, a description of the methodologies and tools that will be used to determine the positive and negative health effects of the project must be provided.

The Impact Statement must:

- if applicable, describe the health-related issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;

- apply a health impact assessment approach to Indigenous peoples, considering the relevant determinants of health;
- describe any potential health effects of the project resulting from changes in the biophysical and social determinants of health for Indigenous communities;
- describe how Indigenous knowledge was used in assessing human health effects; and
- apply GBA Plus across all health effects and document how potential effects or changes to human health conditions could be different for diverse population groups.

9.1.3. Biophysical determinants of health

A health impact assessment must be supported by a Human Health Risk Assessment (HHRA[10]). The Impact Statement must:

- provide an assessment of the potential negative and positive effects on the health of Indigenous peoples, including consideration of potential changes to:
  - air quality, as recommended in Health Canada's guidance document, Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air quality. Air quality criteria and guidelines must not be considered thresholds below which health effects do not occur, particularly for non-threshold substances;
  - noise exposure and the effects of vibrations. For noise, it is recommended to use criteria based on human health. For more details, refer to Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise;
  - light levels;
  - current and future accessibility, availability and quality of traditional foods taken from the wild; and,
  - current and future accessibility, availability and quality of water for drinking, recreational and cultural uses;
- assess cancer risks from human exposures to all potentially carcinogenic polycyclic aromatic hydrocarbons (PAHs) from sources other than diesel, and in mixtures. This should be a weighted approach that allows cancer risks from PAHs to be determined based on total toxicity equivalence relative to benzo[a]pyrene) rather than a single surrogate substance;
- determine the anticipated effects of the project on the quality and quantity of groundwater or surface water used for domestic purposes based on the strictest guideline values for the following criteria: Guidelines for Canadian Drinking Water Quality (GCDWQ), or any relevant provincial water quality standards or guidelines.

[10] HHRA: assessment of the effects on the health of persons exposed to biophysical stressors, particularly increased concentrations of chemical substances present in the environment and linked to various phases of a project (construction, operation, decommissioning and post-abandonment, as the case may be).

- describe how the contaminants related to the project (e.g. arsenic, cadmium, lead, mercury), and that can potentially end up in the water, air or soil, can be absorbed in traditional foods (i.e. foods that are trapped, fished, hunted, harvested or grown for subsistence, cultural or medicinal purposes);
- provide a rationale if it is determined that an assessment of the potential for contamination of traditional foods is not required;
- identify other potential routes of exposure to contaminants;
- provide a detailed justification for every contaminant of potential concern (COPC) or exposure route that would be excluded and/or eliminated from the HHRA;
- conduct a problem formulation exercise or preliminary model predictions to determine whether a more detailed HHRA is required. The proponent must provide a rationale if the problem formulation or preliminary model predictions indicate that a more detailed HHRA is not warranted;
    - problem formulation consists of identifying the main factors to consider. It briefly addresses the following factors:
        - identification of the boundaries of the study;
        - identification of the current and future COPCs;
        - identification of current and future human receptors;
        - identification of current and future exposure pathways;
        - development of the conceptual site model illustrating the connections existing between the COPC, the receptors and the exposure routes.
- if a more detailed HHRA is conducted, the assessment must examine all exposure pathways for COPCs to adequately characterize potential biophysical risks to human health. A multimedia HHRA may need to be considered and conducted for any COPC with an identified risk and multiple pathways. Use best practices in health risk assessment methods (consult Guidance for Assessing Human Health Impacts in Environmental Assessments: Human Health Risk Assessment);
- provide an assessment of the carcinogenicity of diesel exhaust gases when diesel engines are a source of air pollutant emissions for the project. In characterizing the carcinogenic risk of project-related diesel exhaust gases, the proponent has two options:
    - conduct a quantitative risk assessment, using an approach recently developed by Health Canada based on the relationship between ambient exposure to $PM_{2.5}$ and lung cancer risk in the Canadian population (Health Canada, 2022);
    - provide a qualitative risk assessment of the carcinogenic risk of diesel exhaust gases related to the project, which includes three different elements to ensure transparency:
        - identification of the main sources of diesel emissions for the project and acknowledgement of the relative importance of diesel emissions as a source of air pollution for the project;
        - acknowledgement that diesel emissions have been labelled a human carcinogen by international authorities such as Health Canada, WHO's International Agency for

Research on Cancer, the U.S. Environmental Protection Agency, and the California Environmental Protection Agency; and

- why a quantitative assessment of the carcinogenic risk of diesel emissions for the project is not being done;

- assess the non-cancer risks of short-term and chronic exposure to diesel exhaust using the guidance values presented in the Human Health Risk Assessment for Diesel Exhaust;
- describe and quantify specific thresholds used for the HHRA and document if different thresholds were considered for people from various population groups who are affected by the negative effects, including by sex and age. Provide a justification if any applicable threshold was not used;
- document and take into account tolerance thresholds for potential adverse effects on health identified by Indigenous peoples;
- in situations where project related air, water or noise emissions meet local, provincial, territorial or federal guidelines, and yet public concerns were raised regarding human health effects, provide a description of the public concerns and how they were or are to be addressed;
- with regard to potential effects on food security:
  - describe changes in terms of availability, use, consumption, and quality of traditional foods obtained in the wild, and the potential effects related to these changes on the physical and mental health of communities, including Indigenous groups;
  - identify possibilities of avoidance of certain traditional food sources or drinking or recreational water sources by the Indigenous peoples due to the perception of contamination; and
- describe any project-related changes that could result in a positive health effect (e.g. remediation projects).

9.1.4. Social determinants of health

With respect to the social determinants of Indigenous peoples' health, the Impact Statement must:

- describe the potential health effects arising from the effects on social (Section 9.2) and economic (Section 9.3) VCs, and their respective indicators, reflecting the input of the affected Indigenous communities;
- describe, using secondary data and community input, the health effects pathways for positive and negative influences of the project on the social (including cultural) and economic conditions of affected Indigenous communities, for example:
  - changes in psychosocial factors relating to perceived risks to human health affecting mental well-being (e.g., concerns about exposure to air emissions, declining water quality, potential contamination of traditional foods, accidents and malfunctions, traffic safety issues, disruption of normal daily activities);
  - changes in psychosocial factors related to Indigenous community resilience (e.g., traditional land use and connection to the land, cultural continuity, and self-determination) and their subsequent effects

on mental well-being (including emotional and spiritual aspects), with further implications for physical well-being;

- changes in the availability, use, quality, and consumption of traditional foods that may affect physical and mental health;

- describe the project's anticipated influence on factors associated with health inequalities in Indigenous communities, for example:
  - anticipated local workforce requirements regarding an influx of migrant workers into the host community, and the potential negative effects on housing availability and affordability, community safety, and the availability of affordable, quality health and social services, emergency services, and daycare centres for local populations;
  - in particular, the safety of various population groups, including Indigenous girls and women. See the Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls, Sections 13.1 to 13.5 on extractive and resource development industries;
- describe, using secondary data and community input, the health effects pathways for positive and negative influences of the project on the social (including cultural) and economic conditions of affected Indigenous communities, for example:
  - changes in employment opportunities resulting in sudden increases in income, and the interactions of these effects with life histories (e.g., sources of community resilience, poverty, intergenerational trauma), workplace stress (e.g., the demands of mining work, and possibly racism and harassment), the need for work-family balance, and healthy or maladaptive coping mechanisms (e.g., substance abuse), all of which have effects on the mental and physical well-being of workers and their families, as well as effects on health and social service needs;
  - changes in working conditions (e.g., work schedules for new jobs), requiring accommodation in worker camps, and the level of access to quality food at the site;
- describe the effects that work camps can have on the safety of various Indigenous population groups (e.g., women and girls);
- indicate the potential short-term or long-term health effects on Indigenous people resulting from changes in perceived well-being (see Section 9.2, Social conditions) during the construction phase, and identify possible subsequent changes during the operation phase;
- describe how potential avoidance of land near project components by Indigenous peoples due to perceived changes in environmental quality and tranquillity was considered in assessing potential effects on the diet and health of Indigenous peoples;
- document and take into account tolerance thresholds for potential adverse effects identified by Indigenous peoples; and
- describe any positive health effects of Indigenous people (e.g. resulting from improved economic opportunities, increased access to services).

The proponent must refer to the following guidance:

- Analyzing Health, Social and Economic Effects under the Impact Assessment Act;

- Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities; and,
- More-than-mental health: Indigenous identity, culture, community, and relationship with land are integral to Indigenous wellbeing.

9.1.5. Mitigation and enhancement measures

The Impact Statement must describe the proposed mitigation and enhancement measures for any potential effects on Indigenous people health.

In particular, the Impact Statement must:

- describe the mitigation and enhancement measures proposed for each Indigenous community, including:
  - the implementation of all measures that can reduce negative effects or enhance positive effects on the state of mental well-being (e.g., bus services for safe and restful travel, life skills training such as financial management and coping strategies), as well as substance use prevention measures on and off the job, including stress management training and health education to encourage healthy eating;
  - mitigation measures to help stabilize the effects of boom and bust cycles so as to improve community adaptation after the project is completed;
  - mitigation measures to support the health, safety and security of individuals, including permanent measures to prevent gender-based violence;
- if the level of emissions from a particular project or effluent discharge is below or at the applicable limits, identify if additional mitigation measures will still be considered. However, if the change may be substantial (even within established limits) as a result of local or regional circumstances or the extent of the change, the proponent must provide additional mitigation measures to minimize pollution and risks to human health;
- when potential effects on human health exist due to exposure to a non-threshold contaminant (e.g. certain air pollutants such as fine particulate matter and nitrogen dioxide, as well as arsenic and lead in drinking water), describe mitigation measures aimed at reducing residual effects to as low a level as reasonably possible;
- describe mitigation measures to communicate the safety findings of traditional foods harvested in the project area by Indigenous peoples. Consider the interdependence between the components involved (e.g., fish, Indigenous health, etc.); and
- identify mitigation and enhancement measures presented in other sections that are also applicable to health and well-being effects.

The proponent is encouraged to refer to the National Collaborating Centre for Healthy Public Policy's publication entitled Tools and Approaches for Assessing and Supporting Public Health Action on the Social Determinants of Health and Health Equity.

9.2. Social conditions[11]

9.2.1. Baseline conditions

The Impact Statement must describe the existing social conditions for potentially affected Indigenous and local communities.

The Impact Statement must:

- be sufficiently detailed to provide a comprehensive understanding of the current state of each VC, including relevant trends;
- provide the specific social and economic conditions of each Indigenous community on a disaggregated basis (without identifying individuals);
- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline conditions;
- identify the area where social determinants of health could be influenced by the project;
- describe how community and Indigenous knowledge from relevant populations was used in establishing baseline conditions, including input from diverse population groups; and
- describe baseline conditions using disaggregated data for diverse subgroups (e.g. women, youth, and Elders) and their different access to resources, opportunities and services within the community to support GBA Plus.

9.2.1.1. Community profile

The Impact Statement must include community profiles to understand the context of Indigenous and local communities.

For Indigenous communities, the Impact Statement must describe:

- a general profile of the factors that affect the well-being of each community (e.g., disposable income; cost of living; lifestyle; work schedules, language; rates of alcohol and substance abuse, illegal activities and violence; rates of sexually transmitted infections; ethnic and gender-based violence). To do this, rely on publicly available data;
- demographic characteristics and major socio-cultural concerns of communities;
- access, ownership and use of resources (e.g., land tenure, minerals, food, water, social infrastructure) by communities;

[11] This section on social conditions contains requirements for Indigenous peoples to inform (1) the assessment of the project's impacts on any Indigenous group under section 22 (1) (c) of the *Impact Assessment Act* and (2) the project's contributions to sustainability. It also contains specific requirements for local non-Indigenous communities to also inform the project's contributions to sustainability.

- the capacity (available or planned) of institutions to provide public services and infrastructure, including health services, daycare centres, women's shelters, and addiction and mental health services;
- relevant historical community background; and
- applicable history with previous developers.

For local communities (towns of Chibougamau and Chapais), the Impact Statement must describe:

- in general, how work schedules affect the well-being of each community including, but not limited to, violence based on ethnicity and gender.

9.2.1.2. Services and infrastructure

The Impact Statement must describe existing local and regional services and infrastructure in the study area as they relate to the social conditions of Indigenous peoples, including:

- road infrastructure and traffic safety;
- railways;
- housing (e.g., affordability, availability, appropriateness);
- social services, including women's shelters;
- educational services and child care;
- existing health services and programs, including the capacity of health care providers, and mental health-related services;
- care and services for elders;
- ambulance services (fire, police, ambulance);
- all other potentially affected services.

The Impact Statement must describe the following existing local and regional services and infrastructure in the study area, as they relate to the social conditions of the local communities (towns of Chibougamau and Chapais):

- housing (e.g., affordability, availability, appropriateness);
- social services, including women's shelters;
- daycare centres.

9.2.1.3. Navigation

The Impact Statement must describe the baseline conditions for navigation in the study area by Indigenous peoples and local community residents, including:

- identify and describe existing navigable waters, and all their uses; and
- provide a list of potentially affected waterway users and concerns regarding waterway use and access.

9.2.2. Effects to social conditions

The Impact Statement must assess the positive and negative effects of the project on social conditions for potentially affected Indigenous and local communities. Interconnections between social VCs and other VCs and interactions between effects must be described.

Where applicable, the analysis should describe the goals relevant to the assessment that are part of local or regional land use and development plans, and community welfare and safety plans, and the extent to which the project is aligned with such plans to avoid or enhance social effects. The effects assessment should address opportunities to improve benefits to local communities.

The proponent should refer to the Agency guidance on Analyzing Health, Social and Economic Effects under the *Impact Assessment Act* and Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities. The proponent may also wish to consult the Étude sur les enjeux relatifs à la main-d'œuvre, au navettage et aux incitatifs fiscaux spécifiques à la Baie-James de l'Administration régionale Baie-James (2022), the James Bay regional government's study on labour, commuting, and tax incentive issues specific to James Bay.

9.2.2.1. Effects to community well-being

At the Indigenous community level, the Impact Statement must:

- describe the issues related to community wellness encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- assess potential positive and negative effects of changes to the social conditions, including, but not limited to:
  - food security;
  - income inequity;
  - housing prices and accessibility (availability);
  - changes that result from population increases (temporary or permanent) or increased cost of living due to the project;
  - changes resulting from planned work schedules for mine employees, particularly if fly-in/fly-out is planned;
  - prevalence of criminal activity;
  - the main sectors of local economic activity;
  - those conditions considered for the analysis of determinants of health in Section 9.1.1, Baseline Conditions;
- describe the expected interactions between the project's construction, operation, and closure workforce and local communities and businesses;

- describe the effects related to immigration and emigration, including the social and cultural composition of the communities involved and changes in populations, and any differential and particular impact on women;
- identify whether social divisions might be intensified as a result of a project;
- evaluate effects on access, ownership, and use of resources (e.g., land tenure, minerals, food, water, social infrastructure);
- consider a workforce hiring scenario involving temporary foreign workers using a language other than the language used by Indigenous communities as a language of work and in public;
- describe potential effects related to the increased risk of sexually transmitted infections and gender-based violence, based on the "What is Gender-Based Violence" information page;
- consider the risks associated with disruption of community, family, and household cohesion, use of women's shelters, increased alcohol and drug abuse, and increased illegal or potentially disruptive activities;
- document and take into account tolerance thresholds for potential adverse effects identified by Indigenous peoples;
- describe how Indigenous knowledge has been used to assess the well-being of Indigenous communities;
- describe any positive effects on well-being (e.g. resulting from improved economic opportunities, increased access to services); and
- apply GBA Plus to information related to community well-being and document how potential effects of changes to community well-being could be different for diverse relevant population groups (e.g., women, youth, Elders).

At the local community level (towns of Chibougamau and Chapais), the Impact Statement must:

- assess the potential positive and negative effects of changes to the following social conditions:
  - the price and accessibility (availability) of housing;
  - changes resulting from planned work schedules for mine employees, particularly if fly-in/fly-out is planned, including, but not limited to, violence based on ethnicity and gender;
  - social services, including women's shelters;
- describe any positive effect on well-being (e.g., resulting from improved economic opportunities, increased access to services); and
- apply GBA Plus to information related to community well-being and document how the potential effects of changes in community well-being might be different for various relevant population groups (e.g., women, youth, elders).

9.2.2.2. Effects to services and infrastructure

The Impact Statement must:

- if applicable, describe the service and infrastructure issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- at the Indigenous community level, describe the predicted effects on local and regional services and infrastructure, including access to these services and infrastructure in the study area as they relate to social conditions, including positive and negative effects on:
  - housing (e.g. affordability, availability, appropriateness);
  - educational services, facilities and day care;
  - health care services, including elder care and services;
  - road infrastructure and traffic safety;
  - any other local infrastructure;
- at the local community level (towns of Chibougamau and Chapais), describe the predicted positive and negative effects on the following local services and infrastructure elements, including access to these services and infrastructure in the study area as they relate to social conditions:
  - housing (e.g., availability, affordability, appropriateness);
  - daycare centres;
  - social services, including women's shelters;
  - any other relevant local service, project, or infrastructure;
- take into account potential effects arising from a higher risk of accidents for each phase of the project, (e.g. a higher risk of impact on the road system and emergency services during the construction phase due to an increased use of roads); and
- describe any need for government and/or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects.

9.2.2.3. Navigation

Within the study area and for Indigenous communities and local community residents, the Impact Statement must:

- if applicable, describe the navigational issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe navigable waters that could be impacted by the project, and specify the proposed crossing method;
- provide a description of the watercourse(s) that will be drained or diverted;

- describe ancillary project components that will be constructed in, on, under, over, through or across navigable waters to support the project, and specify the proposed crossing method;
- describe potentially affected waterway users and describe consultation with waterway users and Indigenous groups regarding navigational use, issues raised and how issues were addressed; and
- describe project effects to navigation and navigation safety.

9.2.3. Mitigation and enhancement measures

The Impact Assessment must describe the mitigation and enhancement measures that will be implemented for all potential effects on the social conditions of Indigenous and local communities (towns of Chibougamau and Chapais) listed in Section 9.2.2, Effects to social conditions, including to:

- describe mitigation measures for changes to housing and daycare centre availability;
- describe the mitigation measures planned to limit adverse effects related to employee work schedules, particularly if fly-in/fly-out is anticipated;
- offer voluntary training to workers who have encountered financial or substance abuse problems;
- identify opportunities to enhance positive impacts, such as infrastructure improvements, including local municipal or Indigenous community infrastructure, and investment in community causes and projects;
- identify opportunities for employees to contribute to the community (e.g., volunteering);
- take into account local and regional land use and development plans. Consider Indigenous peoples' safety and well-being plans where applicable mitigation or enhancement measures are proposed.

9.3. Economic conditions

9.3.1. Baseline conditions

With respect to economic conditions that can contribute to sustainability in Canada, the Impact Statement must provide:

- an overview of the main economic activities in the study areas, including information on the economically active actors of the local, regional and Indigenous population;
- an overview of businesses that could supply the goods and services required for the project, including Indigenous and local businesses, such as those in the towns of Chibougamau and Chapais;
- workforce, including:
  - the skill profile of the entire workforce, both employed and unemployed;
  - existing working conditions;
  - wages and average salary range in mining and other industries;
  - full-time and part-time employment

- training, including differences in experiences among population groups representative of diversity, including indigenous populations, as appropriate (e.g., women, youth, Elders);
- gender gaps (e.g., in wages, employment rates, and qualifications) by job type in the mining industry;

- the availability of skilled and unskilled labour, including:
  - a qualitative summary of the conditions that influence the availability of labor in the study areas in the short and long term;
  - the expected availability according to the project schedule;
  - a summary of the best and worst scenarios for the availability of labor considering the various factors, including those beyond the control of the promoter;
- current and historical employment and unemployment rates, including primary employment, compared to provincial and national rates, and provide information on economic well-being (income, savings, cost of living in the North, home ownership, low income, family status, etc.) in the study areas and impacted communities;
- any local, provincial, or federal economic development plans for the study area;
- local and regional workforce development and training plans, including those specific for Indigenous people.

With respect to economic conditions specific to Indigenous peoples, the Impact Statement must describe local and regional economic conditions and trends and their effects on Indigenous communities, including the following:

- the main economic activities of Indigenous people in the study area;
- any relevant treaty provisions regarding the economic growth of Indigenous peoples;
- current use of lands and water bodies for economic activities in the study area, including a description of hunting, recreational and commercial fishing, trapping, outdoor recreation, seasonal cabin use, outfitting, and forestry (see also Section 10.2, Current use of lands and resources for traditional purposes);
- an overview of employment in other projects of similar size in the regional area, with a determination of existing Indigenous participation rates.

The proponent must describe baseline conditions using disaggregated data for various population groups (e.g., women, youth, and elders) and their differential access to resources, opportunities, and services within communities to support GBA Plus.

9.3.2. Effects to economic conditions

The Impact Statement must describe potential positive and adverse effects on Indigenous peoples economy and local, regional, and provincial economies. The economic impact assessment must consider opportunities to enhance benefits for Indigenous and local communities. This assessment should also take into consideration the temporal scale for construction, operation, and closure to assess the potential for boom-

and-bust cycles associated with the project. The proponent should refer to the Agency Guidance Document: *Analyzing Health, Social and Economic Effects under the Impact Assessment Act*.

9.3.2.1. Employment

The Impact Statement must;

- if applicable, describe the employment issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe the potential changes in employment including the following aspects:
  - an estimate of the direct, indirect and induced employment created at each phase of the project (including an estimate of the full-time equivalent (FTE) employment during the operation phase of the project and an estimate of full- and part-time employment);
  - an estimate of direct, indirect, or induced income or wages, including a comparison of wages and benefits to be received by mine employees with local, regional, and provincial averages, and with averages for other employers in the mining sector;
  - a description of the types of jobs created at each stage of the project, including the skill and education requirements for these types of jobs;
  - optimistic and pessimistic scenarios estimating the capacity of the local and regional labour market (including Indigenous labour market participants) to meet demand. To the extent possible, indicate the hiring targets and number of jobs potentially created for each Indigenous community identified in the Indigenous Engagement and Partnership Plan;
  - an analysis of the potential for local labour shortages in certain sectors as a result of the project;
  - a description of the plans and rationale for hiring temporary workers, including any temporary foreign workers, to fill the labour and skill shortage in a scenario where hiring a local workforce is difficult;
  - an estimate of workers brought into the local and regional labor market to support the project
  - situations where the project may lead to commuting;
- describe the potential changes in training including;
  - training programs and initiatives to improve employment opportunities for Indigenous peoples, local youth, and other population groups. Identify target populations and funding sources, including proponent and government programs such as the Indigenous Skills and Employment Training Program service delivery network;
- apply GBA Plus to all employment effects and document how potential effects or changes to employment conditions might differ for various population groups, including;
  - the potential effects on employment for women, youth, Indigenous peoples, and other diverse population groups;
  - if applicable, the measures that will be taken to increase the employment of Indigenous peoples, women, and other diverse populations under the project, including training programs and measures to address gender-based violence and discrimination; and

- the project's anti-discrimination measures, diversity and inclusion workforce plans, policies and practices.

9.3.2.2. Business environment and local economy

With respect to economic conditions that can contribute to sustainability in Canada, the Impact Statement must:

- if applicable, describe the business environment and local economy issues encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- set out the investment in the project for each phase and the total investment, including detailed forecast of capital and operating costs;
- describe any benefit agreements that have been reached or are planned with Indigenous and local communities (details are not required);
- provide an estimate of the anticipated levels of local and regional economic participation in the project in comparison to the total project requirements (e.g., total dollar value of contracts), as well as for Indigenous groups;
- describe the overall effects of the project on the overall economy, including:
  - an estimate and description of direct, indirect, and induced economic effects of the project in the short and long term;
  - the sources and methodologies used for developing multipliers and estimates and, where a generic multiplier may not accurately reflect the specific situation of the project, provide evidence of specific economic activity that will result from the project going ahead;
- describe situations when the project may directly or indirectly create economic hardships or the displacement of businesses;
- evaluate the net economic benefits to the economy as a whole, including;
  - a quantitative evaluation of effects on local, regional, provincial, territorial, federal government or Indigenous peoples revenues from tax levies, royalties, revenue sharing and other means for each phase of the project;
  - discuss how the project would affect the gross domestic product at provincial and potentially federal levels (if appropriate);
  - a description of any new technology, process or other intellectual property that might be developed as part of this project, and any potential economic benefits to Canada; and
- provide information on the economic viability of the project, to support the net benefits assessment, including, but not limited to:
  - cash-flow modelling results for the project, with a focus on net-present value, internal rate of return, and break-even commodity prices for the project;
  - forecasts of relevant commodity prices for the project and descriptions for where these were acquired and, if available, how they were forecasted;

- the project's position on the global cost curve and any potential impact on local and global commodity markets;
- sensitivity analysis pertaining to key aspects of the project, including, but not limited to, discount rates, prices, capital and operating costs;
- details on the financial liability and compensation related to the proponent's commitments to close or abandon the project; and
- discussion of environmental, social, and governance risks to project economics, including the cost of capital.

With respect to the specific economic conditions of Indigenous peoples, the Impact Statement must:

- indicate whether a revenue/benefit sharing or economic benefit agreement with respect to Indigenous peoples is being considered or discussed (details not required);
- describe the potential effects of changes in economic conditions for specific sectors in the affected Indigenous communities related to traditional land and resource use (see Section 10.2, Current use of lands and resources for traditional purposes).

The economic effects assessment should apply the GBA Plus methodology to describe the circumstances under which various population groups may experience more adverse effects or receive fewer benefits from the project.

The economic information provided will be made publicly available and should not contain confidential business information.

9.3.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for the potential effects on economic conditions listed in Section 9.3.2, Effects to economic conditions, for all potentially affected population groups, including:

- identify opportunities to enhance positive impacts, such as local job creation and employment of staff for various population groups, including Indigenous people, and other groups underrepresented in the labour market (e.g., women, youth, immigrants, members of racialized groups, and people with disabilities), including:
  - education, training and hiring practices that encourage employment of local people;
  - measures that can be taken to increase access to education and training opportunities for various groups, especially for specialized jobs (technology, science, environment);
  - measures to increase local hiring and retention of the workforce in the area (e.g., available transportation, flexible hours, availability of daycare centres, access to local training);
    - actions to provide flexibility in work schedules to allow Indigenous employees to continue to participate in traditional and cultural activities;
    - support for former employees following mine closure such as early retirement, training, job offers elsewhere, and severance packages;

- a summary of commitments made with respect to employment, training and trade, including any economic benefit plans or specific cooperation agreements with Indigenous communities and groups;
- training, education, and scholarship programs that the proponent plans to support in order to improve employment opportunities, including participation in and contribution to local training networks (e.g., Cree School Board, Centre de formation professionnelle de la Baie-James, sectoral workforce committees). Specify the types of employment targeted by these programs, as well as the targeted clientele, such as local residents, Indigenous peoples, and various relevant subgroups (e.g. Indigenous women);
- professional development programs for Cree workers, particularly to facilitate access to management positions;
- cultural competency training plans for non-Indigenous employees to ensure a respectful working relationship with Indigenous contractors;
- all cultural awareness training plans for non-Indigenous employees to promote a safe work environment that fosters the well-being of Indigenous employees (e.g., language classes, a traditional camp at the project site, cultural activities, workshops);
- the establishment of a complaint management and conflict resolution mechanism between Cree employees, non-Indigenous employees and users of the territory;

- describe any actions, including plans, programs, and policies, to encourage contracting and procurement opportunities for local and regional businesses, as well as businesses owned by Indigenous peoples, women, or other population groups, including:
  - describe supplier network development initiatives, including the identification of potential local suppliers, and plans to provide them with sufficient advance information on technical, commercial, and other requirements. Debrief unsuccessful bidders;
  - describe any procurement policies that promote opportunities for Indigenous and local businesses;
  - describe technology transfer and research and development programs that will facilitate the use of local suppliers of goods and services and local employees, and that will develop new capabilities related to project requirements;
  - assess the potential to benefit community members in relevant population groups;
  - assess circular economy opportunities that could benefit local businesses and organizations;
- describe measures that can be taken to mitigate local workforce shortages that the project may cause in certain sectors;
- where appropriate, provide details regarding financial liability and compensation in place as required by regulation or corporate commitment in relation to decommissioning or abandonment; and
- describe and justify the need for compensation plans to mitigate potential effects on social and economic VCs related to Indigenous peoples;
- describe how the GBA Plus findings on disproportionate effects have been used to inform mitigation and enhancement measures.

10. Indigenous Peoples

The Impact Statement must provide information on how the project may affect Indigenous peoples, as informed by the Indigenous group(s) involved in the assessment. The proponent should apply Agency guidance on engaging with Indigenous groups and appropriate methodologies for assessing potential effects and impacts on Indigenous peoples and their rights.

The assessment of potential effects must include both adverse and positive effects to the current use of lands and resources for traditional purposes, to physical and cultural heritage, to structures, sites or things of historical, archaeological, paleontological or architectural significance, and to environmental, health, social, cultural and economic conditions of Indigenous peoples affected by the project.

Proponents must engage with Indigenous groups to understand the potential impacts of their projects on Indigenous peoples and their rights, and to incorporate Indigenous knowledge into the impact assessment. Indigenous VCs may be holistic in nature and may encompass the effects on several individual environmental, health, social, or economic VCs, as well as impacts on the exercise of Aboriginal and treaty rights. Where holistic VCs are identified, the proponent must combine the analysis of individual VCs into an assessment of the holistic VCs identified by Indigenous groups.

Engagement with Indigenous groups is also required to identify proposed measures to avoid, minimize, offset or otherwise accommodate for potential impacts on Indigenous peoples and their rights. This engagement may also identify potential positive outcomes, including enhancement measures that could improve the underlying baseline conditions that support the exercise of rights. Ideally, the project will be designed to minimize negative effects and to maximize positive impact on the quality of life of Indigenous peoples.

Engagement with Indigenous groups must involve ongoing information sharing and collaboration to the extent possible to help validate the information and assessment findings in the Impact Statement. In cases where a specific study addressing elements relevant to the impact assessment of the project has been prepared by an Indigenous group, the proponent must incorporate it into the Impact Statement and explain how it was taken into account. In addition, the proponent must append the full studies, as they were presented by each Indigenous group, except in cases where the information could be confidential in nature.

The proponent must provide an opportunity for Indigenous groups to review the information prior to submission of the Impact Statement. If the information is about an Indigenous group, they must be afforded the opportunity to comment on the information in the Impact Statement and their comments should be included in the document. The Impact Statement must indicate where input from Indigenous groups has been incorporated, including Indigenous knowledge. To the extent possible, information should be specific to the individual Indigenous group(s) involved in the assessment and describe contextual information about the members within an Indigenous group (e.g., women, men, 2SLGBTQI+, Elders, and youth).

The proponent is also encouraged to work with Indigenous groups who demonstrate an interest in drafting sections of the Impact Statement that concern them, including sections describing Indigenous knowledge, on the subject of current use of lands and resources for traditional purposes, on potential impacts to the rights of Indigenous peoples, and for the identification of mitigation or enhancement measures. Where

applicable, sections of the Impact Statement prepared by Indigenous groups must be clearly identified. All perspectives and the rationale for different conclusions should be documented in the assessment report.

Where Indigenous groups do not wish to participate, the proponent should continue sharing information and analysis with the Indigenous groups of the potential effects of the project, to document its efforts in that respect, and to use available public sources of information to support the assessment.

10.1. Indigenous physical and cultural heritage, and structures, sites or things of significance

10.1.1. Baseline conditions

The Impact Statement must include a description of baseline conditions pre- and post-development of the Troilus Mine by Inmet Mining Corporation associated with the physical and cultural heritage and structures, sites, or things of significance for Indigenous peoples. This description must address the conditions before and after the exploitation of the former Troilus mine by Inmet Mining Corporation, which was in operation from 1996 to 2010. The proponent must describe the source of the information collected and pay particular attention to the views of Elders and land users. This description should include an understanding of the historical baseline conditions associated with the ability to transmit culture (e.g., through language, ceremonies, harvesting, the teaching of sacred, traditional, and stewardship laws, and the transmission of traditional knowledge).

Information on heritage and structures, sites and things of significance for Indigenous peoples can include, and are not limited to:

- burial sites;
- spiritual sites, including rivers and watercourse;
- cultural landscapes;
- oral histories;
- teaching areas used to transfer knowledge between generations;
- cultural values and experiences on the land;
- Indigenous governance systems and Indigenous laws tied to the landscape;
- place names, language and other components that make up a culture
- sacred, ceremonial or culturally important places, plants, animals, objects, beings or things; and
- places with archaeological potential, archaeological sites or artefacts; and
- site occupied historically.

The Impact Statement must:

- describe the interconnections and impact pathways between heritage and cultural structures, sites, places, and things and the current use of lands, health, social, and economic components, Indigenous knowledge, and Indigenous rights for each potentially-impacted Indigenous community, including intergenerational impacts over the lifetime of the project;
- describe how historical and current cumulative effects to environmental and socio-cultural conditions, including changes to those conditions, have already impacted physical and cultural heritage;
- provide the location of physical and cultural heritage features on maps, and provide the GIS files to the communities, if it has be shared by Indigenous peoples with the proponent and if the proponent has obtained permission from the Indigenous groups for the information to be shared publicly;
- include components of the environment identified by Indigenous groups as having heritage value, to reflect that natural and cultural heritage is a multidimensional concept which is not limited to particular sites or objects; and
- describe how input from potentially impacted Indigenous groups was sought and considered in the identification of these locations and features, including opportunities provided to participate in or lead historic resources studies (including field studies).

The proponent should consult the Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing.

10.1.2. Effects to Indigenous physical and cultural heritage

The Impact Statement must:

- if applicable, describe the issues related to Indigenous physical and cultural heritage, and structures, sites or things of significance encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- assess potential effects to physical and cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance to groups, including, but not limited to:
  - loss or destruction of physical and cultural heritage;
  - changes to access to and/or experience with physical and cultural heritage;
  - changes to the cultural value, spirituality, or importance associated with physical and cultural heritage;
  - changes to sacred, ceremonial or culturally important places, objects, or things, including languages, stories and traditions; and
  - changes to visual aesthetics over the life of the project and after project closure.
- take into account potential effects on physical and cultural heritage when assessing the effects on social and economic conditions;
- provide copies of correspondence with provincial, territorial or Indigenous authorities responsible for heritage resources with comments on any physical and cultural heritage resource assessment and proposed mitigation measures;

- describe contingency plans and field responses, and resources that will be contacted in the event of discovery of heritage resources during construction and operation, and cultural heritage training programs for workers;
- explain the interconnections with and potential impacts to physical and cultural heritage from changes to pre-development and current baseline environmental, social, and economic conditions;
- describe the outcomes of engagement and consultation activities with Indigenous groups with concerns about heritage resources in the project area and indicate the participation of the members of these communities in the related studies, if applicable;
- describe how Indigenous knowledge informed studies, including the identification of the sites to assess and include studies conducted by Indigenous peoples, if any;
- consider natural and cultural heritage as a multidimensional concept which is not limited to particular sites or objects and which can also include components of the environment identified by Indigenous peoples as having heritage value; and
- list any other effects highlighted by Indigenous groups or other participants, if applicable.

The proponent should consult the Agency's Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012.

10.2. Current use of lands and resources for traditional purposes

10.2.1. Baseline conditions

The Impact Statement must include information on the current use of lands and resources for traditional purposes. The proponent should refer to the Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012 (guidance to be updated).

Where information is publicly available or is provided by Indigenous groups. The Impact Statement must identify and describe:

- Indigenous governance systems and Indigenous laws associated with the current use of lands and resources for traditional purposes;
- location and description of Treaty lands and/or geographic extent of Treaty rights, title area, land claims or traditional territory (including maps where available);
- location of reserves and communities;
- location of any Indigenous Protected and Conserved Areas;
- traditional activities presently or historically practiced (e.g. hunting, fishing, trapping, gathering of plants or medicines);
- location of sites used for traditional purposes, including hunting, trapping, and fishing camps and cabins, and traditional gathering, teaching, or assembly grounds;

- resources important for traditional and cultural purposes (e.g. plants, fish, mammals, birds and other natural resources), and places where these resources are harvested. Identify those being species at risk and describe their traditional and cultural significance;
- the sites or areas, including water bodies, that are used by Indigenous peoples either as permanent residences, or as a seasonal or temporary location, and the number of people using each site or area identified (include a map, if possible);
- traditionally and culturally significant resources (e.g. plants, fish, mammals, birds and other natural resources), and describe where these resources are harvested. Identify resources that are species at risk, and describe their traditional and cultural significance;
- seasonal harvesting practices and how they vary in time, such as berry and tea harvesting, bait harvesting and fishing, game hunting, and trapping of fur-bearing animals;
- access and travel routes for conducting traditional practices (e.g. physical access to harvest specific species, culturally important harvesting locations, timing, seasonality, distance from community);
- all uses of riverbanks, shorelines, waterways and water bodies navigable by Indigenous peoples, such as for travel and recreation (e.g. canoe route and portage trails), including entry and exit/landing sites for watercraft;
- waterways, water bodies, springs, wetlands, and shallow groundwater used as drinking water sources and aesthetic properties (taste, colour, clarity, temperature, odour) of those waters;
- describe the fish and aquatic plants that are used as wild foods or for other traditional purposes, including a description of species of particular importance, and whether their consumption has cultural significance to Indigenous groups, including for medicinal purposes. All sites used in the study area or those of historical significance for harvesting traditional foods should be identified and mapped, including sites important for fishing;
- the current use of lands and water bodies in the study area, including for harvesting, hunting, gathering, and fishing, as well as social and ceremonial purposes, including as defined by Aboriginal and Treaty rights;
- the use of cabins, camp sites and staging areas;
- frequency, duration or timing of traditional practices;
- efforts by Indigenous groups to restore traditional practices;
- traditional foods consumed by Indigenous groups;
- the quality and quantity of resources (e.g. preferred species and perception of quality);
- access to resources (e.g. physical access to harvest specific species, culturally important harvesting locations, timing, seasonality, distance from community);
- important features for the experience of the practice (e.g. connection to the landscape without artificial noise and sensory disturbances, air quality, visual landscape, perceived or real contamination, etc.);
- location of any Indigenous-led research or monitoring activities; and
- other current uses identified by Indigenous groups.

The information should be provided in sufficient detail to allow analysis of the effects to Indigenous peoples that result from changes to the environment and on health, social and economic conditions.

10.2.2. Effects to current use of lands and resources for traditional purposes

The impact statement must:

- if applicable, describe the issues related to the current use of lands and resources for traditional purposes encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- assess the potential effects on current use of lands and resources for traditional purposes, within the context of historical and current cumulative effects, including to:
  - current and future availability and quality of traditional foods;
  - quality, quantity and distribution of resources available for harvesting (e.g. species of cultural importance, traditional and medicinal plants;
  - access to culturally important harvesting areas or resources, access to traditional territory and to/from the community and reserves;
  - experiences of being on the land (e.g. changes in air quality, noise exposure, effects of vibrations from blasting or other activities, increase in artificial light at permanent and temporary sites, fragmentation of traditional territory, visual aesthetics);
  - the use of travel ways, navigable waters and water bodies;
  - sites of interest to communities including for commercial and non-commercial fishing, hunting, trapping and gathering and cultural or ceremonial activities and practices;
  - access to the territory and to the distribution and availability of harvested wildlife (e.g. wildlife avoidance);
  - economic burdens of, and increased time for, travelling further to hunting, fishing, trapping, and gathering opportunities; and
  - impacts of changes in the sensory experience of being on the land, due to noise and change in soundscape, changes in the visual landscape, and odor, and any corollary wellness impacts as a result of these sensory changes.
  - describe the risks that mining infrastructure may pose to the safety of land users, for example, when travelling (e.g., walking, snowmobiling);
- describe land use losses for Indigenous peoples associated with the project's applicable buffer zones;
- identify the predicted effects of the project on the quality and quantity of groundwater or surface water and the consequences for recreational uses by Indigenous peoples;
- describe the potential effects of population increases caused by the arrival of workers on traditional hunting, fishing, trapping, harvesting, and gathering activities;

- describe potential effects on the transmission of traditional knowledge, language, community tradition of sharing and community cohesion linked to activities potentially affected by the project;
- take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements and best practices in place concerning light pollution (the proponent needs to work with communities to ensure that any standards that are applied are protective of traditional uses and purposes and human health);
- describe the methods used to collect information on traditional use of lands and resources by Indigenous communities;
- describe how the traditions, perspectives, values and knowledge of Indigenous communities have been considered in determining the severity of the project's contribution to current cumulative effects to environmental and socio-cultural conditions affecting Indigenous land and resource use.
- describe how information about impacts to land and resource use is integrated into Section 10.1.2, Effects to Indigenous physical and cultural heritage, including how:
  - changes to access areas, temporary and permanent hunting camps, travelways, and harvesting and traditional land and resource use areas affects cultural values, spirituality, or importance attached to physical and cultural heritage sites;
  - changes to traditional use of cultural landscapes including (and not limited to) important travelways, waterways and harvesting areas associated with sacred, ceremonial or culturally important places, objects or things, use of placenames, languages, stories and traditions;
  - changes to visual, auditory, or olfactory aesthetics over the life of the project and after reclamation, abandonment, or decommissioning affects traditional use; and
  - impacts to harvesting and traditional use affects teaching and knowledge transfer between generations;
- describe how traditional land and resource use and cultural values informed the biophysical assessment and impact rating criteria;
- describe how the results of the biophysical assessment were integrated in the traditional land and resource use assessment and considered in the determining residual effects and the severity of impacts; and
- provide a detailed explanation of how comments from Indigenous communities and Indigenous knowledge informed the assessment of potential effects to current use of lands and resources for traditional purposes;
- describe and assess the interconnections and impact pathways between the current use of lands and resources and health, social, and economic components, Indigenous knowledge, and Indigenous rights for each Indigenous community, including potential intergenerational impacts over the lifetime of the project;
- take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements in place concerning light pollution;
- describe how Indigenous peoples who participated in the gathering of traditional use information took part in the impact assessment and in the development of proposed mitigation measures, including

undertaking their own assessment of effects. Include all Indigenous comments on potential effect to current use of lands and resources for traditional purposes.

10.3. Health, social and economic conditions of Indigenous peoples

10.3.1. Baseline conditions

The Impact Statement must meet the requirements set out in the sections above regarding health, social, and economic conditions, taking into account Indigenous peoples and the GBA Plus specific to the various population groups of Indigenous peoples.

The baseline conditions established for Indigenous groups must take into account Indigenous governance regimes and Indigenous laws associated with health and socio-economic conditions. The baseline conditions should provide community-specific social and economic conditions on a disaggregated basis (without identifying individuals).

10.3.2. Effects to Indigenous health, social and economic conditions

The assessment of these effects to Indigenous peoples must describe and take into account interactions with the effects on physical and cultural heritage, on structures, sites or things of significance, and on the current use of lands and resources for traditional purposes. For example, an effect on a traditional food may have consequences for the practice of traditional activities, and could lead to an effect on the cost of living, food security, and mental health at the community level or on vulnerable groups of population.

The Impact Statement must:

- if applicable, describe the issues related to health, social, and economic conditions of Indigenous peoples encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- describe the health, social and economic effects that the project may have on Indigenous peoples;
- list other effects highlighted by Indigenous groups or other participants, if applicable.

The proponent should refer to the following guidance: Analyzing Health, Social and Economic Effects under the *Impact Assessment Act* and Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities.

10.4. Rights of Indigenous Peoples

10.4.1. Baseline conditions

The Impact Statement must:

identify and describe the Treaty and Aboriginal rights of Indigenous peoples potentially affected by the project, including historic, regional, and community context, the geographic extent of traditional territory, the purpose and importance of the rights to the rights-bearing communities (e.g. the practices, customs, beliefs, worldviews and livelihoods), and information on how rights have already been affected. The description should include maps, when available and permitted by the respective Indigenous communities, to illustrate the location of treaties, traditional territories, and harvesting zones of Indigenous peoples covered by the treaties;

- document the nature and extent of the exercise of rights of Indigenous peoples, potentially impacted by the project, as identified by the Indigenous group(s);
- consider how the information requirements related to physical and cultural heritage, current use, Indigenous health, social, and economic conditions are applicable to the nature and extent of the exercise of rights; and
- consider how the information requirements related to cumulative effects are applicable to the baseline conditions supporting the exercise of rights.

Indigenous groups may also provide their perspective through consultations with the committee, and through the establishment of information requirements included in the Tailored Impact Statement Guidelines. Indigenous communities must be involved in the baseline characterization of conditions supporting the exercise of rights, as well as the scoping and assessment of the nature and extent of the exercise of rights of Indigenous peoples.

The information related to the rights of Indigenous peoples may include, but is not limited to:

- a general description of the rights of Indigenous peoples potentially affected by the project, including the historic, regional and community context. The description should include maps, when available, to illustrate the location of areas with titles, land claims and traditional territories;
- the quality and quantity of resources required to support exercise the right (e.g. preferred species);
- access to the resources required to exercise rights (e.g. physical access to culturally important places, timing, seasonality, distance from community);
- the experience associated with the exercise of rights (e.g. noise and sensory disturbances, air quality, visual landscape);
- specific areas of cultural importance where rights are exercised;
- landscape, social and cultural conditions that support the Indigenous group’s exercise of rights (e.g. large, intact and diverse landscapes, areas of solitude; connection to landscape, sense of place;

language; Indigenous knowledge; clean water, biodiversity, abundance, distribution and quality of wildlife and vegetation);

- Indigenous governance systems and Indigenous laws associated with the exercise of rights;
- where possible, information about members within an Indigenous group, and their role in the exercise of rights (e.g. women, men, Elders, youth, people with disabilities);
- how the Indigenous group's cultural traditions, laws and governance systems, social values, access and patterns of occupation and preferences inform the manner in which they exercise the rights (the who, what, when, how, where and why);
- where they exist, identification of thresholds identified by the community that, if exceeded, may impair the ability to meaningfully exercise of rights;
- maps and data sets (e.g. overlaying the project footprint, places of cultural and spiritual significance, traditional territories, fish catch numbers); and
- pre-existing impacts and cumulative effects that are already interfering with the ability to exercise rights or to pass along Indigenous cultures and cultural practices (e.g. language, ceremonies, Indigenous knowledge).

The proponent should consult Agency guidance on engaging Indigenous groups, and the Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples.

10.4.2. Impacts on rights of Indigenous peoples

The Impact Statement must describe the level of engagement with Indigenous groups regarding potential impacts of the project on the exercise of rights, and where possible, the project's potential interference with the exercise of rights. In some instances, the proponent may adopt Indigenous-led assessment of impacts on rights, and include them directly in the Impact Statement.

It is preferable that Indigenous groups have all the information about the project and its potential effects on hand to be able to assess the potential impacts of the project on their rights. The proponent is therefore encouraged to share studies with Indigenous groups prior to assessing the impact of the project on their rights. The proponent must document the approach taken to support Indigenous groups in identifying the potential impacts of the project on their rights, including the hypotheses put forward on the potential effects. Specific Indigenous groups should be provided the opportunity to review assessments of impacts on rights pertaining to those same Indigenous groups. Indigenous groups should also be provided the opportunity to approve use of Indigenous knowledge pertaining to those same Indigenous groups, prior to submission of the Impact Statement to the committee.

Where an Indigenous group has not provided its views on the impact of the project on their rights to the proponent, or both parties agree that it is better to provide information related to the impact on the exercise of rights directly to the committee, the proponent should describe a rationale for the approach taken to assessing impact on rights. Proponents should discuss with Indigenous groups their views on how best to reflect the assessment of impacts on rights in their Impact Statement. Impacts on rights may be assessed using a methodology identified by Indigenous groups, including community-led assessments, and agreed upon between the Indigenous community and the committee. This may include supporting Indigenous-led

studies and assessments to inform the assessment of effects to Indigenous peoples including on their ability to practice their rights and the resources necessary to support those rights (e.g. for VCs, spatial and temporal boundaries, community health, social conditions and community well-being) that are to be provided publicly and to the Government of Canada.

The proponent must work together with Indigenous groups to find mutually agreeable solutions to concerns raised about a proposed project, especially for those concerns raised by Indigenous peoples about impacts on the exercise of their rights.

The Impact Statement must:

- if applicable, describe the issues related to the rights of Indigenous peoples encountered during the operation of the former Troilus Mine by Inmet Mining Corporation (1996–2010), explain how they were resolved, and present lessons learned that may be relevant to this project;
- document the project's potential impacts on the exercise or practice of the rights of Indigenous peoples or the rights arising from treaties in the project area, as expressed by potentially impacted Indigenous peoples;
- describe the impact on the rights of Indigenous peoples, taking into account the concept of the link between resources, access and experience;
- document the views of potentially affected Indigenous peoples regarding the severity of impact that the project could have on their rights and interests; and
- describe how the results of the traditional land and resource use assessment, the cultural heritage assessment, health and socio-economic assessment of Indigenous peoples were integrated in the Indigenous Rights assessment and considered in the determining residual effects and the severity of impacts.

The proponent should consult the following Agency guidance on this topic: the Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples and the Guidance on Assessing Potential Impacts on the Rights of Indigenous Peoples.

The proponent, in collaboration with Indigenous groups, should consider the following factors, as relevant:

- how the project may contribute cumulatively to any existing impacts on the exercise of rights, as identified by the Indigenous group(s);
- the interference of the project on the quality and quantity of resources available for the exercise of rights;
- how the project affects the ability to travel freely in the territory;
- the effects of the project on the access to areas important to the exercise of rights;
- the effects of the project on the experience associated with the exercise of rights, including the ability of Indigenous communities to exercise their rights in a peaceful manner (e.g. without changes in connection to land, well-being, knowledge of the landscape, air quality, noise exposure, effects of vibrations, artificial light, fragmentation, visual aesthetics, safety);
- the effects of the project on Indigenous traditions, laws and governance;

- how the project will affect the planning, management or stewardship of traditional lands and resources by Indigenous peoples;
- how the project will affect the ability of Indigenous peoples to derive future economic benefits from the land or water or to maintain an ongoing relationship with the land or water;
- the way that the project is aligned with the values, political direction and/or objectives of Indigenous peoples' actions to mitigate or to adapt to a changing climate;
- the manner in which the project and its impacts weaken or strengthen the authority of Indigenous peoples on their territory;
- how the project affects all other components of significance identified by Indigenous groups; and
- the severity of the impacts on the exercise of rights, as identified by the Indigenous communities.

10.5. Mitigation and enhancement measures

The Impact Statement must:

- describe the mitigation and enhancement measures proposed for all potential effects on Indigenous peoples and impacts on the rights of Indigenous peoples, and indicate whether these are measures for which the proponent or other parties would be responsible. Elaborate on how these measures may vary for each Indigenous group;
- describe if and how these measures will be integrated into the project design, if applicable;
- provide an outline of the restoration plan, with an emphasis on points of interest to Indigenous peoples;
- include perspectives of the potentially impacted Indigenous groups, on the effectiveness of particular mitigation measures on such impacts;
- describe collaboration with Indigenous peoples to identify preferred mitigation measures for potential adverse impacts on Indigenous communities or their rights, as well as to optimize the project's benefits for their communities;
- demonstrate how the timing of Indigenous activities on the land was considered when establishing the schedule for project activities. In doing so, pay particular attention to mitigation and enhancement measures surrounding the annual hunting seasons of Indigenous peoples;
- describe accommodation, mitigation, and complementary measures for impacts to previously known heritage and structures, sites, and things of significance, or those identified in the course of impact assessment and other field studies;
- provide any intervention and communication plans, as applicable, pertaining to heritage resources and structures, sites, and things of cultural, historical, archaeological, paleontological, or architectural significance, if there is a possibility of discovery during construction or development activities. This plan must include, at a minimum, the person to be contacted, intervention measures and the conditions that would lead to a shutdown and resumption of work;

- provide copies of correspondence from provincial or territorial heritage resource authorities containing their comments on the heritage resource assessment and proposed mitigation measures;
- describe the measures that would enhance or support the exercise or practice of rights in the project area (e.g. employment, procurement and monitoring measures);
- establish a protocol for the use of camps on the mine site by community members during periods of traditional activities;
- describe how the proponent will implement a policy to prevent harassment related to the use of common areas on the project site;
- assess the needs of tallymen regarding the relocation of camps affected by project activities and specify the proponent's intentions in this regard;
- describe how the proponent has addressed the suggestions and recommendations made by potentially affected Indigenous peoples including where Indigenous knowledge was provided and considered in respect of the design of mitigation measures;
- propose differentiated mitigation measures, if applicable, to ensure that Indigenous peoples and other population groups are not disproportionately affected by adverse effects and that they are not disadvantaged in sharing in the positive effects of the project. These mitigation measures should be developed in collaboration with the potentially affected communities and population groups;
- describe how the GBA Plus results on disproportionate effects have been used to inform mitigation and enhancement measures;
- describe predicted climate change considerations for VCs and incorporate climate change adaptation into reclamation planning;
- provide available evidence of the effectiveness for all mitigation measures related to potential effects to Indigenous communities. Where no evidence exists, describe plans to monitor the effectiveness of mitigation measures. The proponent is encouraged to share results with Indigenous communities and to monitor the effectiveness of mitigation measures in cooperation with Indigenous communities.

Where no mitigation measures are proposed or mitigation is not possible, the Impact Statement must describe the potential adverse impacts on the rights of Indigenous peoples, as identified by the Indigenous group(s). In addition, the Impact Statement must include perspectives of the potentially impacted Indigenous groups on the effectiveness of particular mitigation measures on such impacts.

11. Effects of Potential Accidents or Malfunctions

The failure of certain works caused by technological malfunctions, human error, or exceptional natural events (e.g., floods, earthquakes, forest fires) could result in major effects. If certain events were to occur (e.g., tailings dam failures, minor spills, road accidents), they should be included as expected effects in the previous sections.

11.1. Risk assessment

The Impact Statement must:

- identify hazards for each project phase that could lead to events of accidents and malfunctions related to the project and provide an explanation of how these events were identified (e.g. information sources, recognized risk assessment methodology, professional expertise, similar project, participants' input);
- take into account the lifespan of different project components, design of different project components, complicating factors such as weather or external events, and the potential for vandalism or sabotage;
- conduct an analysis of the risk of each hazard and adverse event (including likelihood and consequences) and describe the potential consequences (including the environmental, health, social and economic effects and effects to Indigenous peoples). Involve members of the affected Indigenous communities, users of the territory, and representatives of the Cree Nation Government in this risk analysis;
- describe the plausible worst-case scenarios and the more-likely but lower-consequence alternative scenarios, including;
  - the magnitude, duration and extent of effects;
  - the quantity, mechanism, rate, form and characteristic of contaminants, greenhouse gases and other materials released or discharged into the environment;
  - influence of local and regional terrain, topography and weather conditions (e.g. difficult access for interventions);
  - modelling for any contaminants spilled or released indirectly into water or air;
  - potential environmental, health, social and economic effects, including effects to Indigenous peoples. With respect to human health specifically, consideration should be given to potential pathways of effects associated with surface water, air, tradtional foods, and other relevant media, including short-term and long-term risks to human health;
  - a description of significant sources of GHG emissions that may result from accidents or malfunctions;
  - relative locations of sensitive receptors (e.g. humans, fish and/or wildlife and their habitat, waterways, private drinking water wells);

- timing related to sensitive receptors (e.g., hunting season, tourist season, migration or nesting season);
- critical infrastructure, such as local drinking water treatment plants or facilities that can treat water sources affected by the project, as well as the ability and capacity of the drinking water treatment plants or facilities to treat water sources affected by accidental releases from the project during all project phases;

- identify and justify the spatial and temporal boundaries for the effect assessment associated with accidents and malfunctions. The spatial boundaries identified for effects from potential accidents and malfunctions will generally be larger than the boundaries for the project effects alone, and may extend beyond Canada's jurisdiction; and
- provide environmental sensitivity mapping that identifies site-specific conditions and sensitive receptors adjacent to project activities, including shorelines, watercourses and wetlands frequented by fish and/or migratory birds, as well as the probable access routes.

11.2. Mitigation measures

The Impact Statement must:

- describe the mitigation measures and safeguards that would be in place to avoid and prevent accidents and malfunctions, including project design choices and operational considerations, including engineering, safety and risk reduction standards, criteria and approaches to be used (e.g., spacing, fire protection, prevention of leaks of toxic chemicals, active fire suppression, and explosion/overpressure minimization, spill prevention plan);
- describe mitigation measures that could be implemented to avoid and prevent potential accidents related to the transportation and storage of hazardous materials;
- describe the proposed security measures to reduce the potential for vandalism or other malicious acts that could lead to accidents or malfunctions;
- describe the mitigation measures for the potential adverse environmental, health, social and economic effects, including effects to Indigenous peoples, in the event of an accident or malfunction, such as emergency response and repair procedures that would be put in place;
- describe long-term monitoring and recovery measures, including adaptive management plans, that would be considered for managing adverse environmental, health, social, and economic effects resulting from accidents and malfunctions, including those to remediate affected lands and waters. These measures should take into account site-specific conditions and sensitivities;
- provide details of financial liability and compensation measures in place pursuant to regulations or the proponent's commitment in case of potential accidents or malfunctions associated with the project;
- describe mutual aid arrangements in the event that the incident exceeds proponent resources and how to access these resources; and
- describe the expected effectiveness of the mitigation measures, safeguards and response measures and systems;

- involve members of the affected Indigenous communities, land users, and representatives of the Cree Nation Government in the development of mitigation measures for accidents and malfunctions.

11.3. Emergency management

The Impact Statement must describe an emergency response plan and as part of this plan must:

- identify emergency planning and emergency response zones;
- present preliminary emergency measures to respond to such events, including identifying associated response systems and capabilities;
- take into account evacuation areas in the planning of emergency measures as well as the particularities linked to these areas (e.g. number of residents varying with the seasons, possible high number of individuals unfamiliar with the region, limited communication means in remote areas and with temporary residents);
- describe existing emergency preparedness and response systems and existing arrangements and/or coordination with the responsible response organizations in the spatial boundaries associated with the project;
- describe how the proponent will integrate its response operations into an incident management system (for example, the Response Command System, ICS) when deploying a significant incident response effort;
- describe the role of the proponent in the case of spill, collision, fire, explosion, or other accidents or malfunctions associated with the project;
- describe emergency response, training, and exercise programs, including a description of the participation and training agreements with Indigenous groups or communities that could be impacted by accidents or malfunctions;
- document spill response strategies for each type of spill scenario, including strategic locations of spill response equipment in relation to potential accident and malfunction sites and likely pathways to sensitive environmental receptors;
- describe emergency communication and public notification plans, community awareness plans and public reporting;
- describe emergency communication plans that would provide emergency instructions to surrounding communities, including Indigenous communities, and how these will be directed to the public, including Indigenous groups. The proponent should consider including:
  - immediate urgent actions, such as notifying the public of security and safety concerns, instructions for on-site shelter or shelter-in-place, procedures, and evacuation routes; and
  - longer-term actions, such as a general website and telephone helplines, updates on the status of incidents, and injured animal reports;

- describe liaison and continuous education plans linked to emergency preparedness for surrounding communities that may be affected by the consequences of a significant incident, including for Indigenous communities;
- describe the coordination with the health care system(s) in case of a mass casualty event;
- explain how the proponent has made and will continue to make an outreach effort to ensure that public and Indigenous groups understand the risks associated with this type of project (e.g., providing non-technical information, providing information in local languages if requested); and
- describe any waste management plan as it pertains to waste generated during an emergency response.

12. Effects of the Environment on the Project

The Impact Statement must consider and describe how environmental conditions, including natural hazards such as severe and/or extreme weather conditions and external events could adversely affect the project and how this in turn could result in effects to the environment, health, social and economic conditions. These events are to be considered in different probability patterns (e.g. 5-year flood vs. 100-year flood) taking into account how these could change under a range of potential future climate scenarios. The focus should be on credible external events that have a reasonable probability of occurrence and for which the resulting environmental effects could be major without careful management.

The Impact Statement must:

- describe how environmental conditions, including natural hazards such as severe or extreme weather conditions and external events, could adversely affect the project and how this in turn could result in effects to the environment, health, social, and economic conditions (e.g., effect of long-term erosion of covers on tailings impoundments, effect of erosion of waste rock piles on acid mine drainage and leaching of metals);
- provide details of planning, design and construction strategies intended to minimize the potential adverse effects of the environment on the project;
- describe mitigation measures that can be implemented in anticipation of or in preparation for the effects of the environment on the project (e.g., stronger or thicker cover on tailings and waste rock piles, or backfilling of pits with potentially acid-generating tailings and waste rock to reduce the effects of cover erosion);
- describe possible mitigation measures to address adverse environmental, health, social and economic effects resulting from effects of the environment on the project;
- describe measures to enhance positive environmental, health, social and economic effects resulting from effects of the environment on the project.
- describe the project's climate resilience and how the impacts of climate change have been integrated into the project design and planning throughout the life of the project, and describe the climate data, projections and related information used to assess risks over the life of the project. Further guidance on how to conduct a climate change resilience assessment can be found in the SACC;
- identify the sensitivities and vulnerabilities of the project's tailings management facilities and waste rock piles to changes in climate (both under average conditions and extreme conditions, such as short-term heavy precipitation events);
- describe all known and relevant trends in meteorological events, weather patterns, or physical changes in the environment that are expected to result from climate change, and incorporate this information into a risk assessment as contributing to or complicating factors for accidents and malfunctions (e.g., increased risk of forest fires that could destroy vegetated cover, increased erosion rates of tailings, and

waste rock piles covers). Provide mitigation measures (both passive and active) that the proponent is prepared to take to minimize the frequency, severity, and consequences of these projected effects;

- identify any areas of potential wind or water erosion; and
- assess the potential effects of seismic events on facilities and specify the soil movement parameters that will be used with the probability of occurrence (e.g., 2% in 50 years) and the best practice codes and guides that are or will be used in the seismic effects analysis (e.g., National Building Code of Canada 2015, CAN/CSA-Z662 standard). The proponent should indicate the seismic hazard in the area, its potential influence on the design of structures, and, if necessary, the seismic hazard design considerations (or codes/standards) that will be followed. The potential influence on design is particularly important for high-impact structures such as tailings dams, explosives storage, seismic stability of mine shaft walls, and others. The latest national seismic hazard provisions are included in the National Building Code of Canada 2020 and the 6th Generation Seismic Hazard Model for Canada.

13. Canada's Ability to Meet its Environmental Obligations and its Climate Change Commitments

The Government of Canada, through the Act, recognizes that impact assessment contributes to Canada's understanding and ability to meet, first, its environmental obligations, and second, its commitments in respect of climate change.

In accordance with paragraph 22(1)(i) of the Act, the Impact Statement should describe the effects of the project in the context of environmental obligations, with a focus on Government of Canada obligations and commitments relevant to decision-making.

Federal environmental obligations relevant to this project include:

- the Convention on Biological Diversity and Canada's supporting national framework (e.g., the Canadian Biodiversity Strategy, Canada's Biodiversity Outcomes Framework, and Canada's current biodiversity goals and objectives), as well as legislation that supports the implementation of Canada's biodiversity commitments, including SARA and the *Canada Wildlife Act (1985)*, and supporting policies and guidance documents;
- recovery strategies and action plans developed under SARA for all species at risk potentially affected by the project;
- the Convention for the Protection of Migratory Birds in the United States and Canada, as implemented in part under the *Migratory Birds Convention Act (1994)*, and supporting guidance documents on conservation objectives and strategies specific to bird conservation regions.

The Impact Statement must:

- describe where the project may enable Canada to meet its environmental obligations, the proponent's plans and commitments to ensure that positive contributions are respected; and
- describe where the project may adversely affect Canada's ability to meet its environmental obligations, the mitigation measures and follow-up programs related to those effects.

With respect to climate change commitments, Section 8.12, Climate change of these Guidelines outline the information required as part of the Impact Statement. The committee, with the support of federal authorities will provide a supplementary analysis on the project's GHG emissions in the context of Canada's emissions targets and forecasts (see Section 6 of the SACC). Although it is not required, the proponent may provide its views in the Impact Statement on the extent to which the effects of the project would hinder or contribute to the Government of Canada's ability to meet its commitments in respect of climate change in order to inform the impact assessment.

The proponent is required to conduct a two-step analysis:

1. determine whether the effects of the project could hinder or contribute to Canada's ability to meet its environmental obligations or climate change commitments; and,
2. where applicable, determine the extent to which these effects could hinder or contribute to these obligations and commitments by referring to the Guidance Document: Description of Effects and Characterization of Significance, including the suggested criteria for characterizing the level of significance of adverse residual effects in Table 2 of the Guidance Document.

The proponent should refer to the Agency's guidance documents on this topic, including the document Policy Context: Considering Environmental Obligations and Commitments in Respect of Climate Change under the *Impact Assessment Act*.

14. Extent to which the Project Contributes to Sustainability

Under the Act, one of the factors that must be considered in impact assessments is the extent to which a project contributes to sustainability. Sustainability is the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generations. Sustainability is a lens to be applied throughout the impact assessment, beginning in Planning phase. Information and data requirements to inform the sustainability analysis should be considered from the outset of the impact assessment.

The sustainability analysis will consider the potential effects of a project through the application of the following principles:

- consider the interconnectedness and interdependence of human-ecological systems;
- consider the well-being of present and future generations;
- consider positive effects and reduce adverse effects of the project; and
- apply the precautionary principle and consider uncertainty and risk of irreversible harm.

The application of the principles will result in better information on the effects of the project, including long-term effects on future generations and the interaction of effects, and may help identify additional mitigation measures and enhancements. The proponent should refer to the Agency's guidance on this topic: Guidance: Considering the Extent to which a Project Contributes to Sustainability and Framework: Implementation of the Sustainability Guidance.

The Impact Statement must provide an analysis of the extent to which the project contributes to sustainability. The analysis should be qualitative but may draw on quantitative data to provide context, and should follow the methodology outlined in the Framework: Implementation of the Sustainability Guidance, and must:

- describe engagement with potentially affected Indigenous groups and outline measures and commitments that contribute to the sustainability of Indigenous livelihood, traditional use, culture and well-being:
  - include any description of sustainability as defined by Indigenous groups;
- describe the project-specific context, including key issues of importance to Indigenous groups and the public that will inform the sustainability assessment;
- describe how the sustainability principles were considered in:
  - the assessment of the potential effects of the project, including setting spatial and temporal boundaries, and identifying mitigation measures and enhancements;
  - the planning and design of the project and the selection of the preferred alternative means and alternatives to the project;
- describe and document all uncertainties and assumptions underpinning the analysis;

- describe how the precautionary principle was applied in cases where there may be risk of irreversible harm;
- provide a summary of the positive and adverse environmental, health, social, and economic effects of the project, with emphasis on potentially affected Indigenous groups, local communities, and diverse population groups whose identities intersect and interact with various structural forms of exclusion (such as poverty, racism, colonialism, sexism, and ableism); and
- indicate how monitoring, management and reporting systems consider the sustainability principles and attempt to ensure continuous progress towards sustainability.

15. Follow-up Programs

Follow-up programs are put in place by the proponent to verify the accuracy of the impact assessment and evaluate the effectiveness of mitigation measures. Through the conditions in the decision statement, the proponent is required to develop a follow-up program in consultation with relevant authorities and Indigenous groups and to submit to the committee the results of monitoring efforts. Monitoring is a key component of follow-up programs and can identify the potential for environmental, health, social or economic degradation during all phases of project development. Monitoring can also assist in developing clearly defined action plans and emergency response procedures to account for environmental, health, social and economic protection.

The proponent should develop expected outcomes for their follow-up programs, in consultation with relevant authorities and Indigenous groups. An expected outcome is defined as an objective that the proponent can reasonably anticipate achieving through a project as a result of the implementation of effective mitigation measures. Expected outcomes may be qualitative or quantitative in nature but must be measurable in order to support a determination of whether mitigation measures are working effectively to eliminate, reduce, control, or offset adverse effects on VCs. Proponents will be expected to provide information on the extent to which they are achieving their expected outcomes in their annual follow-up program reports

If the follow-up program indicates that mitigation measures are not working effectively, additional measures may be required and implemented. If, through a follow-up program, it is identified that the predictions of the impact assessment were not accurate, corrective action or additional measures may be required to be put in place by the proponent.

Follow-up programs are an opportunity to continue engaging with impacted Indigenous groups. If undertaken collaboratively, they can support solution-oriented approaches to managing adaptively through the early identification of issues in follow-up programs and appropriate solutions incorporating Indigenous knowledge.

In developing the follow-up program framework for environmental, health, social or economic VCs, as applicable, the Impact Statement should take into account the considerations outlined in the Agency guidance on Follow-up Programs under the *Canadian Environmental Assessment Act* (guidance to be updated).

15.1. Follow-up program framework

The duration of the follow-up program must be as long as required to verify the accuracy of the environmental, health, cultural, social and economic effects and the impacts on the rights of Indigenous peoples predicted during the impact assessment and/or to evaluate the effectiveness of the mitigation measures.

The Impact Statement must present a follow-up program that includes:

identification of VCs that warrant a follow-up program and rationale taking into account the guidance on follow-up programs cited above;

- the expected outcome(s) and targets of the follow-up program and information describing how the proponent expects to achieve the expected outcome(s);
- preliminary description of follow-up studies planned, as well as their main characteristics (list of parameters to be measured, planned implementation timetable, etc.);
- intervention mechanism used in the event that the effects to the environment or impacts on rights of Indigenous peoples and cultures attributed to the project are not as predicted;
- mechanism to disseminate follow-up results among the concerned interested parties;
- consideration of accessibility and sharing of data for the general population; and
- opportunities for the involvement of Indigenous groups, stakeholders, local and regional Indigenous organizations in the follow-up program design and implementation and the development of a communication mechanism between these organizations and the proponent.

15.2. Follow-up program monitoring

For the proposed follow-up framework, the Impact Statement must present a preliminary overview of the ongoing geochemical characterization program for tailings and waste rock, the acid mine drainage and metal leaching monitoring program for tailings and waste rock management facilities, and the environmental (e.g., aquatic effluent effects monitoring), health, social, and economic monitoring programs. This includes, but is not limited to:

- identification of regulatory instruments that include a monitoring requirement for the VCs;
- description of the methodology for tracking environmental, health, social and economic issues;
- description of the methodology and mechanism for monitoring the effectiveness of mitigation and reclamation;
- description of the characteristics of monitoring where foreseeable (e.g. location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, data management, human and financial resources required);
- identification of the monitoring activities that could pose a risk to the environmental, health, social and economic conditions and/or VCs and the measures and means planned to protect these conditions;
- a description of the indicators to be used to assess progress toward the stated goals and a rationale for their selection;
- an explanation of how differences between predicted and actual measured effects will be attributed to either prediction uncertainty or the effectiveness of mitigation measures;
- guidelines for preparing monitoring reports (number, content, frequency, format, duration, geographic extent) that will be sent to the authorities involved; and

- plans, including funding options, to involve Indigenous groups and local communities in monitoring, where appropriate.

15.3. Compliance monitoring

It is the responsibility of the proponents to verify that the required mitigation measures have been implemented and have worked as intended. The Impact Statement must present a framework by which compliance monitoring for follow-up programs would be implemented. This should include, but not be limited to:

- identification of those positions accountable and responsible for monitoring and ensuring compliance;
- description of the proponent's intervention mechanisms in the event of non-compliance with legal and environmental requirements or obligations imposed on contractors by the provisions of their contracts; and
- quality assurance and quality control measures to be applied to monitoring programs.

15.4. Adaptive management plans

Proponents should consider adaptive management as a means to address high uncertainties associated with the effectiveness of mitigation measures or predicted effects and to help ensure expected outcomes are achieved. Adaptive Management Plans establish a systematic process following six iterative steps: assess, design, implement, monitor, evaluate, and adjust. An Adaptive Management Plan may be warranted in addition to a follow-up program if it meets each of the following criteria:

1. There is high uncertainty around the effectiveness of mitigation measures or predicted effects.
2. There is a need for, or benefit to reducing uncertainties through an Adaptive Management Plan.
3. Adaptive management is technically feasible.

Adaptive management does not eliminate the need to provide sufficient information on the baseline conditions or effects attributed to the designated project. Nor does it eliminate the need to characterize effects and identify appropriate mitigation measures to eliminate, reduce or control those effects.

Please refer to the Agency's guidance on Adaptive Management Measures under the *Canadian Environmental Assessment Act 1992* (guidance to be updated).

16. Assessment Summary

The proponent must prepare a stand-alone plain language summary of the Impact Statement in both of Canada's official languages (French and English). The summary must contain sufficient details for the reader to understand the project, any potential environmental, health, social and economic effects, potential adverse impacts on Indigenous peoples, proposed mitigation measures, residual effects and any required follow-up programs.

The Assessment Summary provides an opportunity for the proponent to demonstrate correspondence between issues raised during the Planning phase and issues addressed in the assessment. The Assessment Summary should be presented by VC, which allows the proponent to demonstrate the completeness of the assessment and provide the results of the analysis. The summary must include key maps or figures illustrating the project location and key project components.

The Impact Statement should also include a series of tables summarizing the following information:

- potential environmental, health, social and economic effects and the potential impacts on Indigenous peoples;
- potential mitigation and enhancement measures in relation to potential effects and impacts;
- description of the residual effects of the project;
- cumulative effects and proposed mitigation measures to address them;
- any other commitments made by the proponent or recommendations made by the proponent to other parties; and
- effects falling within federal jurisdiction, as well as direct or incidental effects, and the extent to which the effects are significant (based on the characterization of residual effects). Effects within federal jurisdiction, and direct and incidental effects, are defined in section 2 of the Act.

Appendix 1 – Additional Guidance

This appendix contains guidance on how to address the requirements outlined in the main body of the Guidelines. Guidance has been placed in appendix for ease of reading. The proponent is expected to demonstrate how relevant guidance or technical recommendations were used. Alternatively, a rationale must be provided as to why it is not applicable, feasible, or why different approaches were found more adequate

List of project components & activities

The list of project components and activities, as required in Section 3.4, Project components and activities, should focus on those with the greatest potential to have environmental, health, social and economic effects, or impacts on Indigenous peoples and their rights, as determined by Indigenous groups. Sufficient information must be included to adequately predict adverse and positive effects, the interaction between those effects, and how those effects can vary depending on diverse groups within communities.

Project components and activities should include the following elements, as relevant:

Project components

- water management infrastructure to divert, control, collect and discharge surface drainage and groundwater discharges to the receiving environment, including collector ditches, groundwater interception wells, sedimentation ponds, sumps, and pump and pipeline systems;
- treatment facilities for potable water, sewage, wastewater and effluent (including proposed treatment technologies, footprint, location, discharge locations);
- material storage including chemicals, hazardous waste, fuel storage tanks, explosives manufacturing facilities and explosives warehouses
- waterbody diversions or realignments;
- crossings of waterbodies and watercourses, including bridges and culverts;
- construction workspace and laydown areas (footprint, location);
- temporary or permanent infrastructure, including administration buildings, warehouse, garages, maintenance offices (footprint, location);
- sources of drinking and industrial water;
- energy supply source, including the relocation of a powerline to site (footprint, location);
- waste disposal (types of waste, methods of disposal, quantity, disposal sites or facilities);
- site access roads or routes;
- temporary or permanent worker accommodations;
- borrow pits and quarries;

- fences and barriers (footprint, location); and
- any other infrastructure relevant to the project, including their footprint, location, etc.

Mining

- mine waste management facility (footprint, location, and preliminary design) and related pipelines (including those for tailings and sewage);
- tailings management strategies, including:
  - the solid and liquid composition and volume of specific waste streams (including mineralogy and total organic carbon content for solid streams), and dissolved inorganic carbon, organic carbon, isotopic composition of water, and potential tracers of groundwater contamination for liquid streams. Mine waste management strategies (e.g., co-disposal) consider geochemical test results as well as cyanide and its degradation products if cyanide is used in ore processing;
  - measures to segregate and monitor streams with elevated solvents or radionuclides;
  - disposal sites, including their location on the post-closure landscape;
  - feasibility and effectiveness of different reclamation strategies (i.e. various wetland landscapes and dry landscapes);
  - measures and strategies for recycling, preventing pollution and minimizing waste throughout the life-cycle of the project, including information on the technologies that will be employed; and
  - identify the limits of proposed tailings treatment technologies at closure;
- storage of waste rock, overburden, low grade ore storage, and stockpiles (footprint, locations, volumes, development and management plans, and design criteria);
- open pit (footprint, location, development plans including pit development phases);
- crushing and processing facilities (footprint, process, technology, location);
- storage and load out facilities for concentrate and or finished product (footprint, location);
- fuelling stations for trucks/vehicles or energy supply sources (e.g., generators, wind-mills, solar, LNG or propane tanks) [footprint, location];
- explosives manufacturing and storage (method, quantity, footprint, location, licensing, management);
- aggregate and sand deposits and aggregate plant (footprint, location, volumes),existing or expected borrow pits, where needed ;
- permanent and temporary linear infrastructures (access roads, rail line, conveyor, haul roads, power supply, primary power lines, bridges and other water crossings transmission line, and pipelines), identifying the route of each of these linear infrastructures, and the location and types of structure used for stream crossings;
- the conceptual design features of all collector and diversion ditches, culverts, bridges, spillways and water storage facilities (including sediment ponds and seepage collection ponds);
- construction of dams.

Project activities

Site preparation and construction

- construction phases;
- surveying and staking;
- site grubbing, clearing and excavation, including tree and vegetation removal;
- excavation and salvage of topsoil, soil and bedrock, and rocky substrates including potentially acid-generating and leachable materials;
- management of excavated materials, including potentially acidogenic or leachable materials;
- blasting (location, frequency, duration, time of year, time of day and methods);
- concrete-related activities, whether by a temporary concrete plant or by the transportation of concrete by concrete mixers, including a site for the washing and management of wash water from concrete mixers or concrete preparation equipment, if applicable;
- explosives manufacture, transportation, storage and management;
- construction of access roads;
- clearing of transportation corridor and construction and relocation of a powerline to site;
- construction of site fencing;
- changes to existing infrastructure (e.g., expansion of existing pits, modification of existing access road);
- transportation and management of borrow materials requirement (source and quantity);
- overburden and waste rock stockpile areas;
- water management, including water diversions, mine water pumping from the pit, storm water management, site drainage, runoff management, and sediment or erosion control;
- water management to divert, control, collect and discharge surface drainage and groundwater seepage to the receiving environment, including collector ditches, groundwater interception wells, sedimentation ponds, sumps, and pump and pipeline systems;
- construction of water management facilities to manage water that comes into contact with mine infrastructure or plant processes, including collector ditches, sumps, pump and pipeline systems, and groundwater interception wells, as well as water recycling;
- water requirements for project construction, operation, and closure(such as process water consumption and other uses like road watering), including estimate of quantities needed;
- management and treatment of wastewater and discharge points;
- construction of mine waste management infrastructure (e.g., waste rock piles, tailings facilities, ore or overburden piles, etc.);
- operation of light duty, heavy-duty, and mobile off-road motor equipment (type, quantity);
- construction of temporary or permanent infrastructure;

- establishment of worker accommodations (capacity, wastewater treatment);
- transportation of employees;
- storage, management and the disposal of mining, domestic and hazardous waste (indicate types, methods, and amounts);
- construction of the Bibou Creek diversion channel and the management and storage of spoil from its excavation;

Operation

- product production and stockpiling, product extraction, processing and treatment. Detail the pit development phases;
- drilling and blasting (location, frequency, duration, time of year, time of day, and methods);
- explosives manufacture, storage and use;
- seismic and vertical seismic profiling;
- management and disposal of wastes;
- storage, handling and transport of materials;
- use and maintenance of access roads;
- water management, including water diversions, site drainage and runoff management, sediment and erosion controls, site dewatering, potable water, water use requirements, storm water, process water, wastewater, water recycling and effluent treatment (quantity, treatment requirements, release point(s) and receiving waterbodies);
- storage and handling of reagents, petroleum products, chemical products, hazardous materials and residual materials;
- mine waste management, including tailings, waste rock and overburden;
- waste management and recycling (other than mine waste such as tailings and waste rock);
- workforce management, including transportation, work schedules and lodging;
- storage, handling ,and transportation of gold and copper concentrate (e.g., by truck, train, or ship) to destination.

Suspension and abandonment

- preliminary outline of a suspension, abandonment, or restoration plan for any components associated with the project;
- the ownership, transfer and control of the different project components;
- site restoration;
- removal of surface contamination caused by facilities and equipment;
- abandonment of wells;

- dismantling and removal of equipment and systems;
- demolition or disposition of buildings and ancillary structures;
- long-term maintenance, monitoring, and maintenance of site integrity, including site drainage and the management of water, effluent, and remaining structures;
- the purging and dismantling of oil equipment;
- suspension or abandonment for temporary or permanent facilities.

Sources of baseline information

Information sources and data collection methods used for describing the baseline environmental, health, social and economic setting may consist of the following:

- Government of Canada's Open Science and Data Platform. This online, public platform provides access to government sources of science, data, publications and information about development activities across the country that are relevant to understanding cumulative effects. The platform can help identify relevant data and scientific articles in one online location, and be a source of open data available for download;
- field studies, including site-specific survey methods;
- database searches, including federal, provincial, territorial, municipal and local data banks, including for example:
  - eBird Canada;
  - Breeding Bird Survey (BBS);
  - Christmas bird counthttps://netapp.audubon.org/CBCObservation/Historical/ResultsByCount.aspx;
  - Birds Canada's Canadian Migration Monitoring Network
  - Nature Counts;
  - iNaturalist;
  - Neighbourhood Bat Watch;
  - Bird Conservation Regions and strategies;
- land cover data, including terrestrial ecosystem mapping, forest cover maps, and remote sensing data. The following habitats and features should be included:
  - water bodies;
  - wetlands;
  - watercourses;
  - riparian habitat;
  - stream and river banks or other eroded habitats;
  - artificial water sources;

  - buildings, bridges, and other anthropogenic features, including linear features (e.g., roads, power lines)
  - critical habitat as described in recovery strategies;
  - any other habitat features recognized as important in the region;
  - trade publications;
  - regional studies or assessments, project assessments, and strategic assessments;
  - vulnerable individuals or subgroups (e.g., individuals with compromised health, children, pregnant women, elders);
- research programs of regional industry, resource or species-specific committees;
- protected areas, watershed or coastal management plans;
- natural resource management plans;
- species recovery and restoration plans;
- field measurements to gather data on ambient or background levels for air, water, soil and sediment quality, light levels or acoustic environment (soundscape);
- published literature;
- environmental assessment documentation, including monitoring reports, from prior projects in the area and similar projects outside the area;
- regional studies including studies conducted by Indigenous Peoples, , and project assessments;
- navigational studies;
- renewable harvest data;
- Indigenous knowledge, including oral histories;
- expert, community, public and Indigenous engagement and consultation activities, including workshops, meetings, open houses, surveys;
- qualitative information gathered from interviews, focus groups or observation;
- census data;
- human health impact assessments or risk assessments;
- information available from Canadian Institute for Health Information;
- community and regional economic profiles;
- statistical surveys, as applicable.

The proponent should consult with federal, provincial or local government authorities to determine whether additional data sources and survey methods may be appropriate.

Establishing spatial and temporal boundaries

The following guidance is supplement to the requirements in Section 7.3, Spatial and temporal boundaries.

The study area boundaries must encompass the spatial boundaries of the project, including any associated project components or activities, and the anticipated boundaries of the project effects. The proponent should consider the following areas in assigning appropriate spatial boundaries:

- areas potentially impacted by changes to water quality and quantity or changes in flow in the watershed and hydrologically connected waters;
- areas potentially impacted by airborne emissions or odours;
- air zone(s) and airsheds under the Air Quality Management System;
- local major emission sources;
- areas of importance to people, including recreational areas;
- modelling domain size based on isopleths resulting from the project-only case that represents 10% of the appropriate jurisdictional ambient air quality criteria (within the limits of validity of the model);
- areas within the range of vision, light and sound;
- the locations and characteristics of the most sensitive receptors or areas;
- species habitat areas, usage timing and migratory patterns;
- emergency planning and emergency response zones;
- the geographic extent of local and regional services;
- any affected communities;
- all potentially affected Indigenous groups;
- areas of known Indigenous land[12], cultural, spiritual and resource use; and
- existing affected infrastructure.

For biophysical VCs, spatial boundaries should be defined using an ecosystem-centered approach. See document Technical Guidance for Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012* for more information on establishing spatial boundaries).

For habitat-related VCs potentially affected by the Project, a land cover analysis, including freshwater environments, should be conducted to determine appropriate ecological boundaries and buffer distances around the project area. The spatial extent of habitat and habitat functions should influence the determination of an appropriate local study area and regional study area. Spatial boundaries of the RSA should be changed if one or more land cover types are concentrated in a sub-area and are uncommon in other parts of the region.

[12] Indigenous lands may encompass reserve lands, traditional territories and/or treaty lands

Where a VC is a species, the local study area should correspond to the project study area plus a buffer defined in consideration of direct and indirect project effects to species including habitat effects, changes to connectivity, alteration of predator/prey dynamics, mortality, sensory disturbance, and pollution. Use simulation modelling to help define buffers that address the species or species group being assessed. The proponent should contact federal, provincial and/or local government authorities to verify appropriate boundaries for wildlife species.

Spatial boundaries should consider the location of sensitive receptors, which may include:

- diverse subgroups affected by the project, (e.g. individuals with compromised health, children, pregnant women, elders);
- residences, health and social services institutions (e.g. hospitals, long-term care facilities, seniors' residences);
- educational institutions (e.g. schools, daycare centres, early childhood centres);
- tourism establishments (e.g. tourism information offices, museums, ski areas, summer camps, outdoor recreation areas, camp sites);
- recreational areas (e.g. recreational land, urban parks, parks and conservation areas);
- areas for the exercise of the rights of Indigenous peoples; and
- sensitive wildlife species or habitats (e.g. soil types or areas with historical loading or poor buffering, important areas of wildlife use, harvesting activities).

The temporal boundaries of the impact assessment should span all phases of the project. If potential effects are predicted after project closure or abandonment, this should be taken into consideration in defining specific boundaries. Define temporal boundaries in a manner that enables detection of all species that use the Project Area, Local Study Area, and Regional Study Area throughout the year and from one year to another, and to estimate their temporal pattern of use (e.g. breeding, migrants stopping on northward and/or southward migration). Temporal boundaries spanning more than one year will enable accounting for variation due to irregular events (e.g., a year of great tree seed production, storms on migration, late snowfalls).

Developing mitigation measures and enhancements

Mitigation measures are technically and economically feasible measures to eliminate, reduce, control or offset the adverse effects of a designated project, and include restitution for any damage caused by those effects through replacement, restoration or compensation. The "hierarchy of mitigation measures" presents three options for types of mitigation measures, in descending order of preference:

- Eliminate: refers to the elimination of effects, such as by changing the location or design of the project. It can also be referred to as "avoidance" of effects.
- Reduce and control: aims to reduce effects to the extent possible, for example, by modifying the most adversely impactful project activities or components or by taking measures specific to the potential effects. There may still be residual effects where measures are not sufficient to eliminate the effects, or

where their absolute effectiveness is uncertain. Effects may also be "minimized" when it is not possible to "avoid" them.

- Offset: aimed at offsetting residual effects following consideration of elimination and reduction measures, through measures referred to as “compensation” or “restitution”. For example, where an adverse effect on fish habitat persists, it will potentially be necessary to offset this effect through the implementation of compensation measures. These measures must be compliant with the guiding principles of the Policy for applying measures to offset adverse effects on fish and fish habitat under the *Fisheries Act*. These measures must fall into one of the four broad categories mentioned in this policy, including habitat restoration and improvement, habitat creation, etc.

As a first step, the proponent should use an approach based on the avoidance and reduction of the adverse effects at the source, namely consider modifying the design or changing the location of certain project components.

Enhancement measures for positive effects are not necessarily required to mitigate negative effects, but are measures that may be developed to make use of opportunities presented by the project to contribute to, for example, local and regional training efforts, investment in infrastructure and services, projects to rehabilitate degraded environments, etc. Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation.

The proponent is encouraged to work with the communities to align project goals with an aim to enhance positive project effects. Such an approach may include the modification of the design of the project or relocation of project components.

Compensation and offset plans

Where compensatory or offset measures are proposed to mitigate effects (e.g. on species at risk and their critical habitats, fish and fish habitat, or wetland functions), the Impact Statement must include the compensation or offset plans for consideration during the impact assessment process.

In general, these plans should address the following elements, or refer to locations in the Impact Statement where this information is presented:

- describe the baseline conditions of fish and fish habitat, species at risk, critical habitat, and wetland functions potentially impacted by the project;
- explain and justify the hierarchy of mitigation measures considered;
- identify and describe residual effects that are the subject of the compensatory measures;
- identify a compensation ratio with rationale, including how any policies or guidance provided by federal and provincial authorities and Indigenous peoples have been considered;
- where feasible, identify the location and timing of implementation of compensation projects;
- identify and describe the success criteria;
- identify and describe in detail non-habitat related compensation measures (e.g. predator control);

- describe how the proposed measures align with published provincial and federal recovery management or action plans and strategies for species at risk, or for fish and fish habitat;
- describe how the proposed measures align with published provincial and federal recovery management or action plans and strategies for wetlands;
- identify, if possible, the parties responsible for implementation of the compensatory measures, including monitoring and efficiency evaluation;
- identify indicator species for setting compensation objectives. The choice of indicator species should be based on baseline data. Species at risk should not be used as indicator species, since compensation efforts must be specifically directed to these species;
- describe the habitat functions gained at the compensation site(s);
- Provide evidence that habitat functions can be replaced by the proposed offset activities;
- describe the selection process for proposed compensation sites and associated baseline conditions;
- provide a description of the monitoring schedule and activities to be completed to verify the success of compensation activities; and

If offsets are required to address residual effects, refer to the Operational Framework for Use of Conservation Allowances.

The proponent must explain how Indigenous peoples were involved in the development of the compensation plans. The proponent must demonstrate how the information received from Indigenous peoples has been taken into account, including the choice of compensation ratios, if applicable. The proponent must also elaborate on how Indigenous peoples will be involved in the implementation of the compensation measures and the evaluation of the success of these measures.

For compensation plans targeting **species at risk**, the proponent can refer to Template 2 in the *Species at Risk Act* Permitting Policy.

With respect to **wetlands**, compensation plans should:

- clearly indicate the location and total area of each type of wetland, as well as their respective locations, for which the residual effects should be mitigated by compensation measures;
- favour the restoration of drained or altered natural wetlands of the same type and function as those affected by the project. Wetland restoration is preferable to wetland enhancement, both of which are preferable to the creation of new wetlands;
- demonstrate that wetland functions can be replaced by the proposed compensation activities;
- indicate where it is not possible to compensate for the loss of functions in cases where wetlands are unique, perform habitat functions that ensure the survival of a large proportion of migratory birds, or provide habitat for species at risk; and take this information into consideration when developing compensation measures;
- use a minimum ratio of 2:1 for the area of wetlands to be restored or created, versus the original area of wetlands affected. A higher compensation ratio is recommended for wetland types where

compensation is more difficult or where there is uncertainty about the success of the compensation measures. The choice of ratio for wetland compensation needs to be justified;

- compensate lost wetland functions on-site if site conditions are suitable for wetland functions.. If this is not possible, the preference is to compensate within the same watershed, and then within the same ecosystem as the one where functions are affected;
- minimize the delay between the time the adverse effects occur and the time habitat and functions are restored; and
- explain how vegetation removals, as well as soil and peat excavation activities will be managed for reclamation of disturbed wetlands (e.g. methods, conditions and timing of stockpiling).

Each compensation plan to offset residual adverse effects on **fish and fish habitat** must be developed in accordance with the Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* and must include:

- an exact location for the proposed measures of the project (latitude and longitude, lot number, municipality, regional municipality county, etc.) and property rights;
- baseline information including a description of the environment (biological, hydrological, physical, chemical, etc.), an estimation of the quality of the environment in question and a description of the issue to address. Ideally, the description of the environment should be accompanied by georeferenced and dated photographs;
- a description of the proposed measures (nature, extent, method, timetable, etc.);
- the fish species affected by the proposed measures, including the resulting fish habitat functions (feeding, reproduction, rearing, shelter, growth, migration);
- an assessment of the benefits to fish and fish habitat resulting from the offsetting measures in terms of the significance, magnitude and adequacy of the gains to be achieved with respect to the current situation; and
- a follow-up program to measure the success of offsetting objectives, including the details of its implementation. Offsetting objectives as well as the methods and criteria used to evaluate success (parameters, frequency, duration, etc.) must be clearly identified and described. Deliverables must be identified (e.g. baseline information, follow-up protocol, plans and specifications, work report, follow-up report, etc.), along with contingency measures in case success criteria are not met. The offsetting objectives and the timelines of the follow-up program (including deliverables) should be compiled in one or more tables.

Offsetting plans and monitoring programs for fish and fish habitat should be developed using standard Fisheries and Oceans Canada (DFO) guidance:

- A review of functional monitoring methods to assess mitigation, restoration, and offsetting activities in Canada;
- Assessing the Effectiveness of Habitat Offset Activities in Canada: Monitoring Design and Metrics;
- Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program; and

- Policy for applying measures to offset adverse effects on fish and fish habitat under the *Fisheries Act*.

Guidance for biophysical components

Atmospheric, acoustic and visual environment

The following guidance should be consulted in conjunction with Section 8.5, Atmospheric, acoustic and visual environment:

- project sources of air pollutant emissions should include the following types of sources:
  - stationary sources: including but not limited to power generation equipment (i.e., gensets), turbines, compressor engines, incinerators, exhaust vents and stacks from processing facilities, ventilation vents, boilers and other heating equipment, flares, idling transport vehicles, drills, fugitive emissions from storage tanks, and leaks from gas pipes and other equipment. This should also include start-up and shut-down emissions, as appropriate;
  - area sources: including drilling and blasting activities, material handling(e.g., loading and unloading of transport trucks), material transport, wind erosion of waste rock piles and stockpiles, fugitive emissions process areas and tailings management areas, and dust emissions from paved and non-paved roads. Fugitive dust emission factors and expected fugitive dust mitigation (control effectiveness) should be described and justified to the extent practicable;
  - mobile sources: include vehicle engine exhaust emissions. Include all off-road and on-road fleet vehicles used in the project. Exhaust emission factors should be estimated using established methods;
  - emissions from rail transport, if applicable;
- baseline data should be taken from existing or new long term monitoring with representative monitoring data, collected over an appropriate duration (multi-year) and geographic scope;
- if a long-term monitoring data is not available, then other techniques may be acceptable on a case-by-case basis – with a rationale provided – including:
  - limited or short term monitoring;
  - data from a surrogate site that has similar meteorological and air quality to represent the site in question;
  - results of existing large scale modelling;
  - dispersion modelling to indicate spatial distribution of contaminants;
- for requirements pertaining to the use of atmospheric dispersion modelling, the proponent should:
  - assess four scenarios in the air quality assessment, namely: i) baseline conditions (i.e., the reference case); ii) project only (with and without mitigation); iii) baseline conditions plus project; and iv) cumulative effects or future development, if applicable;

- perform dispersion modeling for all relevant temporal scenarios, i.e., construction and operation scenarios. The modeling for the construction phase should represent the conditions that will maximize the impact on air quality. For the operation phase, it is also important to select a year in which air quality impacts are at their maximum;
- conduct modeling of fugitive emissions with and without mitigation measures to assess the impact of these measures on air quality and particulate matter deposition at sensitive receptors. In particular, modeling of particulate matter emissions from unpaved roads should be performed with and without mitigation measures. Various mitigation control efficiency scenarios should be modeled, such as with control efficiencies of 0% (no mitigation or worst case scenario), 50%, and 70%.

To do this:

- perform modeling over an appropriate time period to account for variability in weather and baseline conditions. Use the most recent meteorological and emissions data
- use of appropriate domain boundaries which allow in particular to observe the expected concentrations on the sensitive receptors. At a minimum, the modelling domain should enclose concentrations that are 10% of relevant air quality criteria;
- use an air quality model that is appropriate for the complexity of the terrain, sources and meteorology.

The proponent should engage with experts at ECCC to inform the choice of program to conduct regional air quality modeling of acidifying deposition rates.

Wetlands

The following guidance should be consulted in conjunction with Section 8.7, Vegetation, riparian and wetland environments.

With regards to the wetlands functions assessment, the proponent should:

- complete this assessment for a representative selection of wetlands that the project would directly impact and of wetland(s) that are hydrologically connected. In conducting this assessment, the proponent should ensure that wetlands are considered in the context of:
  - the larger watersheds of which they are a part;
  - adjacent land use with a focus on hydrological and other functions;
  - landscape and/or watershed considering topography, soil types and hydrological linkages; and,
  - the global significance of peatlands across the regional study area;
- be as specific as possible to the biological characteristics of the wetland and to the ecological services and functions it provides;
- collect data from representative wetlands in a manner that enables reliable extrapolations in space (i.e. at minimum to the project area, LSA and RSA) and in time (i.e. across years), including:
  - design survey in support of the assessment so that they represent the spatial and temporal targets of modeling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of mitigation effectiveness. Survey designs should be sensitive enough to detect and

quantify the effects at the appropriate spatial and temporal scales, any departures from predictions, and the effectiveness of mitigations. Justify the selection of modeling techniques based on current and recent scientific literature;

- plan survey protocol for representative wetlands to include statistical modelling and simulations to estimate sampling requirements, and analysis to evaluate resulting design options. Sample size must be planned to support evaluation of the project study area within the context of the LSA and RSA. Appropriate design of surveys will need to consider multiple survey locations in order to represent the wetland heterogeneity of the RSA, and to yield multiple survey locations per wetland type, without requiring aggregation of habitat classes post-hoc;

- incorporate the value of wetlands from an Indigenous perspective and existing disturbance when making proposals for wetland offsets;
- provide this assessment in a quantitative form and include the collection of site-specific baseline information on wetland functions, including:
  - surveys to assess for the presence, abundance, density, and distribution of migratory birds and federally listed species at risk, provincially listed species at risk, and species assessed by COSEWIC as at-risk in relation to potentially affected wetlands and associated riparian areas. Surveys should meet appropriate standards, be species or bird group specific as appropriate, and be conducted during the appropriate times of the year;
  - surveys for species at risk should assess species individually where possible (typically an indicator approach is not appropriate for species at risk). Surveys should not be limited to species or groups of species that are wetland-obligate, but rather should include any species known to use wetland habitats as part of its lifecycle. Data should be sufficiently robust to identify which wetland classes are important to which species (and for how many);
  - the location and a description of the biological characteristics of each potentially affected wetland and the ecological services and functions (hydrology, biochemical cycling, habitat, climate) they provide. The functions assessment should be as specific as possible to the biological characteristics of the wetland and to the ecological services and functions it provides; et
  - a supporting rationale and detailed description of the methods used in completing the wetland functions assessment, including sampling design;
- contact the relevant provincial and local government authorities to determine if other wetland conservation policies, regulations or wetland compensation guidelines apply. See also resources available from The Wetland Network;

The proponent should:

- submit complete data sets from all survey sites, including GIS files. These should be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation/visit information and with observations and measurements in un-summarized form; and
- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation).

Fish and fish habitat

The following guidance should be consulted in conjunction with Section 8.8, Fish and fish habitat, as relevant to the establishment of baseline conditions.

- for watercourses, it is recommended that the description be provided on the basis of homogenous section. Parameters to be measured may include: length of the section, wetted width at the natural high water mark (NHWM, width at bankfull discharge (WBD) at potential watercourse crossings, depth, streamflow types and characteristics (depth, velocity, turbidity, peak and low flows), substrate type (shoreline and bottom), aquatic (e.g. grass flat) and riparian vegetation, natural (significant vertical drop, waterfalls, subsurface flow over large distances, etc.), and anthropogenic barriers (stream crossing structures, etc.) that impede or obstruct free passage of fish. The obstacles must be documented (size, condition, etc.) and their passability by fish must be assessed.
    - Ordinary High Water Mark is the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (e.g., rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes and wetlands environments it refers to those parts of the water-body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (i.e. full supply level).
- for waterbodies, the parameters to be measured include, but are not limited to, size, bathymetry, littoral, sublittoral, bathyal, epipelagic, mesopelagic, bathypelagic zones, maximum and average depths, seasonal water level fluctuations, substrate type (sediment), aquatic (submerged, floating and emergent) and riparian vegetation, and water quality (temperature and dissolved oxygen profile, turbidity, transparency, pH, salinity);
- baseline measurements of contaminants should be provided for the complete fish food web (including water, invertebrates, prey fish), and include carbon and nitrogen stable isotope measurements in fish and the complete fish food web. These measurements should then be used to inform the assessment of effects from contaminants, including bioaccumulation of contaminants, in fish downstream of the project

For potentially affected fish, the proponent should:

- First, use existing information (e.g. the Fish and Wildlife Internet Mapping Tool, accessible regional reports, primary literature, fisheries management objectives, information from consultation and engagement activities, traditional knowledge of Indigenous peoples affected by the project, etc.). Existing information should be supplemented using field data collection as necessary to support the assessment, and as relevant to validate predictions and mitigation success in the future;
- Perform field data collection programs in a representative number of locations (including reference locations where applicable), using sampling methods appropriate to the aquatic system, and should be performed in multiple seasons;

With respect to the assessment of effects on fish and fish habitat, the proponent should:

present potential habitat destruction, degradation, and disturbance on maps at appropriate scales and in tabular form;

- include changes to surface water conditions resulting from changes to groundwater quantity and discharge location. The Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada should be used to guide this aspect of the effects assessment;
- refer to standard metrics for changes in habitat quality and quantity to choose an analysis that is appropriate to the type and scale of effects (see A framework for assessing fisheries productivity for the Fisheries Protection Program). For example, broader, ecosystem-wide effects may require a modelling approach. It is recommended that the information be collected in the form of a map at appropriate scales, as well as in the form of a table; and
- consider that the effects of chronic and acute disturbances to fish populations are often dependent on the state of the fish population. If the fish population is already quite depleted, the effect of an acute disturbance may have a disproportionate effect on the population.

Birds and bird habitat

The following guidance should be consulted in conjunction with Section 8.9, Birds, migratory birds and their habitat:

- data collection should come from surveys that are designed to meet the defined outcomes and goals for the Impact Statement. Designed data collection (as opposed to haphazard, opportunity or convenience based sampling) ensures that goals are met, and the potential for biases in the data collected are minimized.
- the proponent should consider and assess the following groups of migratory and non-migratory birds separately: waterfowl, water birds (other than waterfowl), songbirds, shorebirds, each bird species at risk and their habitat;
- avian surveys should be designed based on a thorough review of the available scientific literature pertinent to the specific region, bird groups and anticipated effects;
- in order to establish adequate baseline conditions for birds, the proponent should take into account the following technical recommendations:
  - collect data to account for natural variability among years, within and among seasons, and within the 24-hour daily cycle;
  - collect data in a manner to allow for reliable extrapolations in space (i.e. at a minimum in the project area, local and regional study areas) and in time (i.e. over the years);
  - design surveys so that they represent the spatial and temporal targets of modeling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of the effectiveness of mitigation measures. Survey designs should be sensitive enough to detect and quantify the impacts at the spatial and temporal scales identified above (i.e. project area, LSA, RSA), any departures from predictions, and the effectiveness of mitigation measures. Justify the selection of modeling techniques based on current and recent scientific literature;

- survey protocol planning should include modeling and simulations to estimate sampling requirements and analysis to evaluate resulting survey options. It is recommended to collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of sampling is suggested as a minimum to achieve this goal. As the number of sampling years increases so does the understanding of natural variability;
- use spatially balanced and randomly chosen sampling sites, preferably using stratified random sampling that covers all habitat types. When major habitat edges are identified, sampling should be designed such that it is possible to sufficiently describe the importance not only of the types of habitat, but also of the edges between the types of habitat;
- have sufficient sampling effort and sampling locations to reflect variability among habitat type in the project, local and regional study areas, with more intensive sampling effort:
    - in the project area;
    - in areas or habitats more likely to be affected by the project;
    - for rare species that may be harder to detect;
- take into account detection errors and provide unbiased estimates of abundance and distributions using, as appropriate, simulation modelling in study design;
- provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g., mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g., 95% confidence intervals, credible intervals).

- describe the protocols used to conduct surveys using point counts, Autonomous Recording Units, and aerial survey methods and provide rationale for why the selected protocols are best suited for the project;
- where predictive modelling is required, provide the explanatory data (e.g. covariables such as associated land cover, etc.) required to predict effects on bird groupings (e.g. changes in abundance, distribution or other relevant effects) collected in such as way as to represent the following sources of variation where applicable: spatial variation in land cover composition, soil type, geomorphology, hydrological processes, and inter-annual and intra-annual climate variability;
- when selecting metrics to characterize avifauna biodiversity, it is recommended that:
    - biodiversity metrics should include the following: distribution in space, frequency of occurrence, occurrence and abundance trends in time, abundance and density, as well as the types of associated habitats and the strength of the associations; and
    - species communities should not be grouped together by diversity indicator and should not be limited to the indicator species. The identification of species, distribution, abundance and, when possible, estimates of species' breeding status should be the main quantification objectives;
- when identifying areas of concentration of migratory birds, the following must be considered:

- migratory bird concentrations can vary within a year and between years. It is therefore important to survey across the project study area, local study area, and regional study area both temporally and spatially;
- migratory bird counts are dependent on length of stay as well as presence. Attempting to estimate abundances across a migratory period should incorporate an estimate of inter and intra-annual trends and estimates of lengths of stay. Irruptive species may act in ways similar to migrants in terms of abundance. They may be absent from an area until conditions change (such as a year of great tree seed production), during which time the habitat becomes vital to these species;

- baseline description of bird habitats should include, at a minimum, characterization of biophysical conditions with regard to ecoregion and Bird Conservation Region, taking into account the specific conditions found near the borders of these regions;
  - habitat surveys need to be detailed enough within the local and regional study areas to provide context for local and regional habitat availability and quality;
  - mixed wood and old-growth forest land cover and other upland vegetation types may be particularly important for many forest associated birds, supporting birds during migration, breeding and through the winter. Peatlands and wetlands including fens and bogs are ecologically important elements of the landscape. River riparian corridors with adjacent mixed wood forest are another relatively uncommon feature that should be clearly identified;
- the analysis of predicted effects on birds should:
  - include separate analyses for each activity, component and project phase;
  - distinguish between migratory and non-migratory birds;
  - consider sources of error for all analyses to ensure that the final effects predictions indicate the best estimate, considering data precision;
  - explore, wherever possible, non-linear, indirect and synergistic responses to the project;
  - produce defendable forecasts of effects on bird species or groupings and of the effectiveness of mitigation measures; and
  - justify any assumptions regarding relocation or temporary displacement during construction and operation of the project by using scientific references. The reference data should provide evidence that there is a significant number of equivalent habitats in which the birds can move and that the vegetation removed is not unique to the project area.

The proponent should consult:

- *Framework for the Scientific Assessment of Potential Project Impacts on Birds* for examples of project types and potential techniques for assessing effects on migratory birds;
- Government of Canada's guidance on the website Avoiding harm to migratory birds to characterize effects on birds in terms of amount, duration, frequency, and timing of disturbances;
- Guidelines to reduce risk to migratory birds and ECCC's website on General nesting periods for migratory birds to inform the development and application of mitigation measures;

- Note that although the nesting period dates on ECCC's website cover the main nesting periods of migratory birds, it does not authorize the disruption, destruction, or taking of a migratory bird, its nest, or its eggs outside these periods.

The description of bird species and their habitat in the study area may be based on existing sources, but supporting evidence is required that demonstrates that the data used are representative of the avifauna and habitats in the study area. Existing data must be supplemented by inventories, if required to produce a representative sample of the avifauna and habitats of the study area.

The proponent should:

- submit complete data sets from all survey sites. These should be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation/visit information and with observations and measurements in un-summarized form; and
- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation).

Wildlife and species at risk

The following guidance should be consulted in conjunction with Section 8.10, Terrestrial wildlife and wildlife habitat and for Section 8.11, Species at Risk and their habitat.

In order to establish adequate baseline conditions for wildlife and species at risk, the proponent should take into account the following technical recommendations:

- data collection should come from surveys that are designed to meet the defined outcomes and goals for the Impact Statement. Designed data collection (as opposed to haphazard, opportunity or convenience based sampling) ensures that goals are met, assumptions for analysis and statistical modelling are met, and the potential for biases in the data collected are minimized. Wildlife surveys should be designed based on a thorough review of the available scientific literature pertinent to the specific region, wildlife, and anticipated effects;
- it is recommended to collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of sampling is suggested as a minimum to achieve that goal. As the number of sampling years increases so does the understanding of natural variability. Repeated sampling of locations or spatial overlap of sampling between years is required to separate spatial variability from temporal variability;
- if recent existing data is available for the study area, it can be used to complement the data collected in the field. If data from prior surveys is used to replace further sampling (e.g., only one year of sampling is planned to be conducted), a demonstration must be presented that these data and survey designs meet the requirements outlined below;
- survey protocol planning should include modeling and simulations to estimate sampling requirements and analysis to evaluate resulting survey options. It is recommended to:

- collect data to represent sources of temporal variation between years, during and between seasons (e.g., spring migration, breeding, fall migration, wintering), and in the daily 24-hour cycle;
- consider that rare species require more survey effort to detect than common species, and this needs to be accounted for in survey design by increasing the number and duration of surveys;
- collect data in a manner to allow for reliable extrapolations in space (i.e. at minimum in the project area, LSA, and RSA) and in time (i.e. over the years);
- design surveys so that they represent the spatial and temporal targets of modelling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of the effectiveness of mitigation measures. Survey designs should be sensitive enough to detect and quantify the impacts at the spatial and temporal scales identified above (i.e. project area, LSA, RSA), any departures from predictions, and the effectiveness of mitigation measures. Justify the selection of modeling techniques based on current and recent scientific literature;
- use spatially balanced and randomly chosen sampling sites, preferably using stratified random sampling that covers all habitat types. When major habitat edges are identified, sampling should be designed such that it is possible to sufficiently describe the importance not only of the types of habitat, but also of the edges between the types of habitat;
- provide the criteria and document any simulations used to select sample sites and sample sizes;
- plan the sample size and survey design to ensure sufficient assessment of the project area in the context of the local and regional study areas. Survey design will need to consider a large number of sites to represent the heterogeneity of regional study area habitat and to plan the number of sites by land cover or by habitat class so that aggregation of post hoc habitat classes is not necessary;
- design sampling effort per unit area - field survey effort to be most intensive within the project study area. The level of effort per unit area may be similar or somewhat less within the remainder of the LSA, but should be scaled to the likelihood that project effects will effect species within that zone. Efforts outside the project study area should be carefully designed to ensure that estimates comparing within and across the project area, LSA, and RSA are unbiased and as precise as possible;
- use simulation modelling in designing surveys and statistical methods to assess if methods are expected to have levels of bias and precision that ensure the estimates are useful for comparison between project area, LSA, and RSA and to compare performance of potential survey design;
- if necessary to constrain or adjust site selection based on access limitations, simulation modelling should provide evidence that this sampling strategy has not resulted in the introduction of bias. Minimize, quantify, and understand bias(es) in estimates of abundance that impair extrapolation and statistical inference;
- provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g., mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g., 95% confidence intervals, credible intervals);

- preferably use stratified random sampling of habitat. Sample sites must be selected using a random procedure such as a GIS grid overlay;

- plan to include several sampling stations and several visits to each station to support all required assessment analyses. Inventories and analyses should be conducted by qualified experts; and
- consult recovery plans for which an inventory schedule would have been created to identify information gaps for these species, including for the designation of critical habitat;

The proponent should:

- submit complete data sets from all survey sites. These should be in the form of complete and quality-assured relational databases, with precise geo-referenced site information, precise observation/visit information, and with observations and measurements in un-summarized form;
- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation). The proponent should contact provincial or local government authorities to determine additional data sources and survey methods.

With respect to woodland caribou, the proponent should:

- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation);
- provide the best available information from the relevant jurisdiction concerning baseline range population size and trend;
- consult with experts of the relevant jurisdiction on appropriate survey methodologies for woodland caribou. Provide a justification for the selected methodologies as compared to other options;
- provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g., mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g., 95% confidence intervals, credible intervals);

With respect to Northern Myotis and Little Brown Myotis:

- include the following types of surveys:
  - acoustic surveys, ensure study design is statistically valid;
  - continuous acoustic monitoring throughout the night (as least sunset to sunrise; 30 minutes before sunset to 30 minutes after sunrise recommended) active season (spring dispersal/ migration, breeding summer/ fall migration and swarming), as well as appropriate hibernaculum surveys; and
  - locate and assess potential hibernacula and roosts for use by bats, accounting for inter-annual and within-season variability in use, including existing mine infrastructure;
- data or reports must include information on acoustic detection methods used, including the following:
  - detector make and model;
  - microphone model used;
  - location of detectors;
  - height of microphones;
  - orientation of microphones;

  - special housing that may affect microphone sensitivity (e.g. wind screen, cones, weatherproofing, etc.);
  - mounting method (e.g. meteorological tower, pole, etc.);
  - device specific settings (e.g. gain/ sensitivity, TBC, etc.);
  - recording mode (i.e. full spectrum or zero-crossing); and
  - a summary of any issues with equipment failure, and a description of procedures used to ensure equipment was operational during deployment (including ensuring microphone sensitivity remains within an acceptable range);
- clearly describe methods used to define a bat “pass” and be consistent with the definition used for any comparison group. Provide a rationale for the chosen method;
- clearly describe methods used for acoustic identification, including any validation procedures used, criteria used for deciding on species classifications, and software used (including versions and settings); and

  where results are compared across years, timing of surveys compared, equipment and setup protocols must remain consistent across years; and
- note that study design, analysis and acoustic data interpretation of results require the services of a bat expert.

Appendix 2 – Resources and Guidance

Atmospheric, acoustic and visual environment

Air Quality Management System (AQMS) and the Canadian Ambient Air Quality Standards (CAAQS). Canadian Council of Ministers of the Environment (CCME). Available at https://ccme.ca/en/current-activities/air

Convention on Long-range Transboundary Air Pollution. United Nations Economic Commission for Europe (UNECE). 1979. Available at https://unece.org/convention-and-its-achievements

Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks. Canadian Council of Ministers of the Environment (CCME). 1993. Available upon request to CCME.

ISO 12913-1:2014 Acoustics—Soundscape—Part 1: Definition and conceptual framework. International Organization for Standardization. 2014. Available at https://www.iso.org/cms/render/live/en/sites/isoorg/contents/data/standard/05/21/52161.html

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Birds, migratory birds and their habitat

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Nesting Calendar Query Tool. Birds Canada. Available at https://www.birdscanada.org/apps/rnest/index.jsp

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Fish and fish habitat

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Gender-based analysis Plus

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Greenhouse gases and climate change

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Indigenous participation and engagement

The Committee expects proponents to keep apprised of updated or new practitioner guidance or policies published on the Agency's website as may be the case over the course of a multi-year IA process. Best practices and current published guidance should be relied upon to the extent possible by proponents in developing their Impact Statement, and the following list of resources may be updated from time to time.

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