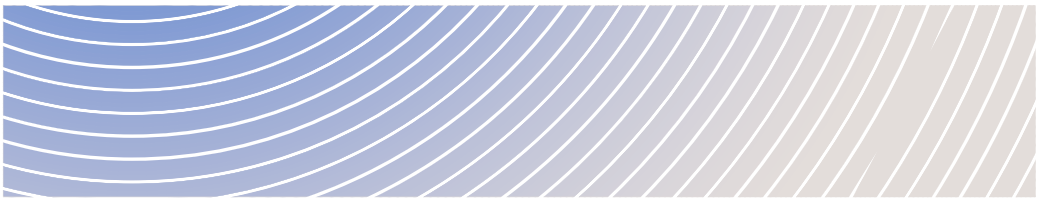
Tailored Impact Statement Guidelines



NOVADOR GOLD MINE PROJECT

AUGUST 13, 2024

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

Canada

Contents

Abbreviations and Short Forms

Term	Definition
AQMS	Air Quality Management System
BAT/BEP	Best Available Technologies / Best Environmental Practices
BCR	Bird Conservation Region
Boreal caribou	Woodland caribou, boreal population
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
Declaration	The United Nations Declaration on the Rights of Indigenous Peoples
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
GBA Plus	Gender Based Analysis Plus
GBV	Gender-based violence
the Guidelines	Tailored Impact Statement Guidelines
GIS	geographic information system
GHG	Greenhouse gas
HHRA	Human Health Risk Assessment
HIA	Health Impact Assessment
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
LEMV	Quebec's *Loi sur les espèces menacées ou vulnérables*
LSA	Local study area
MEND	Mine Environment Neutral Drainage program

NHWM	Natural High Water Mark
PA	Project area
PAH	Polycyclic aromatic hydrocarbons
Registry	Canadian Impact Assessment Registry
RSA	Regional study area
SARA	*Species at Risk Act*
SACC	Strategic Assessment of Climate Change
VC	Valued component
WHO	World Health Organization

1. Introduction

The federal impact assessment process is intended to prevent or mitigate significant adverse effects within federal jurisdiction — and significant direct or incidental adverse effects — by anticipating, identifying and assessing the potential effects of designated projects in order to inform decision making. The Impact Assessment Agency of Canada (IAAC) uses the proponent's impact statement and other information received during the impact assessment process to prepare an impact assessment report.

A key element for the impact assessment process is the preparation of Tailored Impact Statement Guidelines (the Guidelines), which provide the proponent with directions and requirements for the preparation of an Impact Statement. These Guidelines for the Novador Gold Mine Project (the project), proposed by Probe Gold Inc. (the proponent), were adapted by IAAC 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

Section 22 of the *Impact Assessment Act* (IAA) lists the factors to be taken into account in the impact assessment:

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 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 impact assessment that IAAC requires to be taken into account.

The scope of the factors 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 IAAC 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, the guidelines will refer to the Gender-based Analysis Plus (GBA 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, socio-economic status, state of health 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 Guidance Document: Guidance: Gender-based Analysis Plus in Impact Assessment and Tool - Assessing the Quality of a GBA Plus in the Impact Statement, provides 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 population group;

- 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 groups;
- describe the circumstances in which various population groups 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 [GBV], 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 population groups whose identities intersect and interact with various structural forms of exclusion (such as poverty, racism, colonialism, sexism, and ableism; e.g., analysis of GBV) 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 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 IAAC 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 IAAC 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.

IAAC 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 IAAC 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 plans, draft sections of the Impact Statement) before submitting the formal Impact Statement. Active engagement will support early identification and resolution of issues.

IAAC 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 IAAC 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 IAAC 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, IAAC may extend the time limit by any period that is necessary for the proponent to provide IAAC with the information or studies. If the proponent does not provide IAAC 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 study must be based on information that is publicly accessible, within the limitations of confidentiality and ethical constraints, such as in relation to Indigenous 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 provided as a map in the Impact Statement, the proponent must also provide IAAC with the corresponding electronic geospatial data file(s). IAAC will make the geospatial data files available to the public under the terms of the Open Government Licence – Canada. Geospatial data files must include metadata that is compliant with the ISO 19115 standard and, at a minimum, provide:

- 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; and

- confirmation that there are no restrictions or limitations on sharing the data.

The proponent should review IAAC'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 IAAC upon request. IAAC may require specific data sets to support the review of the Impact Statement or for the impact assessment.

The proponent should be prepared to provide the following:

- 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 modelling; 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 IAAC 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 subcontractors 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; and
- credibility or standing as a holder of Indigenous or community knowledge;

IAAC 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.

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 effects of the project. The following information must be included and, where appropriate, located on maps:

- 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 land use in terms of surface area and topography;
- surface areas, volume (if relevant), location and spacing of project components;
- location of any federal lands within the regional study area;
- the services and infrastructure 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);
    - sources of contaminants release into the environment, and known contaminated sites or sites undergoing restoration; and
    - local businesses and industries such as outfitters, and any other relevant uses;
- primary, secondary and tertiary regional watersheds;
- the bodies of water, the watercourses (permanent and intermittent) and the watersheds affected directly or indirectly and their location on a map, including flow direction;
- the description and location of the water supply sources;
- the navigable waters;
- land cover in the area; including important or critical habitats;

- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Land Classification[1];
- 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 sensitive or protected area;
- lands subject to conservation agreements;
- description of the local community and Indigenous groups;
- Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, Indian Reserve lands as defined in section 2(1) of the *Indian Act*, Indigenous harvesting regions (with permission of Indigenous groups);
- 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 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). Further guidance is provided in Section 3.4.4 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;

[1] Introduction to the Ecological Land Classification 2017 and Ecozones Introduction of the Canadian Council on Ecological Areas

- any relevant land use plans (including Indigenous lands), land zoning, or urban plans;
- information on land lease agreement or land tenure, when applicable; and
- municipal, regional, provincial and/or national objectives, standards, recommendations 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 effects and changes to health, social and economic conditions, and potential impacts on Indigenous peoples and their rights;
- describe project activities to be carried out during each project phase, with a focus on activities with the greatest potential to cause environmental effects, changes in health, social and economic conditions, or impacts on Indigenous people and their rights;
    - describe the location, affected areas (temporary and permanent), methods used, schedule (including expected start date, time of year, duration and frequency), magnitude and scale for each project activity; and
    - highlight activities that involve periods of increased disturbance to environmental, health, social and economic conditions or impacts on Indigenous peoples and the exercise of their rights;
- provide a summary of any change made to the project as 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 various 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 infrastructure, proponent lands, leased properties or lands, adjacent resource lease boundaries, adjacent land uses and any important environmental features. Maps should be produced at an appropriate scale in order to show both the project and environmental components (e.g., water drainage system and access roads between the mine site's components).

At a minimum, the Impact Statement must describe the following components and activities, as relevant:

Project components

- open pits and underground mining operations (footprint, location, development plans including pit and underground worksite development phases);
- crushing and processing facilities (footprint, process, technology, location);
- storage of waste rock, overburden, low-grade ore storage, and stockpiles (footprint, locations, volumes, development and management plans, and design criteria);
- mine waste management facilities (footprint, location, and preliminary design), including dams, and related pipelines (including those for tailings and sewage);
- storage and load out facilities for concentrate and or finished product (footprint, location);
- water management infrastructure, including:
    - surface runoff diversion structures and management systems, as well as sediment or erosion control structures and systems;
    - contact water, seepage water, mine water or process water management structures, including collector ditches, groundwater interception wells, retention or sedimentation ponds, sumps and pump and pipeline systems, as well as water recycling, and a description of their design features;
- site access roads or paths (temporary or permanent), as well as haul roads;
- crossings of waterbodies and watercourses (temporary or permanent), including bridges and culverts;
- canals and associated structures (temporary and permanent) for water diversions, particularly for the Colombière River and Tiblemont River;
- treatment facilities for potable water, sewage, wastewater and effluent (including proposed treatment technologies, footprints, location, discharge locations);
- fuelling stations for trucks / vehicles or energy supply sources (e.g., generators, windmills, solar, liquefied natural gas or propane tanks), including substations and electrical distribution lines on the project site (footprint, location);
- material storage facilities including chemicals, hazardous waste, as well as fuel storage tanks and explosives warehouses (footprint, location and stored quantities);
- construction workspace and laydown areas (footprint, location);
- temporary or permanent related infrastructure, including administration buildings, warehouse, garages, parking, construction trailers and maintenance offices (footprint, location);
- fences and barriers; and
- any other infrastructure relevant to the project, including their footprint, location, etc.

Project activities

Site preparation and construction

- site preparation, including 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 and disposal of waste and contaminated soil;
- management of excavated materials and tailings (surface area, deposition and storage), including potentially acidogenic or leachable materials;
- construction of temporary or permanent infrastructure;
- construction of temporary roads, haul roads, and the access road;
- construction of mine waste management infrastructure (e.g., waste rock piles, tailing facilities, ore or overburden piles, etc.);
- construction and installation of site fencing;
- blasting (location, frequency, duration, time of year, time of day and methods);
- explosives transportation, storage and management on the site;
- 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;
- dismantling of the bridge on the Colombière River;
- construction of crossings of waterbodies and watercourses (temporary or permanent);
- changes to existing infrastructure (e.g., modification of the existing access road), if required;
- exploitation on the site of borrow pits, transport and management of borrow materials (sources and quantity);
- diversions and realignments of water bodies and watercourses, including the construction of watercourse diversion channels, namely for the Colombière and Tiblemont rivers, and the management and storage of spoil from their excavation;
- management of surface runoff, as well as sediment or erosion control during construction;
- construction of facilities to manage surface runoff and site drainage;
- construction of facilities to manage contact water, seepage water, mine water or process water;
- 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;

- operation and maintenance of light duty, heavy-duty, and mobile off-road motor equipment (type, quantity);
- storage, management and the disposal of combustible materials and hazardous waste (indicate types, methods, and amounts); and
- management and disposal of non-hazardous waste.

Operation

- pit development phases;
- product production and stockpiling, product extraction, ore processing and treatment (including a diagram and description of the various stages of ore processing, including inputs and outputs);
- drilling and blasting (location, frequency, duration, time of year, time of day, and methods);
- explosives storage and use;
- use and maintenance of haul roads and the access road;
- mine waste management (including mine tailings, waste rock and overburden), 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;
    - 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;
- water management, including water diversions, site drainage and runoff management, sediment and erosion controls, site dewatering, potable water, process water, wastewater, water recycling and effluent treatment (quantity, treatment requirements, release point(s) and receiving waterbodies);
- storage, handling and transport of materials on the site;
- storage and handling of reagents, petroleum products, chemical products, hazardous materials and residual materials;
- management and recycling of other than mine waste (types of waste, methods of disposal, quantity, disposal sites or facilities); and
- storage, handling, and transportation of gold on the site.

Closure and restoration

- final site restoration, containing the preliminary outline of a suspension, closure, or restoration plan for any components associated with the project, including the transfer of ownership and control of the different project components;
- filling of ditches with water, as necessary, or reconnection to the natural drainage system;
- dismantling of wells;
- dismantling and removal of equipment and systems;
- demolition or disposition of buildings and ancillary structures;
- removal of surface contamination caused by facilities and equipment;
- long-term care, monitoring and maintaining the integrity of the site, including site drainage, water and effluent management, and any remaining structures;
- the purging and dismantling of oil equipment; and
- suspension or closure of temporary or permanent facilities.

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, timeline for when they will be created, as well as the approximate duration (months and years) for each phase of the project. Positions should be presented using the National Occupational Classification system;
- the region of origin of the projected workforce (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, certification and education levels required for the positions;
- anticipated hiring policies and programs;
- investment in workforce training;
- the projected working conditions and schedule for construction and operation (e.g., working hours, rotating shifts);
- the planned mobility modes of workers at the job sites (e.g., commuting by bus);
- housing and accommodation needs of the workforce for each phase 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, training to address GBV and harassment, and cultural training programs; and
- employee assistance programs and benefits programs.

In addition to the above, the Impact Statement must include GBA Plus to describe any potential differential effects for various population groups in communities potentially impacted by the Project. This must include a discussion of how hiring policies and programs, access to employment and training opportunities, investment in training, and workplace policies and programs take into consideration vulnerable or underrepresented population groups, including Indigenous peoples or other community-relevant population groups (e.g., women, youth, seniors). 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 groups.

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 IAAC 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 markets (e.g., international, domestic, local), where applicable. The *purpose of* the statement should include any objectives the proponent has in carrying out the project and the proponent is encouraged to consider the perspectives of participants (i.e., public, Indigenous groups, governments) in establishing objectives that relate to the project objectives.

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:

- information or data that demonstrates the economic, environmental or social need for the project, based in particular on local and regional economic development plans; and
- any comments or view of Indigenous peoples, the public and other participants on the proponent's need statement.

4.3. Alternatives to the Project

The Impact Statement must provide a description of the alternatives to the Project that are technically and economically feasible to meet the Project need and achieve the Project purpose, from the perspective of the

proponent. The process of identifying and considering alternatives to the Project must consider the views, information and knowledge from Indigenous communities potentially impacted by the Project and other participants, as well as existing studies and reports.

The Impact Statement must present a rationale for selecting the proposed project over other options, which includes how sustainability principles (described in section 14 Sustainability) were considered. The analysis of alternatives to the Project should serve to validate that the preferred alternative for the Project is a reasonable approach to meeting the need and purpose.

The Impact Statement must describe, at a minimum, the following alternatives to the Project:

- the no-action (null) alternative to serve as a benchmark for the assessment and comparison of the Project and any alternatives to a Project. The description should note the baseline conditions of the VCs associated with the Project, as well as changes to these baseline conditions that are likely to occur in the future if the Project was not carried out (e.g., changes as result of other projects already planned for the region, changes to the socio-economic conditions, future climate change).

4.4. Alternative means of carrying out the project

The Impact Statement must:

- identify and consider 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, 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 effects and changes to health, social and economic conditions, and their impacts on the Indigenous peoples and their rights as identified by Indigenous peoples.
- 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, including:
  - consideration of environmental effects, and changes to health, social and economic conditions, the impacts on the rights of Indigenous peoples, technical and economic feasibility, risk from accidents and malfunctions, and the use of best available technologies, and consideration of the sustainability principles;
  - potential effects to species at risk as per the *Species at Risk Act* (SARA), including any critical habitat, including a description of how avoidance of effects was considered and how it may be achieved through alternative means;

- application of GBA Plus to the analysis of alternative means of carrying out the project to inform how effects may vary for various population groups; 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's activities and design:

- the location and footprint of the project and its main components;
- timing options for the construction or development of certain components and phases of the project;
- on-site transportation for:
  - construction materials;
  - gold;
  - fuel;
  - employees;
  - other inputs;
- the route of the site access road;
- the energy sources to supply the project and other stationary sources to supply heat or steam;
- the water supply sources (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 such as:
  - the type of mining operation (open pit, underground mining or both), including the pit development phases;
  - the location and design of the ore processing facility (crushing, separation, concentration and dehydration);
  - the storage of ore (management methods, location, duration);
  - the location of the tailings, waste rock and overburden storage facilities, accounting for the surface and groundwater flow directions and the local water users;
  - the methods used for the treatment and storage of mine waste to increase its solids content, including the combination of different methods (e.g., thickened or filtered tailings, tailings storage facilities, dry pile facilities, co-deposition of tailings and waste rock, use as backfill for pits, reuse as underground fill, off-site storage, etc.), and the location of associated storage facilities based on their potential for contamination and the site's hydrological and hydrogeological characteristics;
  - the methods used for pits dewatering (to remove mine water), taking into account groundwater flow directions and the effects this dewatering may have on the environment (e.g., fish habitat, migratory bird habitat, etc.) or the human environment (e.g., drinking water quantity);
- the diversion of watercourses, including the Colombière River and the Tiblemont River, and the location of diversion structures, their design and construction methods;

- the location, construction and crossing methods for bodies of water, watercourses, wetlands and other obstructions;
- water-retaining structures, such as dams, dikes, berms and others;
- water and wastewater management, including:
    - 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 water drainage system, including ditches, pipes, ponds and pumping systems;
    - the effluent treatment and quality control technologies and techniques;
    - the management of sludge generated by wastewater treatment;
    - reuse of water;
- waste management, including household waste and hazardous waste; and
- options for the possible and temporary suspension of operations and plans for mine suspension, closure and site restoration.

This project may be subject to the *Metal and Diamond Mining Effluent Regulations* under the *Fisheries Act*, and may also require an amendment to Schedule 2 of the Metal and Diamond Mining Effluent Regulations. To support this amendment, the evaluation of the alternatives must be conducted in such a way to demonstrate that the chosen location is the most appropriate option for mine waste disposal as described in the Guidelines for the assessment of alternatives for mine waste disposal. With regard to the management of mining waste, whether potentially acid-generating and/or leachable or not, consider the possibility of operating mining pits in order to free up a pit for the management of mining waste (whether potentially acid-generating and/or leachable or not). This approach should also take into account the possibility of co-disposal of tailings and waste rock.

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 IAAC 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 population groups, and the organizations consulted;
- 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;
- a description of the efforts conducted to engage various population groups in order to support the collection of the necessary information to produce GBA Plus; and
- the various awareness measures that will be undertaken to effectively inform target groups about consultation opportunities.

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 potential environmental effects and changes to health, social and economic conditions, including the

disproportionate effects for various population groups 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 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 into the Impact Statement. 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 Indigenous peoples and their rights.

The proponent must collaborate with Indigenous groups in completing its Impact Statement. The proponent must also:

- work with communities to seek 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 IAAC;
- share project information frequently and transparently with Indigenous groups;
- 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 or funding 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[2] by the Crown in the *Indigenous Engagement and Partnership Plan*. 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 3.1 of the *Indigenous Engagement and Partnership 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, including Indigenous Knowledge.

IAAC 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 IAAC 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 IAAC's guidance documents on Indigenous participation and engagement throughout the Impact Statement, which are available on IAAC's website and are listed in Appendix 2 - Indigenous participation and engagement.

[2] 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 Agency 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[3] 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 should be brought together on equitable footing with scientific or technical information to inform the impact assessment including the environmental effects and changes to health, social, economic conditions, as well as the assessment of impacts on indigenous rights. 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. 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 Indigenous population group participating in the assessment, and provide contextual information about the members of an Indigenous population group (e.g., women, 2SLGBTQI+ people, men, seniors 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 impact assessment and provide a rationale. Where conclusions differ between Indigenous knowledge and other scientific or technical studies, the proponent must clearly present how both have been considered in the Impact Statement.

In accordance with the Indigenous peoples Principles of OCAP (Ownership, Control, Access, Possession) and section 31 of the Declaration, 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.

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

[3] 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.

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[4] 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 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 3.1 of the *Indigenous Engagement and Partnership Plan*, this community must also be involved, and the proponent is required to notify IAAC as soon as possible.

The record of engagement in the Impact Statement must include:

- the proponent's policy on Indigenous engagement, and the policies, local protocols, information-sharing agreements and statements of principle established in the collection of Indigenous 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. If only one engagement plan was developed by the proponent for engagement with all Indigenous groups, provide a rationale for this approach;
- a description of 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 groups 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;
- a description of how project information is frequently and transparently shared with Indigenous peoples;
- a description of the culturally adapted and 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, toponymy or provision of summaries in Indigenous languages);

[4] 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 Agency 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 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 efforts to engage diverse segments of each Indigenous community in culturally appropriate ways, including various population groups of Indigenous communities broken down by identity factors (e.g., age groups, sex, gender) and by other community-relevant factors (e.g., hunters, trappers and other harvesters) to support the collection of information needed to complete the 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.

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 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;
- describe the potential effects to physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, informed by the Indigenous groups involved in the assessment;
- describe the rights or interests of each Indigenous group, that the groups themselves have identified and consented to including in the Impact Statement, which may be impacted 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 federal lands include “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 the 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 rights, as well as assumptions and methodologies used for the analyses;
- integrate the perspectives of the various population groups, such as youth, women, Indigenous elders, two-spirited persons, persons with disabilities, and individuals identified according to other identity 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:
    - the construction, operational, closure and restoration plans;
    - the water management infrastructure on the site and the location of the effluent discharge points;
    - assessment of the alternatives to carry out the project (e.g., selection of the location of the effluent discharge points);

- developing the impact assessment including setting spatial and temporal boundaries, identifying and selecting VCs, location of sensitive receptors and collection of baseline information;
- validation of model assumptions used, where appropriate (e.g., the rate of consumption of traditional foods);
- characterization of potential environmental effects of the project and changes to health, social and economic conditions for each Indigenous group;
- cumulative effects assessment;
- measures to mitigate effects or to enhance or optimize potential project benefits, including the compensation plans listed in Appendix 1 – Compensation and offset Plans;
- characterization of the extent to which the adverse federal effects are significant;
- follow-up and monitoring activities, and adaptive management strategies, should the project be approved; and

- 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 life cycle 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;
- set out any proponent commitments for engaging affected Indigenous groups, where appropriate;
- describe how Indigenous groups will be involved in decision-making processes related to 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 provides input that may describe how environmental, health, social and economic conditions are interrelated.

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 and input were considered in determining 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 population groups and provide disaggregated data, as needed; and
- include a bibliography of all documents and information sources consulted.

Proponents are encouraged to consult with IAAC 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 consists of components that are of particular concern or value to participants and that 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 to 11, 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. Where relevant, the assessment methodology described in these Guidelines apply these components. The VCs will help to organize the description of the effects of the project required by the Guidelines.

The VCs included in the Impact Statement must include, at a minimum:

Valued Component	Rationale for inclusion
Valued Components for the assessment of adverse effects within federal jurisdiction, as defined under section 2 of the IAA	
Fish and Fish habitat	Project components and activities, such as watercourse diversions, watercourses flow reduction or lowering of the water levels (surface and groundwater), use of watercourses to deposit mining waste, discharge of effluents, water use and management, tailings management, and deposition of dust in water bodies or watercourses, could result in the death of fish and/or an alteration, disruption or destruction of their habitat.
Migratory birds	Project components and activities such as vegetation clearing, stripping, noise, lighting, changes to air quality and the potential release of deleterious substances into waters frequented by migratory birds, could have adverse effects on migratory birds and their habitats, including habitat loss and

	modification (disturbance and fragmentation), habitat avoidance, accidental mortality of individuals and disturbance during the breeding period.
Indigenous physical and cultural heritage, and structures, sites or things of significance	Project components and activities could result in habitat losses and modifications, and thus have adverse effects boreal caribou, a species of cultural and heritage importance for the Indigenous communities. Changes to surface and groundwater quality and quantity, as well as to wetland and riparian habitats, could affect the Harricana and Nottaway river watersheds which have spiritual significance. The project components and activities could uncover historical or archaeological remains.
Current use of lands and resources for traditional purposes by Indigenous Peoples	Project components and activities could alter habitats and landscapes, air quality, water quality and quantity (surface and groundwater), and thus have negative effects on the practice of traditional activities such as hunting, fishing, gathering, trapping and the current use of lands and resources (e.g., berries, wild rice, mushrooms, lake sturgeon, moose, small game and furbearer animals).
Health, social and economic conditions of Indigenous Peoples	Project components and activities are likely to affect the health (physical and psychological) and social conditions of Indigenous Peoples by causing changes to air quality, surface water quality, resources and to land in general. The project may have negative effects on the availability, accessibility and affordability of housing due to the influx of new workers into the region with high purchasing power (high salaries). The project may positively affect economic conditions through employment and business opportunities, as well as negative effects by negatively influencing the market for other sectors (e.g., community services).

The proponent may 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 multiple environmental, health, social, or economic components. Where identified, the proponent should structure the analysis and presentation of individual components into an assessment of the holistic 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.

The Impact Statement must:

- describe the VCs and provide a rationale for the selection of VCs in sufficient detail to allow IAAC 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;
- in the event that a VC is suggested by an Indigenous group but is excluded from the Impact Statement, provide a justification for its exclusion; and
- describe how community and Indigenous knowledge and the perspectives were considered in selecting VCs.

7.3. Spatial and temporal boundaries

The Impact Statement must establish appropriate spatial and temporal boundaries to describe the baseline conditions for each VC, and to guide the assessment. The spatial and temporal boundaries will vary depending on the VC and must be considered 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 socio-economic 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 (PA): defined as the project footprint including all temporary and permanent areas associated with the project, and alternatives considered;
- Local Study Area (LSA): defined as the area beyond the project footprint where project effects may extend; and
- Regional Study Area (RSA): defined as the larger area around the LSA (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;
  - 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, and for intergenerational knowledge transfer;
  - 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 RSA.

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 surface water and groundwater quality after mine 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. The overall effects

assessment methodology must also consider the project's potential impacts on 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 the community and Indigenous knowledge.

After considering the technically and economically feasible mitigation measures (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 residual effects of the project and those of past, existing and reasonably foreseeable projects or physical activities to be carried out, as described in section 7.6 Cumulative effect assessment.

Depending on the VC, the description of the effects can be either a qualitative or quantitative, taking into account any important contextual factors, as appropriate. The Impact Statement may 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 local 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 adverse effects within federal jurisdiction and the direct or incidental adverse effects, as defined in section 2 of the IAA;
- 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 IAAC 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;
- review and describe the interactions among the environmental effects, and changes to health, social and economic conditions and their 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 population groups and provide disaggregated data where necessary.

7.5. Mitigation and enhancement measures

The Impact Statement must identify mitigation measures that are technically and economically feasible and that would eliminate, reduce, control or offset adverse effects within federal jurisdiction, and direct or incidental adverse effects. The Guidelines, in Sections 8 to 11, provide additional requirements specific to mitigating environmental effects, and changes to health, social and economic conditions which may be considered for the development of mitigation measures of adverse effects within federal jurisdiction, or direct or incidental adverse effects. As such, for the purpose of these Guidelines, the term “mitigation” is used broadly to refer to any measure to eliminate, reduce, control or offset adverse 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 and enhancement 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, policies and undertakings that are part of the project design and that help avoid or mitigate the anticipated 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;
  - any new or innovative mitigation measures being proposed;
- identify and justify the use of pre-established environmental threshold levels that would trigger the application of additional mitigation measures;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on the various population groups, 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 population groups 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 environmental protection plans for the project and, if applicable, the environmental management system through which the proponent will deliver these plans. 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 subcontractors 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[5] 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 Plans) including:
  - identifying the expected outcomes and targets that the Adaptive Management Plan will address;
  - describing the uncertainties that the Adaptive Management Plan will address;

[5] Adaptive management plans should be developed in consultation with the Indigenous communities that might be impacted.

  - 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 closed, include planned activities to do so. Project components that may be closed 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.

7.6. Cumulative effects assessment

The proponent must assess the project's cumulative effects using the approach described in IAAC's guidance document: Policy Framework for Assessing Cumulative Effects under the *Impact Assessment Act*.

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 those 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 and justify the VCs that will be subject to a cumulative effects assessment, including;
  - all VCs for which residual effects from the project are anticipated;
  - VCs considered as being of particular concern in the context of cumulative effects by the public and Indigenous groups based on engagement activities;
  - VCs where the predicted residual effects might not indicate the need for a cumulative effects assessment, but which the importance of the effects relies 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;
  - spatial and temporal boundaries will generally be larger than the boundaries for the project effects alone. They should not be constrained by jurisdictional boundaries and may extend beyond Canada's jurisdiction;
  - temporal boundaries should account for potential effects throughout the life cycle of the project, including closure or restoration; 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 past, existing or future projects or activities 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:
  - mining activities or projects;
  - mineral exploration activities near the project;
  - hydroelectric developments and power transmission lines;

  - diversion of watercourses;
  - road projects, including the relocation of the Pascalis Road;
  - forestry operations;
- 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 different scales, 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 the 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, and must take into account the views and preferences of each Indigenous group in carrying out and presenting the assessment. 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 adverse federal effects are significant

For adverse effects within federal jurisdiction and direct or incidental adverse effects, the Impact Statement must:

- characterize adverse residual effects 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
  - uncertainty;
- the environmental, health, social and economic context within which likely effects may occur 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
  - the potential for disproportionate residual effects for various population groups, as per GBA Plus;
- characterize the extent to which the adverse residual effects within federal jurisdiction, and the residual direct or incidental adverse effects, are significant;
- characterize the extent to which the cumulative adverse effects within federal jurisdiction, and cumulative direct or incidental adverse effects, are significant;
- 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 were considered in characterizing the extent of significance;
- indicate, among the residual and cumulative adverse effects within federal jurisdiction and direct or incidental adverse effects, those that are likely to be, to some extent, significant;

- justify the methodology and choice of qualitative and quantitative criteria used to determine the extent to which the residual and cumulative effects are significant; and
- identify and explain relevant sources of information that were used to characterize the extent to which residual and cumulative effects are significant, including how the perspectives, concerns and tolerance levels of Indigenous groups and other participants were considered.

The information provided must be clear and sufficient to enable IAAC, Indigenous groups, and participants to evaluate the proponent's proposed characterization of the extent of significance of adverse residual effects within federal jurisdiction and of direct and incidental adverse effects.

The proponent should consult the 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.

The presence of rare or unique ecosystems, or important habitat (e.g., federal, provincial, or Indigenous protected areas and critical habitat 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.

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 information;
- provide summary data and references 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; 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;
- identify on geological maps the location of areas of bedrock outcrops that will require blasting;
- 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;
- provide a characterization of instabilities caused by historical mining 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:

- potential effects of the project in areas of geological instability caused by passed mining activities; and
- potential increase in the number of landslides, slope erosion, potential for ground and rock instability, and subsidence during the operation, restoration and closure phases of the project.

8.3. Geochemistry of mined or excavated materials

8.3.1. Baseline conditions

The Impact Statement must:

- provide a geochemical characterization of expected mined or excavated materials (and historical waste, if applicable). This should include waste rock, ore (including off-site), low-grade ore, pit wall materials, underground development ramps, process waste (i.e., tailings) overburden and potential construction

material (e.g., non-acid generating or non-leachable waste rock, quarries, and borrow pits of unconsolidated materials), as well as existing waste rock piles and tailings facilities.

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 and the MELCC's 2020 edition of the *Guide de caractérisation des résidus miniers et du minerai* are recommended as guidance documents 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, tailings, ore and overburden, including identification of potential parameters of concern. 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; and
- describe the quality assurance/quality control procedures. Provide laboratory certificates of analysis that include information related to analytical methodology and quality assurance/quality control.

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 or excavated 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:

- present chemical release rates from all 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 each phase of the project; and
  - mine waste disposal, management and mitigation methods and their effects on acid rock drainage and/or metal(loid) leaching potential;
- 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;
- assess different methods of disposing potentially acid-generating and/or metal(loid) leaching waste and non-acid-generating or non-leaching waste during the project's life cycle (e.g., co-disposal), including separated waste management, and include construction material or separated waste management, if applicable; and
- 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; and
- 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, soils and sediment

8.4.1. Baseline conditions

The Impact Statement must:

- describe the terrain, soils, and sediments within the LSA and RSA;
- describe and map landforms associated with important wildlife habitat features including eskers, cliffs, rock outcrops and talus;
- provide a description and location of any erosion-sensitive soils and areas of ground instability;

- provide maps depicting soil depth by horizon and soil order within the project area in order to support land recovery and rehabilitation activities, and to outline potential for soil erosion;
- describe the suitability of topsoil or overburden for use in the reclamation of disturbed areas, taking into account the results of the acid generation and metal(loid) leaching potential assessment of the overburden to be used;
- describe any known or suspected soil or sediment contamination 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.

8.4.2. Effects to Topography, soils and sediment

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

- 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; and
- the potential for soil quality change through the deposition of dust generated by project activities.

8.4.3. Mitigation and enhancement measures

The Impact Statement must describe mitigation measures to reduce effects on topography, soils, and sediments, including:

- consideration of the use of phytostabilization and native plants as mitigation measures to reduce contaminant mobility in soil; and
- the methods for managing contaminated soil based on its nature and rate of contamination, if applicable.

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 LSA and RSA, and identify existing emissions and contaminant sources. Include a description of the impact of forest fires on air quality by referring to the *Portrait statistique des feux de forêt of the Ministère des Ressources naturelles et des Forêts du Québec*;

- identify and indicate the characteristics of the atmospheric zone in which the project is located, particularly the threshold values of management levels based on the Air Quality Management System (AQMS);
- provide a list and quantitative description of contaminants from existing emission sources in the project's LSA and RSA. Locate these sources on a map;
- identify and locate on maps the project, the main current emission sources, as well as sensitive receptors, including communities, traditional territory users and areas used (e.g., gathering, hunting, trapping and fishing areas), cottages and temporary camps, flora and fauna;
- provide baseline ambient air concentrations for the following contaminants, in particular near key sensitive receptors:
    - total particulate matter (TPM);
    - particulate matter less than 2.5 microns ($PM_{2.5}$);
    - particulate matter less than 10 microns (PM_{10});
    - crystalline silica;
    - carbon monoxide (CO);
    - sulphur dioxide (SO_2);
    - nitrogen dioxide (NO_2) and nitrogen oxides (NOx);
    - ozone (O_3);
    - volatile organic compounds, 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;
    - metals;
    - specific aldehydes contained in the products of diesel fuel combustion (e.g., acetaldehydes, formaldehydes, 1,3-butadiene, acrolein, benzene, diesel particulate matter); and
    - any other relevant air pollutants from mobile, stationary, or fugitive sources;
- compare ambient air quality results with the 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;
    - the standards and objectives include the Canadian Ambient Air Quality Standards (CAAQS), National Ambient Air Quality Objectives (NAAQO) and relevant provincial standards. The proponent must refer to the new CAAQS established by the Canadian Council of Ministers of the Environment (CCME) for $PM_{2.5}$, O_3, SO_2 and NO_2 established in 2020 and will come into force in 2025;
- describe dust (particulate matter) and acid (acidifying pollutants) 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 used to establish the baseline ambient air quality, identify and describe all existing sources, including emissions from mobile, stationary or fugitive sources. The modelling must then be done with all relevant sources. The proponent will need to provide details of the approach they intend to take;
- provide current ambient noise levels at key sensitive receptors (e.g., communities, 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 of 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.);
    - 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 selected 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 - 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:

- provide a detailed description of emission sources (mobile, stationary and diffuse) of air pollutants from the project;
- 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 corresponding 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 evaluate the effects of emissions resulting from project-related sources:
  - provide appropriately scaled contour maps plotting the predicted emission concentrations and the location of the most sensitive human receptors (see Appendix 1 - Guidance for biophysical components for guidance on dispersion modelling);
  - locate all potential sensitive receptors on these maps;
  - 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;
- justify the choice of the atmospheric dispersion model used for air quality analysis, including model options used, emission sources considered, emissions and emission sources characteristics, and the complexity of the terrain and meteorology. If modelling is not considered necessary, justify the reasons;
- justify the effectiveness of the mitigation and control measures used in the atmospheric dispersion model 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 degree of uncertainty of the model, including:
  - uncertainty in the modelled air pollutant concentrations using relevant range of model inputs;
  - an evaluation of how uncertainty in modelled predictions may vary spatially and temporally;
  - uncertainty in baseline concentration estimates, in the estimates of meteorological inputs, and in the quantification of source emissions estimates;
- assess the relative contribution of project and non-project emission sources on pollutant concentrations at sensitive receptors. The source contribution analysis should be conducted for all pollutants that exceed 10% of the relevant guidance or standard value. 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 undertaken in the context of air sheds and air zones with the AQMS and based on the principles of "keeping clean areas clean" and continuous improvement;
- comparison with applicable thresholds (consider current, historical loadings, buffering capacity, including acid deposition critical loads);
- comparison 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 (fauna and flora) and consider effect 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, in particular:
  - 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 communities 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 night-time 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 sensitive receptors, including species at risk and areas favoured by Indigenous peoples for the practice of traditional activities; and
- describe any positive changes.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health effects in Impact Assessment: Noise and Guidance for Evaluating Human Health Effects in Impact 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 establish the need for follow-up monitoring for model validation or any concerns raised by participants;
- provide a description of existing and planned measures to reduce odours and dust;
- 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;
- 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;
- 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 towards 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/ultraviolet (UV) wavelengths.

8.6. Groundwater and surface water

8.6.1. Baseline conditions

The Impact Statement must:

- provide hydrometeorological (temperature, precipitation, evapotranspiration) and hydrological (e.g., river flows) 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-watersheds 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 [NHWM], 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 seasonal baseflow and low flow:
  - hydrographs may be based on data from gauging stations on the site or from nearby gauging 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 Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada;
  - in the cases of the Colombière River and Tiblemont River, provide and describe the baseline water levels at the NHWM and bankfull discharge, and flow velocities, and the average, low and high flows;

- provide stage hydrographs for lakes suspected to be affected directly or indirectly 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, directly or indirectly, provide a description of ice cover, thickness and conditions and the timing of freeze-thaw cycles;
- provide for each waterbody potentially affected directly or indirectly by the project, bathymetry, maximum and mean depths, waterbody 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 the identification of resurgences and 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;
- develop surface water balance for watersheds potentially affected by the project, detailing water intake and outflow to the new project environment as well as those planned for the site restoration;
- describe the surface water, ground water and sediment quality baseline characterization program, including sampling site selection and locations, sampling methodology, and analytical protocol, including quality assurance and quality control measures. The characterization should include sampling sites influenced by the former mines:
    - describe the incorporation of any applicable historical data or existing information;
    - characterization program should include sampling locations within the PA, LSA and RSA, 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 mines;
    - water sample collection and analysis should use appropriately sensitive detection limits and the data should illustrate the seasonal and inter-annual variability in baseline surface water quality with sufficient years of baseline data to fully characterize natural variability, including possible variabilities due to groundwater–surface water interactions;
- provide reference values for relevant physicochemical parameters and chemical constituents in relation to applicable water quality and sediment guidelines, criteria or recommendations;
- identify groundwater-producing strata (coarse-grained sediments and permeable bedrock) that may be affected by the project. Locate on maps domestic, communal, or municipal water wells within the LSA

of the project and its surroundings. Provide information on their depth, distance from the project, stratigraphy, screened hydrostratigraphic units, piezometric level and capacity;

- provide a summary of key groundwater monitoring wells within the RSA 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 LSA to support the assessment of groundwater effects with respect to fish and fish habitat. Information in the RSA 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;
- provide cross-sections (including stratigraphy, well depths and water table depths) where water will be pumped to dewater the pits, to ensure that eskers or wells (not owned by the proponent) are not affected. Information on the water table could come from pumping tests, either in situ or simulated in a numerical model;
- 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 watercourses, 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:

- describe the effects of the project on surface and ground water (quality and quantity), including related to:
  - project use of surface water or groundwater resources;
  - changes to water flow or diversion, including as a result of the diversion of the Colombière and Tiblemont rivers and the diversion of other watercourses, if applicable;
  - discharge of water, effluent, wastewater or other deleterious substances to the environment;
- quantify project effects on water bodies and watercourses, and on water 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 the effects of activities related to the manufacture or use of concrete, including those from the discharge of wash water from concrete mixers or concrete preparation equipment, if applicable;
- discuss changes to watersheds, including alignment and condition of water bodies, watercourses, and wetlands, whether permanent or temporary, including those created, destroyed, partially destroyed or altered by the project;
- describe and illustrate, at an appropriate scale on one or more topographic maps, the changes to water flow patterns based on the project phases that have a significant impact on water drainage (various stages of construction, operation, restoration and closure). Indicate the direction of water flow;

- 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 for all phases of the project, taking into account climate change (see 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., use in ore extraction process, water reserve for fire protection); and
    - the conditions under which this water is released into the receiving environment;
- determine temperature changes in surface waters due to groundwater-surface water interactions;
- determine and characterize current and projected water levels at the NHWM and bankfull discharge using a map, flow velocities and average, low water and flood flows in Colombière and Tiblemont rivers, as well as in water bodies or watercourses upstream and downstream that may be affected by the future diversions and other project effects;
- present a water balance and comprehensive site water management plans considering the entire mine site operations (also include a map) for the entire life cycle of the project, including the major phases of the construction phase. This should include all water inflows and outflows from the project site, but not be limited to:
    - the backfilling of water bodies and watercourses;
    - water diversion;
    - the accumulation of water in ponds;
    - watering of roads;
    - the concrete plant or water needed to clean concrete mixers, if applicable;
    - washing and other maintenance activities of equipment and vehicles;
    - process water;
    - stormwater, including flow direction;
    - water within the project site, including runoff, ditches and pipelines flow directions;
    - mine water;

  - pit flooding strategies including determining the watercourse to which the pit water will flow after filling and timing of the overflow;
  - any water input or loss at the site (evaporation and precipitation, including snow accumulation);
  - the use of water for domestic purposes and fire protection;
- present a 3-dimensional numerical groundwater flow model of the hydrogeological system that incorporates all major project features such as open pits, waste rock, overburden and ore 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 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), and 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 hydraulic 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 to surface water flows or water levels caused by groundwater drawdown, including water table levels;
- 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 the deposition of 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, recommendations, 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 runoff 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;
- describe locations at which potential changes to water or sediment quality will be assessed, including:
  - all point and diffuse sources of discharges;
  - the immediate receiving environment for any point or diffuse source of discharges from the project, including ditches during closure and post-closure;
  - at the 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;

- locations at the PA, LSA and RSA boundaries;

- 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.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Effects in Impact 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 potential 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, 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 avoid and reduce the adverse effects, including the supply and discharge of water, potential exchanges between watersheds and, where appropriate, consider the use of alternative water sources or the possibility of reusing water:
    - If the final details of the hydrostatic[6] tests have not been confirmed yet, specify the expected requirements, the options available and the criteria to apply to assure protection of water resources;

[6] 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 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 LSA and the RSA;
  - the proposed monitoring points to assess changes to groundwater quality, which should include well locations and depths;
  - 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 materials and 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; and
- 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 products 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

This section is intended to document the baseline conditions, the effects and the mitigation measures for vegetation, riparian and wetland environments used as a habitat by fish, migratory birds and species at risk, and by species of importance for traditional Indigenous practices or that that are culturally important for Indigenous communities.

Note that the specific requirements for vegetation species at risk are included in Section 8.11, Species at risk and their habitat, and will need to be considered in the Impact Statement.

8.7.1. Baseline conditions

The Impact Statement must:

- describe the general biodiversity[7], relative abundance and map the distribution of vegetation species and communities of importance in the study areas, including:
  - rare plant communities and communities of limited distribution;
  - old growth forests;
  - plant species or communities of importance for traditional Indigenous practices or that are culturally important to Indigenous peoples based on consultations held with and in cooperation with Indigenous communities;
- describe the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection;
- describe and map all invasive alien species;
- identify, quantify, describe and map riparian areas and wetlands (e.g., bogs, fens, marshes, swamps, and shallow water wetlands) potentially affected by the project, and provide their surface area and their abundance at local, regional and provincial scales;
- determine whether these riparian areas and wetlands are habitats of fish, migratory birds, species at risk or species of importance to Indigenous communities;
- describe the current level of both anthropogenic and natural disturbance (e.g., fire, flood, drought, insect infestations) associated with vegetation, riparian areas and wetlands, including a description of:
  - the level of habitat fragmentation and loss;
  - historical and current disturbance regimes and any activities that have resulted in changes to fire regimes;
- establish a LSA that considers the size of the watershed and the hydrologic connectivity of wetlands within or crossed by the project area; and
- establish a RSA of sufficient size to capture effects to wetlands within the larger drainage area and include wetlands located outside of the LSA that may be affected by hydrological changes as a result of cumulative effects.

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 identified in section 8.7.1. In particular, the Impact Statement must:

- describe all potential effects due to the project, for all project phases, to vegetation and to the riparian and wetland environments. For example, the impact statement must include the potential effects caused by:

[7] A description of biodiversity can include the species or communities found, abundance, density, species richness and evenness, species distribution within the study area.

- hydrological or water flow changes, either permanent or temporary, that could alter moisture regimes or drainage conditions, including the indirect effects of pit dewatering and watercourse deviation or any other indirect effects;
- the potential introduction of invasive alien species or due to the increase in the spread and prevalence of diseases or pests;
- project emissions that may result in contamination and acidification of surrounding soils and water bodies, if any;
- fragmentation, and changes to regional biodiversity;

- describe the key indicators used to assess project effects and the sensitivity of vegetation communities of importance, wetlands, and riparian environments to disturbance, including the rationale for their selection, and how they relate to the indicators used to characterize baseline conditions;
- quantify and map vegetation communities and riparian and wetland environments that may be cleared, stripped or otherwise disturbed and specify the type of disturbance and at what stage of the project it would occur.

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 ways of avoiding or reducing the temporary or permanent adverse effects on vegetation communities of importance, wetlands and riparian environments.

8.8. Fish and fish habitat

Note that the specific requirements for fish species at risk are included in Section 8.11, Species at risk and their habitat, and will need to be considered in the Impact Statement. The proponent should also consult the additional guidance for requirements pertaining to fish and fish habitat and species at risk 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 the 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 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: grain size, percentage of covering, presence of sediment, organic

materials) 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. Obstruction 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 (grain size, percentage of covering, presence of sediment, organic materials), 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 their life cycle based on inventories conducted in the field (standardized test fisheries) and available existing 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 survey method conducted should be presented in detail (e.g., description of gear and catch methods, location of sampling stations, date of surveys, captures and samplings, species targeted and surveyed, size and developmental stage, catch per unit effort). It is recommended that the information be compiled in a tabular format; and
- provide the location and total area of potential or confirmed habitat in or near the work area and describe use by fish species 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 temporal and spatial variability;
- for each water body or watercourse that is potentially affected, directly or indirectly, provide the fish habitat location and surface area directly or indirectly affected by the project that is under the NHWM. 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 conditions for the extent of fish habitat existing disturbances (e.g., fragmentation);
  - habitat use or suitability for fish and aquatic species present and the function of the habitat (e.g., spawning, nursery, growth, feeding, invertebrate population, migration, shelter area, thermal refuge and overwintering area) and sensitive times for these activities;

- identify and describe the data sources used, including information on data collection (e.g., location of sampling stations, date of catches and date of surveys). It is recommended that the information be presented in the form of tables;
- provide baseline measurements of contaminants in fish and aquatic species;
- identify and describe sensitive habitat areas (e.g., Ecologically and Biologically Sensitive Marine Areas) within the LSA and the RSA and include maps that demonstrate proximity of these areas to the project components; and
- identify, describe and locate on a map all aquatic invasive species (flora and fauna).

Certain intermittent and ephemeral watercourses or waterbodies, as well as certain wetlands (marshes, peat bogs, ponds, etc.), may constitute fish habitat or contribute indirectly to fish habitat during a certain period. 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 potentially affected by the project, directly or indirectly, the following must be documented and considered in the determination of effects:

- the consequences on fish habitat from the loss or altering of watercourses or water bodies during the construction and operation phases (diversion, dewatering, reduced supply of surface water, surface water pumping, water management on the site);
- geomorphological changes and their effects on hydrodynamic conditions and aquatic habitats (e.g., modification of substrates and aquatic vegetation, dynamic imbalance, long-term bank instability, silting of spawning grounds), including direct and indirect effects from habitat fragmentation;
- changes in hydrological and hydraulic conditions and their effects on aquatic habitat and life cycle activities (e.g., spawning, nursery, feeding, movement, migration, refuges, including winter or summer thermal refuges) and any changes to aquatic invertebrate communities, including, where appropriate, aquatic species at risk;
- changes in fish passage conditions (upstream or downstream movement) caused by the construction or operation of permanent or temporary structures, businesses or activities. This includes the installation of physical barriers that may restrict the free passage of fish, such as culverts or sills, as well as modifications to stream flows (e.g., effluent discharge, water interception) and their effects on the ability of fish to move through them (e.g., dewatering of stretches, creation of impassable falls, flow exceeding the fish's swimming capacity);

- 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 runoff and sediment transport;
- any alteration to accessibility or use of habitat;
- 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 natural or anthropogenic structures modulating flow and water levels (e.g., beaver dams), the effects 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); and
- 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:

- provide a summary of existing studies and research on the potential effects of noise and vibrations on aquatic species that are likely to be affected, including behavioural effects;
- describe any need for a *Fisheries Act* authorization or SARA licence and describe any review of Fisheries and Oceans Canada (DFO) guidance documents that will be considered;
- for the entire affected fish habitat, delineated by the water body or watercourse's NHWM, and where applicable, assess the fish mortality and anticipated habitat impact (both temporary and permanent) in terms of surface area, sensitivity of lost habitat (e.g., resilience of affected species, habitat rarity, habitat resilience, contribution to fisheries productivity, and species at risk) and significance (e.g., magnitude, intensity, and persistence). The effects on habitat (degradation, destruction and disturbance) must be clearly located, delimited and described. The delimitation must be based on the surface area, along with the habitat type, sensitivity and significance (e.g., magnitude, intensity and persistence) and the type of work or activity undertaken. It is recommended that the information be compiled in map form at appropriate scales, as well as in a table;
- include an examination of the correlation between construction periods and sensitive periods for fish (timing windows to conduct projects in or around water as established by DFO), 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 criteria or 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;
- describe 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 invasive aquatic species, including pathogens, through project activities;
- describe potential effects on fish behaviour including movement and spawning, distribution, abundance, and migration patterns; and
- describe tolerance thresholds for potential adverse effects identified by Indigenous communities and how they were considered in the assessment.

Additional guidance documents 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; and
- A Science-Based Framework for Assessing the Response of Fisheries Productivity to State of Species or Habitats.

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 watercourse crossings and riparian areas would be restored and maintained following construction of the project. Water

crossings must be restored and constructed in accordance with the Guidelines for Watercourse Crossings in Quebec (DFO, 2016) to ensure free passage of fish;

- measures to mitigate sensory disturbances from project components and activities, and the resulting functional loss of fish habitat;
- 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 in 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); and
- describe how environmental protection plans will address any applicable federal policies with respect to fish habitat.

The proponent must refer to DFO guidance and explain how it was applied to the assessment, including the references provided in Appendix 1 - Additional guidance under *Compensation and offset plans* and *Fish and fish habitat*.

8.9. Birds and their habitat

Birds covered under this section are either migratory birds as defined under the Migratory Birds Convention Act, 1994, or bird species of importance for traditional Indigenous practices or that have cultural significance based on consultations held with and in collaboration with Indigenous communities. Note that the specific requirements for bird species at risk are included in Section 8.11, Species at risk and their habitat, and will need to be considered in the Impact Statement. The proponent should also consult the additional guidance for requirements pertaining to birds and species at risk provided in Appendix 1 - Guidance for biophysical components.

8.9.1. Baseline conditions

The Impact Statement must:

- identify bird species or groups that may be affected differently by the project and may require particular 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;
    - waterbirds (other than waterfowl);
    - landbirds, including songbirds;
    - shorebirds;
    - birds of prey that have cultural significance for Indigenous communities (e.g., golden eagle, bald eagle); and
    - game birds that are important for traditional practices of Indigenous communities (e.g., grouse);
- identify any applicable Bird Conservation Regions (BCRs) and describe applicable BCR strategies;
- describe and map the general biodiversity[8] of bird species and their habitats that are found or are likely to be found in the LSA and RSA, based on available information from a literature review, supplemented by field data as necessary to build confidence in the assumptions. In particular, the literature review should be based on representative studies of habitats and current conditions. The representativeness of the studies should be explained and justified;
- establish biotic and abiotic parameters and indicators to be used to characterize baseline conditions for avifauna and discuss the rationale for their selection;
- identify and describe the species, communities, or groups of birds that use the LSA at any time of the year (e.g., winter, spring migration, breeding season, fall migration), based on data from existing sources or surveys, if required, and that are likely to be directly or indirectly affected by the project. It may be necessary to undertake surveys to get the current data needed for reliable estimates. For those species, describe:
    - abundance (including relative abundance in each habitat type) and population status;
    - distribution;
    - 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 study area (e.g., winter, spring migration, breeding season, fall migration), based on data from existing sources and / or surveys, if required. It may be necessary to undertake surveys to get the current data needed for reliable estimates;

[8] 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).

- identify and map areas of concentration of migratory birds, including sites used for, breeding, feeding, wintering, resting, staging and migrating;
- describe, quantify (including relative abundance) and map the different types of habitats (forests, wetlands, fields, meadows, etc.) present in the PA (including temporary and permanent infrastructure), the LSA and RSA, along with their characteristics associated with the presence and needs of bird species and groups that are likely to be affected by the project, based on the best available existing data (e.g., land cover types, vegetation, aquatic environments);
- identify and map sites that are likely to be important or sensitive habitats for birds, including protected areas;
- describe the source of the data, data collection methods, and provide a rationale for any modelling approaches chosen. See Appendix 1 - Guidance for Biophysical Components for more guidance on collecting baseline data; and
- where predictive modelling is used to portray baseline conditions and estimates of project effects, provide the explanatory data (e.g., covariates such as associated land cover). Explanatory data should be shown to be sufficient for representing 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 and their habitat

The Impact Statement must:

- describe the interaction between the project and birds and their habitat, for all phases, including from:
  - site preparation, vegetation removal, particularly of habitats important for nesting, foraging, overwintering or that act as migratory stops or movement corridors;
  - deposition 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;
  - changes to the atmospheric, acoustic, and visual environment (e.g., noise, vibration, lighting, air emissions and dust);
  - site restoration; and
  - any project activities that may occur during critical periods and/or restricted activity periods for birds;
- 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 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. Quantify losses in terms of relative habitat abundance in the PA, LSA and RSA;
  - changes to bird-habitat relationships; the change in biodiversity, abundance, and density of the avian community that utilize the various habitat types or ecosystems;
  - changes to mortality risk, including as a result of collision of birds with project infrastructure, 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, 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 their bioaccumulation, focusing on bird species consumed by indigenous communities;
- analyze the predicted effects for (1) migratory birds, (2) birds of importance for Indigenous communities, (3) each VC and (4) priority BCR species. Include separate analyses for each activity, component and project phase.

If a temporary or permanent relocation assumption is made during the project stages, support the assumption with scientific data demonstrating that there is available habitat in the LSA or RSA to allow for relocation of the birds 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 birds; and
- Migratory birds environmental assessment guideline.

8.9.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the measures to mitigate adverse effects to birds and their habitat, including their eggs and nests;

- describe the measures to prevent and/or mitigate the effects of harmful, destructive or disruptive activities during sensitive periods for birds (e.g., breeding bird season, migration and nesting), their nests and their eggs, or areas frequented by birds, or at sites used for a particular part of their life cycle (e.g., migration and nesting) or significant aggregation areas frequented by birds—such as avoiding lights at night during migration peaks or avoiding excessively loud noise, vibrations or blasting during the breeding season;
- demonstrate how the proponent considered the timing of activities most likely to disrupt birds and their nests, such as vegetation removal, to avoid the nesting period;
- describe measures to mitigate sensory disturbance and the functional habitat loss it may cause;
- describe measures for preventing the deposit or spill of harmful substances in areas frequented by 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 avoid harm to migratory birds and to the General nesting periods of 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 species covered in this section refer to terrestrial wildlife species that are important to traditional Indigenous practices or have cultural significance based on consultations held with and in collaboration with Indigenous communities (see sections 10.1 Indigenous physical and cultural heritage, and structures, sites or things of significance, and 10.2 Current use of lands and resources for traditional purposes). Note that the specific requirements for terrestrial wildlife species at risk are included in Section 8.11, Species at risk and their habitat, and will need to be considered in the Impact Statement. The proponent should also consult the additional guidance for requirements pertaining to wildlife and species at risk provided in Appendix 1 - Guidance for biophysical components.

8.10.1. Baseline conditions

The Impact Statement must:

- describe and map the general biodiversity [9] 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 existing information which could be supplemented by field data, as necessary;
- identify terrestrial wildlife species of importance to Indigenous communities (e.g., fur-bearing animals, small game, big game such as moose) and describe their habitat requirements, including during critical periods (e.g., reproduction, rutting, calving, migration, wintering);
- describe and map locations within the study area that might constitute important habitats or sensitive areas for terrestrial wildlife, including protected areas;
- 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 sources of the baseline data used and data collection methods, if applicable (see Appendix 1 - Guidance for Biophysical Components for more guidance on collecting baseline data); and
- describe how local and Indigenous knowledge was included.

8.10.2. Effects to terrestrial wildlife and their habitat

The Impact Statement must:

- describe the potential effects of the project on terrestrial wildlife species of importance to Indigenous communities and their habitat, including those arising from to the following:
  - site preparation, including vegetation removal, particularly of habitats important for breeding, overwintering or that act as movement corridors;
  - noise, light and other sensory disturbances;
  - deposition of harmful substances in waters or areas that are frequented by wildlife (e.g., contaminants, effluents, dust deposition);
  - increased access by hunters;
- describe potential effects on terrestrial wildlife species of importance to Indigenous communities and their habitats, including:
  - changes to habitats (e.g., fragmentation, modification, loss). If applicable, describe the replacement habitat available in the LSA and RSA for species that must relocate;
  - induced or increased disturbance caused by the project (e.g., sound, artificial light, presence of workers), taking into account sensitive wildlife periods such as breeding, migration and wintering;
  - effects on wildlife related to changes in air quality;

[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).

  - the bioaccumulation of contaminants in wildlife species;
  - the effects of the project on mortality risks and wildlife movement patterns;
  - effects on local and regional biodiversity;
- describe and assess the resilience and recovery capabilities of wildlife populations and habitats to disturbance, including following the mine closure;
- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous groups have identified; and
- describe how Indigenous groups were consulted to provide their knowledge about terrestrial wildlife species of importance. Indicate how concerns have been addressed, including any studies required to assess potential effects, and develop mitigation strategies if required.

The provincial government should be considered a source of information on appropriate methodologies to assess potential effects to terrestrial wildlife.

8.10.3. Mitigation and enhancement measures

The Impact Statement must describe the measures for mitigating potential effects on terrestrial wildlife of importance to Indigenous communities and their habitats, including:

- describe all technically and economically feasible measures to avoid or mitigate potential adverse effects to wildlife and their habitat;
- describe and explain the condition in which the temporary construction areas will be restored following construction, and explain the mitigation measures considered including possible revegetation, reduction of fragmentation and reduction of long-term cumulative effects;
- describe the deterrent systems that will be used to mitigate effects to wildlife due to, for example, the attractiveness of the project site and/or the components and activities associated with the project;
- 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 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; and
- describe mitigation measures applicable to wildlife habitat 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.

The Impact Statement must address tailored requirements for each species at risk listed on Schedule 1 of the federal SARA or recommended by COSEWIC to be listed on Schedule 1, if the species or its habitat are likely to be in the PA or study areas. Specifically, the Impact Statement must include, but not be limited to, each of the following species, and each of them must be considered as a valued component:

Mammals:

- Caribou, Boreal population (threatened);
- Silver-haired Bat (assessed by COSEWIC as endangered);
- Hoary Bat (assessed by COSEWIC as endangered);
- Northern Myotis (endangered);
- Red Bat (assessed by COSEWIC as endangered);
- Little Brown Myotis (endangered);
- Tri-colored Bat (endangered);

Birds:

- Hudsonian Godwit (assessed by COSEWIC as threatened);
- Buff-breasted Sandpiper (special concern);
- Eastern Whip-poor-will (threatened);
- Common Nighthawk (special concern);
- Bobolink (threatened);
- Wood Thrush (threatened);
- Evening Grosbeak (special concern);
- Short-eared Owl (special concern);
- Bank Swallow (threatened);
- Barn Swallow (threatened);
- Chimney Swift (threatened);
- Olive-sided Flycatcher (special concern);
- Canada Warbler (threatened);
- Lesser Yellowlegs (assessed by COSEWIC as threatened);
- Red-necked Phalarope (special concern);
- Eastern Wood-pewee (special concern);

- Rusty Blackbird (special concern);
- Yellow Rail (special concern);
- Eastern Meadowlark (threatened);

Fish:

- Lake sturgeon, Southern Hudson Bay – James Bay populations (special concern);

Reptiles:

- Wood Turtle (threatened);
- Midland and Eastern Painted Turtle (special concern);
- Snapping Turtle (special concern);

Insects:

- Monarch (endangered).

The Impact Statement must also address any species at risk that are added to Schedule 1 after these guidelines are published or recommended by COSEWIC to be added, if the species or their habitat are likely to be in the project area or study area. It is recommended to refer to the most recent COSEWIC annual report for the list of assessed wildlife species posted on its website.

8.11.1. Baseline conditions

For each species at risk identified in the list above, the Impact Statement must:

- justify how the studies used for baseline conditions are representative of current conditions;
- 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 (if applicable);
- provide maps 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, as well as the limits of the maximum project footprint (construction or operation) by identifying all temporary and permanent infrastructure;
- provide information on residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified or proposed Critical Habitat (where applicable);
- describe the general biological cycles for animal species (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, breeding, roosting, overwintering), setback distances, or other restrictions related to animal species at risk;
- 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, abundance and distribution of species at risk, including recovery strategies or action or management 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 were incorporated.

With respect to bats listed in Schedule 1 of the federal SARA or assessed by COSEWIC, the Impact Statement must also:

- provide information and mapping at an appropriate scale for any hibernacula and roosting habitat (maternity and male roosting sites) including the results of surveys undertaken as outlined in the guidance documents on bats listed in the Species at risk section of Appendix 2 – Resources and Guidance;
- describe relative abundance of roosting habitat in the PA, LSA, and RSA; and
- identify potential regional migration corridors, as well as travel corridors and movement patterns for each project site (Monique, Pascalis and Courvain).

With respect to woodland caribou, boreal population (boreal caribou[10]), and its habitat, the Impact Statement must also:

- include a map showing the proximity of the boundaries of the Val-d'Or boreal caribou range (QC1) in relation to the proposed project footprint;
- define the entire local Val-d'Or boreal caribou population as the RSA and assess baseline conditions and population-level effects;
- provide a qualitative summary of the most predictable changes to habitat conditions and population levels that would occur in the absence of the project over project timelines, taking into account forest management practices, forest succession, and other predictable changes;
- provide the best available information about present and historic uses of the study areas by boreal caribou (e.g., distribution, movement, timing), having consulted the Government of Quebec and ECCC,

[10] The boreal caribou is called the woodland caribou by the provincial government.

as necessary, and provide details on existing data used (e.g., source, timeliness, limitations, etc.), as well as survey methodologies;

- evaluate whether boreal caribou have potential to interact with the Project or be impacted by the project activities during sensitive periods associated with boreal caribou life stages, such as calving, overwintering, and any seasonal movements over project timelines;
- describe the type and spatial extent of biophysical attributes of the different types of habitat used by the boreal caribou to accomplish life processes and permanent and temporary alterations present in the PA and LSA, as defined in Appendix H of the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020;
- conduct field surveys to complement existing habitat data if necessary to understand where the biophysical attributes occur within the LSA;
- describe the current state of connectivity of boreal caribou habitat within the Val-d'Or range without the project, including the corridors between the different habitat types used by boreal caribou, and as determined appropriate through technical discussions with IAAC and federal expert advisors prior to submitting the Impact Statement, and the projection of boreal caribou habitat connectivity with the Project; and
- describe the current state of predator and/or alternate prey access into otherwise undisturbed areas within LSA.

The proponent should contact provincial or local government authorities to determine additional data sources and survey methods.

8.11.2. Effects to species at risk and their habitat

For each species at risk identified in the list above, the Impact Statement must:

- describe and quantify the potential effects of the project (scope, duration, scale, etc.) on each species, its habitat and, where applicable, its critical habitat (including its extent, availability and presence of biophysical attributes) while considering the objectives of recovery strategies, action plans and management plans. The analysis of potential and residual effects should be provided separately for each species at risk, including separate analyses for each activity, component and phase of the project;
- the cumulative effects assessment will also need to consider each of the species at risk or assessed by COSEWIC as separate VCs;
- 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, noise and artificial light on usage patterns and migratory behaviour of species at risk;
- describe any alteration to accessibility or use of habitat, including residence and critical habitat of aquatic species at risk; and

- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous groups have identified.

With respect to bats listed in Schedule 1 of the federal SARA or assessed by COSEWIC, the Impact Statement must also:

- provide the number of roosting sites (maternity and male roosting sites) in the PA, LSA and RSA, and estimate the number of these sites that would be lost; and
- describe the potential effects to hibernacula in the PA, LSA and RSA, including the percentage lost in each study area.

With respect to woodland caribou, boreal population, the Impact Statement must also:

- determine whether the Project will remove or alter any biophysical attributes necessary for boreal caribou, and provide an explanation for the conclusion;
- with respect to effects on existing habitat at the scale of the range:
    - include a map that shows the project components in the Val-d'Or range of the boreal caribou at an appropriate scale and any other potentially relevant characteristic for connectivity and use;
    - on the map, define a 500-metre buffer zone around all project components, including temporary ones;
    - include all habitats in the LSA that present the biophysical attributes of the various habitat types frequented by the boreal caribou to carry out their life processes (refer to Appendix H of the Caribou Recovery Strategy);
    - quantify the temporary and permanent loss of habitats in the LSA that present the biophysical attributes of the various habitat types used by the boreal caribou to carry out their life processes, including losses associated with the buffer zone;
    - provide a report (and a geographic information system [GIS] file if available) for each essential habitat type defined in Appendix H of the Recovery Strategy, of the existing habitat affected, by using the following formula: (project footprint + 500-metre buffer) - (temporary and permanent changes + 500-metre buffer) (see the glossary in the federal recovery strategy;
    - describe the project's consequences for the population and distribution objectives identified in the boreal caribou recovery strategy, which are as follows:
        - maintain the local population and bring the population up to a minimum of 100 individuals to mitigate the risk of near disappearance;
        - achieve and maintain the status of habitat in terms of area and types of undisturbed habitats to ensure that the local boreal caribou population is self-sustaining. This means reaching and maintaining a minimum of 65% undisturbed habitat and the availability of biophysical attributes necessary for the boreal caribou;
- evaluate effects to habitat quality and habitat connectivity at the local, regional and range scales using quantitative methods (e.g., habitat quality analysis);

- determine whether the project is likely to result in increased access to undisturbed areas by predators and/or prey and justify this conclusion;
- evaluate the effects on the status of the boreal caribou population 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 boreal caribou (e.g., sensory disturbance [e.g., noise, vibration, light], mortality [e.g., collision], pollution) and assess whether disturbance could lead to habitat avoidance;
- describe and map how the PA will provide for future boreal caribou habitat during the post-closure phase, including how much of the project footprint would be one again available for boreal caribou use, and approximately when the restored habitat is expected to age to preferred boreal caribou habitat; describe how reclaimed habitat may compare to baseline conditions; and
- describe any effects on the progress of boreal caribou recovery across the Val-d'Or caribou range in the short, medium, and long-term, including the project construction, operations, and closure phases.

The provincial government should be considered a source of information on appropriate methodologies to predict effects to wildlife species at risk.

8.11.3. Mitigation and enhancement measures

The Impact Statement must:

- describe proposed mitigation measures for potential adverse effects on species at risk, potential habitat and critical habitat if designated in a recovery strategy, 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;
- provide mitigation measures for effects on habitat, aligned with the hierarchy of mitigation measures and justify moving from one mitigation option to another; and
- design and implement a follow-up program in accordance with Section 15, Follow-up programs including but not limited to:
  - monitoring effects on species at risk (if present or if individuals become present) and their critical habitat;

- monitoring the efficacy of offsetting; and
- include methodology to allow for a quantitative assessment, a monitoring schedule, performance indicators, thresholds for adaptation, and contingency measures.

With respect to bats listed in Schedule 1 of the federal SARA or assessed by COSEWIC:

- 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 resting areas (including maternity colonies) and hibernacula (or areas likely to contain resting areas 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/ultraviolet (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 boreal caribou:

- describe all reasonable alternative means of carrying out the project that would avoid the adverse effects of the project on boreal caribou and its critical habitat;
- 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 boreal caribou and its critical habitat;
- describe and demonstrate that all feasible measures will be taken to minimize the adverse effects of the project on the boreal 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;
- avoid destruction of biophysical attributes (see Appendix H of the recovery strategy);
- 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 both increased predator access and increased predator density;
- design and implement measures to offset the effects on the boreal caribou and its habitat, as determined to be appropriate through technical discussions with IAAC and its expert federal advisors, before submitting the Impact Statement, and which considers the following elements:
  - the Operational Framework for Use of Conservation Allowances (Minister of the Environment, 2012);
  - a compensation ratio that reflects the risk that the project represents for the species and its essential habitat;
  - the timelines, probability of success and the manner in which the measure(s) offset the project's effects on the population and distribution objectives established in the amended Recovery Strategy for the woodland caribou (Rangifer tarandus caribou), boreal population, in Canada in 2020;

- report on how the project and mitigation measures are consistent with the Amended Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada.

8.12. Climate change

The proponent must follow the directions and guidance contained in the Strategic Assessment of Climate Change (SACC)[11] and the and the technical guides related to the SACC, developed by Environment and Climate Change Canada (ECCC). The requirements are summarized below, and the IAAC expects the proponent to keep apprised of updates to the SACC and related technical guides published by ECCC.

The Impact Statement must:

- assess the project's GHG emissions as described in section 5 of the SACC and section 2.1 of the Technical Guide;

[11] In accordance with the relevant version of the Strategic Assessment of Climate Change (SACC) and 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 at the time the Impact Statement is submitted to the Agency.

- provide a quantitative and qualitative description of the project's positive or negative effects on carbon sinks as described in section 5.1.2 of the SACC and section 4 of the Technical Guide; and
- provide an explanation of how the project may impact Canada's efforts to reduce GHG emissions, in Canada and globally, as described in section 5.1.3 of the SACC and in the Technical Guide.

8.12.1. Mitigations for climate change and greenhouse gas emissions

In terms of 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 net GHG 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.

If the proponent determines that there will be activities beyond 2050, the proponent must also provide a credible plan to achieve net-zero emissions that would be used for and form the basis of the BAT/BEP determination process, describing the mitigation measures that will be taken to minimize GHG emissions during all project phases and achieve net-zero emissions by 2050, as described in section 5.3 of the SACC. The plan to achieve net-zero emissions must follow the principles and include the required information that is described in sections 3.5.1 and 3.5.2 respectively of the Draft Technical Guide, or any final version of the Technical Guide that becomes available prior to submission of the Impact Statement.

9. Social and Economic Conditions

9.1. Social conditions

9.1.1. Baseline conditions

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

The Impact Statement must:

- identify the social area of influence of the Project (i.e., the populations that may be positively or negatively affected by the Project);
- provide the specific social conditions of local communities (e.g., community well-being, local and regional services and existing infrastructure in the study area, etc.) on a disaggregated basis;
- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline conditions;
- describe how community knowledge from relevant populations was used in establishing baseline conditions, including input from various population groups; and
- describe baseline conditions using disaggregated data for various potentially affected population groups (e.g., women, youth, and seniors, taking into account intersecting identity factors [intersectional approach]) and their different access to resources, opportunities and services within the community to support GBA Plus.

9.1.1.1. Housing

Related to housing in general, the Impact Statement must describe for local communities:

- affordability;
- availability (access);
- occupancy rate; and
- appropriateness.

9.1.1.2. Navigation

The Impact Statement must describe the baseline conditions for navigation in the study area, including:

- identify and describe existing navigable waters[12], and all their uses; and

[12] As defined in the Canadian Navigable Waters Act, navigable water means a body of water, including a canal or any other body of water created or altered as a result of the construction of any work, that is used or where there is a

- provide a list of potentially affected navigable water users and concerns regarding navigable water use and access.

9.1.2. Effects to social conditions

The Impact Statement must assess the positive and negative effects of the project on social conditions for potentially affected local communities.

Where applicable, the analysis must describe the extent to which the project's goals, relevant to the assessment, are aligned with local or regional land use plans, and community welfare and safety 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 guidance document: Analyzing Health, Social and Economic Effects under the *Impact Assessment Act*.

9.1.2.1. Effects to housing

Considering the origin of the workforce, the Impact Statement must:

- assess the potential positive and negative effects of changes to social conditions for local communities, related to housing, including:
  - affordability;
  - availability (access);
  - occupancy rate; and
  - appropriateness.

Apply GBA Plus to information related to well-being and document how potential effects of changes to community well-being could be different for various relevant population groups (e.g., women, youth, seniors), taking into account intersecting identity factors (intersectional approach).

9.1.2.2. Effects to navigation

Within the study area, the Impact Statement must:

- provide a list of navigable waters that may potentially be affected by the project and specify how they will be affected (dewatering of watercourse or water body, water-level changes, diversion, crossing, etc.);
- provide a list of related project components that will be constructed in, on, under, over, through or across navigable waters (e.g., temporary or permanent bridges), and specify the proposed crossing method;

reasonable likelihood that it will be used by vessels, in full or in part, for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by section 35 of the *Constitution Act, 1982*.

- identify potentially affected navigable water users and describe consultation with navigable water users regarding navigational use, issues raised and how issues were addressed; and
- describe project effects to navigation and navigation safety.

9.1.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for potential effects on the social conditions of local communities, including to:

- describe measures to mitigate changes to housing availability;
- describe the mitigation measures planned to limit the negative effects of the project on navigation and navigation safety; and
- describe how the GBA Plus findings on disproportionate effects have been used to inform mitigation and enhancement measures related to housing.

9.2. Economic conditions

9.2.1. Baseline conditions

With respect to the local and regional economic conditions and trends of local communities, the Impact Statement must:

- provide an overview of the main economic activities in the studied study areas, including information on the economically active actors of the local and regional population;
- provide an overview of the businesses that are likely to provide the goods and services needed for the project, which must note whether these suppliers are located outside of the study area;
- describe local and regional workforce, including:
    - the availability of skilled and unskilled workforce;
    - existing working conditions;
    - wages and average salary range;
    - full-time and part-time employment;
    - training; and
    - gender gaps (e.g., in wages and qualifications);
- provide current employment rates and information on economic well-being (income, savings, cost of living in the region, home ownership, low income, family status, etc.) in the study areas and impacted local communities;
- describe any local, provincial, or federal economic development plans for the study area;
- describe local and regional workforce development and training plans; and

- describe any use of lands and water bodies for economic activities on the project site, including recreational and commercial fishing and outdoor recreation).

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

9.2.2. Effects to economic conditions

The Impact Statement must describe potential positive and adverse effects on local, regional, and provincial economies. The economic impact assessment must consider opportunities to enhance benefits for 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 IAAC Guidance Document: *Analyzing Health, Social and Economic Effects under the Impact Assessment Act*.

The Impact Statement must, including:

- describe the potential changes in employment;
- present the total investment in the project, and for each stage, including a forecast of capital and operating costs, separating the amounts that would be invested locally, regionally and provincially, as well as out-of-province if applicable;
- 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);
- 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's implementation;
- describe the situations where the project may directly or indirectly create economic hardship or opportunities, or displace businesses to communities near the site;
- describe the potential effects of changes to economic conditions for specific sectors in affected local communities, including:
    - forestry and logging operations, including the recovery of wood cut during the construction phase;
    - fishing, hunting, and trapping;
    - commercial outfitters;
    - commercial recreation and tourism;
- describe the potential effects of changes to land and resources used in local economic activity, including;

- potential effects of the project on the availability, value and quality of commercial land and real estate;
- potential effects of the project on the quality and quantity of groundwater or surface water used for commercial purposes;
- a description of the indirect effects on the economy resulting from changes in land use;

- evaluate the net economic benefits to the economy as a whole, including:
  - a quantitative evaluation of effects on local, regional, provincial, territorial, federal government 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;
- provide information on the economic viability of the project, to support the net benefit 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.

The employment and economic effects assessment should apply the GBA Plus methodology to describe the circumstances under which various population groups (e.g., women, youth, immigrants, etc.) may experience effects that are more adverse or positive or receive fewer benefits from the project.

9.2.3. 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 9.2.2, 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;

- describe any actions, including plans, programs, and policies, to encourage contracting and procurement opportunities for local and regional businesses;
- describe measures that can be taken to mitigate local workforce shortages that the project may cause in certain sectors; and
- 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 IAAC 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. 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 peoples is also required to identify proposed measures to avoid, minimize, offset or otherwise accommodate for potential impacts on Indigenous peoples or 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 impacts on the quality of life of Indigenous peoples.

Engagement with Indigenous peoples must involve ongoing information sharing and collaboration to the extent possible to help validate the information and assessment findings in the Impact Statement. Where necessary and appropriate, the proponent must provide information in the language chosen by the Indigenous community. 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, unless they contain Indigenous knowledge communicated in confidence.

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+, seniors, and youth, with the possible intersections of gender and age).

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, current use of lands and resources for traditional purposes, health and well-being, 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 associated with the physical and cultural heritage and structures, sites, or things of significance for Indigenous peoples, including Indigenous people living in urban area. 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, including Indigenous people living in urban area, can include:

- spiritual sites, including rivers and watercourses (particularly the Harricana and Nottaway river watersheds);
- 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;
- sacred, ceremonial or culturally important places, plants, animals (in particular, boreal caribou), objects, beings or things;
- place names, language and other components that make up a culture;
- places with archaeological potential, archaeological sites or artefacts; and sites 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, if it has been shared by Indigenous peoples with the proponent and if the proponent has obtained permission from them. Provide the GIS files to the communities;
- 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 (in particular, boreal caribou that plays an important role in the culture and history of Indigenous peoples in Canada, as well as the Harricana and Nottaway river watersheds); and
- describe how input from potentially impacted Indigenous groups, as well as from Indigenous people living in urban area, 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:

- assess potential effects to physical and cultural heritage (e.g., effects on woodland caribou and the Harricana and Nottaway river watersheds), 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;
- 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 peoples and the Indigenous people living in urban area 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 things 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, including Indigenous people living in urban area, or other participants, if applicable.

The proponent should consult IAAC'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 by Indigenous communities including Indigenous people living in urban area. The proponent should refer to the Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012.

Where information is publicly available or provided by Indigenous communities, 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;
- location of reserves;
- resources important for traditional and cultural purposes, including the following:
    - berries and plant species (e.g., wild rice);
    - fish (including lake sturgeon and other large-bodied fish;
    - big game (e.g., moose and bear);
    - small game (e.g., geese, ducks, grouse, ruffed grouse, wolf, hare, etc.);
    - fur-bearing animals (e.g., beaver, mink, lynx);
    - waterways, waterbodies, wetlands; and

  - other resources identified by Indigenous communities;
- the traditional and cultural significance of resources identified above;
- the quality and quantity of identified resources (e.g., preferred species and perception of quality);
- the types of traditional practices, including for:
  - hunting, trapping, fishing, gathering, or harvesting practices;
  - rotational harvesting practices and how they vary in time (e.g., berry, tea and wild rice harvesting, bait harvesting and fishing, big-game hunting, and trapping of fur-bearing animals);
  - historic, current and potential future uses of riverbanks, shorelines, waterways and waterbodies navigable by Indigenous Peoples, such as for travel or recreation, including entry and exit/landing sites for watercraft;
  - social and ceremonial purposes, as well as gathering or teaching grounds;
  - traditional economic purposes (e.g., berries); and
  - other current uses by Indigenous communities;
- context for traditional practices, including:
  - the frequency, duration or timing of traditional practices;
  - access and travel routes for conducting traditional purposes (e.g., physical access to harvest specific species, culturally important harvesting locations, timing, seasonality, distance from the 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.); and
  - efforts by Indigenous communities to restore traditional practices;
- locations of resources and traditional practices (include a map, if possible):
  - places where each resource important for traditional and cultural purposes are located;
  - places where each traditional practice is undertaken including culturally important locations;
  - cabins, camp sites and staging areas, including those used for hunting, trapping and fishing;
  - gathering and teaching grounds for social or ceremonial purposes; and
  - for locations identified for traditional purposes; identify whether it is used as a permanent residence or as a seasonal/temporary location, and the number of people using each identified site or area;
- location of any Indigenous-led research or monitoring activities; and
- other current uses identified by Indigenous communities (e.g., mycosilviculture).

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

The Impact Statement must also outline methods used to collect information on traditional use of lands and resources by Indigenous communities including Indigenous people living in urban area, if it has been shared by Indigenous Peoples with the proponent and if the proponent has obtained permission from the Indigenous communities for the information to be shared publicly.

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

The impact statement must:

- 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 country foods (traditional foods[13]);
  - quality, quantity and distribution of resources available taken from nature (as identified in section 10.2.1);
  - 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 waterways (e.g., watercourses in the Harricana and Nottaway river watersheds) and water bodies (e.g., Bonnefond Lake);
  - 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 (e.g., Pascalis Road) and to the distribution and availability of harvested wildlife (e.g., wildlife avoidance);
  - economic burdens related to longer travel and time spent hunting, fishing, trapping and harvesting;
  - 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 odour, and any corollary wellness impacts as a result of these sensory changes;
- describe the risks to the safety of land users or the changes in land use that mining infrastructure may pose, 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;

[13] Traditional foods refers to all foods that do not come from commercial networks. They include all foods that are trapped, fished, hunted, harvested or grown for medicinal or subsistence purposes, or that have Indigenous cultural value (e.g., berries, mushrooms and medicinal plants).

- 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;
- describe the methods used to collect information on traditional use of lands and resources by Indigenous communities, including Indigenous people living in urban area;
- describe how the traditions, perspectives, values and knowledge of Indigenous communities (including Indigenous people living in urban area) 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 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 that affect traditional use over the life of the project, including the project's closure, restoration or abandonment; and
    - impacts to harvesting and traditional use that affects teaching and knowledge transfer between generations;
- 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;
- 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; and
- describe in detail how Indigenous peoples (including Indigenous people living in urban area) 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. Social, economic and health conditions 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 present health, social and economic conditions in a specific way, according to communities (including Indigenous people living in urban areas) and on a disaggregated basis.

The assessment of these effects to Indigenous peoples, including Indigenous people living in urban area, 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 various population groups in this community.

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.

10.3.1. Social conditions

10.3.1.1. Baseline conditions

The Impact Statement must describe the existing social conditions for potentially affected Indigenous communities, including Indigenous people living in urban area.

The Impact Statement must:

- identify the social area of influence of the Project (i.e., Indigenous populations that may be positively or negatively affected by the Project, including Indigenous people living in urban area);
- provide the specific social and economic conditions of each Indigenous community consulted, on a disaggregated basis;
- provide a comparison of data at the provincial, regional or national level to better interpret baseline conditions;
- describe how Indigenous knowledge was used in establishing baseline conditions, including input from various population groups; and
- describe baseline conditions using disaggregated data for potentially affected Indigenous communities (e.g., women, youth, and seniors, taking into account intersecting identity factors [intersectional approach]) and their different access to resources, opportunities and services within the community to support GBA Plus.

10.3.1.1.1. Community profile

The Impact Statement must describe the existing social conditions for each potentially affected Indigenous communities, including Indigenous population living in urban area.

For Indigenous communities, including Indigenous people living in urban area, the Impact Statement must describe:

- a demographic profile of each Indigenous community consulted (GBA Plus disaggregated data);
- a profile of the Well-Being Index (CWB) for each Indigenous community consulted using publicly available data on the Indigenous Services Canada site: The Community Well-Being Index;
- access, ownership and use of resources (e.g., land tenure, minerals, food, water, social infrastructure) by Indigenous communities;
- relevant historical community background; and
- applicable history with previous developers.

10.3.1.1.2. Services and infrastructure

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

- housing (e.g., affordability, availability, appropriateness); and
- daycare.

10.3.1.2. Effects to social conditions

The Impact Statement must assess the positive and negative effects of the project on social conditions for potentially affected Indigenous communities including Indigenous people living in urban area. 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 Indigenous communities, including Indigenous people living in urban area.

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.

10.3.1.2.1. Effects to community well-being

For Indigenous peoples including Indigenous people living in urban area, the Impact Statement must:

- assess potential positive and negative effects of changes to the social conditions. This includes, but is not limited to:
  - income inequity;
  - effects on school dropout rates;
  - changes that result from population increases (temporary or permanent) or increased cost of living due to the project, particularly in relation to accessibility (availability, affordability, vacancy rate) of housing and land, and basic goods and services;
  - changes to community well-being linked to anticipated work schedules for mine employees (e.g., employees' compressed schedules);
  - the main sectors of local economic activity; and
  - factors or indicators used for the analysis of determinants of health in section 10.3.1.1 Baseline Conditions;
- describe the expected interactions between the project's construction, operation, and closure workforce and Indigenous communities, including any differential and particular impact on women and girls, including these effects in the context of the National Inquiry into Missing and Murdered Indigenous Women and Girls;
- 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 the risks associated with disruption of community, family, and household cohesion, use of women's shelters, increased alcohol and substance abuse, and increased illegal or potentially disruptive activities;
- document and take into account tolerance thresholds for potential adverse effects identified by 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 well-being and document how potential effects of changes to community well-being could be different for various relevant Indigenous population groups (e.g., women, youth, seniors) taking into account intersecting identity factors (intersectional approach).

10.3.1.2.2. Effects to services and infrastructure

At the Indigenous community level including Indigenous people living in urban area, the Impact Statement must:

- describe the predicted effects to the local and regional infrastructure facilities and services in the study area as they relate to social conditions, including adverse and positive effects to:
  - housing (e.g., affordability, availability, appropriateness); and
  - daycare.

10.3.1.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on the social conditions of Indigenous communities including Indigenous people living in urban area and local communities, including to:

- describe measures to mitigate changes to housing and daycare centre availability;
- describe the mitigation measures planned to limit adverse effects related to employee work schedules;
- describe the programs or policies that will be implemented in the workplace to prevent violence and harassment against Indigenous people, including GBV;
- describe any mitigation measures to prevent school dropout related to the high wages and labour shortage in the mining industry;
- identify opportunities to enhance positive impacts, such as infrastructure improvements, including local municipal or Indigenous community infrastructure, and investment in community causes and projects; and
- take into account local and regional land use and development plans. Consider safety plans and Indigenous people's well-being where applicable mitigation or enhancement measures are proposed.

10.3.2. Economic conditions

10.3.2.1. Baseline conditions

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;
- an overview of the Indigenous businesses that are likely to provide the goods and services needed for the project;
- current and historical employment and unemployment rates for Indigenous communities including the Indigenous people living in urban area, including primary employment, compared to provincial and national rates, and provide information on economic well-being (income, savings, regional cost of living, home ownership, low income, family situation, etc.) in the study areas;
- current use of lands and water bodies for economic activities in the study area;
- the extent to which the local Indigenous workforce can supply workers, including the number of local and regional Indigenous residents with the required skills and availability, or who can be trained quickly;
- an overview of the local Indigenous populations interested in working in this sector, and in which of the project's subsectors;
- workforce development and training plans for Indigenous peoples, including those living in urban areas;

- barriers to employment and/or labour market participation for local Indigenous populations and communities; and
- 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 Indigenous population groups (e.g., women, youth, seniors, Indigenous status, etc.) and their differential access to resources, opportunities, and services within communities to support GBA Plus.

10.3.2.2. Effects to economic conditions

The Impact Statement must describe potential positive and adverse effects on Indigenous People economy. The economic impact assessment must consider opportunities to enhance benefits for Indigenous communities including Indigenous people living in urban area. 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 IAAC Guidance Document: *Analyzing Health, Social and Economic Effects under the Impact Assessment Act*.

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 or medicinal plants may have consequences for the practice of traditional activities, and could lead to an effect on food security at the community level or on vulnerable population groups.

10.3.2.2.1. Employment

The Impact Statement must:

- describe the potential changes in employment for Indigenous communities (including Indigenous people living in urban area) including the following aspects:
  - the potential effects on employment for Indigenous community members;
  - if applicable, the measures that will be taken to increase the employment of Indigenous peoples including Indigenous people living in urban area, including training programs and measures to address violence and discrimination; and
  - the project's anti-discrimination measures, diversity and inclusion workforce plans, policies and practices;
- describe the potential changes in training including:
  - training programs and initiatives to improve employment opportunities for Indigenous peoples, including Indigenous people living in urban area, women and youth, and other population groups;
- apply GBA Plus to all employment effects and document how potential effects or changes to employment conditions might differ for various population groups.

10.3.2.2.2. Business environment and local economy

The Impact Statement must:

- describe any economic benefits agreement planned or concluded with Indigenous communities (details not necessary);
- provide an estimate of the anticipated levels of economic participation for Indigenous communities in the project in comparison to the total project requirements (e.g., total dollar value of contracts);
- describe the overall effects of the project on the economy of Indigenous communities;
- describe the situations where the project may directly or indirectly create economic hardship or opportunities, or displace businesses to Indigenous communities near the site;
- 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 impacts on the economic conditions of Indigenous communities as a result of environmental changes, for activities such as mycosilviculture, marketing of berries and any other economic activity mentioned by Indigenous communities in the project's sector; and
- 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 (e.g., women, youth, immigrants, etc.) may experience effects that are more adverse or receive fewer benefits from the project.

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

10.3.2.3. 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, including:

- identify opportunities to enhance positive impacts, such as local job creation and employment of staff for Indigenous communities, including the Indigenous people living in urban area, including:
  - Indigenous hiring strategies or policies;
  - measures that can be taken to increase access to education and training opportunities for various Indigenous population groups, especially for specialized jobs (technology, science, environment);
  - measures to increase hiring and retention of the Indigenous 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;

- 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. Specify the types of employment targeted by these programs, as well as the targeted clientele, such as various relevant Indigenous population groups (e.g., Indigenous women);
- all cultural awareness training plans for non-Indigenous employees to promote a safe and respectful work environment that fosters the well-being of Indigenous contractors and employees (e.g., language classes, a traditional camp at the project site, cultural activities, workshops);

- describe any actions, including plans, programs, and policies, to encourage contracting and procurement opportunities for businesses owned by Indigenous peoples, including:
  - describe any procurement policies that promote opportunities for Indigenous businesses;
  - describe technology transfer and research and development programs that will facilitate the use of Indigenous suppliers of goods and services and Indigenous employees, and that will develop new capabilities related to project requirements;
- describe and justify the need for compensation plans to mitigate potential economic effects; and
- describe how the GBA Plus findings on disproportionate effects have been used to inform mitigation and enhancement measures.

10.3.3. Health conditions

10.3.3.1. 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. Description of health determinants can be found in the references provided in Appendix 2 - Human health.

The Impact Statement must:

- identify the social area of influence of the Project (i.e., the Indigenous populations who may be positively or negatively affected by the Project, including Indigenous people living in urban area);
- be sufficient to provide a comprehensive understanding of the state of human health of affected Indigenous communities and Indigenous people living in urban area;
- provide information that is sufficiently detailed to describe the interconnections by which the project's influence on the determinants of health may affect health risks;

- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline health conditions of affected Indigenous communities and Indigenous people living in urban area;
- describe how Indigenous knowledge was used to establish baseline health conditions, including observations from various population groups; and
- describe baseline conditions and existing health inequities for consulted Indigenous communities using disaggregated data for various population groups (e.g., women, youth, and seniors, including Indigenous people living in urban area, taking into account intersecting identity factors [intersectional approach]), 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 the Indigenous communities consulted, including Indigenous people living in urban areas, the Impact Statement must:

- establish community health profiles that reflect the overall health of each Indigenous community and Indigenous people living in urban areas, where information is available. These profiles must focus on current community vulnerabilities and resilience, including:
  - health outcomes of interests (i.e., current health status), such as chronic diseases (e.g., diabetes, heart disease, cancer), communicable diseases (e.g., rates of sexually transmitted infections), mental health conditions, GBV, rates of alcoholism and drug addiction and suicide rate;
  - health factors of interest, such as biological risk factors (e.g., overweight\obesity, hypertension), and health-related behaviours (e.g., food consumption, physical activity, use of alcohol and drugs) and mental well-being;
  - where known, use secondary information sources (e.g., Public Health Agency of Canada, Statistics Canada, provincial and /or local health authorities);
- describe any context-specific definitions of health and physical, mental and social well-being, including from the perspective of each Indigenous community consulted and of Indigenous people living in urban areas; and
- describe the relevant history or context of the Indigenous communities consulted and Indigenous people living in urban areas, including historical impacts on health.

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

- present conceptual effect pathway models (i.e., overarching links) for guiding the collection of additional baseline information, where applicable, by:
  - specifying project-related social determinants of health of interest or concern (as reflected by rightsholder and stakeholder input), along with their respective indicators; and
  - illustrating their interconnections among project components\ activities, the social determinants of health, and health factors (i.e., mental well-being, health-related behaviours, and\or health equity considerations), along health effect pathways;
- 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 sections 10.3.1 Social conditions and 10.3.2 Economic conditions;

- document and describe the relevant protection factors specific to each Indigenous community and to Indigenous people living in urban areas 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, country 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;
- describe the existing infrastructure and available health and social services (including related programs), and safety services (i.e., fire protection, police protection and emergency medical services), as well as the level of provider capacity for these services;
- describe access to traditional foods, and their consumption, by Indigenous peoples (including Indigenous people living in urban area) 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 concentrations of contaminants in drinking water, and tissues of traditional foods used and consumed by Indigenous communities. The proponent should work with local Indigenous communities to identify species for which tissue samples should be collected, as applicable;
- describe the level of food security and food sovereignty within Indigenous communities (including Indigenous people living in urban area). 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;
- 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; and
- describe baseline conditions using disaggregated data for various Indigenous population groups potentially affected (e.g., women, youth, and seniors), including Indigenous people living in urban areas.

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 effects 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.

10.3.3.2. Effects to Indigenous health

The proponent must assess the potential effects of the project on human health. Interconnections between human health and other components and interactions between effects must be described. Applying a determinants of health approach in the assessment of human health effects will support the identification of these linkages as well as of disproportionate effects across various population groups.

A Health Impact Assessment (HIA), supported by a Human Health Risk Assessment (HHRA[14]), should demonstrate an understanding of the project's health, social, and economic impacts, including on Indigenous communities and Indigenous people living in urban areas, and will contribute to understanding the project's impacts on rights and culture. The proponent should refer to 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 HIA in Appendix 2 – Human Health. A rationale must be provided if the sponsor indicates that the use of a HIA 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:

- apply a HIA approach, including consideration of the biophysical, social, and economic determinants of health;
- describe any potential health effects of the project resulting from changes on biophysical and social determinants of health for Indigenous communities and Indigenous people living in urban areas;
- consider and 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 various Indigenous population groups.

10.3.3.2.1. Biophysical determinants of health

A HIA must be supported by a HHRA. The Impact Statement must:

- provide an assessment of the potential positive and negative effects on Indigenous communities' health including Indigenous people living in urban areas in consideration of, but not limited to, potential changes in:
  - air quality, as recommended in Health Canada's guidance document, Guidance for Evaluating Human Health Effects in Impact 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;

[14] 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, closure and post-closure, as the case may be).

  - 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 Effects in Impact Assessment: Noise;
  - light levels;
  - current and future accessibility, availability and quality of food taken from the wild (in particular traditional food); 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;
- describe how the contaminants (e.g., arsenic, cadmium, lead, mercury) related to the project, and that can potentially end up in the water, air or soil, can be absorbed in country 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[15]) or exposure route that would be excluded and/or eliminated from the HHRA;
- conduct a problem formulation exercise or preliminary conceptual model predictions to determine whether a more detailed HHRA is required. The proponent must provide a rationale if the problem formulation or preliminary conceptual model predictions indicate that a more detailed HHRA is not warranted;
- 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 Health Canada's Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment);

[15] COPC: Any chemical substance for which the concentration in the environment is likely to be high due to the project's activities may first be considered as a COPC. However, if it is established that the sum of the modelled concentrations and the background concentrations is below the guidelines, standards or criteria — based on health protection — for the affected area, the statement of the problem stage of the risk assessment may conclude that it is unnecessary to treat this chemical substance as a COPC in a quantitative risk assessment.

- 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 where concerns were raised by Indigenous communities (including Indigenous people living in urban area) regarding human health effects, provide a description of these 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 Indigenous communities, including Indigenous people living in urban area;
    - identify possibilities of avoidance of certain country food sources or drinking or recreational water sources due to the perception of contamination; and
- describe any project-related changes that could result in a positive health effect (e.g., remediation projects).

10.3.3.2.2. Social determinants of health

With respect to the social determinants of health of Indigenous communities and Indigenous people living in urban area, the Impact Statement must:

- describe the potential positive and adverse health effects arising from project-related interactions among the relevant social, cultural, psychosocial[16] and economic factors along effect pathways;
- describe Indigenous peoples potential avoidance of the project's areas of disturbance, or any potential effects on their relationship with the land, air, and water, due to real or perceived effects to environmental quality (e.g., contaminants) and tranquility;
- use secondary information and indigenous input to describe potential project-related effects on psychosocial factors linked to the mental well-being of Indigenous peoples living in communities (e.g., reserves) or urban areas, with implications for physical well-being, including but not limited to:
    - factors that confer Indigenous community resilience pertaining to the land and water, along with their resources; cultural continuity; and self-determination;
    - concerns regarding the risk of traffic-related injuries during the construction phase, and the risk of accidents or malfunctions related to project operations, as well as disturbances of normal daily activities;
    - concerns regarding perceived risks of environmental exposures; and
    - concerns regarding community cohesion during the construction phase and\or the operation phase;
- use secondary information and Indigenous input to describe potential project-related effects on socio-economic factors as a result of an influx of money and\or in-migrant workers (and possibly their families), where applicable, affecting the physical and mental well-being of Indigenous peoples living in communities (e.g., reserves) or urban areas, including but not limited to:
    - house availability and affordability;
    - increased average income, which may result in a rise in the cost of living and worsened wage inequality;
    - local drug and sex trades;
    - access to health, social, and public safety services, including the increased use of these services in the relevant communities and the region; and
    - the availability, accessibility, utilization (quality and use) and stability pillars of food security, including country (or traditional) food considerations within the broader perspective;
- describe any positive health effects on Indigenous communities and Indigenous people living in urban area (e.g., resulting from improved economic opportunities, training and increased access to services);
- describe the effects that transient workers may have on community safety, including that of the Indigenous women and girls, and any contributing factors to these effects;
- describe the potential effects associated with the context of natural resources extraction projects in terms of an increased risk of sexually transmitted infections, as a proxy indicator of possible increases

[16] Psychosocial factors represent the psychosocial dimension of social (including cultural) and economic conditions directly linked to mental well-being, underlying physical well-being. They also refer to perception of environmental health risks and nuisances within the human environment, which may contribute to the community's stress burden.

in sexual exploitation or sexual assaults, and in terms of gender-based violence GBV (e.g., harassment or human trafficking), based on the "What is Gender-Based Violence" information page; and

- describe the effects that challenging working conditions and other contributing factors may have on the mental well-being of Indigenous project workers, their coping abilities, and their family life, as well as any additional health effects on these workers and family members;
    - give a particular consideration to rotational shift work, exposures to workplace violence and\or harassment, and social isolation.

The proponent should refer to the human health guidance referenced in Appendix 2.

10.3.3.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the proposed mitigation and enhancement measures for any potential effects on human health of Indigenous communities and Indigenous people living in urban area, in particular:
    - any measures that could reduce negative effects or enhance positive effects on Indigenous project workers' state of mental well-being and help cultivate personal resilience, such as shuttle services for safe and restful commuting, and life skills training (e.g., financial management and coping strategies);
    - additional measures for substance use prevention in and outside the workplace, including stress management training and health education to encourage healthy eating, which also promotes mental well-being;
    - mitigation measures to help stabilize the effects of boom-and-bust cycles so as to improve community adaptation after the project is completed; and
    - mitigation measures to support the health, safety and security of individuals, including permanent measures to prevent GBV;
- describe a plan for medical and health services, including social services, in anticipation of increased demands for services from project workers (e.g., services provided to workers by the proponent to alleviate the additional burden on existing public services;
- describe the communications plans for sharing the results of monitoring studies regarding relevant environmental contaminants and the quality of traditional foods harvested in the project area by Indigenous populations;
- if the level of emissions from the project or effluent discharge is below or at the applicable regulatory limits, identify if additional mitigation measures should 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 health of Indigenous communities (including Indigenous people living in urban area);
- when potential effects on health of Indigenous communities (including Indigenous people living in urban area) 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;

- if it is demonstrated that country foods are not contaminated by project activities, describe mitigation measures to minimize avoidance of consumption of country foods harvested in the project area by Indigenous peoples. Consider the interdependence between the components involved (e.g., fish, Indigenous health, etc.);
- identify mitigation and enhancement measures presented in other sections that are also applicable to health and well-being effects for the consulted Indigenous communities and Indigenous people living in urban area;
- the Impact Assessment must describe:
    - mitigation measures to avoid health effects on Indigenous communities in permanent residences and seasonal cottages near the project;
    - any measures to mitigate the effects on human health due to the discharge of effluent or any other watercourse or water body supplying the water intakes used by Indigenous communities (including the Indigenous people living in urban area);
    - mitigation measures for human health effects resulting from project-related changes that affect residential and seasonal use properties (hunting camps, cottages) of Indigenous communities (including the Indigenous people living in urban area); and
    - describe how the GBA Plus findings on disproportionate effects have been used to inform mitigation and enhancement measures.

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.

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 groups 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 IAAC. Indigenous groups 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:

- the quality and quantity of resources required to support exercise of rights (e.g., preferred species);
- access to the resources required to exercise rights (e.g., physical access to culturally important places, timing, seasonality, distance from the 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, roles of members within an Indigenous group (e.g., women, men, 2SLGBTQI+ individuals, seniors, youth, with the possible intersections of gender and age) in the exercise of rights;
- 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);
- any 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 IAAC 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 each Indigenous groups regarding the analysis of potential impacts of the project on the exercise of rights. It is also possible to adopt Indigenous-led assessment of impacts on rights, and to include them directly in the Impact Statement.

It is preferable that Indigenous groups have all the information about the project and its potential impacts 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. Each Indigenous group should have the opportunity to review the assessments of impacts on their rights. Indigenous groups should also have the opportunity to approve use of their Indigenous Knowledge, prior to submission of the Impact Statement to IAAC.

The proponent should describe a rationale for the approach taken to assessing the impact on rights where an Indigenous group has not provided its views on those impacts to the proponent, or when both parties agree that it is better to provide this information directly to IAAC. Proponents should discuss with Indigenous groups their views on how best to reflect the assessment of impacts on rights in their Impact Statement.

The proponent must work together with Indigenous groups to find mutually agreeable solutions to concerns raised about impacts on the exercise of their rights.

The Impact Statement must:

- document the project's potential impacts on the exercise or practice of Indigenous right or of the rights arising from treaties in the project area, as expressed by potentially impacted Indigenous peoples;
- describe the impact on the rights of Indigenous groups, 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 assessment of the project's effects was integrated in the Indigenous Rights assessment and considered in the determining residual effects and the severity of impacts.

The proponent should consult the following IAAC 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 cultures, 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.

10.4.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the mitigation and enhancement measures proposed for all potential impacts to Indigenous rights and interests, identify if these are measures for which the proponent or other parties would be responsible and elaborate on how these measures may vary for each Indigenous group;
- describe if and how the mitigation 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 groups;
- include perspectives of the potentially impacted Indigenous groups, on the effectiveness of particular mitigation measures on such impacts;
- describe collaboration with Indigenous groups to identify preferred mitigation measures as well as to optimize the project's benefits for their communities;
- describe prevention methods that would be implemented to reduce or prevent incidents involving Indigenous communities, including those related to hunting and fishing activities and those related to racism;
- 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 indigenous 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);
- describe how the proponent has addressed the suggestions and recommendations made by potentially affected Indigenous groups including where Indigenous Knowledge was provided and considered in respect of the design of mitigation measures and describe the opportunities for Indigenous knowledge holders to participate in the design of these mitigation measures;
- propose differentiated mitigation measures, if applicable, to ensure that Indigenous peoples and various 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; and
- 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, vandalism and malicious acts, or exceptional natural events (e.g., floods, earthquakes, forest fires) could result in major effects. If certain accidents or malfunctions were to occur (e.g., tailings dam failures, minor spills, road accidents), they should be included as potential 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 accidents and malfunctions were identified (e.g., information sources, recognized risk assessment methodology, professional expertise, similar projects, participants' input);
- take into account the lifespan of different project components, design of different project components, complicating factors such as weather, floods 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 effects and changes to health, social and economic conditions, and effects to Indigenous peoples' rights). Involve members of the affected Indigenous communities and users of the territory 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, GHG emissions 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 released directly or indirectly into water or air, taking into account, where possible, various meteorological conditions;
    - potential environmental effects and changes to health, social and economic conditions, and impacts on Indigenous groups. With respect to human health specifically, consideration should be given to potential pathways of effects associated with surface water, air, country 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, toxic chemical leak prevention plans, 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 effects and changes to health, social and economic conditions, including impacts on Indigenous groups, 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 effects and changes to health, social, and economic conditions and impacts on Indigenous groups 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;
- describe the expected effectiveness of the mitigation measures, safeguards and response measures and systems; and
- involve members of the affected Indigenous communities and land users 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 (e.g., the Response Command System when deploying a significant incident response effort);
- describe the role of the proponent in the case of spill, 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 of spills 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 groups;
- 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:

- describe how environmental conditions, including natural hazards such as severe or extreme weather conditions, floods, 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). 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;
- 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 effects and changes to health, social and economic conditions resulting from effects of the environment on the project;
- describe measures to enhance positive environmental effects and changes to health, social and economic conditions 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;
- identify the sensitivities and vulnerabilities of the project (tailings management facilities and waste rock piles) to climate change (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, floods 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 potential 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.

Additional guidance related to conducting climate change resilience assessments is included in the SACC.

13. Canada's Ability to Meet its Environmental Obligations

The Government of Canada 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.

The Impact Statement should describe the likely effects of the project in the context of environmental obligations, with a focus on the Government of Canada's obligations and commitments.

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; and
- the Convention for the Protection of Migratory Birds in the United States and Canada, as well as the *Migratory Birds Convention Act (1994)*, which in part supports the implementation of this convention, as well as supporting guidance documents on conservation objectives and strategies specific to bird conservation regions.

The Impact Statement must:

- describe the extent to which the likely effects of the project could hinder or contribute to Canada's ability to meet its environmental obligations, including:
    - the proponent's plans and commitments to ensure that positive contributions are respected; and
    - any mitigation or follow-up program related to those likely effects of the project.

With respect to climate change commitments, section 8.12 Climate change of these Guidelines outline the information required as part of the Impact Statement. IAAC, 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 likely 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 should refer to IAAC'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. 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. Information and data requirements to inform the sustainability analysis should be considered from the outset of the impact assessment.

The Impact Statement must:

- provide an analysis of the extent to which the project's likely effects contribute to sustainability. The analysis should be qualitative but may draw on quantitative data to provide context, and should follow the methodology and sustainability principles outlined in the Guidance: Considering the Extent to which a Project Contributes to Sustainability:
  - 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;
- 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 likely effects of the project, including setting spatial and temporal boundaries, and identifying mitigation and enhancements; and
  - the rationale for, planning, and design of the project and the selection of preferred alternatives to the project;
- describe and document uncertainties and assumptions underpinning the analysis;
- describe how the precautionary principle was applied in cases where there may be a risk of irreversible harm; and
- indicate how monitoring, management and reporting systems consider the sustainability principles and attempt to ensure continuous progress towards sustainability.

15. Follow-up Program

A follow-up program is set up by the proponent to verify the accuracy of the impact assessment and evaluate the effectiveness of mitigation measures. The proponent is required to develop a follow-up program in consultation with relevant authorities and Indigenous groups. The proponent will be required to implement this program and to submit the follow-up and monitoring results to IAAC. Monitoring is a key component of a follow-up program which entails collecting the information necessary to verify the accuracy of the effects predicted in an impact assessment, determine the effectiveness of mitigation measures, and determine whether new or modified action(s) are required to protect VCs.

The proponent must develop expected outcomes for their follow-up program, 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. Should the project proceed, the proponent will be expected to provide information on the extent to which they are achieving the expected outcomes.

If the follow-up program indicates that mitigation measures are not working effectively, corrective or additional measures may then be required and implemented by the proponent.

Follow-up program development and implementation are an opportunity to continue engaging with impacted Indigenous groups. When undertaken collaboratively, follow-up programs can incorporate Indigenous Knowledge to support solution-oriented approaches for identifying and managing issues.

15.1. Follow-up program framework

The duration of the follow-up program must be as long as required to verify the accuracy of effects on VCs, including impacts on Indigenous rights and interests, 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;
- 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 (e.g., list of parameters to be measured, planned implementation timetable, etc.);

- thresholds[17] associated with each VC included in the follow-up program and, the technically and economically feasible new or modified measures that may be implemented if the thresholds are met or exceeded, as indicated by the monitoring results;
- mechanism to disseminate follow-up results among the concerned stakeholders;
- consideration of accessibility and sharing of data for the general population; and
- information on how Indigenous groups, as well as local and regional Indigenous organizations would be involved in the design and implementation of the follow-up program and the development of a communication mechanism between these organizations and the proponent.

15.2. Follow-up program monitoring

The Impact Statement must present the preliminary monitoring program for each VC included in the follow-up program, including, but not limited to the:

- list of regulatory instruments that include a monitoring requirement for the VCs;
- identification of the monitoring activities that could pose a risk to the VCs, and the measures and means planned to protect them;
- description of the methodology for monitoring, including how the methodology was informed by community knowledge and Indigenous Knowledge or by input provided by various population groups specifically impacted;
- 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);
- a description of the indicators to be used to assess progress towards 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;
- outlines of monitoring reports (number, content, frequency, format and duration of the reports) that will be provided to the authorities involved and other interested parties; and
- plans, including funding options, to involve Indigenous groups and local communities in monitoring, where appropriate.

[17] Thresholds are the levels of environmental, health, social or economic changes relative to baseline conditions that would trigger the implementation of new or modified mitigation measures.

15.3. Compliance monitoring

The proponent is responsible for verifying whether the required mitigation measures were implemented and have worked as intended. The Impact Statement must present a framework by which compliance monitoring for the follow-up program would be implemented. This should include, but not be limited to:

- identification of the positions responsible for monitoring and compliance;
- description of the proponent's response mechanisms in the event of non-compliance with legal and environmental requirements or obligations imposed on contractors by the provisions of their contracts;
- a description of how monitoring results will be used to trigger the proponent's response mechanisms for effects that do not have compliance-based thresholds (e.g., CAAQS for common air pollutants); and
- quality assurance and quality control measures to be applied to monitoring program.

15.4. Adaptive management plans

The proponent should consider adaptive management as a means to address uncertainties associated with the effectiveness of mitigation measures or predicted effects and to help ensure expected outcomes are achieved. The Adaptive Management Plan[18] establishes 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 project, nor does it eliminate the need to characterize effects and identify appropriate mitigation measures to eliminate, reduce or control those effects.

[18] Adaptive management plans should be developed in consultation with the Indigenous communities that might be impacted.

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, potential environmental effects, and changes to health, social and economic conditions, potential adverse impacts on Indigenous rights, proposed mitigation measures, residual and cumulative effects, the extent to which the effects that are likely to be caused by the carrying out of the project contribute to sustainability and to the Government of Canada's ability to meet its environmental obligations, and the follow-up program.

The Assessment Summary provides an opportunity for the proponent to demonstrate how issues raised, notably by Indigenous groups and the public, were addressed. 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 and may summarize information through a series of tables.

The Assessment Summary must summarize the Impact Statement, including:

- potential environmental effects, and changes to health, social and economic conditions, and the potential impacts on Indigenous rights and interests;
- mitigation and enhancement measures in relation to potential effects and impacts;
- 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
- the extent to which adverse effects within federal jurisdiction and the direct or incidental adverse effects are significant based on the characterization of residual effects and of cumulative effects.

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.

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 count;
  - Birds Canada's Canadian Migration Monitoring Network;
  - Nature Counts;
  - iNaturalist;
  - Neighbourhood Bat Watch;
  - Bird Conservation Regions and strategies;
  - Aquatic species at risk map;
- 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 (permanent and intermittent);
  - riparian habitats;
  - stream and river banks or other eroded habitats;

  - artificial water sources;
  - buildings, bridges, and other anthropogenic features, including linear infrastructure (e.g., roads, power lines);
  - critical habitats as described in recovery strategies;
  - any other habitat features recognized as important in the region;
  - trade publications;
- 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);
- 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;
- navigability studies;
- 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; and
- 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 a 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 Canadian AQMS;
- major local emission sources;
- areas of importance to people, including recreational areas;
- modelling domain size based on isopleths (or isoconcentration lines) resulting from the project-only impact and representing concentrations equivalent to 10% of ambient air quality criteria (within the model's validity limits);
- 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;
- all potentially affected communities;
- all potentially affected Indigenous groups;
- areas of known Indigenous land[19], cultural, spiritual and resource use; and
- existing affected infrastructure.

For biophysical VCs, spatial boundaries should be defined using an ecosystem-centred 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 aquatic environments, should be conducted to determine appropriate ecological boundaries and buffer distances around the PA. The spatial extent of habitat and habitat functions should influence the determination of an appropriate LSA and RSA. 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.

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

Where a VC is a species, the LSA should correspond to the PA 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:

- various population groups affected by the project (e.g., individuals with compromised health, children, pregnant women, seniors);
- residences, health and social service 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, 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 poor buffering, important areas for wildlife, 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 restoration, 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 PA, LSA, and RSA 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; and

- 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 measures are proposed to offset any residual adverse effects that cannot be avoided or mitigated, 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 and critical habitat potentially impacted by the project;
- explain and justify the hierarchy of avoidance or mitigation measures considered for the potential effects;
- identify and describe residual effects that are the subject of the compensatory measures;
- determine the required offsetting measures with rationale, including how the policies or guidelines 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 nonhabitat-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;
- identify, if possible, the parties responsible for the 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; and
- provide a description of the monitoring schedule and activities to be completed to verify the success of compensation activities.

If offsets are required to address residual effects for species at risk other than fish, 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 non-aquatic species at risk, the proponent can refer to Template 2 in the *Species at Risk Act* Permitting Policy.

For fish and fish habitat, each 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 should 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 reports, follow-up reports, 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;
- 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 shutdown emissions, as appropriate;
  - diffuse 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;
- 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– 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; ii) project only (with and without mitigation); iii) baseline conditions plus project; and iv) cumulative effects or future development, if applicable;
    - perform dispersion modelling for all relevant temporal scenarios, including construction and operation scenarios. The modelling 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 modelling 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, modelling of particulate matter emissions from unpaved roads should be performed with and without mitigation measures. Various mitigation control efficiency scenarios should be modelled, such as with control efficiencies of 0% (no mitigation or worst-case scenario), 50%, and 70%.

To do this:

- perform modelling 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; and
- 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 modelling of acidifying deposition rates.

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 homogeneous sections. Parameters to be measured may include: length of the section, wetted width at the NHWM, width at bankfull discharge 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 obstructions must be documented (size, condition, etc.) and their passability by fish must be assessed;

- NHWM is the usual or average level to which a waterbody or a watercourse 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 waterbody 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, pelagic and benthic zones, maximum and average depths, seasonal water level fluctuations, substrate type (sediment), aquatic (submerged, floating and emergent) and riparian vegetation, presence of aquatic invasive species, and water quality (temperature and dissolved oxygen profile, turbidity, transparency, pH);
- 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 survey 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; and
- consult DFO before using environmental DNA (eDNA). Environmental DNA can be used to complement field inventories and existing data, but it is not a substitute for existing inventories and data. If the characterization effort (field and existing data) is deemed insufficient, eDNA results cannot be used to describe fish populations.

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

- present potential habitat deterioration, disruption and destruction on maps at appropriate scales, as well as in the form of tables;

- 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 and presented 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 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 is minimized;
- bird 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 PA, 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., PA, LSA, RSA), any departures from predictions, and the effectiveness of mitigation measures. Justify the selection of modelling techniques based on current and recent scientific literature;
    - survey protocol planning should include modelling 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 types in the PA, LSA and RSA, with more intensive sampling effort:
  - in the PA;
  - 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, modelled 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 PA, LSA, and RSA 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 BCR, taking into account the specific conditions found near the borders of these regions;
    - habitat surveys need to be detailed enough within the LSA and RSA 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 to and that the vegetation removed is not unique to the PA.

The proponent should consult:

- *Framework for the Scientific Assessment of Potential Project Impacts on Birds* for examples of project types and recommended techniques for assessing effects on migratory birds; and
- 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.

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 is 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. 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 above;
- survey protocol planning should include modelling 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 a 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., PA, LSA, RSA), any departures from predictions, and the effectiveness of mitigation measures. Justify the selection of modelling 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 study area. Survey design will need to consider a large number of sites to represent the heterogeneity of RSA 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 affect species within that zone. Efforts outside the project study area should be carefully designed to ensure that estimates comparing within and across the PA, 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 PA, 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, modelled 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). Raw scripts or workflows are preferred in place of descriptive documentation; and

- contact local or provincial government authorities to determine additional data sources and survey methods.

With respect to woodland caribou, the proponent needs to:

- 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 trends; and
- 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.

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/standard/52161.html

Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Cheminfo. Prepared for Environment Canada Transboundary Issues Branch. 2005. Available at: http://www.bv.transports.gouv.qc.ca/mono/1173259.pdf

Birds and their habitat

Audubon Christmas Bird Count. Audubon. Available at http://netapp.audubon.org/CBCObservation/Historical/ResultsByCount.aspx

Avoiding harm to migratory birds. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds.html

Barker, R. J., Schofield, M. R., Link, W. A., Sauer, J. R. 2018. *On the reliability of N-mixture models for count data*. Biometrics, 74(1), 369–377. Available at https://doi.org/10.1111/biom.12734

Bird Conservation Regions and strategies. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/migratory-bird-conservation/regions-strategies.html

Bird surveys. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/bird-surveys.html

Canada-US convention protecting migratory birds. Environment and Climate Change Canada. 1999. Available at https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-countries-regions/north-america/canada-united-states-protecting-migratory-birds.html

Canadian Migration Monitoring Network (CMMN). Birds Canada. 2019. Available at https://www.birdscanada.org/bird-science/canadian-migration-monitoring-network-cmmn/

eBird Canada. Available at https://ebird.org/canada/home

Fact sheet: Nest Protection under the Migratory Birds Regulations, 2022. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/fact-sheet-nest-protection-under-mbr-2022.html

General nesting periods of migratory birds. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html

A Framework for the Scientific Assessment of Potential Project Impact on Birds. Prepared by Alan Hanson et al. Available at http://www.publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf. Environment and Climate Change Canada. Technical Report Series Number 508.

Migratory Birds Regulations, 2022*.* Available at https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-105/index.html

Milko, R. 1998. *Migratory birds environmental assessment guideline*. Environment Canada – Canadian Wildlife Service. Available at http://publications.gc.ca/site/fra/9.647049/publication.html

North American Breeding Bird Survey Website - Results. Available at https://wildlife-species.canada.ca/breeding-bird-survey-results/P001/A001/?lang=e

NatureCounts. Birds Canada, Avian Knowledge Network. Available at https://www.birdscanada.org/birdmon/default/searchquery.jsp

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

North American Waterfowl Management Plan. NAWMP Canada. 2013. Available at http://nawmp.wetlandnetwork.ca/what-is-nawmp/

Pileated Woodpecker Cavity Identification Guide. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/pileated-woodpecker-cavity-identification-guide.html

Yip, D. A., L. Leston, E. M. Bayne, P. Sólymos, and A. Grover. 2017. *Experimentally derived detection distances from audio recordings and human observers enable integrated analysis of point count data*. Avian Conservation and Ecology 12(1):11. Available at https://www.ace-eco.org/vol12/iss1/art11

Fish and fish habitat

A science-based framework for assessing the response of fisheries productivity to state of species or habitats. Fisheries and Oceans Canada. 2013. Available at: https://waves-vagues.dfo-mpo.gc.ca/Library/360944.pdf.

Bradford, M.J., R.G. Randall, K.S. Smokorowski, B.E. Keatley and K.D. Clarke. 2014. *A framework for assessing fisheries productivity for the Fisheries Protection Program.* Fisheries and Oceans Canada, Canadian Science Advisory Secretariat. Available at https://waves-vagues.dfo-mpo.gc.ca/Library/359758.pdf

Bradford, M.J., Smokorowski, K.E. Clarke, K.D., Keatley, B.E. and Wong, M.C. 2016. *Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program.* Fisheries and Oceans Canada, Canadian Science Advisory Secretariat. Available at https://waves-vagues.dfo-mpo.gc.ca/Library/364029.pdf

Braun, D.C., Smokorowski, K.E., Bradford, M.J., and Glover, L. 2019. *A review of functional monitoring methods to assess mitigation, restoration, and offsetting activities in Canada.* Fisheries and Oceans Canada, Canadian Science Advisory Secretariat. Available at https://publications.gc.ca/collections/collection_2020/mpo-dfo/fs70-5/Fs70-5-2019-057-eng.pdf

Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada. Fisheries and Oceans Canada, Canadian Science Advisory Secretariat. 2013. Available at https://waves-vagues.dfo-mpo.gc.ca/Library/348881.pdf

Pathways of Effects. Fisheries and Oceans Canada. Available at https://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html

A field guide to oil spill response on marine shorelines. Environment and Climate Change Canada. 2016. Available at https://publications.gc.ca/site/eng/9.820227/publication.html?wbdisable=true

*Policy for applying measures to offset adverse effects on fish and fish habitat under the Fisheries Ac*t. Fisheries and Oceans Canada. 2019. Available at https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/policies-politiques-eng.html

Smokorowski, K.E., Bradford, M.J., Clarke, K.D., Clément, M., Gregory, R.S., Randall, R.G. 2015. *Assessing the effectiveness of habitat offset activities in Canada: Monitoring design and metrics.* Canadian Technical Report of Fisheries and Aquatic Sciences 3132. Available at http://publications.gc.ca/collections/collection_2015/mpo-dfo/Fs97-6-3132-eng.pdf

Guidelines for Watercourse Crossings in Quebec. Fisheries and Oceans Canada. 2016. Available at https://www.qc.dfo-mpo.gc.ca/infoceans/en/infocean/protecting-fisheries-watercourse-crossings

Gender-based analysis Plus

By the Numbers: Gender Diversity in Canada's Natural Resource Industries and Science, Technology, Engineering and Math (STEM), *Submitted Brief.* Natural Resources Canada. Available at https://www.ourcommons.ca/Content/Committee/421/FEWO/Brief/BR8745320/br-external/NRC-e.pdf

Demystifying GBA+ Job Aid. Women and Gender Equality Canada. Available at: https://women-gender-equality.canada.ca/gbaplus-course-cours-acsplus/assets/modules/Demystifying_GBA_job_aid_EN.pdf

GBA+ in Impact Assessment Fact Sheet. Impact Assessment Agency of Canada. 2019. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/gender-based-analysis-plus-impact-assessment-fact-sheet.html

Gender Diversity and Inclusion: A Guide for Explorers. Prospectors and Developers Association of Canada. 2020. Available at https://www.pdac.ca/priorities/responsible-exploration/gender/gender-diversity-and-inclusion-guidance-document

Gender, diversity and inclusion statistics. Statistics Canada. Available at https://www.statcan.gc.ca/eng/topics-start/gender_diversity_and_inclusion

Guidance: Gender-based Analysis Plus in Impact Assessment. Impact Assessment Agency of Canada. 2021. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/gender-based-analysis.html

Intersectionality Job Aid. Status of Women Canada. 2018. Available at https://women-gender-equality.canada.ca/gbaplus-course-cours-acsplus/assets/modules/Intersectionality_tool_job_aid_EN.pdf

Tool – Assessing the Quality of a GBA Plus in the Impact Statement, Impact Assessment Agency of Canada. 2022. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/tool-assessing-quality-gba-plus-impact-statement.html

Gender-based Analysis Plus. Women and Gender Equality Canada. 2022. Available at https://women-gender-equality.canada.ca/en/gender-based-analysis-plus.html

Greenhouse gases and climate change

Policy Context: Considering Environmental Obligations and Commitments in Respect of Climate Change under the Impact Assessment Act. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/considering-environmental-obligations.html

Strategic Assessment of Climate Change. Environment and Climate Change Canada. 2020. Available at https://www.strategicassessmentclimatechange.ca

Draft technical guide related to strategic assessment of climate change. ECCC. 2021. Available at: https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html

Human health

Bhatia, R., Farhang, L., Heller, J., Lee, M., Orenstein, M., Richardson, M., Wernham, A. *Minimum Elements Practice Standards for Health Impact Assessment, Version 3*. 2014. Available at https://pdfs.semanticscholar.org/040d/8ff2749f8ef2ec8b8233b7bffae9f7a38a12.pdf

Canadian Best Practices Portal – Food Security. Public Health Agency of Canada. Available at https://cbpp-pcpe.phac-aspc.gc.ca/public-health-topics/food-security/

Canadian Drinking Water Guidelines. Health Canada. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/water-quality/drinking-water/canadian-drinking-water-guidelines.html

Community and health system characteristics – Community. Health Indicators E-Publication. Canadian Institute for Health Information. Available at https://www.cihi.ca/en/health-indicators-e-publication

Guidance for Evaluating Human Health Effects in Impact Assessments: Air Quality. Health Canada. 2023. *Available* atH129-54-1-2023-eng.pdf (publications.gc.ca).

Guidance for Evaluating Human Health Impacts in Environmental Assessments: Country Foods available at http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-country-foods.html. Health Canada. 2017.

Guidance for Evaluating Human Health Effects in Impact Assessments: Noise available at https://publications.gc.ca/collections/collection_2024/sc-hc/H129-54-3-2023-eng.pdf. Health Canada. 2023.

Guidance for Evaluating Human Health Impacts in Environmental Assessments: Radiological Impacts available at http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-radiological.html. Health Canada. 2017.

Guidance for Evaluating Human Health Effects in Impact Assessments: Drinking and Recreational Water Quality available atH129-54-2-2023-eng.pdf (publications.gc.ca). Health Canada. 2023.

Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment. Health Canada. 2023. Available at H129-54-6-2023-eng.pdf (publications.gc.ca)

Health Canada's Risk Assessment Guidance Parts I through VII. Health Canada. 2017. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/contaminated-sites/guidance-documents.html

Health Impact Assessments. National Collaborating Centre for Environmental Health. Available at https://www.ncceh.ca/environmental-health-in-canada/health-agency-projects/health-impact-assessments

Health Inequalities and Social Determinants of Aboriginal Peoples Health. National Collaborating Centre for Indigenous Health. 2013. Available at https://www.nccih.ca/en/publicationsview.aspx?sortcode=2.8.10.16&id=46

Health Inequalities Data Tool – Public Health Infobase. Public Health Agency of Canada. Available at https://health-infobase.canada.ca/health-inequalities/indicat

Key Health Inequalities in Canada. A National Portrait. Public Health Agency of Canada. 2018. Available at: https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/science-research/key-health-inequalities-canada-national-portrait-executive-summary/hir-full-report-eng.pdf

Lewis, D., James, S. Thom, O., Doxtator, S., Nahmahbin-Hiltz, M., and Beacock, E. *Intangible Impacts - More-than-mental health: Indigenous identity, culture, community and relationship with land are integral to Indigenous wellbeing* (training manual). Western University. 2021. Available at: https://indigenousimpacts.uwo.ca/training_resources/indigenous_impacts_story_map.html

Positive Mental Health Indicator Framework. Public Health Agency of Canada, 2019. Available at *https://health-infobase.canada.ca/positive-mental-health/*

Rotenberg, C. 2016. *Social determinants of health for the off-reserve First Nations population, 15 years of age and older, 2012*. Statistics Canada. Available at https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2016010-eng.htm

Salerno, T., Tam, J., Page, J., Gosling, S., and Firelight Research Inc. *Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities* Final Report. May 7, 2021. Available at https://www.canada.ca/content/dam/iaac-acei/documents/research/indigenous-mental-wellness-and-ia-en.pdf

Social Determinants of Health and Health Inequalities available at https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html. Public Health Agency of Canada. 2019.

What are the social determinants of health? National Collaborating Centre for Determinants of Health. Available at https://nccdh.ca/resources/entry/SDH-factsheet

International Agency for Research on Cancer (IARC). 2014. Monograph Volume 105: Diesel and Gasoline Engine Exhausts and Some Nitroarenes. Available at: https://publications.iarc.fr/129

California Environmental Protection Agency (CalEPA). 1998. The Report on Diesel Exhaust. Available at: https://ww2.arb.ca.gov/sites/default/files/classic//toxics/dieseltac/de-fnds.htm

Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities. Available at : https://www.canada.ca/content/dam/iaac-acei/documents/research/indigenous-mental-wellness-and-ia-en.pdf

More-than-mental health: Indigenous identity, culture, community and relationship with land are integral to Indigenous wellbeing (training manual, in English only).

Laurie Chan, Malek Batal, Olivier Receveur, Tonio Sadik, Harold Schwartz, Amy Ing, Karen Fediuk, Constantine Tikhonov and Kathleen Lidhorst. Étude sur l'alimentation, la nutrition et l'environnement chez les Premières Nations (EANEPN) : Résultats du Québec 2016. [First Nations food, nutrition and environment study (FNFNES): 2016 Quebec results] Ottawa : University of Ottawa, 2019. Available at https://www.fnfnes.ca/docs/CRA/FNFNES_Quebec_Regional_Report_FRENCH_2021-10-19.pdf

Indigenous participation and engagement

IAAC expects proponents to keep apprised of updated or new practitioner guidance or policies published on IAAC'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.

Indigenous Knowledge under the Impact Assessment Act: Procedures for Working with Indigenous Communities. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/indigenous-knowledge-under-the-impact-assessment-act.html

Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessm ent-act/guidance-assessm ent-potential-im pacts-rights-indigenous-peoples.html

Guidance: Collaboration with Indigenous Peoples in Impact Assessments. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/collaboration-indigenous-peoples-ia.html

Guidance: Indigenous Participation in Impact Assessment. Impact Assessment Agency of Canada. 2019. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-indigenous-participation-ia.html

Policy Context: Indigenous Participation in Impact Assessment. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/policy-indigenous-participation-ia.html

Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessm ent-act/assessm ent-potential-im pacts-rights-indigenous-peoples.html

Protecting Confidential Indigenous Knowledge under the Impact Assessment Act – Supplementary Guidance to Indigenous Knowledge in Impact Assessment: Procedures for Working with Indigenous Communities. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/indigenous-knowledge-under-the-impact-assessment-act.html

Technical Guidance for assessing the Current Use of Lands and Resources for Traditional Purposes under the Canadian Environmental Assessment Act, 2012. Canadian Environmental Assessment Agency. 2015. Available at https://www.canada.ca/content/dam/iaac-acei/documents/policy-guidance/assessing-current-use-lands-resources-traditional-purposes/current_use_final_draft-eng.pdf

United Nations Declaration on the Rights of Indigenous Peoples. United Nations. 2007. Available at https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html

Public participation

Framework: Public Participation under the Impact Assessment Act. Impact Assessment Agency of Canada. 2019. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/framework-public-participation.html

Guidance: Public Participation under the Impact Assessment Act. Impact Assessment Agency of Canada. 2019. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-public-particaption-impact.html

Purpose and need

Guidance: "Need for", "Purpose of", "Alternatives to" and "Alternative means". Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-need-for-purpose-of-alternatives-to-and-alternative-means.html

Policy Context: "Need for", "Purpose of", "Alternatives to" and "Alternative means". Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/need-for-purpose-of-alternatives-to-and-alternative-means.html

Social and economic conditions

Analyzing Health, Social and Economic Effects under the Impact Assessment Act. Impact Assessment Agency of Canada. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/analyzing-health-social-economic-effects-impact-assessment-act.html

Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing. Impact Assessment Agency of Canada. 2015. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/technical-guidance-assessing-physical-cultural-heritage-or-structure-site-or-thing.html

Species at Risk

Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal population, in Canada. 2020. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-2020.html

Bats and bat habitats: guidelines for wind power projects. Ministry of Natural Resources, Ontario. 2011. Available at https://www.ontario.ca/page/bats-and-bat-habitats-guidelines-wind-power-projects

Canadian National White-nose Syndrome Decontamination Protocol for entering bat hibernacula. Canadian Wildlife Health Cooperative. 2016. Available at: http://www.cwhc-rcsf.ca/docs/WNS_Decontamination_Protocol-Nov2016.pdf

Charbonneau, P., Fabianek, F., McDuff, J. & Tessier, N. 2022. Recueil des protocoles standardisés d'inventaires acoustiques de chauves-souris au Québec. pp. 44. Ministère des Forêts, de la Faune et des Parcs, Gouvernement du Québec, QC, Quebec

COSEWIC Status Reports. Committee on the Status of Endangered Wildlife in Canada. Available at: https://cosewic.ca/index.php/en/status-reports.html

Little Brown Myotis (*Myotis lucifugus*), the Northern Myotis (*Myotis septentrionalis*), and the Tri-colored Bat (*Perimyotis subflavus*): recovery strategy. 2018. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/little-brown-myotis-2018.html

Master, L. L., Faber-Langendoen, D., Bittman, R., Hammerson, G. A., Heidel, B., Ramsay, L., Snow, K., Teuche, A., Tomaino, A. 2012. *NatureServe Conservation Status Assessments: Factors for Evaluating Species and Ecosystem Risk*. Available at https://www.natureserve.org/publications/natureserve-conservation-status-assessments-factors-evaluating-species-and-ecosystem

Operational Framework for Use of Conservation Allowances. Environment and Climate Change Canada. 2012. Available at https://publications.gc.ca/collections/collection_2012/ec/En14-77-2012-eng.pdf

Report on the progress of recovery strategy implementation for the woodland caribou (*Rangifer tarandus caribou*), boreal population, in Canada for the period 2012-2017. Available at: https://publications.gc.ca/site/eng/9.846289/publication.html

Scientific assessment to inform the identification of critical habitat for woodland caribou (Rangifer tarandus caribou), boreal population, in Canada. Environment Canada, Canadian Wildlife Service. 2011. Available at https://central.bac-lac.gc.ca/.item?id=CW66-296-2011-eng&op=pdf&app=Library

Species at Risk Act Permitting Policy. Government of Canada. 2016. Available at https://species-registry.canada.ca/index-en.html#/consultations/2983

Species at risk public registry. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

Sustainability and environmental obligations

Canada's national biodiversity clearing-house. Federal, provincial and territorial working group on biodiversity. Available at https://biodivcanada.chm-cbd.net/

Guidance: Considering the Extent to which a Project Contributes to Sustainability. Impact Assessment Agency of Canada. 2021. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-considering-extent-project-contributes-sustainability.html

Policy Context: Considering Environmental Obligations and Commitments in Respect of Climate Change under the Impact Assessment Act. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/considering-environmental-obligations.html

Water Quality

Canadian Drinking Water Guidelines. Available at: Canadian Drinking Water Guidelines - Canada.ca

Canadian Water Quality Guidelines for the Protection of Aquatic Life. Canadian Council of Ministers of the Environment. Available at https://ccme.ca/en/resources/water-aquatic-life

Environmental Code of Practice for metal mines. 2009. Available at https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/code-practice-metal-mines/chapter-1.html

Global Acid Rock Drainage Guide. INAP: The International Network for Acid Prevention. Available at gardguide.com/images/5/5f/TheGlobalAcidRockDrainageGuide.pdf

Guide de caractérisation des résidus miniers et du minerai. Ministère de l'environnement et de la lutte contre les changements climatiques. 2020. (French only) Available at: https://www.environnement.gouv.qc.ca/Industriel/secteur-minier/guide-caracterisation-minerai.pdf

Guidelines for the Assessment of Alternatives for Mine Waste Disposal. Environment and Climate Change Canada. Available at https://www.canada.ca/en/environment-climate-change/services/managing-pollution/sources-industry/mining-effluent/metal-diamond-mining-effluent/tailings-impoundment-areas/guidelines-alternatives-mine-waste-disposal.html

Mine Environment Neutral Drainage (MEND) Report 1.20.1 Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. William A. Price. Natural Resources Canada. 2009. Available at http://mend-nedem.org/mend-report/prediction-manual-for-drainage-chemistry-from-sulphidic-geologic-materials/

Mine Environment Neutral Drainage (MEND) Report 3.50.1 - Study to Identify BATEA for the Management and Control of Effluent Quality from Mines. 2014*. Available at:* http://mend-nedem.org/mend-report/study-to-identify-batea-for-the-management-and-control-of-effluent-quality-from-mines/

Wetlands

Canada – Ramsar website. Available at https://www.ramsar.org/wetland/canada

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar). Environment and Climate Change Canada. 1983. Available at https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-organizations/important-wetlands-ramsar-convention.html

Canadian Wetland Classification System. Developed by the National Wetlands Working Group. Available at https://publications.gc.ca/site/eng/9.867506/publication.html

Hanson, A., L. Swanson, D. Ewing, G. Grabas, S. Meyer, L. Ross, M. Watmough, and J. Kirkby. 2008. *Wetland Ecological Functions Assessment: An Overview of Approaches*. Canadian Wildlife Service, Environment and Climate Change Canada. Technical Report Series No. 497. Atlantic Region. 59 pp Available at: http://publications.gc.ca/site/eng/343283/publication.html.

Lachance, D., G. Fortin et G. Dufour Tremblay (2021). Identification et délimitation des milieux humides du Québec méridional – version décembre 2021, Québec, ministère de l'Environnement et de la Lutte contre les changements climatiques, Direction adjointe de la conservation des milieux humides, 70 p. + annexes. (in French only) Available at https:// www.environnement.gouv.qc.ca/eau/rives/guide-identif-dellimit-milieux-humides.pdf

National Wetlands Working Group (1997). The Canadian Wetland Classification System, 2nd edition. BG Warner and C.D.A. Rubec (eds.). The Wetlands Research Centre, University of Waterloo, Waterloo, Ontario. Available at: https://nawcc.wetlandnetwork.ca/Wetland%20Classification%201997.pdf

Other references

Assessing cumulative environmental effects under the Canadian Environmental Assessment Act, 2012. Canadian Environmental Assessment Agency. 2018. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-under-canadian-environmental-assessment-act-2012.html

Guidance: Describing effects and characterizing extent of significance. Impact Assessment Agency of Canada. 2023. Available at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-describing-effects-characterizing-extent-significance.html

Summary of Guidance: Describing Effects and Characterizing Extent of Significance. Impact Assessment Agency of Canada. 2023. Available at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/summary-guidance-describing-effects-characterizing-extent-significance.html

Introduction to Ecological Land Classification (ELC) 2017. Statistics Canada. 2017. Available at: https://www.statcan.gc.ca/eng/subjects/standard/environment/elc/2017-1

*Ecozones Introduc*tion. Canadian Council of Ecological Areas (CCEA). 2014. Available at: https://ccea-ccae.org/ecozones-introduction/

Ecological Risk Assessment Guidance Document. Canadian Council of Ministers of the Environment. 2020. Available at https://ccme.ca/en/res/eraguidance_e.pdf

Operational Guidance: Framework for determining whether a Monitoring Committee is warranted for a Designated Project under the Canadian Environmental Assessment Act 2012 and under the Impact Assessment Act. Impact Assessment Agency of Canada. 2020. Available at https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/framework-determining-monitoring-committee.html

IAAC guidance documents are available from the Practitioner's Guide to Federal Impact Assessments under the *Impact Assessment Act*.