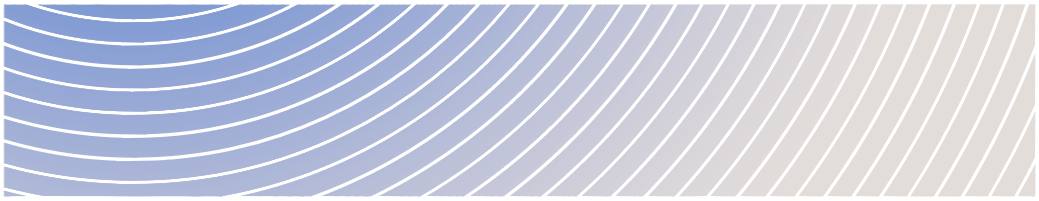
IMPACT ASSESSMENT AGENCY OF CANADA

Tailored Impact Statement Guidelines



GREAT BEAR GOLD PROJECT

AUGUST 1, 2024

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

Canada

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Abbreviations and Short Forms

Term	Definition
the Act	*Impact Assessment Act*
the Agency	Impact Assessment Agency of Canada
BAT/BEP	Best Available Technologies / Best Environmental Practices
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
COPC	Contaminant of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
GBA Plus	Gender Based Analysis Plus
the Guidelines	Tailored Impact Statement Guidelines
GHG	Greenhouse gas
HHRA	Human Health Risk Assessment
LSA	Local Study Area
Minister	Minister of Environment and Climate Change
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
VOC	Volatile organic compound

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 (the Agency) 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. The Guidelines for the Great Bear Gold Project (the Project) proposed by Kinross Gold Corporation (the proponent), were tailored by the Agency 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 with the Proponent, the public, Indigenous communities, federal authorities and provincial ministries.

1.1. Factors to be considered in the impact assessment

Section 22 of the *Impact Assessment Act* (IAA) prescribes 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[1] of Canada recognized and affirmed by section 35 of the *Constitution Act, 1982*;
d) the purpose of and need for the designated project;

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

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

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

1.2. Gender-based Analysis Plus (GBA Plus)

For consideration of the intersection of sex and gender with other identity factors, the Guidelines will refer to Gender-Based Analysis Plus (GBA Plus). GBA Plus is an analytical process that can guide practitioners to identify who is impacted by a project and assess how they may experience impacts differently, in order to develop mitigation measures to address these differential impacts. These Guidelines refer to "diverse population groups" in the context of GBA Plus, in reference to groups within the general population and within communities (e.g. by sex, gender, age, ethnicity, indigeneity, socioeconomic status, health status and any other community-relevant identify factors). The Agency's Guidance: Gender-Based Analysis Plus in Impact Assessment provides guiding principles and tools to apply GBA Plus in the Impact Statement.

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

- be sufficiently disaggregated to support the analysis of disproportionate effects as per GBA Plus's intersectional approach. Where possible the data must be disaggregated by identity factors (e.g. by

sex, gender, age, ethnicity, Indigenous identity, ability, and any other community-relevant identity factors) and be presented distinctly for each population group;

- describe how community and Indigenous Knowledge from affected populations, including community-developed indicators and locally collected data, was used in establishing baseline conditions and informing effects assessments;
- describe how community members differ in access to resources, opportunities, and services;
- describe the circumstances in which diverse population groups could suffer more adverse effects or receive fewer benefits related to the Project than others, and how they may respond differently to potential effects; and
- describe mitigation or enhancement measures to address these differential effects.

Quantitative information, including equality, diversity and inclusion sensitive data (e.g. gender-based violence, economic participation and prosperity, discrimination or unfair treatment, and any other data relevant to the community), should be complemented by qualitative insights from studies or consultations, and other sources. The description of effects should be based on both data collected and concerns expressed through engaging with the affected Indigenous communities and community members.

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 is particularly important in the case of information gathered and studies conducted with diverse 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 community) 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 all requirements outlined in the Guidelines. Where the proponent is of the opinion that the information is not required, it should contact the Agency to confirm the rationale for not including it prior to submitting the Impact Statement. The rationale for not including the information must also be provided in the Impact Statement. The proponent should also notify the Agency of any changes made to the Project as originally proposed in the Detailed Project Description that may result in a different set of effects and may require a reconsideration of information requirements.

The Agency is available to support the proponent during the preparation of the Impact Statement and may establish technical advisory groups, consisting of federal authorities and others, as appropriate. The proponent is encouraged to engage the Agency 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. proposed study plans, draft sections of the Impact Statement) prior to submitting the formal Impact Statement. Active engagement will support early identification and resolution of issues. The proponent is expected to provide the Agency with a work plan for the Impact Statement Phase of the Project, within 3 months of the Notice of Commencement.

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

1.4. Format and accessibility

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

Where information is required or is provided as a map in the Impact Statement, the proponent must also provide the Agency with the corresponding electronic geospatial data file(s). The Agency 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 are 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 the Agency's Guidance on submitting geospatial data for more information.

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

The proponent should be prepared to provide:

- all biophysical survey data in a well-documented data file which provides information on the site, site visits and individual observations or measurements (georeferenced where possible);
- individual results of all laboratory analysis, including methods, standards or references followed, detection limits, controls, and quality assurance and control procedures;
- socioeconomic data in a well-documented data file;
- input and output data from 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 the Government of Canada's commitment to Open Science and Data and facilitate the sharing of information with the public through the Registry and the Government of Canada's Open Science and Data Platform. The proponent should contact the Agency 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(s) of the legal entity(ies) that would develop, manage and operate the Project;
- describe corporate structure, including roles and responsibilities of key personnel;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the Project; and
- identify key personnel, contractors and/or sub-contractors responsible for preparing the Impact Statement.

2.2. Qualifications of individuals preparing the Impact Statement

In support of transparency, the Impact Statement must:

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

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

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

The Agency 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. If the Project is part of a larger sequence of projects, the Impact Statement must outline the larger context.

3.2. Project location

The Impact Statement must describe the Project's location, the geographical setting and the socio-ecological context in which the Project is to take place. The description should focus on aspects of the Project and its setting that are important in order to understand the potential environmental, health, social and economic effects and impacts of the Project. The following information must be included and, where appropriate, located on map(s):

- geographic coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the main project site;
- project footprint, including the extent of the tenure;
- surface areas, location and spacing of project components;
- distance of project components to any federal lands and the location of any federal lands within the RSA;
- services and infrastructure and current land and aquatic uses in the area, including:
    - roads;
    - municipalities and administrative regions;
    - resource development projects already underway in the study area (e.g. mines and forestry operations);
    - dams, reservoirs and hydropower facilities in regulated waterways;
    - local businesses and industries such as fisheries and outfitters, and any other relevant uses; and
    - boundaries of local resource management plans including water management plans, forest management plans, fisheries and wildlife management plans;
- primary, secondary and tertiary watersheds, as per the Ontario Watershed Boundaries;
- all waterbodies, including intermittent and ephemeral streams, and their location on a map, as well as flow direction;
- navigable waterways;
- landcover in the area; including important or critical habitats;

- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Land Classification[2];
- environmentally sensitive areas, such as national, provincial, and regional parks, ecological reserves, ecologically and biologically sensitive or significant areas, wetlands, and habitats of federally or provincially listed species at risk and other sensitive areas;
- lands subject to conservation agreements;
- description and locations of all potable drinking water sources (i.e. municipal, Indigenous or private);
- description of local communities and Indigenous communities;
- Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, First Nation Reserve lands, Indigenous harvesting regions (with permission of Indigenous communities); and
- culturally important features of the landscape as identified by Indigenous communities.

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;
- federal or provincial greenhouse gas (GHG) legislation, policies or regulations that will apply to the Project, in accordance with the relevant version of the Strategic Assessment of Climate Change (SACC) at the time the Impact Statement is submitted to the Agency;
- government policies, resource management plans, planning or study initiatives relevant to the Project and/or the impact assessment and their implications, including relevant regional studies, regional assessments and strategic assessments;
- any treaty, self-government, land claims or other agreements between federal or provincial governments and Indigenous communities that are pertinent to the Project and/or the impact assessment;
- any relevant land use plans, land zoning, or community plans;
- information on land lease agreement or land tenure, when applicable; and

[2] Introduction to the Ecological Land Classification (ELC) 2017 and Ecozones Introduction by Canadian Council on Ecological Areas.

- municipal, regional, provincial and/or national objectives, standards or guidelines, by-laws or ordinances that have been used by the proponent to assist in the evaluation of any predicted environmental, health, social or economic effects or impacts.

3.4. Project components and activities

The Impact Statement must:

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

At a minimum, the Impact Statement must describe components and activities, for each project phase, outlined below.

Project components:

- open pit mine (footprint, location, development plans including phases for the pits[3]);

[3] At the time of publishing the Guidelines, the proponent proposed the removal of the Discovery Pit, which is a reduction in the number of open pits from three pits to two pits, see https://www.iaac-aeic.gc.ca/050/documents/p85832/157909E.pdf. This is a change to the Project as originally proposed in the Detailed Project Description.

- underground mine (location, development plans);
- crusher and processing facilities (footprint, process, technology, location);
- storage of waste rock, overburden, topsoil, low-grade ore storage, lake sediment, aggregate, and stockpiles (footprint, locations, volumes, development and management plans and design criteria);
- tailings management facilities (footprint, location and preliminary design) and related pipelines (including those for tailings and return water);
- water management infrastructure to divert, control, collect and discharge surface drainage and groundwater discharges to the receiving environment, including collector ditches, groundwater interception wells, sedimentation and seepage collection ponds, sumps, and pump and pipeline systems;
- waterbody diversions or realignments, if needed[4];
- other permanent and temporary linear infrastructures (transmission line, access roads, haul roads, and pipelines), identifying the route of each of these linear infrastructures, the location and types of structures used for water crossings;
- provide the conceptual design features of all collector and diversion ditches, culverts, dams, bridges, spillways and water storage facilities (including sediment ponds and seepage collection ponds);
- sources of drinking and industrial water, including water used for dust control (include estimate of quantities needed for each phase);
- treatment facilities for potable water, sewage, wastewater and effluent (including proposed treatment technologies, footprint, location, and discharge locations);
- aggregate deposits and aggregate plant (footprint, location, volumes), if needed;
- fueling stations for trucks / vehicles or energy supply source (e.g. generators);
- explosives storage (method, location, licensing, management);
- construction workspace and laydown areas;
- temporary or permanent infrastructure, including accommodation complex, administration buildings, warehouses, garages, maintenance buildings, parking areas;
- temporary or permanent energy supply sources;
- fences and barriers (including location); and
- any other infrastructure relevant to the Project.

Project Activities:

Construction, including site preparation:

- construction staging;

[4] At the time of publishing the Guidelines, the proponent indicated that the diversion of Dixie Creek is no longer proposed, see https://www.iaac-aeic.gc.ca/050/evaluations/proj/85832/contributions/id/61904. This is a change to the Project as originally proposed in the Detailed Project Description.

- site grubbing, clearing and excavation, including tree and vegetation removal;
- excavation and salvage of topsoil, soil and bedrock, and rocky substrates;
- management of excavated materials, including potentially acid-generating and metal-leaching materials;
- blasting (locations, frequency, duration, time of year, time of day, and methods);
- explosives transportation, storage, and management;
- operation of light-duty, heavy-duty, and mobile off-road equipment (type, quantity, power source);
- storage, gestation, disposal and management of hazardous materials, fuels and waste (indicate types, methods, location, and amounts);
- transportation and management of aggregate materials, if needed (source and quantity);
- storage areas for material stockpiles;
- construction of site fencing;
- construction of access roads and haul roads;
- construction of temporary or permanent infrastructure;
- construction of mine waste management facility;
- construction of permanent and temporary water management structures, including:
    - water management facilities to manage water that comes into contact with plant processes, including collector ditches, sumps, pump and pipeline systems, and groundwater interception wells;
    - water diversions, dewatering or deposition activities, storm water management, site drainage, runoff management and sediment or erosion control; and
    - water management to divert, control, collect, treat (if necessary) and discharge surface drainage and groundwater seepage to the receiving environment, including collector ditches, groundwater interception wells, sedimentation ponds, sumps, and pump and pipeline systems;
- development of aquatic habitat offset and compensation features and species at risk compensation features (if applicable)[5].

Operation:

- ore production and stockpiling, product extraction, processing and treatment;
- drilling and blasting (location, frequency, duration, time of year, time of day, and methods);
- explosives storage and use;
- mine waste management, including tailings, waste rock, overburden, and contaminated soil;
- water management, including water diversions, site drainage and runoff management, sediment and erosion controls, site dewatering, potable water, water use requirements, storm water, process water,

[5] Indicate if offsetting and compensatory habitat will be developed during or after the construction phase.

wastewater, water recycling and effluent treatment (quantity, treatment requirements, release point(s) and receiving waterbodies);

- use and maintenance of access roads and haul roads;
- storage and handling of reagents, petroleum products, chemical products, hazardous materials and residual materials;
- progressive reclamation of project components and open pit slopes; and
- workforce management, including transportation and work schedules.

Suspension, decommissioning, or abandonment:

- preliminary outline of a suspension, decommissioning, or abandonment, or reclamation plan for any components associated with the Project that remain in the proponent's control;
- the ownership, care, and control of project components;
- site restoration and reclamation including desired outcomes, approach, and follow-up or adaptive management to achieve desired outcomes;
- filling the open pit with water and reconnecting pit with natural drainage system, if appropriate;
- removal of surface contamination from facilities and equipment;
- well decommissioning;
- dismantling and removal of equipment and systems;
- demolition or disposition of buildings and ancillary structures;
- long term care, monitoring and maintaining the integrity of the site, including site drainage and water management, and any remaining structures;
- transfer of fuel and associated wastes to interim and long-term licensed storage facilities;
- suspension, abandonment or decommissioning for temporary or permanent facilities; and
- removal of power infrastructure.

3.5. Workforce requirements

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

- opportunities for employment outlining the anticipated number of full-time and part-time positions to be created, and timeline for when they will be created. Positions should be presented using the National Occupational Classification system;
- anticipated workforce region of origin (i.e. local, regional, out-of-province or international employees), including the anticipated scenario plus a qualitative summary of other plausible scenarios, for each phase of the Project;
- the skill and education levels required for the positions;

- anticipated hiring policies and programs;
- investment in training opportunities;
- working conditions and anticipated work scheduling for construction and operation (e.g. hours of work, rotational schedules, fly-in/fly-out);
- the anticipated transportation options for employees to commute to and from the mine site;
- accommodation and lodging requirements for the workforce during each project phase;
- workplace policies and programs for Indigenous employment, and employment of other underrepresented groups;
- workplace policies and programs, including codes of conduct, workplace safety, education and cultural training programs; and
- employee assistance programs and benefits programs.

Workforce requirements must take GBA Plus into consideration. The information must be presented in sufficient detail to analyze how historically excluded or underrepresented groups will be taken into account, including Indigenous communities and other relevant diverse 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 alternatives to the Project and alternative means of carrying it out. The proponent should consult the Agency guidance documents Guidance: "Need for," "Purpose of," "Alternatives to" and "Alternative Means" and Policy Context: "Need for," "Purpose of," "Alternatives" and "Alternative Means".

4.1. Purpose of the Project

The Impact Statement must outline what is to be achieved by carrying out the Project. The Impact Statement should broadly classify the Project (e.g. mineral extraction and processing) and indicate the target market (e.g. international, domestic, local), where applicable. The *purpose of* statement should include any objectives the proponent has in carrying out the Project and the proponent is encouraged to consider the perspectives of participants (i.e. public, Indigenous communities, governments) in establishing its objectives that relate to the intended effect of the Project on society.

4.2. Need for the Project

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

The description must include:

- supporting information that demonstrates the need for a project;
- any comments or views of Indigenous Peoples, the public and other participants on the proponent's need statement; and
- description of whether and how the Project would support any federal or provincial government objectives.

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 16 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 socioeconomic conditions, future climate change).

4.4. Alternative means of carrying out the Project

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

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

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

The Impact Statement must then describe:

- the methodology and criteria that were used to compare the alternative means, to determine the preferred means of carrying out the Project, and to justify the exclusions of other solutions, based on the trade-offs associated with the preferred and other alternative means;
- environmental criteria should include effects to air quality, water quality, all wildlife and associated habitat (including wetlands), risk from accidents and malfunctions;
- potential effects to species at risk as per the *Species at Risk Act* (SARA), including any critical habitat, must be considered in alternative assessment, including a description of how avoidance of effects was considered and how it may be achieved through alternative means of carrying out the Project or alternatives to the Project;
- the preferred means of carrying out the Project and the rationale for the selection based on the consideration of environmental, health, social and economic effects, the impacts on the rights of Indigenous Peoples, technical and economic feasibility, and the use of best available technologies, and consideration of the sustainability principles (described in section 16 Sustainability);
- application of GBA Plus to the analysis of alternative means of carrying out the Project to inform how effects may vary for diverse 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:

- project layout and/or component size and locations;
- route or corridor options for linear project components (e.g. transmission lines, access roads (including public access roads), haul roads, natural gas pipelines, effluent pipelines);
- energy and power sources (temporary and permanent, stationary and mobile);

- aggregate supply sources (e.g. location of dedicated sources and/or suppliers);
- location, construction and crossing methods for waterbodies, watercourses, wetlands, and other obstacles;
- mining-related activities:
  - mining operations (open pit, underground); and
  - processing facilities location and design (e.g. comminution, separation, concentration and dewatering);
- mine waste and stockpile management (tailings, waste rock, overburden, low-grade ore), including:
  - tailings storage methods (e.g. conventional slurry, thickened, filtered tailings facility, co-deposition, re-use as partial pit backfill);
  - location of mine waste and stockpiles in consideration of groundwater flow, local groundwater users, as well as nearby rivers, lakes and wetlands;
  - methods of managing acid mine rock drainage, neutral metal mine drainage, and/or metal(loid) leaching potential of all excavated materials;
  - storage, management, and re-use of excavated materials (e.g. waste rock, overburden, topsoil); and
  - stockpile designs (e.g. height, slope pitch);
- water and wastewater management including:
  - water supply sources (potable and industrial, surface water and groundwater);
  - location of effluent discharge points (including temporary discharge locations during the construction phase, and ongoing discharge locations during the operations phase); and
  - treatment technologies and techniques to control effluent quality;
- domestic waste management (e.g. landfills, disposal facilities);
- timing options for components and phases of the Project;
- suspension, decommissioning, and abandonment options; and
- workforce hiring, scheduling and accommodation strategies.

For mine waste management facilities, an assessment of alternatives must be conducted in such a way that it clearly demonstrates that the chosen location is the most appropriate option for mine waste disposal from environmental, technical, economic, social and health perspectives. The assessment of alternatives shall include the following steps with all supporting documents and/or references (see Guidelines for the assessment of alternatives for mine waste disposal - Canada.ca):

1. Identification of candidate alternatives (including threshold criteria)
2. Pre-screening assessment
3. Alternatives characterization (including environmental, technical, economic and social considerations)

4. Multiple accounts ledger (including the determination and evaluation of impacts generated by each option)
5. Value-based decision process
6. Sensitivity analysis

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

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

5. Description of Public Participation and Views

The proponent must engage with local communities and stakeholders. Engagement activities should be inclusive and ensure that interested members of the public have an opportunity to share their views. They should also consider the language needs, with regards to official languages, of the people being engaged. Particular attention must be paid to the engagement of individuals and communities that have rights and interests in the lands affected by the proposed project.

The proponent should consult Agency guidance documents on this topic, particularly: Framework: Public Participation Under the Impact Assessment Act, and Guidance: Public Participation under the Impact Assessment Act. Additionally, the proponent would also consider public engagement methods and tools outlined in the Public Participation Plan for the Project.

5.1. Summary of public engagement activities

The Impact Statement must describe the proponent's public engagement activities regarding the Project, including:

- a record of engagement undertaken that describes all efforts, successful and unsuccessful, to seek the views of the public with respect to the Project;

- efforts made to distribute project information and the information and materials that were distributed during the consultation process;
- methods used, where consultations were held, the persons, organizations, and diverse population groups consulted;
- efforts made to involve the public in the development and revision of the proponent's Impact Statement, including collection and incorporation of community knowledge; and
- efforts to engage diverse population groups of the community to support the collection of information needed to complete the GBA Plus.

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

The Impact Statement must:

- provide a summary of key issues related to the Project, including the potential environmental, health, social and economic effects and potential for disproportionate effects for diverse population groups, which were raised through engagement with the public, or how they were incorporated into the Impact Statement;
- describe any questions and comments raised by the public and how they influenced the design of the Project;
- identify the alternative means, mitigation measures or the monitoring and follow-up programs identified to deal with public uncertainties;
- identify public concerns that have not been addressed, if any, and provide the reasons why they have not been; and
- provide details and commitments regarding how the public will be kept involved if the Project were to be approved and were to proceed, such as public involvement in follow-up and monitoring programs.

6. Description of Engagement with Indigenous Communities

The proponent must engage with Indigenous communities at the earliest reasonable opportunity in order to identify and understand the potential impacts of the Project on Indigenous Peoples and their rights, including the use of their lands, territories and resources, and to incorporate Indigenous Knowledge into the impact assessment. The assessment process will be conducted in a manner consistent with the Indigenous Engagement and Partnership Plan. Engagement with Indigenous communities 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. Ideally, the Project will be designed not only in such a way as to minimize its negative effects, but also to maximize its positive impact on the quality of life of Indigenous Peoples.

The proponent's engagement efforts should be consistent with the Government of Canada's commitment to implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP or 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 communities in decisions that affect them, their communities and their 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. The proponent's 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 the Indigenous communities that may be potentially impacted by the Project. In order to facilitate the participation of each Indigenous community in the development of the Impact Statement, the proponent is required to work with each Indigenous community identified in Section 4[6] of the Indigenous Engagement and Partnership Plan to establish a mutually agreed approach to their participation, should they wish to participate. The degree of engagement with each Indigenous community will vary and in general, will be proportionate to the evidence provided by Indigenous communities, regarding potential pathways of impact from the Project on Aboriginal and/or Treaty rights. Section 4.1 of the Indigenous Engagement and Partnership Plan identifies the Indigenous communities with whom the proponent must engage 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. Engagement with Indigenous communities must involve ongoing information-sharing and collaboration between the proponent and Indigenous communities 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.

For the purposes of the Impact Statement, for the Indigenous communities identified in Section 4.1 of the Indigenous Engagement and Partnership Plan, the proponent must:

- in accordance with any existing community protocols and/or guidance provided by the Agency, collect available Indigenous Knowledge and expertise and integrate it into its Impact Statement, just as it integrates scientific knowledge;

[6] The list of Indigenous Peoples or communities identified 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 and will notify the proponent of any modifications.

  - implement ceremonial practices (e.g. offering tobacco), as requested or advised by Indigenous communities prior to collecting Indigenous Knowledge and/or conducting baseline studies;
- share project information frequently and transparently with Indigenous Peoples;
- support the participation of Indigenous communities in the completion of the Impact Statement, which could include funding studies conducted by potentially affected Indigenous communities who will have demonstrated interest in this regard (e.g. baseline studies, Traditional Knowledge and Land Use studies; Indigenous-led evaluation of effects on health, social and economic conditions, Indigenous Knowledge and land uses, cultural and physical heritage, as well as Aboriginal or Treaty rights);
- cooperate with Indigenous communities to present information in a format requested by the Indigenous communities;
- engage with Indigenous communities to understand and discuss perspectives in order to seek agreement on the nature of potential impacts on Indigenous rights and interests and appropriate ways to address those impacts; and
- cooperate with Indigenous communities to identify preferred mitigation 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.

If the proponent becomes aware of potential adverse effects on the exercise of potential or established Aboriginal or Treaty rights of an Indigenous community that is not listed in section 4.1 of the Indigenous Engagement and Partnership Plan, that community must also be engaged, as outlined above, and the proponent is required to notify the Agency as soon as it has the opportunity to do so.

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. For any Indigenous communities who may be identified in the future in section 4.2[7] of the Indigenous Engagement and Partnership Plan, the proponent must, at a minimum, provide project updates at key milestones of the impact assessment process, and document the engagement in the Impact Statement.

The result of any engagement with each Indigenous community must be present in the Impact Statement, and, as best as possible, convey the perspectives of the Indigenous communities 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 communities regarding information specifically pertaining to those Indigenous communities that is presented in the Impact Statement.

The Agency notes that some Indigenous communities may prefer to assess the proposed Project through an Indigenous-led assessment. The Impact Statement will draw on available information approved for use by those Indigenous communities in accordance with Indigenous community's(ies') assessment

[7] At present, there are no Indigenous communities identified in section 4.2 of the Indigenous Engagement and Partnership Plan.

preferences and protocols, and with Indigenous Knowledge considerations (section 6.1). This may include existing data and information, inputs from engagement, and sources of Indigenous Knowledge.

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

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

6.1. Indigenous Knowledge considerations

Indigenous Knowledge[8] 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 aspects to inform the impact assessment, including the assessment of potential impacts on the biophysical environment, on health, social, and economic conditions and best practices and mitigation. 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 communities and their exercise of rights. It is also important to capture the context in which Indigenous communities 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 communities, including Indigenous Knowledge, has been incorporated and how it was considered. Information should be specific to the individual Indigenous community(ies) involved in the assessment and describe contextual information about the members within an Indigenous community (e.g. women, men, Elders and youth).

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

[8] 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.

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 community with respect to the 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 communities identified 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 communities, and to inform an assessment of the potential adverse impacts of the Project on Indigenous Peoples and their rights.

The record of engagement in the Impact Statement must include:

- the proponent's Indigenous engagement policy, as well as established policies and stated principles related to the collection of Traditional Knowledge and traditional land use information;
- the list of Indigenous communities engaged by the proponent, including those that the proponent was unsuccessful in engaging;
- the list of Indigenous communities wishing to be engaged but omitted by the proponent from engagement and the reasons for their omission;
- where applicable, a copy of each community-specific engagement plan developed collaboratively by the Indigenous community and the proponent for the Project. If only one engagement plan was developed for engagement with all Indigenous communities, provide a rationale for this approach);
- the engagement activities undertaken with each Indigenous community, including the date, means and results of engagement;
- a description of the outcomes of conversations with each Indigenous community about how they wish to be engaged by the proponent;
- the results of any engagement and the perspectives of the Indigenous Peoples involved;
- the list of the consultation or engagement protocols adopted by each Indigenous community, if applicable. A written copy of the protocols must be included, when available;
- 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 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 or provision of summaries in Indigenous languages);
- a description of how Indigenous communities were provided with a reasonable opportunity to review draft sections of the Impact Statement prior to them being filed, based on the mutually agreed approach to their participation, 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 groups identified by gender, age or other community-relevant factors (e.g. hunters, trappers, other harvesters, and Elders) to support the collection of information needed to complete the GBA Plus;
- a description of how engagement activities by the proponent were intended to ensure Indigenous communities were provided an opportunity to evaluate the Project's potential positive and negative effects and impacts on their members, communities, activities and rights, as identified by the Indigenous community(ies);
- where applicable, a description of Indigenous-led assessments and a summary of the scope, objectives and timelines of the assessments, as made available to the proponent; 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 communities were taken into account, and that timelines were adequately communicated and flexible enough to ensure Indigenous communities 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. The proponent should share engagement records with Indigenous communities on a routine basis prior to submitting the Impact Statement to the Agency. 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 communities 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 communities and impacts on the rights of Indigenous Peoples and of all the input received from Indigenous communities

with respect to the Project. This analysis is to include Indigenous Knowledge and all input received by Indigenous communities prior to, and since commencing, the impact assessment process. This analysis should serve to inform the identification of potential effects and impacts on any applicable VCs, impacts on Indigenous Peoples and their rights, and proposed measures to mitigate or accommodate for adverse impacts, enhance or optimize positive effects.

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

It is recommended that the proponent organize and analyze information relevant to Indigenous communities in separate sections for each community potentially affected by the Project, either by Nation, community, or other grouping based on the preference expressed by those people. 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.

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 communities (e.g. observations, issues, knowledge);
- describe the potential effects and impacts to environmental, health, social, cultural and economic conditions of each Indigenous community, informed by the Indigenous community(ies) involved in the assessment and must include both adverse and positive effects;
- describe the potential effects to Indigenous Peoples' 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 an Indigenous community involved in the assessment;
- describe the rights or interests of each Indigenous community, that the communities themselves have identified and consented to including in the Impact Statement, that 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 each Indigenous community regarding the extent of impact on the exercise of rights as well as how these effects and impacts may be avoided, managed, mitigated or accommodated;
- detail the main issues, questions and comments raised by each Indigenous community 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 communities, if permission has been obtained from the Indigenous community concerned 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 Indigenous youth, women, two-spirited people, individuals with disabilities, Elders, and other community-relevant factors where provided;
- indicate where and how Indigenous communities' Indigenous Knowledge, perspectives, participation, and input were integrated into or contributed to decisions regarding the Project or its impact assessment, including:
  - the construction, operation, decommissioning, abandonment, and reclamation plans, including final land use plans for the site (e.g. decommissioning of water management infrastructure on site);
  - the evaluation of alternatives to the Project, and alternative means of carrying out the Project (e.g. selection of the effluent discharge location);
  - developing the assessment including setting spatial and temporal boundaries, identifying and selecting VCs and sensitive receptor locations, and collecting baseline information (e.g. fish studies and moose),
  - the validation of model assumptions (e.g. the rate of country food consumption);
  - characterization of potential environmental, health, social and economic effects of the Project for each Indigenous community,
  - the cumulative effects assessment;
  - measures to mitigate effects or to enhance or optimize potential project benefits, including compensation and offset plans (as listed in Appendix 1 – Compensation and offset plans) and measures of success;
  - the determination of the extent of significance of effects;
  - follow-up and monitoring activities as well as adaptive management strategies should the Project proceed; and
- describe how the information gathered during the Planning Phase of the impact assessment of the Project was included, including the documents submitted to the Registry by Indigenous communities during that phase of the impact assessment.

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

The proponent must explain in the Impact Statement how it plans to continue to work with affected Indigenous Peoples during subsequent phases of the impact assessment process and throughout the lifecycle of the Project, should the Project 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 communities during subsequent phases of the impact assessment process;
- set out any proponent commitments for engaging affected Indigenous communities, where appropriate;
- describe how Indigenous Peoples will be involved in decision-making processes related to the Project throughout its lifecycle; and
- describe how Indigenous Knowledge and expertise 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 communities provides input that may describe how environmental, health, social and economic conditions are interrelated.

Baseline data must be collected in a manner to allow for reliable analysis, extrapolation and predictions. The proponent will be responsible for collecting the data, establishing appropriate data governance, and performing reliable analysis, extrapolation, and predictions. The baseline data should be suitable to estimate pre-project baseline conditions, to predict effects from the Project, and to evaluate post-project changes in the conditions within and across the Project, local and regional study areas. Further data requirements are included in the specific baseline conditions sections for biophysical environment (section 8), for the health, social and economic conditions (sections 9, 10,11), and for impacts on Indigenous Peoples (section 12) in the Guidelines.

Ethical guidelines and relevant cultural protocols governing research, data collection and confidentiality must be adhered to. This is particularly important in the case of information gathered and studies conducted with diverse vulnerable population groups (e.g. analysis of gender-based violence). 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 community). For all 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 future climate change;
- include baseline data collected in a way that makes analyses, extrapolations and reliable predictions possible, and are suitable to estimate pre-project baseline conditions, to predict effects from the Project, and to evaluate post-project changes in the conditions within and across the project study area, LSA and RSA;
- provide detailed descriptions of data sources and data collection methods, including sampling, survey and research protocols, modelling methods, sources of uncertainty, error estimates and any assumptions or biases, and an explanation of why these are the most appropriate sources and methods for the Project;
- describe modelling methods and include assumptions, calculations of margins of error, and other relevant statistical information. Models should be validated using field data from the appropriate LSA and RSA;
- 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;
- describe how GBA Plus was applied to examine differences in baseline conditions among diverse population groups and provide disaggregated data where necessary; and
- describe how any ongoing or completed regional assessment in the proposed PA or any relevant strategic assessments were considered in determining baseline conditions.

Proponents are encouraged to consult with the Agency during the development and planning of baseline studies[9]. 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 consist 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.

[9] Of particular note, the potential for project contributions to methylmercury production in downstream watersheds requires a detailed and robust analysis. The proponent must submit a study plan to the Agency with sufficient time to facilitate a review by experts and interested parties and to inform the studies undertaken. This includes establishing baseline methodology and effects assessment methodology related to methyl mercury as outlined in section 8.6 Groundwater and Surface Water and 8.8 Fish and Fish Habitat.

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

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

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

- VC presence in the PA, LSA and RSA;
- the extent to which the effects of the Project and related activities have the potential to interact with the VC;
- the extent to which the VC may be affected by other past, existing or future projects and activities and natural processes;
- the extent to which the VC is linked to Indigenous interests or rights of Indigenous Peoples and whether an Indigenous community has requested the VC;
- the extent to which the VC is linked to a federal, provincial, or municipal government priority;
- the views of Indigenous communities, the public, or federal, provincial, municipal or Indigenous governments on the adverse or positive effect on the VC;
- information from any ongoing or completed regional or strategic assessment processes; and
- whether the potential effects of the Project on the VC can be measured and/or monitored or would be better ascertained through the analysis of a proxy VC.

The Impact Statement must:

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

Based on comments from participants during the Planning Phase of the impact assessment of the Project, the following non-exhaustive list of VCs has been raised as important to consider in the assessment:

- fish and fish habitat, including;
  - lake whitefish, walleye, lake trout, and lake sturgeon (Winnipeg River – English River populations, henceforth referred to as lake sturgeon), including spawning habitat and methylmercury in fish tissue;
  - water quality and flows in the Chukuni River, and anywhere downstream that may have pre-existing mercury contamination; and
  - small lakes and watercourses near the tailings management facility;
- migratory birds listed under the *Migratory Birds Convention Act*, 1994;
- species at risk listed under the *Species at Risk Act* including woodland caribou (boreal population; henceforth referred to as boreal caribou), wolverine, bats and birds, and habitat recovery goals;
- current use of lands and resources for traditional purposes and the physical and cultural heritage of Indigenous Peoples, including:
  - ability to hunt, fish, trap, gather, and continue spiritual and cultural practices;
  - species identified by Indigenous communities in section 12.1 Indigenous physical and cultural heritage, and structures, sites or things of significance and section 12.2 Current use of lands and resources for traditional purposes; and
  - access to Rice Lake;
- health, social and economic conditions of Indigenous Peoples, including:
  - quality of accessible country foods and drinking water;
  - accessible housing, health care, community infrastructure, and social services;
  - access to training, employment, economic development and business opportunities;
  - inclusivity and well-being in the mining workforce; and
  - community safety and well-being;
- local and regional economic conditions and trends.

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

7.3. Spatial and temporal boundaries

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

The proponent must engage with Indigenous communities 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 communities in its definition of spatial and temporal boundaries, particularly for VCs related to effects to 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);
  - community knowledge and Indigenous Knowledge;
  - current or traditional land and resource use by Indigenous communities;
  - rights of Indigenous Peoples, including treaty lands, traditional territories and areas or sites used for cultural and spiritual practices;
  - 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 RSAs;
- any ongoing or completed regional assessment in the proposed PA or any relevant strategic assessments; and

- identify where spatial boundaries may extend to areas that are (i) on federal lands, (ii) in a province other than the one where the physical activity or the Project is being carried out, or (iii) outside Canada where effects are expected.

7.3.2. Temporal boundaries

The Impact Statement must:

- describe the temporal boundaries for each VC and provide a rationale for each boundary; and
- 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 communities,
  - 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,
  - timing of past, present and foreseeable projects and activities including any foreseeable expansion and delay of decommissioning in the event that other source mines are developed; and
  - any ongoing or completed regional assessment in the proposed PA or any relevant strategic assessments.

7.4. Effects assessment methodology

The Impact Statement must describe the changes to the environment or to the health, social or economic conditions and the positive and negative consequences of these changes (the effects) that are likely to be caused by the carrying out of the Project, and the results of interactions among the effects. This includes the effects to Indigenous Peoples' physical and cultural heritage, current use of lands and resources for traditional purposes, any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and any change occurring in Canada to the health, social or economic conditions of the Indigenous Peoples of Canada. The overall effects assessment methodology must also consider the Project's potential interference with the exercise of rights of the Indigenous Peoples of Canada as further detailed in section 12. 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. 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 socioeconomic conditions). The assessment of effects should also provide the probability or likelihood of that effect occurring and the degree of confidence in the

analysis. The assessment of effects must use methods that are statistically and scientifically defensible and must describe the degree of uncertainty related to the data and methods used and reflect community and Indigenous Knowledge if it is available.

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 Project and past, existing and reasonably foreseeable projects or physical activities to be carried out, as described in section 7.6 Cumulative effects assessment.

Depending on the VC, the description of the effects can be either qualitative or quantitative, taking into account any important contextual factors, as appropriate. The Impact Statement 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 socioeconomic context should also be provided. The perception of the same effect may vary among different individuals, groups and communities. Consequently, the effects assessment should take into account views and concerns expressed through engagement with Indigenous Peoples and community members.

The Impact Statement must:

- describe in detail the Project's potential direct and indirect, adverse and positive effects for each phase of the Project, as applicable specify adverse effects within federal jurisdiction and direct or incidental adverse effects, as defined in section 2 of the IAA;
- 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;
- describe how baseline data were 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, and provide clear definitions of any criteria or descriptors used[10];
- 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;

[10] The potential for project contributions to methylmercury production in downstream watersheds requires a detailed and robust analysis. The proponent must submit a study plan to the Agency with sufficient time to facilitate a review by experts and interested parties and to inform the studies undertaken. This includes establishing baseline methodology and effects assessment methodology related to methyl mercury as outlined in section 8.6 Groundwater and Surface Water and 8.8 Fish and Fish Habitat.

- 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 decommissioning and abandonment). The proponent should confirm the rationale with the Agency before submitting the Impact Statement;
- for predictions that may be affected by climate change, discuss how the range of potential climates informed the assessment, including predicted changes in climate extremes;
- consider and describe the interactions among the environmental, health, social and economic effects and impacts on Indigenous Peoples and their rights;
- consider and describe the perspectives, concerns and tolerance levels of Indigenous communities and other participants;
- describe where and how community knowledge and Indigenous Knowledge and input were considered and incorporated into effects assessment;
- describe how GBA Plus was applied to examine differences in effects among diverse population groups and provide disaggregated data where necessary; and
- describe how any ongoing or completed regional assessment in the proposed PA or any relevant strategic assessments were considered in the effects assessment.

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 effect, and changes to health, social or economic conditions, identified in the effects assessment including:
  - mitigation practices, policies and commitments that are part of the Project design and that are required to achieve the predicted effects (e.g. project design elements that were accounted for in the effects assessment);

  - standard mitigation practices, policies and commitments that constitute proven technically and economically feasible mitigation measures and that are to be applied as part of standard practice; and
  - any new or innovative mitigation measures being proposed;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on diverse population groups, or so they are not disadvantaged in sharing any development benefits and opportunities resulting from the Project. These mitigation measures should be developed in collaboration with those who are vulnerable and/or disadvantaged;
- write mitigation measures as specific commitments that clearly describe how the proponent intends to implement them and the desired outcomes. Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation;
- identify and describe the use and application of best available technology and best environmental practice in identifying, assessing and implementing mitigation measures;
- describe any environmental protection plan(s) for the Project and, if applicable, the environmental management system through which the proponent will deliver this plan. The plan(s) must provide an overall perspective on how potentially adverse effects would be minimized and managed over time;
- identify the party responsible for the implementation of mitigation measures and the system of accountability;
- discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with any commitments;
- describe the approach that would be taken if a mitigation measure is no longer feasible while the Project is carried out;
- describe how, throughout the Project's duration, the lessons learned through follow-up programs will be used to continually improve mitigation measures;
- where components are to be decommissioned and abandoned, include planned activities to do so. Project components that may be decommissioned and abandoned 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 company commitment in relation to decommissioning or abandonment;
- document specific suggestions raised by Indigenous communities for avoiding, mitigating or otherwise accommodating the Project's environmental, health, social and economic effects, including potential effects and impacts on Indigenous Peoples 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;

- identify 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;
- where appropriate, describe any adaptive management plans that will be implemented to address uncertainties associated with the effectiveness of mitigation measures included in a follow-up program (see section 17.4 Adaptative 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;
  - 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;
- describe any relevant federal, provincial, regional or municipal legislative or regulatory frameworks (such as regulations, approvals, and programs) that will contribute to the management of effects; and how they will contribute to the management of effects (see section 3.3 Regulatory framework and the role of government).

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 Knowledge and community knowledge;
- describe all relevant uncertainties and assess how they could affect predicted residual effects;
- if there is little experience or some question as to the effectiveness of any measures, describe the potential risks and effects should those 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 communities 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.

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

7.6. Cumulative effects assessment

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

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

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

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

The Impact Statement must:

- identify the VCs that will be subject to the cumulative effects assessment, including:
  - VCs for which the proponent anticipates residual effects from the Project (must be considered in the cumulative effects assessment);
  - VCs identified as being of particular concern in the context of cumulative effects by the public and by Indigenous communities;
  - VCs where the predicted residual effects might not indicate the need for a cumulative effects assessment, but rely heavily on uncertain mitigation measures; and
  - VCs for which cumulative effects were identified as a concern during the Planning Phase of the impact assessment of the Project, including:
    - fish and fish habitat;
    - migratory birds;
    - species at risk, including boreal caribou;
    - current use of lands and resources for traditional purposes by Indigenous Peoples, including hunting, trapping, gathering, and experience of using the land (e.g. potential impacts from other mining, forestry and industrial activity, and new roads and transmission lines); and
    - the health of Indigenous Peoples (e.g. potential changes in the surrounding watershed and downstream water quality from effluent discharge and past industrial development);
- include a rationale if VCs are excluded from the cumulative effects assessment;

- identify and justify the spatial and temporal boundaries for the cumulative effect assessment for each VC selected, taking into account:
  - boundaries may differ for each VC and should not be constrained by jurisdictional boundaries (for example, for downstream effects to watersheds, both the Chukuni and Wabigoon watersheds would be considered);
  - spatial and temporal boundaries will generally be larger than the boundaries for the project effects alone, and may extend beyond Canada's jurisdiction;
  - temporal boundaries should account for potential effects throughout the lifecycle of the Project, including decommissioning and abandonment; and
  - spatial and temporal boundaries for VCs related to effects and impacts on Indigenous Peoples defined in collaboration with the Indigenous communities concerned;
- identify the sources of potential cumulative effects. Specify which other projects or activities that have been or will be carried out that could have resulted or could result in effects on the selected VCs within the defined boundaries and whether those effects could interact with the residual effects of the Project. Clearly explain and justify the rationale for selecting other past, existing or future projects or activities to include in the cumulative effects assessment. Project activities to be considered include, but are not limited to:
  - past, existing or future mining activities or projects;
  - mineral exploration activities near the Project;
  - any potential extension and expansion of the processing and mine waste management in the PA as a result of other source mines being developed;
  - timber harvest and forest management in the surrounding forest management units;
  - transmission lines;
  - hydroelectric facilities; and
  - waste management practices, including landfills;
- consider the results of any relevant regional studies or regional assessments;
- 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, lifecycle regulators, jurisdictions, federal authorities and other participants;
- assess the cumulative effects for each selected VC:
  - the analysis must include the effects of past, existing and future projects and physical activities in combination with the residual effects of the Project, taking into account how the effects may interact (additive, synergistic, compensatory, and masking effects);
  - the analysis of the effects of future projects and physical activities must include a comparison of possible future scenarios with and without the Project, but must reflect the full range of cumulative effects and not just the Project's contribution;
  - the effects of past and existing projects and physical activities can be used to put the current state of the VC into context, but must be included in the cumulative effects analysis; and

  - cumulative effects for the same VC may need to be assessed using a hierarchy, e.g. effects on local populations of certain species and on the larger populations;
- describe technically and economically feasible mitigation measures proposed for cumulative environmental effects, and changes to health, social and economic conditions, as well as potential impacts on the rights of Indigenous Peoples, including:
  - an assessment of the effectiveness of the measures proposed to mitigate the cumulative effects; and
  - in cases where measures to mitigate these effects are beyond the control of the proponent, identify any parties that have the authority to act on these measures. In such cases, the Impact Statement must summarize any commitments by the other parties regarding implementation of the necessary measures and any associated communication plans;
- assess the regional implications of applying project-specific mitigation and enhancement measures, taking into account any reasonably foreseeable development in the area; and
- develop a follow-up program to verify the accuracy of the assessment and the effectiveness of mitigation measures for cumulative effects (see section 17 Follow-up programs).

Where there is the potential for residual effects after mitigation, in relation to the ability of Indigenous Peoples to exercise their rights due to the Project, the Impact Statement must include a cumulative effects assessment for those residual effects. Both the content and means of presenting this information is to be developed in consultation with each potentially impacted Indigenous community. Where provided with information, the proponent must also document the lived and told experience of the changes in relation to the ability of Indigenous Peoples to exercise their rights and culture through time in collaboration with Indigenous communities. If Indigenous communities do not wish to participate in the cumulative effects assessment, the proponent should continue sharing information and analyses with the Indigenous communities, 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, 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 diverse population groups as per GBA Plus;
- characterize the extent to which the residual adverse 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 effects 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 or 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 communities and other participants were considered.

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

The best practices described in the Agency's technical guidance document for Describing effects and characterizing extent of significance may be considered for the characterization of residual effects as applicable.

8. Biophysical Environment

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

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

- primary, secondary and tertiary watersheds as per the province's Ontario Watershed Boundaries;
- waterbodies and watercourses, including intermittent and ephemeral streams;
- wetlands as per the province's Ontario Land Cover Compilation v.2.0; and
- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Landscape Classification (see Introduction to the Ecological Land Classification (ELC) 2017).

8.1. Meteorological environment

The Impact Statement must:

- describe the local and regional climate, in sufficient detail to highlight weather variations and characteristics of the regions affected by project activities and components, including historical records of relevant meteorological information;
- provide summary data and the reference to underlying data source, including unique weather stations identifiers for:
  - monthly mean, maximum, and minimum temperatures;
  - monthly mean, maximum, and minimum precipitation;
  - typical wind speed and direction; and
  - 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 geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components;
- describe the geology of the bedrock and unconsolidated sediments at an appropriate scale for the Project, including a table of geological descriptions, geological maps, geophysical information, satellite imagery, and cross-sections at the appropriate scale;
- identify on geological maps the location of areas of bedrock outcrops, highlighting locations 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 induced earthquakes, and secondary effects such as the risk of generated landslides and liquefaction;
  - evidence of active faults;
  - isostatic rise or subsidence; and
  - history of landslides, slope erosion and the potential for ground and rock instability/landslides, and subsidence during and following project activities; and
- 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:

- describe potential effects of the Project in areas of geological instability caused by historical mining activities; and
- potential for increased landslides, slope erosion and potential for ground and rock instability/landslides, and subsidence during all Project phases (construction, operation, decommissioning, and abandonment).

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, such as waste rock, ore, low-grade ore, pit wall materials, underground development ramps, process waste (i.e. tailings, treatment sludge), overburden, and potential construction material (i.e. mine rock, quarries, unconsolidated material), whether sourced on-site or transported to the site from external sources. The program should be designed to meet the requirements in section 8.6.2 Effects to groundwater and surface water and in consideration of the advanced exploration project and metallurgical testing of the bulk sample.

In particular:

- provide a detailed summary of analytical methods used to evaluate mineralogy, acid rock drainage, neutral mine drainage, metal(loid) leaching, and the potential release of other substances to meet the requirements in section 8.6.2 Effects to groundwater and surface water. The Mine Environment Neutral Drainage (MEND) report 1.20.1 is recommended as guidance to support study design plus the Government of Canada Screening Assessment – Cyanide (2023) and the Risk management approach for cyanides;
- 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, including with respect to cyanide destruction and desulfurization, if applicable;
- describe the approach and methods for the prediction of acid rock drainage, neutral mine drainage, and metal(loid) leaching, including identification of potential parameters of concern based on the testing program above. 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 test results;
- describe the quality assurance/quality control procedures. Provide laboratory certificates of analysis that include information related to analytical methodology and quality assurance/quality control; and
- provide estimates of the potential for all materials to be sources of acid drainage, neutral mine drainage, metal(loid) leaching, and the potential release of other substances to meet the requirements in section 8.6.2 Effects to groundwater and surface water, timing to its onset, and short- and long-term loading rates calculated from kinetic testing for both neutral and acidic conditions, with consideration for the use of a proxy (i.e. mine waste from on-site advanced exploration activities,

analytical tests replicating acidic conditions) if kinetic tests have not produced acidic leachate, if applicable.

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 materials mined or excavated on site, and geological materials transported onto the site, to inform assessment of effects on groundwater and surface water quality (section 8.6.2 Effects to groundwater and surface water), which are then used to inform on necessary mitigation measures, including:

- present chemical release rates from all major sources of mine or excavated materials and mine wastes for all materials described in section 8.3.1 Baseline conditions; 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 project phases considering:
  - the results of the geochemical characterization study that evaluated the potential for acid rock drainage, neutral mine drainage, and/or metal(loid) leaching and the potential release of other substances to meet the requirements in section 8.6.2 Effects to groundwater and surface water;
  - exposure of potentially acid generating and/or metal(loid) leaching rock in pit walls;
  - baseline groundwater and surface water quality as described in section 8.6.1 Baseline conditions;
  - potentially acid-generating rock volumes and tonnage for the lifecycle of the Project; and
  - mine waste disposal, management and mitigation methods and their effects on acid rock drainage, neutral mine drainage, metal(loid) leaching and the potential release of other substances to meet the requirements in other sections such as 8.6.2 Effects to groundwater and surface water and 9.2.1 Biophysical determinants of health;
- 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; and
- 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 operation, and to identify non-potentially acid generating and/or metal(loid) leaching mine rock to be used for construction purposes;

- describe methods for the prevention, monitoring, management, and control of acid rock drainage, neutral mine drainage, metal(loid) leaching, and the potential release of other substances to meet the requirements in other sections such as 8.6.2 Effects to groundwater and surface water and 9.2.1 Biophysical determinants of health during all project phases (considering the mine waste characterization program in section 8.3.1 Baseline conditions); and
- describe tailings management strategies, including:
  - characterization of tailings to be backfilled and tailings to be stored on surface considering the requirements in section 8.3.1 Baseline conditions;
  - 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;
  - disposal sites and dimensions, including their location on the landscape following decommissioning;
  - feasibility and effectiveness of different reclamation strategies (i.e., various wetland landscapes and dry landscapes), the use of covers and consideration of their long-term performance, including after decommissioning;
  - 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;
  - identify the limits of proposed tailings treatment technologies at decommissioning; and
  - a plain language summary of options for, and approach adopted for tailings management.

8.4. Topography, soil and sediment

8.4.1. Baseline conditions

The Impact Statement must:

- describe the terrain, soils, and sediments within the LSA and RSA, including sediment stratigraphy. Provide surficial geology maps and cross-sections of appropriate scale;
- describe and map landforms associated with important wildlife habitat features including elevated land forms, eskers, ridges, rock outcrops, exposed bedrock;
- provide a description and location of any erosion-sensitive soils and areas of ground instability;
- describe the suitability of topsoil and overburden for use in the reclamation of disturbed areas including an assessment of the acid generating potential of overburden to be used;
- describe the historical land use and the potential for contamination of soils and sediments; and
- describe any known or suspected soil or sediment contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the Project.

8.4.2. Effects to Topography, soil and sediment

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

- changes to general topography and the view scape from locations of interest;
- potential and likelihood of problematic erosion from movement or redistribution of soil and overburden, vegetation clearing, and watercourse diversions;
- potential and likelihood of re-suspended, releasing or otherwise disturbing known or suspected soil or sediment contamination; and
- potential and likelihood of changes to soil quality and fertility, loss, and compaction.

8.5. Atmospheric, acoustic and visual environment

8.5.1. Baseline conditions

The Impact Statement must:

- characterize the ambient air quality in the PA, LSA, and RSA, and identify existing emissions and contaminant sources;
- provide baseline ambient air concentrations for contaminants in the LSA, in particular near key receptors (refer to section 9.2.1 Biophysical determinants of health) (e.g. traditional land users, wildlife) for the following:
  - total particulate matter;
  - particulate matter less than 2.5 microns ($PM_{2.5}$);
  - particulate matter less than 10 microns (PM_{10});
  - carbon monoxide (CO);
  - sulphur dioxide (SO_2);
  - nitrogen dioxide (NO_2) and nitrogen oxides (NOx);
  - ozone (O_3);
  - volatile organic compounds (VOCs)[11], 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;

[11] In addition to relevant VOCs, it is recommended to assess specific aldehydes that are associated with diesel exhaust, such as acetaldehyde formaldehyde, 1,3-butadiene, and acrolein, as well as benzene, for the evaluation of VOCs.

  - diesel particulate matter; and
  - any other relevant air pollutants from mobile, stationary or fugitive sources, including contaminants produced by the combustion of diesel fuel;
- compare ambient air quality results with applicable regional, provincial, and federal standards. For air pollutants with standards, the comparison must use the same averaging period and the statistical format associated with each numerical value;
  - standards include Canadian Ambient Air Quality Standards (CAAQS), National Ambient Air Quality Objectives, or relevant provincial criteria and 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 for 2020 and 2025;
  - relevant provincial criteria and standards include Ontario's Ambient Air Quality Criteria (https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria);
- describe deposition through either existing long term, or new monitoring data for a duration of a minimum of one year;
- describe the data collection methods and data source(s), including data validation 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 representative monitoring data, collected over an appropriate duration and geographic scope;
- if modelling is undertaken to understand baseline ambient air quality, then describe direct and indirect sources of baseline air emissions, including mobile, stationary, and fugitive, and provide an inventory, within the care and control of the proponent, of all machines that are sources of baseline air emissions;
- provide current ambient noise levels at key receptor points around the Project (e.g. traditional land users within or outside the property boundary, and wildlife), including the results of a baseline ambient noise survey and permissible noise levels for each receptor. The information on usual noise sources (natural or anthropogenic), their geographic extent and temporal variations must be included. At the time of collecting baseline data for the study on ambient noise where there are human receptors, it is recommended that the following aspects be considered:
  - natural sounds;
  - soundscapes (see ISO 12913-1:2014. Acoustics — Soundscape — Part 1: Definition and conceptual framework);
  - expectations regarding quiet conditions in specific places or at specific times; and
  - degree of baseline annoyance attributable to existing noise sources (e.g. vehicle traffic);
- justify the selection of and provide information on all noise sensitive receptors in the study area, including any foreseeable potential receptor and the distance between the receptors and the Project;
- describe existing ambient night-time light levels at the project site and at any other areas where project activities could have an effect on light levels;

- describe night-time illumination levels during different weather conditions and seasons; and
- describe landscapes of interest, visual screens, and other components of the visual environment, and locate them on maps.

The proponent should consult the additional guidance for atmospheric environment provided in Appendix 1 - 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 of air pollutants from the Project listed under 8.5.1.Baseline conditions, for all phases of the Project;
- provide detailed methodology and assumptions used to estimate emissions of air pollutants released;
  - all relevant emission factors should be provided and referenced;
  - for all applicable emission sources, include the assumed tier of emission standard for each emission factor applied; and
  - provide details of the achievement of emission standards for each mobile and stationary machine used in the Project;
- use atmospheric dispersion modelling to predict the fate of air pollutants resulting from project-related emission sources, with a big enough domain to identify potential air quality impacts on all sensitive receptors, and provide appropriately scaled contour map(s)[12] plotting the predicted pollutant levels for all phases of the Project (see Appendix 1 - Guidance for biophysical components for guidance on dispersion modelling);
  - determine whether the formation of secondary pollutants (pollutants which are not directly emitted but form when other primary pollutants react in the atmosphere) resulting from the Project under assessment has the potential to raise concentrations above baseline levels – if so, identify and characterize these pollutants;
- provide the rationale for the choice of air quality model, including the type and magnitude of emissions, the complexity of sources, terrain and meteorology, or for why modelling is not being used to predict fate of air emissions;
- provide justification for all control efficiencies used to reduce emission rates of sources within the model, including details of all assumptions associated with the related mitigation measures, and their achievability;

[12] Extend contour maps within property boundary in areas where traditional land uses will be allowed to continue, if any.

- assess the uncertainty in the modeled air pollutant concentrations using relevant range of model inputs. All sources of uncertainty should be taken into account, including:
  - model uncertainty, including a consideration for how uncertainty in modeled predictions may vary spatially and temporally; and
  - uncertainty in baseline concentration estimates, in the estimates of meteorological inputs, and in estimates of source emissions and control efficiencies (from sources attributable to the Project, and externally);
- conduct a source contribution analysis to assess the relative contributions of project and non-project emission sources on pollutant concentrations at key receptors. The source contribution analysis should be conducted for all pollutants that exceed 10% of the relevant guidance or standard value. Emission sources should be grouped into appropriate categories;
- model particulate matter emissions from unpaved road dust both with and without implementation of mitigation measures during the construction and operation phases. Mitigation measures with varying control efficiency scenarios should be modeled such as 50% and 70% control efficiency;
- assess effects to receiving environment through:
  - comparison of predicted air pollutant levels to the most stringent applicable federal or provincial air quality criteria and standards, including the Canadian Ambient Air Quality Standards (CAAQS). The assessment against CAAQS should be based on the principles of “keeping clean areas clean” and continuous improvement, and in the context of air sheds and air zones with the Air Quality Management System;
  - comparison with critical thresholds (consider current, historical loadings, buffering capacity, including Acid Deposition Critical Loads);
  - comparison with sensitive ecological receptors (consider effects thresholds of species in question); and
  - comparison to other appropriate existing guidelines, objectives, or standards, where relevant. This includes regional and community-based air quality guidelines;
- describe changes in ambient vibration and sound levels resulting from the Project at potential receptor locations (such as the mine site, potential nearby sensitive fish habitat, and nearby locations for potential Indigenous wild rice harvesting, and around the Project as indicated above) and how they might impact the perception of nonanthropogenic sounds. Describe the anticipated frequency and timing of changes in ambient vibration and other sound levels such as changes that might occur from blasting;
- for project activities that result or may result in an increase in sound emissions during any phase of the Project:
  - quantify sound levels at appropriate distances from any project facility and/or activities and describe, for each contributing source, the timing (e.g., hours of night-time activities), number and duration of noise events, and their sound characteristics, including frequency spectrum;
  - provide the baseline hourly distribution of individual noise events at night compared to that of predicted individual noise events at night, at each receptor location;

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

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Effects in Impact Assessment: Noise and Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality[13] 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.

It is recommended that the proponent consult with the Ontario Ministry of the Environment, Conservation and Parks prior to initiating ambient air quality monitoring as described in the Operations manual for air quality monitoring in Ontario, to support the development of a monitoring plan.

The proponent should also refer to the Ontario Ministry of Environment, Conservation and Parks Environmental Noise Guideline – Stationary and Transportation Sources for additional guidance on the proper control of sources of noise emissions to the environment.

[13] These resources provide guidance for assessing effects to human health. The Proponent is encouraged to use this guidance with a focus on assessing impacts to the health of Indigenous Peoples.

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:

- describe all methods and practices to be deployed to reduce and control emissions, including details on actions, triggers, and frequency of mitigation measures. If the best available technologies are not included in the project design, the proponent should provide a rationale for the technologies selected;
- document and justify how the contaminant emission reduction efficiencies were applied in the calculation of emission rates, including details of all assumptions associated with these mitigation measures and their feasibility;
- provide a description of existing and planned measures to reduce odours and dust, including a description of improvements to existing infrastructure, as applicable;
- provide a description of 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 which are 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, common noise mitigation measures, the performance efficiency of the noise control devices, the best practices programs, and the continuous improvement programs, and establish the need for follow-up monitoring for the purposes of validation of the model or due to any concern raised by participants, including a complaint resolution process as appropriate; and
- provide a lighting management plan, including the planning and management of lighting and of the ambient light for every activity site and the consideration of measures for the reduction of excessive light during construction and operation. Consider the following options of measures for lighting management:
  - avoid or minimize the use of artificial light;
  - select low-intensity lighting;
  - use lighting fixtures that limit or concentrate the lighting to targeted areas and avoid light spilling out of the spaces to be illuminated;
  - limit the projection of light toward the sky by using fixtures that produce dark, uniform lighting that meets actual lighting needs;
  - avoid the emission of light at more than 90 degrees; and
  - avoid lights that emit blue/green/white/UV wavelengths.

8.6. Groundwater and surface water

8.6.1. Baseline conditions

The Impact Statement must:

- provide complete hydrometeorological information (temperature, precipitation, evapotranspiration), based on data from nearby weather stations or from a weather station on site;
- 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 the new water crossings and any watercourse diversions;
- provide a list of all waterbodies and watercourses (permanent, intermittent, and ephemeral) that may be directly or indirectly affected by the Project. Provide a table that groups waterbodies and watercourses by sub-watershed and provides the following information about each:
  - type of watercourse impacted (e.g. lotic or lentic system, lake, river, pond, temporary or permanent stream); and
  - size of the waterbodies and watercourses, as applicable (e.g. width at the ordinary high water mark, length, or area);
- provide flow hydrographs and corresponding water levels for nearby streams and rivers showing the full range of seasonal and inter-annual variations, as well as seasonal low-flow for baseflow quantification;
  - hydrographs may be based on data from nearby gauging stations that are representative of the ungauged site, or from gauging stations on site. Data should be site-specific, avoiding regional datasets where possible;
  - approach used should take into account the need to provide information for use in fish habitat characterization and effects assessment as guided by the Canadian Science Advisory Secretariat's Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada; and
  - for the Chukuni River, describe additional context from the Lake of the Woods Control Board Policies, including any upper and lower water level limits, minimum flow requirements, and unnatural daily seasonal variation;
- provide stage hydrographs for lakes expected to be affected by the Project showing the full range of seasonal and inter-annual water level variations;
- for each waterbody and watercourse potentially affected by the Project, provide a description of ice cover, thickness and conditions, and the timing of freeze-thaw cycles;

- provide for each waterbody potentially affected by the Project, bathymetry, maximum and mean depths, vertical profile information, information on stratification and turnover, and sediment composition (e.g. particle size analysis and sediment quality);
- using traditional field and mapping techniques, provide a delineation and characterization of groundwater–surface water interactions, including an identification of groundwater-dependent ecosystems, wetlands, discharge and recharge areas that are potentially affected by the Project;
  - the chosen field and mapping techniques should take into account the potential effects that changes to groundwater-surface water interactions have on fish and fish habitat;
- develop a quantitative surface water balance for watersheds potentially affected by the Project, detailing water intake and outflow to the environment;
- describe the surface water, groundwater and sediment quality baseline characterization program, including sampling site selection and locations (upstream, within the zone of influence of the Project, and downstream), monitoring duration and frequency, sampling methodology, and analytical protocol, including quality assurance and quality control measures;
  - describe the incorporation of any applicable historical data or existing information; and
  - the characterization program should include sampling locations within the PA, the 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; and
  - 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;
- describe baseline concentrations for relevant physicochemical parameters and chemical constituents in relation to applicable water quality and sediment guidelines;
- identify the physicochemical parameters, biological parameters, and chemical constituents for surface water that can contribute to the methylation of mercury, using established scientific sources;
  - at a minimum, these parameters must include sulphate, pH, Dissolved Organic Material, mercury ions (Hg^{2+}), copper ions (Cu^{2+}), and iron ions (Fe^{3+});
- provide the baseline data for relevant physicochemical parameters, biological parameters and chemical constituents for surface water that can contribute to the methylation of mercury, from locations both upstream and downstream of the Project including anywhere that project effects may interact with pre-existing mercury contamination;

- identify springs and any other potable surface water resources within the LSA and RSA, and describe their current use, potential for future use, and whether their consumption has Indigenous cultural importance (refer to section 12.2 Current use of lands and resources for traditional purposes);
- identify domestic, communal or municipal water wells within the LSA and RSA, and provide information on their depth, distance from the Project, stratigraphy, screened hydrostratigraphic unit and piezometric level and capacity, and describe their current use, potential for future use, and whether their consumption has any Indigenous cultural importance (refer to section 12.2 Current use of lands and resources for traditional purposes);
- identify groundwater-producing strata (coarse-grained sediments and permeable bedrock) that may be affected by the Project. Where current domestic, communal or municipal water wells access these strata, their distance from the Project must also be marked and added to the above noted baseline maps;
- provide a summary of key groundwater monitoring wells within the LSA and 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 RSA and LSA to support the assessment of groundwater effects as they relate to fish and fish habitat;
- describe the hydrostratigraphic units (aquifers, aquitards, aquicludes) of the hydrogeological environment in both bedrock and overburden and provide a piezometric map showing heads and the direction of groundwater flow for the various hydrostratigraphic units;
- describe the structural geology of the hydrogeological environment, including major faults, fracture density and orientation with respect to groundwater flow directions, and magnitudes;
- 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, storativity, saturated thickness, porosity, and specific yield, as applicable;
- 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;
- 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 or integrated surface water-groundwater flow model developed for the PA based on the conceptual model of the hydrogeological environment;
  - state limitations and assumptions in the modelling approach, including calibration methods, model validation and accuracy;
  - 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 investigation, and provide metrics and graphs describing the quality

of the calibration that was achieved and discuss how spatial variability is considered in model calibration;

- analyze the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge, and describe uncertainty within the model as it relates to model assumptions; and
- using the calibrated numerical model, provide a baseline groundwater budget including 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 model should be developed to support the assessment of potential changes to water and sediment quantity and quality in rivers, streams, lakes, springs and wetlands, with input from regulators and Indigenous communities; and
- explain how baseline data were 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, as well as human health, and the current use of lands 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, including effects related to:
  - project use of surface water or groundwater resources;
  - changes to water flow in waterbodies or watercourse diversions; and
  - discharge of water, effluent, wastewaters, or other substances to the environment;
- describe how the effects of climate change are taken into account in the evaluation of the project effects;
- discuss physical changes to the English River at Manitou Falls Generating Station Dam Watershed and Chukuni River watershed, including changes to the Dixie Creek subwatershed. The discussion should include the alignment and condition of the waterbodies and watercourses (permanent, intermittent, and ephemeral), including those created, removed, or altered by the Project;
- quantify the extent of hydrological changes that will result from disturbances to groundwater and surface water features for each phase of the Project, taking into account climate change (see also sections 8.12 Climate change and 14 Effects of the Environment on the Project). This includes changes to the quantity or timing of surface flow, groundwater flow, surface water-groundwater interactions, water levels, ice thickness or extent, sediment input, and channel regime in watercourses, thermal regimes, and water levels in affected waterbodies;
- present an integrated site water balance model incorporating surface and groundwater fluxes to or from all major project components, for all project phases. Include estimates of surface water runoff rates for major project components;
- indicate the groundwater and surface water withdrawal requirements during all phases and specify:

- the timing, quantity and quality of water withdrawn from the environment (flow rates and annual volumes);
- any treatment carried out on these waters (e.g. addition of a tracer); and
- the conditions under which this water is released into the receiving environment;

- present key flow rates for all project components and water management structures, including inflow, outflow or surface run off from storage piles, dredge materials, contaminated material storage, and tailings management facilities;
- present a comprehensive site water management plan for the Project's lifecycle, including for:
  - water inflows and outflows from the Project site;
  - water diversion;
  - process water management;
  - storm water management;
  - water management within the Project site;
  - water management in the open pit and any underground mining components;
  - open pit and underground mine flooding strategies; and
  - drainage of water management ponds to the environment during decommissioning and abandonment;
- present a 3-dimensional numerical groundwater or integrated surface water-groundwater flow model of the hydrogeological system that incorporates all major project features such as open pits, underground workings, waste rock stockpiles, tailings management facilities, dewatering wells, and water diversion ditches:
  - the model should be based on the calibrated model used to describe baseline conditions; and
  - the use of model mesh or grid refinement is recommended in the vicinity of open pits and tailings management facilities;
- using the 3-dimensional numerical groundwater or integrated surface water-groundwater flow model:
  - estimate key project fluxes, including open pit and underground mine inflow rates, open pit and underground mine dewatering rates, open pit and underground mine flooding rates, and tailings and waste storage (including in-pit and underground storage) seepage rates during operation, decommissioning, and the abandonment phases;
  - estimate seasonal changes to surface water and groundwater regimes during the operation, decommissioning, and abandonment phases, including effects of depressurization of the basal aquifer and dewatering water bearing of surficial deposits, effects on baseflow in rivers and streams, effects on wetlands, effects on potable supplies, and effects on natural flow divides;
  - describe the direction, quantity, timing, and receptors for any groundwater seepage associated with project facilities during the operation, decommissioning, and abandonment phases including the waste rock stockpiles, the low-grade ore stockpiles, the tailings management facility, and the flooded open pit, using particle tracking, piezometric contours, and water balance quantification; and

- quantify changes in groundwater discharge to surface water, or surface water recharge to groundwater, relative to the calibrated baseline conditions for the operation, decommissioning, and abandonment phases;

- clearly indicate and describe any output from the groundwater flow model used within the integrated site wide water balance and/or water quality model, or in the assessment of other VCs;
- describe the contaminants associated with the Project, their spatial and temporal locations and their potential flow paths (e.g. groundwater seepage pathways and how they relate to potential receptors). Characterize how they could affect surface and groundwater quality, including information on the source(s) of any contaminants, and their transport and fate in the hydraulic environment;
- describe the downgradient flow of groundwater affected by the Project, with the use of figures showing groundwater piezometric contours, drawdown contours, and particle tracking results;
- describe the contaminant attenuation capacity within the hydrogeological units in the PA. 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 (i.e. daughter materials) 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 generation and deposition of dust and particulate matter and any contaminants they contain (such as metals, mercury, methylmercury);
  - changes to surface water and groundwater quality due to all discharges and effluents from the Project, including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen), and relevant chemical constituents (major and minor ions, trace metals, radionuclides, nutrients, organic compounds), and taking into account predicted changes to water quantity;
  - potential changes to surface water, groundwater, and sediment quality resulting from acid rock drainage and/or metal(oid) leaching from mined or excavated material, tailings, stockpiles, and pit walls; and
  - potential changes to the physicochemical parameters, biological parameters, and chemical constituents for surface water that can contribute to the methylation of mercury downstream of the Project;
- compare any changes to surface or groundwater quality to applicable guidelines, objectives or standards;
- describe the quantity and quality of all effluent streams released from the site to the receiving environment, including effluent from treatment facilities, dewatering activities, seepage, and surface run off from project components and site;
  - compare the quality of all effluent streams to applicable guidelines, objectives or standards to better identify possible adverse effects on the receiving environment; and

  - present the predicted mixing zone extent from each final effluent discharge point into the receiver(s) consistent with Ontario guideline B-1-5: Deriving Receiving Water Based Point Source Effluent Requirements for Ontario Waters, taking into account predicted changes to water quantity in receiving watercourses;
- using an integrated chemical mass balance model, and taking into account predicted changes to water quantity, describe predicted worst, base, and sensitivity case 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); and
  - watercourse and waterbody crossings, blasting, diversions, dewatering, water withdrawal, wastewater return, overflows from excavation, and surface runoff quantity and quality;
- compare the predicted worst, base and sensitivity case scenario changes to groundwater, surface and sediment quality to baseline and applicable guidelines, objectives or standards;
- provide an assessment for off-site migration pathways for impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units of the project study area;
- describe locations at which potential changes to water and sediment quality will be assessed and how Indigenous input was considered, including:
  - all point and diffuse sources of discharges;
  - immediate receiving environment for any point and diffuse sources of discharges from the Project;
  - at outer boundary of mixing zone, defined as where it is anticipated the concentration of the parameters of concern reach applicable criteria within the receiver(s);
  - where the water quality from the immediate receiving environment begins to meet Water Quality Guidelines, or background levels for that contaminant;
  - at Project boundary;
  - at LSA boundary;
  - at RSA boundary; and
  - at locations that will enable an assessment and report of predicted residual water quality changes at the Snowshoe Rapids Dam on the Chukuni River, the outlet of the Chukuni River into Pakwash Lake, the Manitou Falls Generating Station Dam on the Pakwash Lake/English River, and the confluence of the Chukuni-English River and the Wabigoon River;
- analyze and describe changes to surface and groundwater at a scale and resolution that allows for the application of results to the assessment of interrelated VCs, notably for fish and fish habitat and human health. Carry forward the assessment of potential changes in water quality, as required in the following sections of the Guidelines.

Refer to section 13 Effects of Potential Accidents or Malfunctions for effects from hazardous materials entering the water system, section 8.3 Geochemistry of mined or excavated materials for effects to chemical release rates, and section 12 Indigenous Peoples for effects to Indigenous health conditions, and traditional food sources related to water quality. The proponent should refer to the Nibi Declaration of Treaty #3 to ensure that it understands the significance of water for Indigenous communities while conducting the assessment of potential effects on groundwater and surface water.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Effects in Environmental Impact Assessment: Drinking and Recreational Water Quality[14] to ensure that it provides the information and analysis considered necessary to assess the Project's effects on human health in relation to changes to water quality. It is requested that the proponent complete the checklist provided in this guide (Appendix A) to assist participants in verifying that the main elements of a water quality impact assessment have been completed and in identifying the location of this information in the Impact Statement. This checklist will facilitate the review of the Impact Statement and will be particularly useful if analyses on this aspect are found in several sections of the Impact Statement.

8.6.3. Mitigation and enhancement measures

The Impact Statement must:

- describe the mitigation measures for the possible effects on the quantity and quality of surface water, groundwater, and sediment, including water supply wells and provide a rationale with quantitative and qualitative evidence that explains the effectiveness of proposed measures;
- describe any applicable water quality treatment measures and provide evidence supporting the effectiveness of these measures (refer to Mine Environment Neutral Drainage Report 3.50.1), including predicted inflow and outflow concentrations for relevant water quality parameters, particularly those physicochemical parameters, biological parameters, and chemical constituents for surface water that can contribute to the methylation of mercury downstream of the Project;
- provide the details of mitigation measures comprised in water management plans proposed for waterbodies and watercourses likely to be affected during all phases of the Project, including measures applicable to water use minimization;
- describe and justify water use for the Project and the measures that will be taken to eliminate or reduce the adverse effects, including the supply and discharge of water, and potential exchanges between watersheds. Indicate any other water sources (e.g. recycled water) for the Project and consider the possibility of reusing the water;
- describe groundwater and surface water monitoring programs during, as applicable, the construction, operation, decommissioning, and abandonment phases including:
  - the proposed monitoring points to assess changes to surface water quality, which should include monitoring at all point and diffuse sources of discharge and in the immediate receiving environment

[14] While also taking into account any analysis to be undertaken for provincial permitting such as the ability to meet Provincial Water Quality Objectives.

and at the boundaries for the outer mixing zone, the PA, the LSA, the RSA, and upstream of the confluence of the Chukuni-English and Wabigoon watersheds;

- the proposed monitoring points to assess changes to surface water quantity due to the Project, which should include monitoring stations to monitor effects to:
  - watercourses and waterbodies with the potential for flow reductions such as: Dixie Creek, Rice Lake (Unnamed waterbody 6), Chukuni River, and Pakwash Lake; and
  - watercourses and waterbodies downstream of watercourses or waterbodies that may be overprinted such as Tear Drop Lake (Unnamed Waterbody 1), Unnamed Watercourse 3, Unnamed Waterbody 4, Unnamed Watercourse 6A, and Unnamed Watercourse 6B;
- the proposed monitoring points to assess changes to groundwater quality and quantity, which should include well locations and depths;
- the parameters that will be measured, the duration and frequency of monitoring and reporting, the sampling protocol and analysis protocol and the quality assurance and quality control measures. Include the description of the measures that will be implemented if the criteria are exceeded;

- 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 methods for the prevention, management and control of acid rock drainage, neutral mine drainage, metal(oid) leaching, and other contaminant release (e.g. cyanide, ammonia), during construction, operation, decommissioning, and abandonment phases;
- 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, in the event of uncertainty with predictions or effectiveness of measures proposed, detail an adaptive management plan to meet requirements under section 17.4 Adaptive management plans;
  - include methods for managing run-off of sulphide-rich minerals from potentially acid-generating waste rock and stockpiles (e.g. sulphate management plan);
- describe the methods for ensuring that the rate of methylation of mercury downstream of the Project does not increase as a result of the Project, taking into account physicochemical parameters, biological parameters, and chemical constituents of surface water that can contribute to the methylation of mercury.

8.7. Vegetation, riparian, and wetland environments

8.7.1. Baseline conditions

The Impact Statement must:

- provide a description of the biodiversity[15], relative abundance and distribution of vegetation species and communities of ecological, economic, or human importance with the LSA and RSA of the Project, including:
  - boreal caribou habitat, wolverine habitat, bat habitat, and bird habitat including any critical habitat as described in final or draft recovery strategies or action plans for these species at risk (refer to section 8.11 Species at Risk and their habitat);
  - moose habitat and fur-bearing mammal habitat including American pine marten/pine marten (refer to section 8.10 Terrestrial wildlife and wildlife habitat); and
  - other vegetation species of importance to Indigenous Peoples, including wild rice (refer to section 12.1 Indigenous physical and cultural heritage, and structures, sites or things of significance and section 12.2 Current use of lands and resources for traditional purposes);
- describe the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection;
- provide maps, at an appropriate scale, of the vegetation species and communities of importance within the LSA, and where available, the RSA. Maps should also include areas identified, at a scale appropriate to protect confidential Indigenous Knowledge, as either sensitive or culturally important to Indigenous communities, if communities have granted permission to share them;
- describe the current level of both anthropogenic and natural (e.g. fire, flood, drought) disturbance associated with vegetation, including a description of level of habitat fragmentation and loss, historical and current disturbance, any proximate activities that have resulted in changes to fire regimes (e.g. fire suppression, flooding, insect infestations);
- describe the use of local vegetation for medicinal purposes, or as a source of country foods (traditional foods) including wild rice, and whether its consumption has any Indigenous cultural importance;
  - describe any existing weed species or other invasive species within the local study area that have the potential to spread into areas used for wild rice harvesting;
- describe the shoreline, banks, current and future flood risk areas, and wetland catchment boundaries;
- quantify, describe, and map riparian areas within the LSA and RSA potentially affected by the Project;
- use the Ontario Land Cover Compilation v.2.0 to quantify, describe and map wetlands (e.g. swamps, fens, marshes, bogs) within the LSA and RSA potentially affected by the Project, in the context of:
  - wetland class, ecological community type, and conservation status;
  - biodiversity;
  - wetland habitat that provides important functions for migratory birds, species at risk, and species of importance to Indigenous Peoples;

[15] 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.

  - peatland volume;
  - abundance at local, regional, and provincial scales;
  - distribution; and
  - current level of disturbance;
- determine whether these wetlands are within a geographic area of Canada where wetland loss or degradation has reached critical levels, or considered ecologically, socially, or economically important to a region;
- identify and describe wetland capacities to perform hydrological and water quality functions, provide for wildlife and wildlife habitat or other ecological functions, such as carbon sequestration;
- provide a wetland functions assessment in accordance with the guiding principles of Wetland Ecological Functions Assessment: An Overview of Approaches or any subsequent approved guidelines by which to determine the most appropriate functions assessment methodology to use (see Appendix 1 - Guidance for biophysical components) for more guidance on conducting a wetland function assessment);
  - provide a rationale for the wetland functions assessment method chosen and submit complete data sets from any survey sites, including geospatial data files and sources;
- determine if other wetland conservation policies, regulations or wetland compensation guidelines apply (contact provincial and/or local government authorities) See also resources available from The Wetland Network;
- define an LSA that takes into account watershed area and hydrological connectively of wetlands within or bisected by the PA; and
- identify an 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, including:

- describe the key indicators used to assess project effects and the sensitivity of vegetation communities, wetlands, and riparian and terrestrial environments to disturbance. Provide a rationale for their selection, including a clear connection to indicators used to characterize baseline conditions;
- quantify the area of vegetation communities, riparian, wetland, and terrestrial environments, that may be cleared or otherwise disturbed within the study area during all phases of the Project, including a description of the disturbance and changes to;
  - interior to edge habitat ratios;
  - the availability of rare habitat; and

  - functions within the remaining vegetation or wetland complex;
- describe changes related to landscape disturbance, including loss and fragmentation of habitats, alteration of riparian areas, including buffers or setbacks and project effects on areas of soil or ground instability;
- describe effects related to potential introduction of weed species or invasive species in areas used for wild rice gathering;
- describe potential effects from sulphate discharges or unplanned leaching to any surface waters containing wild rice (Manoomin, Zizania palustris L.) above background values or 10 mg/L;
- describe effects onto the biodiversity of riparian, wetland, and terrestrial environments, including effects from fragmentation and changes to regional biodiversity;
- describe potential changes to riparian, wetland, and terrestrial environments due to activities that may affect topography, soil erosion, compaction, and productivity, contamination, bank slopes, and suspension of sediment, or due to any contaminants of concern potentially associated with the Project that may affect vegetation, soil, sediment, or water;
- describe any known or suspected soil contamination within the LSA that could be re-suspended, released or otherwise disturbed as a result of the Project;
- describe any hydrological or water flow changes, either permanent or temporary, that could alter moisture regimes or drainage conditions, and describe the effects on vegetation and wetlands, including consideration of biogeochemical conditions suitable for methylmercury production; and
- describe any changes to or loss of wetland function, including consideration of ecological (e.g. hydrological, biogeochemical cycling, habitat, and climate functions) and socioeconomic functions of wetlands. Describe and justify the methodology used to assess the effects.

8.7.3. Mitigation and enhancement measures

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

In particular, the Impact Statement must:

- describe the construction methods used to cross wetlands and other sensitive habitats, and the criteria for determination of techniques proposed for each crossing, including the locations where trenchless crossing methods will be employed;
- describe the ways of avoiding or reducing the temporary or permanent adverse effects on wetlands and riparian habitats;
- describe the width of the construction right-of-way and the permanent right-of-way, including the locations where the right-of-way will be narrowed to eliminate or reduce the adverse effects;
- describe the temporary facilities and infrastructure, and the considerations taken for minimizing the adverse effects, namely the preferred location and management measures;

- describe the proposed measures to mitigate bank erosion, including measures to eliminate the potential for erosion, such as bank stabilization using vegetation;
- describe the vegetation standards and controls that will be deployed during construction and operation of the Project;
- describe the measures allowing identification of invasive species or other undesirable introduced species, avoid their propagation and control their spread into areas used for wild rice gathering during all phases of the Project, including the necessity of preconstruction surveys to identify any high density areas;
- identify the criteria and circumstances of application of chemical, biological, or mechanical control methods as well as the relevant regulations and determine the adverse effects associated with control methods;
- describe the selection of plant species to be conserved and planted in order to promote vegetation communities with low natural growth;
- concerning wetlands and other riparian habitats:
  - explain how avoidance of wetlands and riparian habitats was considered, namely by considering other locations for project components and activities;
  - explain how mitigation measures consider the natural succession and the variability of the environment over time; and
  - describe proposed compensation measures (see Appendix 1 - Compensation and offset plans for relevant guidance);
- describe any reclamation and rehabilitation procedures proposed as mitigation measures, including:
  - revegetation techniques and the locations where they would be implemented;
  - selection of plant species to be maintained and planted to promote return to a natural ecosystem, including consideration for Indigenous use, during operation and upon reclamation, rehabilitation, and integration of the reclaimed landscape with the regional landscape;
  - Native and Indigenous species adapted to the local conditions should be used when the purpose of revegetation is to naturalize or regenerate the area;
  - the expected timelines, from an ecological perspective, for establishment and recovery of vegetation communities and the expected differences in community composition and structure. Identify the information sources on which the predictions rely, such as evidence from peer-reviewed scientific literature;
  - any sources of uncertainty with respect to the anticipated effectiveness of reclamation and rehabilitation. Explain how uncertainty was taken into account in the predictions; and
  - reclamation and rehabilitation standards to be used to evaluate ecological equivalency of post-operation reclaimed landscapes, in consultation with Indigenous communities;
- describe the soil treatment methods to eliminate or reduce the adverse effects on the soils and materials in the root area, including recovery techniques (e.g. soil stripping including the proposed width, stump removal, and other soil treatment techniques), soil separation maintenance measures,

control measures for wind and water erosion, work shutdown procedures in case of wet conditions, and soil settlement prevention measures; and

- describe how to locate pre-existing soil or sediment contamination, the mitigation and monitoring measures that will be undertaken in this regard, and the applicable regulatory restoration measures.

8.8. Fish and fish habitat

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

8.8.1. Baseline conditions

The Impact Statement must:

- prepare a list of all waterbodies and watercourses (permanent and intermittent) that may be directly or indirectly affected by the Project and provide:
  - type of waterbody or watercourse;
  - size and depths of the waterbody or watercourse, supported by channel cross sections, long profiles and/or bathymetric surveys where appropriate;
  - streamflow types, Strahler stream order and streamflow characteristics;
  - substrate type, emergent and submerged aquatic vegetation type and presence, and barriers to fish;
  - description of any proposed in-water work; and
  - for crossings, describe the anticipated method of crossing;
- for each potentially affected waterbody or watercourse that has the potential to be frequented by fish, provide the location and area of potential and confirmed fish habitat and a detailed assessment of physical and biological habitat characteristics. 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;
  - baseline extent of habitat disturbance (e.g. fragmentation);
  - habitat use or suitability for fish and aquatic species present, including Lake Whitefish, Walleye, Lake Trout, Lake Sturgeon, and other species identified as important by Indigenous Peoples (refer to section 12.2 Current use of lands and resources for traditional purposes), habitat function (e.g. spawning, nursery, growth, prey, invertebrate population, food availability, foraging, migration, cover habitat, thermal and overwintering habitat), and sensitive times for these activities; and

  - substrate type, substrate distribution and transport characteristics, aquatic vegetation, riparian vegetation, bank stability, light penetration, presence of woody debris, presence of beaver dams, stream segment type (riffle, run, pool) and Strahler stream order, natural or anthropogenic barriers to fish passage, and geomorphological features and processes;
- for each potentially affected waterbody or watercourse, provide a detailed description of potentially affected fish[16] species and populations (as defined in subsection 2(1) of the *Fisheries Act)* within the freshwater environment;
  - where data are used to generate biodiversity metrics (e.g. abundance, richness, diversity, density), provide rationale on the choice of metrics based on their applicability for use in the effects assessment and associated follow-up, if applicable;
- describe parameters and ecological processes relevant to predicted effects on fish and aquatic species listed above. For example, it may be necessary to establish a broader ecological baseline if the Project affects a spawning area for a migratory species, but does not affect the larger area they depend on for life processes. Relevant parameters and ecological process may include: migratory patterns, food webs and trophic levels, structural and functional linkages (e.g. predator-prey interactions), life history and population dynamics, sensitive habitats and periods, behaviour, or other relevant ecological processes that fish depend on to carry out their life history;
  - use either a qualitative or a quantitative approach to characterize ecological processes, as appropriate, and include a rationale to support the selected approach;
- identify and describe the data sources used, including information on data collection (e.g. gear and catch methods, location of sampling stations, date of catches, date of surveys, species surveyed, size and lifecycle stage, catch per unit effort). It is recommended that the information be presented in the form of maps and tables;
- provide baseline measurements of contaminants in fish and aquatic species, including a characterization of methylmercury levels in fish tissue in fish harvested by Indigenous communities[17];
- describe the use of fish as country foods, bait, or for other traditional purposes, including a description of the particular species of importance including walleye, lake whitefish, lake trout, lake sturgeon, and other species identified as important by Indigenous Peoples (refer to section 12.2 Current use of lands and resources for traditional purposes) and whether its consumption has cultural importance for Indigenous Peoples, including medicinal use. All sites used in the LSA or historically important sites for the collection of country foods must be identified and mapped, such as important fishing sites, except in cases where the information is deemed confidential by Indigenous Peoples;
- provide a summary of existing studies and research on potential effects of noise and vibrations resulting from blasting (above ground and underground) on potentially affected aquatic species

[16] fish includes: parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals.

[17] The Ministry of Environment, Conservation, and Parks works with the Ministry of Natural Resources and Forestry to monitor contaminant levels in fish across Ontario, including mercury. In areas where fish are used as a major food source and historical contamination is higher, fish are re-tested every 1 to 5 years.

including, but not limited to, walleye, lake whitefish, lake trout, and lake sturgeon; and including behavioural impacts, in the freshwater environment from all species at different life stages;

- describe any existing, designated or proposed special freshwater areas, such as species at risk critical habitat or ecological reserves, within or in proximity to the project location or that could be affected by routine project operation; and
- identify and describe sensitive fish habitat areas within the LSA and RSA and include maps that demonstrate proximity of these areas.

Certain intermittent and ephemeral watercourses or waterbodies 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 of the Project on fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*. Consider any effects whether they are adverse or positive, direct or indirect, and temporary or permanent, for all phases of the Project, including from the release of effluent or the deposit of a deleterious substance to water frequented by fish, for all developmental stages of fish, and other aquatic species. Refer to Section 8.6 Groundwater and surface water for related water quality and quantity requirements to inform the assessment.

For additional effects on water quality, refer to section 13 Effects of Potential Accidents or Malfunctions for effects from hazardous materials entering the water system, section 8.4 Topography, soil and sediment for effects from soil or sediment contamination and dust emissions, section 8.3 Geochemistry of mined or excavated materials for effects to chemical release rates, and section 7.6 Cumulative effects assessment for assessing cumulative environmental effects including fish and fish habitat, and fish harvested by Indigenous communities.

For each waterbody and watercourse affected by the Project that has the potential to be frequented by fish (directly or indirectly) the following must be documented and considered in the determination of effects:

- changes in groundwater and surface water conditions, and their effects on geomorphological hydrodynamic conditions and aquatic habitats (e.g. altering sediment transport dynamic and substrate characteristics, dynamic imbalance, long-term bank instability, silting of spawning grounds), including direct and indirect effects from habitat fragmentation;
- changes in groundwater and surface water conditions and their effects on aquatic habitat and life cycle activities (e.g. reproduction rearing, feeding, migration and habitat connectivity, summer and winter refuge) and any changes to aquatic invertebrate communities, including any flow reductions and lowering of water levels in potentially affected watercourses and waterbodies such as Unnamed Waterbody 2, Unnamed Watercourse 1, Unnamed Watercourse 6A, Rice Lake (Unnamed Waterbody 6), Unnamed Watercourse 6, Dixie Creek, Chukuni River, and Pakwash Lake that result from loss of drainage basin or groundwater drawdown;

- changes to riparian areas that could affect fish and fish habitat, aquatic species at risk and productivity;
- any alteration to accessibility or use of habitat, including residence and critical habitat of aquatic species at risk;
- risk of fish mortality, including that associated with:
  - noise and vibrations caused by project activities (e.g. blasting above and underground) in or near the aquatic environment; and
  - entrapment, impingement or entrainment;
- potential introduction of aquatic invasive species, including pathogens, through project activities, including relocation of species, including discussion of the frequency of those activities;
- any proposed fish relocation activities and the timing and methodology that will be used to undertake each fish relocation;
- changes to water quality and quantity, including:
  - potential introduction of deleterious substances (e.g. sediment, project-related contaminants);
  - potential discharges to the aquatic environment of waters used for hydrostatic testing; and
  - effluent at the discharge point and in the receiving environment, and seepage and runoff from the mine not discharged through a discharge point (referencing the assessment of water quality in section 8.6 Groundwater and surface water);
- compare predicted water quality for all project phases and at all key locations in the receiving environment to:
  - applicable water quality guidelines;
  - site-specific objectives or benchmarks;
  - relevant toxicity test results (either site-specific or published); and/or
  - other applicable methods;
- changes in potential contaminant levels in harvested species and their prey, with a focus on traditional foods harvested by Indigenous Peoples, such as methylmercury levels in fish;
- changes in access to the area and increased access to fishing;
- for linear project components, describe and justify watercourse-crossing techniques to be used and the criteria for determining the techniques proposed for each watercourse crossing;
  - describe how the watercourse crossing techniques consider long-term geomorphological processes (e.g. erosion and deposition); and
  - provide evidence as to how the watercourse crossings will provide fish passage; and
- any other changes resulting from the Project that may affect fish and fish habitat.

For effects to Indigenous use of land for traditional purposes and health conditions refer to section 12 Indigenous Peoples.

The Impact Statement must:

- use a Pathways of Effects approach to determine potential effects to fish and fish habitat;
- delineate anticipated harmful alteration, disruption or destruction of fish habitat (temporary or permanent) in terms of area, habitat type, sensitivity of habitat, and impact (e.g. magnitude, intensity and persistence). Habitat losses must be clearly located and presented on a map at appropriate scales and in a table with area of loss represented;
- delineate anticipated death of fish by means other than fishing;
- describe potential effects to fish and fish habitat, based on specific life history processes, population status, resilience in the face of change, dependence on specific habitat features, or limiting ecological processes or variables;
- include an examination of the correlation between construction periods and sensitive periods for fish (e.g. reproduction), key fisheries windows for freshwater and anadromous/catadromous species, and any potential effects due to overlapping periods;
- describe potential effects to fish from contaminants, including from bioaccumulation downstream of the Project. Include a comparison of predicted water quality for all project phases at all key locations in the receiving environment to applicable water quality guidelines, site-specific objectives or benchmarks, and relevant toxicity test results (either site-specific or published), or other applicable methods. Describe potential effects from contamination on fish and other aquatic species' behaviour, distribution, abundance, and migration patterns;
- effects should be predicted or modeled 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 including impacts from changing water levels on the riparian zone;
- describe potential effects on fish behaviour, distribution, abundance, and migration patterns;
- describe tolerance thresholds for potential adverse effects that the Indigenous Peoples have identified, and how they were considered in the assessment;
- describe potential changes to fish populations in relation to any local Fisheries Management Objectives set by the Province of Ontario, as context for local fish and fish habitat priorities and needs;
- describe any need for a *Fisheries Act* authorization and/or a SARA permit and describe any consideration of Fisheries and Oceans Canada guidance documents; and
- describe any positive changes, such as habitat creation and, where applicable, provide information on re-stocking (including the number of fish) or creation of new fish habitat (including the new area created), and provide maps for proposed locations.

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

- A framework for assessing fisheries productivity for the Fisheries Protection Program.

- A Science-Based Framework for Assessing the Response of Fisheries Productivity to State of Species or Habitats.

If an authorization may be required under Section 34 or 35 of the *Fisheries Act*, proponents may wish to coordinate the collection of information for authorizations with associated requirements outlined above. Further information on authorization requirements under the *Fisheries Act* is available here: Applicants Guide Supporting the Authorizations Concerning Fish and Fish Habitat Regulations.

For projects requiring the use of natural waterbodies frequented by fish for the disposal of mine waste[18] and/or for the management of process water, an amendment to the Metal and Diamond Mining Effluent Regulations (MDMER) will be required. This regulatory process will not be initiated until the proponent has undertaken a detailed assessment of alternatives for mine waste disposal. By fulfilling the requirements of the regulatory authorization during the impact assessment, authorizations may be granted in an accelerated manner. For further guidance, the proponent should consult Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal.

8.8.3. Mitigation and enhancement measures

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

- all standard measures, codes of practice, 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;
- measures to prevent or mitigate the risk of harmful alteration, disruption or destruction of fish, fish habitat, or death of fish caused by any project activity, including during the sensitive periods and in the sensitive locations (e.g. spawning and migration) for fish and other aquatic species;
- provide details on the potential salvage or relocation of fish and other aquatic species from potentially affected watercourses and waterbodies, prior to their overprinting, draining or dewatering, and construction of diversion channels;
- measures applicable to all water crossings, intakes, and outflows including how they would be maintained following construction of the Project;
- describe the conditions on which crossings of watercourses and riparian areas would be restored and maintained after construction of the Project;
- measures to mitigate sensory disturbance and functional fish habitat loss that it may cause, including in relation to blasting;
- measures recommended to avoid fish mortality, for example, during use of explosives in the aquatic environment or nearby, during fish salvage or relocation activities, or by fish impingement and

[18] For the purposes of this document, mine waste refers to waste rock and effluent as set out in section 5(1) of the *Metal and Diamond Mining Effluent Regulations*.

entrainment during pumping and water withdrawal operations (e.g. during the construction of temporary structures and of hydrostatic tests) or transfer between waterbodies;

- measures to prevent the deposit of substances harmful to fish in the aquatic environment;
- measures for impacted riparian or aquatic environments;
- describe the 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;
- mitigation measures to be applied during hydrostatic tests, including for water withdrawal and discharge activities;
- measures to prevent the introduction and intrusion of invasive aquatic species during work in or near the aquatic environment;
- measures to prevent the creation of fish passage barriers as a result of the Project;
- measures and plans to offset or compensate for any loss in productivity of fish populations and fish habitat as a result of the Project (see Appendix 1 - Compensation and offset plans, for relevant guidance);
- describe how environmental protection plans will address any applicable federal and provincial policies with respect to fish habitat; and
- describe how the mitigation measures are consistent with any applicable recovery strategy, action plan or management plan.

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

8.9. Birds, migratory birds, and their habitat

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

8.9.1. Baseline conditions

The Impact Statement must:

- identify species or groups that may be affected differently by the Project and may require different mitigation measures, and, where possible, avoid collapsing data into diversity metrics or narrowing to an indicator species;
- the following groupings should be considered as unique VCs with rationale provided where groups are not included as unique VCs:
  - raptors, such as, hawks, eagles, falcons;

- waterfowl, such as, ducks, geese, swans;
- waterbirds, such as, loons, gulls, terns;
- marshbirds, such as grebes, rails, herons, cranes;
- shorebirds, such as sandpipers, plovers, snipes;
- forest birds, such as warblers, vireos, thrushes;
- other land birds, such as, owls, swallows, kingfishers;
- each migratory bird species at risk as an individual VC, including barn swallow, bank swallow, eastern whip-poor-will, common nighthawk, Canada warbler, eastern wood-pewee, evening grosbeak, olive-sided flycatcher, lesser yellowlegs, yellow rail, and red-necked phalarope (see also section 8.11 Species at Risk and their habitat);
- any bird species of importance to Indigenous Peoples (refer to section 12.1 Indigenous physical and cultural heritage, and structures, sites or things of significance and section 12.2 Current use of lands and resources for traditional purposes); and
- important habitats associated with species at risk birds and with species of importance to Indigenous Peoples (refer to section section 12.1 Indigenous physical and cultural heritage, and structures, sites or things of significance and section 12.2 Current use of lands and resources for traditional purposes);

- identify any applicable Bird Conservation Regions and Bird Conservation Region strategies;
- provide baseline information that is representative of current conditions, with a justification if additional studies are not necessary to improve confidence in the prediction of residual effects and the appropriate selection of mitigation;
- provide an estimate of year-round bird use of the LSA (e.g. winter, spring migration, breeding season, fall migration), based on data from existing sources and surveys;
- describe and map the general biodiversity[19] 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 desktop analysis, supplemented by field data if necessary to build confidence in assumptions;
- identify the metrics, and biotic and abiotic indicators that are used to characterize the baseline conditions and discuss the rationale for their selection;
- for the bird species and groups listed above and for any other bird species or groups that use the LSA at any time of year that are likely to be affected, describe their:
  - abundance (including relative abundance in each habitat type), population status, and distribution;
  - life cycle, seasonal ranges, migration, movements;

[19] 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).

  - frequency and timing of occurrence;
  - seasonal and annual variation in abundance, distribution and habitat use;
  - habitat association(s) and requirements for all relevant life cycle stages; and
  - sensitive periods (e.g. seasonal, time of day);
- describe and map the habitat and habitat features found in the PA, LSA, and RSA that are associated with the presence of those bird species and groups that are likely to be affected, based on the best available existing information (e.g. land cover types, vegetation), supplemented by field data as appropriate to enable demonstration of sufficient data for baseline characterization to the extent necessary to be confident in the selection of appropriate mitigation and prediction of residual effects;
- for each bird species of conservation concern identified above, locate on an appropriately scaled map the potential habitats, survey locations, records of the species, residences, and critical habitat, except where locations and records are considered sensitive information;
  - identify federal species at risk/critical habitat in the study area;
  - identify migratory birds listed under the *Species at Risk Act* to which the *Species at Risk Protection Statement* applies (see Appendix 2);
  - identify migratory birds that are provincial species at risk and their status under Ontario's *Endangered Species Act*;
  - identify any species assessed as at risk by the Committee on the Status of Endangered Wildlife (COSEWIC) in Canada;
  - identify any sites that are likely to be sensitive locations and habitat for birds or environmentally significant areas such as Areas of Natural and Scientific Interest; and
  - illustrate on the map the Project's footprint, identifying temporary and permanent infrastructure;
- locate the highest concentrations or areas of use by species;
- describe the source of the data, data collection methods, and provide a rationale for chosen analysis and modelling approaches (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, migratory birds, and their habitat

The Impact Statement must:

- describe the interaction between the Project and birds, migratory birds, and their habitat, for all phases of the Project, including from:

  - site preparation, vegetation removal, particularly of habitats important for nesting, foraging, staging, overwintering, or that act as movement corridors;
  - deposit of harmful substances in waters that are frequented by birds and changes to water quality;
  - changes to the aquatic flow regime and sediment load;
  - construction and operation of tailings disposal facilities (i.e. tailings ponds), wastewater ponds, or other ponds containing process liquids or substances harmful to birds;
  - construction and operation of structures;
  - changes to the atmospheric, acoustic, and visual environment (e.g. noise, vibration, lighting, air emissions, and dust);
  - site reclamation; and
  - any project activities that may occur during critical periods and/or restricted activity periods for migratory and non-migratory birds, including species at risk;
- provide the relative abundance of habitat in the PA, LSA, and RSA including the percentage of total lost in each study area;
- describe the potential effects of the Project on birds (migratory and non-migratory birds), their nest and eggs, including, but not limited to, from:
  - short and long-term changes to habitats important for breeding, foraging, migration, overwintering, rearing and moulting and to movement corridors between habitat, and from habitat loss, fragmentation and structural change;
  - changes in biodiversity, abundance and density of the avian community that utilize various habitat types or ecosystems;
  - changes to mortality risk, including as a result of collision of birds (migratory and non-migratory) with project infrastructure, buildings, overhead lines, vehicles, as a result of light attraction and from indirect effects, such as increased movement of predators or access to hunting; and
  - increased disturbance (e.g. sound, artificial light, presence of workers) considering the critical periods for the birds, including breeding, migration, and overwintering;
- describe the activities most likely to result in disturbance, injury or take of birds (migratory and non-migratory), their nests and eggs, such as vegetation clearing, increased noise from industrial machinery, and indicate the timing window for these activities, the amount, duration, frequency, and timing of disturbances, and whether or not those activities would be permanent or non-permanent in the environment; and
- describe, using evidence, the available habitat, if any, in the LSA and RSA for the relocation of displaced birds.

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

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

8.9.3. Mitigations and enhancement measures

The Impact Statement must:

- ensure mitigation described for birds that are species at risk is consistent with any applicable recovery strategies (avoid, minimize, restore onsite, offset);
  - for bird species at risk that have recovery strategies, the proponent must demonstrate how relevant recovery strategies were considered as part of broader mitigation efforts;
- describe any protections provided to species through provincial regulatory mechanisms under Ontario's Endangered *Species Act, Fish and Wildlife Conservation Act,* or other provincial legislation;
- describe the measures to mitigate adverse effects to migratory and non-migratory birds and their habitat, including their eggs and nests;
- describe the measures to prevent and mitigate the risk of harmful, destructive or disruptive activities during sensitive periods and in sensitive locations (e.g. breeding bird season, migration and nesting) for birds, their nests and their eggs, or areas frequented by birds, such as avoiding lights at night during key migration peaks, avoiding excessive loud noises, vibration or blasting during breeding season;
- demonstrate how the proponent considered the timing of vegetation removal and construction to be outside the main breeding season;
- describe measures to mitigate sensory disturbance and the functional habitat loss it may cause;
- describe measures for preventing the deposit of substances harmful to migratory birds in areas frequented by migratory birds;
- describe technologies and approaches to minimize the impacts of tailing ponds on migratory birds that may come into contact with process affected waters;
- describe any feasible options for compensation or offsetting if habitat will be lost and is a limiting feature for the species in the RSA, and propose whether and how any habitat losses will be offset to the Agency and federal experts prior to submitting the Impact Statement; and
- for bank swallow, take measures to prevent future establishment on soft banks, following the Ontario Ministry of Natural Resources and Forestry's Best Management Practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario.

The proponent should refer to the Guidelines to reduce risk to migratory birds and to the General nesting periods for migratory birds, which covers the main nesting periods of migratory birds and reduces the risk of taking their nests or eggs. This recommendation does not authorize the disruption, destruction or taking of a migratory bird, its nest or its eggs outside these periods.

8.10. Terrestrial wildlife and wildlife habitat

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

8.10.1. Baseline conditions

The Impact Statement must:

- provide baseline information that is representative of current conditions, with justification (statistical analyses, simulations, organized reasoning) if additional studies are not necessary to improve confidence in the prediction of residual effects and the appropriate selection of mitigation;
- describe and map the general biodiversity[20] of terrestrial wildlife species (amphibians, reptiles, mammals) and wildlife habitats that are found or are likely to be found in the study area;
- identify wildlife species, other than avian species, of importance to Indigenous Peoples (refer to section 12.1 Indigenous physical and cultural heritage, and structures, sites or things of significance and section 12.2 Current use of lands and resources for traditional purposes), within the study area, that are likely to be directly or indirectly affected, and describe, in general, for each species or group:
  - distribution and location;
  - abundance and population status;
  - lifecycle;
  - known residences;
  - seasonal ranges, migration and movements;
  - habitat requirements;
  - sensitive periods (e.g. seasonal, diurnal, and nocturnal); and
  - provide a map showing the highest concentrations or areas of use from all available data sources by species and important habitat (specifically for moose, provide a map of moose aquatic feeding areas, late winter habitat and known calving areas);
- identify the metrics and biotic and abiotic indicators that are used to characterize the baseline conditions (e.g. population size, recruitment rates) and discuss the rationale for their selection;
- describe the use of wildlife as a source of country foods (traditional foods) and whether its consumption has Indigenous cultural use and value, including for medicinal purposes;

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

- describe the use and harvesting of fur-bearing species and whether its harvesting has Indigenous cultural or socio-economic value;
  - describe any locations within the study area that might constitute sensitive areas for terrestrial wildlife and show on maps, such as: ecological reserves, wildlife management areas, established or proposed sanctuaries and protected areas, in proximity to the Project location or that could be affected by routine project operations; and
  - any lands in the study area that might constitute sensitive areas and habitat for wildlife;
- describe the levels of disturbance currently affecting wildlife and wildlife habitat, such as habitat fragmentation and the extent of human access and use;
- describe the natural disturbance regimes and their sources (e.g. fire, floods, droughts, diseases, insects and other pests, etc.);
- describe the source of the baseline data, data collection methods, and provide a rationale for any modelling approaches chosen, and describe how community knowledge and Indigenous Knowledge was incorporated (see Appendix 1 - Guidance for Biophysical Components for more guidance on collecting baseline data); and
- consider accepting submissions of wildlife sightings (photographs with date, time, and location), or use of Citizen Science, from Indigenous and non-Indigenous members of the public.

8.10.2. Effects to terrestrial wildlife and their habitat

The Impact Statement must:

- describe the potential effects of the Project on wildlife and wildlife habitat of importance to Indigenous Peoples, including population-level, regional or local sub-population effects, including, but not limited to:
  - site preparation, vegetation removal, particularly of habitats important for breeding, overwintering or that act as movement corridors;
  - noise, light and sensory disturbances;
  - water and air emissions or dust;
  - bioaccumulation of contaminants in wildlife;
  - habitat loss and fragmentation;
  - altered predator-prey relations, such as increased wildlife predation; and
  - increased access by hunters;
- provide an evaluation of the effect of the Project, including any new road access, pipeline, transmission line or other rights of way on wildlife mortality risk and movement patterns;
- provide an evaluation of effects to wildlife and wildlife habitat that are directly linked or necessarily incidental to other federal permitting decisions for the Project (this would include an assessment of how changes to waterbodies and fish habitat could affect wildlife and wildlife habitat);

- describe effects to wildlife biodiversity, considering biodiversity metrics and the biotic and abiotic indicators selected, including changes to regional biodiversity and local and regional ecosystems;
- describe and quantify, where possible, the potential effects to wildlife, including acute and chronic effects to wildlife health, of changes to air and water quality (e.g. from contaminants, effluents, atmospheric emissions, dust deposition, and bioaccumulation);
- describe and assess the resilience and recovery capabilities of wildlife populations and habitats to disturbance, including the anticipated potential for the PA to be returned to its existing state with respect to wildlife populations and their habitat following operations;
- describe the potential adverse effects of the Project on wildlife and wildlife habitat of importance to Indigenous Peoples, including moose aquatic feeding areas and calving sites, and fur-bearing mammal habitat including American pine marten (refer to section 12 Indigenous Peoples);
- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous communities have identified;
- describe changes to important habitat for species important to current use of lands and resources for traditional purposes;
- describe, using evidence, the available habitat, if any, in the LSA and RSA for the relocation of displaced species; and
- describe how Indigenous communities were consulted to contribute Indigenous Knowledge regarding valued wildlife. Include how concerns were addressed including studies needed to assess potential impacts and develop mitigation strategies as needed.

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

8.10.3. Mitigation and enhancement measures

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

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

- describe and explain the measures to control the use of the right-of-way, new access roads to access areas that were previously difficult to reach, including by wildlife predators as well as by hunters, off-roading recreationalists, and other users;
- describe the deterrent systems that will be used to mitigate impacts to wildlife and species at risk due to, for instance, attraction to the project site and/or components, and activities associated with the Project;
- describe wildlife friendly road-design principles and features, which may include underpasses, wildlife bridges, and speed limits, taking into account sensitive periods like nesting seasons (as well as monitoring to estimate bat and other wildlife mortality);
- describe measures to prevent the release of harmful substances into waters or areas frequented or occupied by wildlife;
- describe measures to address sensory disturbance and the resulting functional loss of wildlife habitat;
- describe technologies and approaches to minimize the impacts of tailings ponds on wildlife that may come into contact with water in the tailings ponds or ditches collecting seepage from the tailing ponds;
- identify provincial or federal permits (*Fish and Wildlife Conservation Act*) or authorizations that may be required in relation to impacts to wildlife and its habitat (e.g. removal of beaver dams), and describe discussions with the appropriate authority regarding permits or authorizations; and
- describe mitigation measures applicable to wildlife habitat and other biodiversity metrics that will be implemented through reclamation, including timelines and targets that will be used to assess effectiveness.

8.11. Species at Risk and their habitat

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

The Impact Statement must identify species at risk listed on Schedule 1 of SARA, if the species or its critical habitat are likely to be in the PA or study areas. The Impact Statement must identify any likely adverse effects from the Project on the listed species and their critical habitat, as well as measures that can be taken to avoid or lessen those effects and to monitor them.

Specifically, the Impact Statement must consider each of the following species at risk:

- boreal caribou (threatened);
- wolverine (special concern);
- little brown myotis, northern myotis, and tri-colored bat (endangered);
- bank swallow, eastern whip-poor-will, barn swallow, and Canada warbler (threatened);
- eastern wood-pewee, common nighthawk, olive-sided flycatcher, evening grosbeak, rusty blackbird, short-eared owl, yellow rail, and red-necked phalarope (special concern); and

- lesser yellowlegs (not listed, and assessed by COSEWIC as threatened).

For boreal caribou and wolverine, tailored information requirements are provided below. Any residual effects on these species may inform the assessment of effects on Indigenous Peoples and their rights (refer to section 12 Indigenous Peoples).

For birds listed under the *Migratory Birds Convention Act* (1994), refer to section 8.9 Birds, migratory birds and their habitat.

For little brown myotis, northern myotis, tri-colored bat, rusty blackbird, and short-eared owl, provide an assessment of any potential effects of the Project and measures that will be taken to comply with Ontario's *Endangered Species Act*. Describe how the measures are consistent with any existing federal Recovery Strategy, where applicable. If they are not consistent, then propose additional measures to ensure they are consistent. Provide a rationale.

The Impact Statement must also address any species at risk that are added to Schedule 1 or recommended by COSEWIC to be added after these guidelines are published, if the species or their habitat are likely to be in the PA 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

The Impact Statement must[21], for boreal caribou and wolverine:

- provide baseline information that is representative of current conditions;
- describe abundance (including relative abundance in each habitat type), population status, and distribution;
- describe seasonal and annual variation in abundance, distribution, and habitat use;
- provide a map showing survey sites, species sighting records, the areas of highest concentration or areas of use from all available data sources;
- provide information and/or mapping at an appropriate scale for residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified or proposed critical habitat, and/or recovery habitat (where applicable);
- describe the general life history (e.g. breeding, foraging) that may occur in the PA, or be affected by the Project;

[21] Should the Project require an authorization under Ontario's *Endangered Species Act*, the Government of Ontario will use Ontario-specific guidance for survey methods and desktop analysis to support the authorization application process. The proponent should review original submissions to the Agency from the Ontario Ministry of the Environment, Conservation and Parks and consult the Government of Ontario on specific permitting requirements, prior to collecting baseline data, to avoid timeline delays.

- identify critical periods (e.g. denning, rutting, spawning, calving, breeding, roosting), setback distances, or other restrictions related to these species;
- provide any published studies that describe the regional importance, abundance and distribution of species at risk, including recovery strategies or plans. This includes, but is not limited to, the resources and guidance in Appendix 2; and
- 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 communities); and
  - describe how community knowledge and Indigenous Knowledge was incorporated;

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

- include a map showing the proximity of the full Sydney Caribou Range boundary in relation to the proposed project footprint;
- define the entire Sydney Caribou Range as the RSA and assess baseline conditions and effects at the range-scale;
- with respect to defining the LSA it should include, at a minimum:
  - the project study area plus a buffer that includes home range size estimates for the local population if available, or provincial/national estimates as a proxy, considering best available data. Any buffer size chosen should encompass the maximum home range size estimate. Best available data includes, but is not limited to:
    - any recent and historical observations, surveys (aerial, fecal), telemetry data, and Indigenous Knowledge;
  - consult with expert advisors with the Government of Ontario[22] and ECCC and provide a justification of the extent of the LSA;
- provide the best information available from the Government of Ontario and ECCC regarding population size, habitat condition, level of disturbance (anthropogenic vs. fire), trends, in the absence of the Project, within the study areas;
  - In some instances, provincial methodologies may differ from federal recommendations. Consider both methodologies in order to apply the federal 35% habitat disturbance threshold outlined in the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020*,* and to determine the amount of habitat disturbance. If provincial

[22] For consideration while consulting both jurisdictions, the Government of Ontario recommends the boreal caribou LSA include all areas within a minimum 10-kilometre buffer around all project components.

disturbance information applies more recent information (i.e. best available), this information should also be considered;

- 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 phases, taking into account forest management practices, forest succession, and other predictable changes;
- provide the best available information about use of the study areas by boreal caribou (e.g. distribution, movement, timing) over project phases; and supplement this information with data from additional baseline studies where there are gaps in information, as necessary to build confidence with conclusions (having consulted both ECCC and the Government of Ontario on the state of existing data, survey methodology, and the development of any study plans);
- 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, over the course of all project phases, the type and spatial extent of biophysical attributes and permanent 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;
- include a map of General Habitat categories throughout the LSA using Ontario's General Habitat Description for the Forest-Dwelling Caribou and identify permanent alterations;
- describe the current state of connectivity of boreal caribou habitat, within the range, and between ranges, including the corridors between important habitat features, as determined appropriate through technical discussions with the Agency and its federal expert advisors prior to submitting the Impact Statement, and the projection of boreal caribou habitat connectivity in the absence of the Project over the course of all project phases; and
- describe the current state of predator and/or alternate prey access into otherwise undisturbed areas within the LSA.

See Appendix 1 – Additional Guidance for Biophysical Components for more guidance on collecting baseline data. The proponent should contact provincial or local government authorities to determine additional data sources and survey methods.

8.11.2. Effects to species at risk and their habitat

The Impact Statement must, for boreal caribou and wolverine:

- describe the potential effects of the Project on species at risk identified above and its critical habitat (including its extent, availability, and presence of biophysical attributes). The analysis of potential effects should be provided separately for each species at risk, including separate analyses for each activity, component and phase of the Project;

- describe key indicators used to assess project effects and the sensitivity of species at risk to disturbance. Provide a rationale for their selection, including a clear connection to the indicators used to characterize baseline conditions;
- identify provincial or federal permits or authorizations that may be required in relation to the species at risk, and describe discussions with the appropriate authority regarding permits or authorizations;
- describe the area, biophysical attributes, and location of habitat including critical habitat affected (e.g. destroyed, permanently altered, disrupted), including direct and indirect effects due to vibration and artificial light in the PA on usage patterns and migratory behaviour of species at risk;
- describe the residual effects that are likely to result from the Project after avoidance and minimization measures have been applied, including the extent, duration, and magnitude of the effects on:
  - number of individuals killed, harmed, harassed; and
  - number of residences damaged or destroyed;
- describe and take into account the tolerance thresholds for potential adverse effects that Indigenous communities have identified.

With respect to boreal caribou, the Impact Statement must additionally:

- provide an assessment of potential adverse effects on boreal caribou habitat from the Project activities;
- 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:
  - provide an account (and GIS file if available) of existing habitat affected using the following formula: (Project footprint + 500-metre buffer) – overlapping (permanent alteration(s) + 500 m buffer) (see glossary in the federal recovery strategy); and
  - determine whether the Project is expected to compromise the ability of the range to be restored to the undisturbed habitat threshold, and provide a rationale;
- determine whether the Project is expected to result in a reduction of connectivity within the range and/or between ranges, and provide a rationale for the conclusion;
- 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 expected to result in an increase of predator and/or prey access to undisturbed areas and provide a rationale for the conclusion;
- provide an assessment of potential adverse effects on boreal caribou individuals, including:
  - any sensory disturbance (e.g. noise, vibration, light) or sources of collisions that could affect individual boreal caribou, if they are present, and assess if these could lead to avoidance of habitat;
- evaluate the effects on the status of boreal caribou populations at the range scale by providing:
  - the best available information regarding population size and trend;

  - an assessment of the potential adverse effects of the Project on the population condition of the range (i.e. size and trend); and
  - an assessment of the potential adverse effects on boreal caribou (e.g. sensory disturbance, mortality, pollution);
- describe and map how the landscape will provide for future boreal caribou habitat during the decommissioning and abandonment phases, including how much of the project footprint will be 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 boreal caribou recovery progress at the Sydney range-scale, over the short, medium and long-term including the construction, operation, decommissioning, and abandonment phases of the Project.

8.11.3. Mitigation and enhancement measures

The Impact Statement must demonstrate the use of the mitigation hierarchy to select appropriate mitigation measures and describe the measures for mitigating potential effects on species at risk and their habitat, including:

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

With respect to boreal caribou, the Impact Statement must additionally:

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

- describe all feasible measures that will be taken to minimize the adverse effects of the Project on boreal caribou 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 in the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020);
  - minimize noise, light, smell and vibrations;
  - develop a management plan, as determined appropriate through discussions with the Agency and its federal expert advisors, including contingency measures that will be implemented if boreal caribou is observed near the Project;
  - use techniques to prevent predators from using the corridors and disturbed areas;
  - design and implement offsets for effects to boreal caribou and habitat, as determined appropriate through technical discussions with the Agency and its federal expert advisors, to be hosted by the proponent prior to submission of the Impact Statement, that consider:
    - the *Operational Framework for Use of Conservation Allowances* (Minister of the Environment, 2012);
    - an offset ratio that reflects the risk the Project poses to the species and its critical habitat; and
    - that the offset must account for time lags, probability of success, and how the measure(s) counterbalance the effects of the Project to the population and distribution objectives established in the Amended Recovery Strategy for the Woodland Caribou, Boreal Population, in Canada;
  - describe measures to progressively reclaim boreal caribou habitat during operation, decommissioning and abandonment, taking into account Ontario's Best management practices for mineral exploration and development activities and Woodland Caribou in Ontario;
- report on how the Project and mitigation measures are consistent with the Amended Recovery Strategy for Woodland Caribou, Boreal Population, in Canada;
- design and implement a follow-up program in accordance with section 17 Follow-up Programs including but not limited to:
  - monitoring effects on boreal caribou (if present or if individuals become present) and their critical habitat;
  - monitoring the efficacy of offsetting; and
  - include robust methodology to allow for a quantitative assessment, a monitoring schedule, performance indicators, thresholds for adaptation, and contingency measures.

8.12. Climate change

The following requirements are based on the Strategic Assessment of Climate Change (SACC), developed by Environment and Climate Change Canada (ECCC). The proponent must follow the directions and guidance contained in the SACC[23] and the technical guide related to the SACC. The Agency expects the proponent to keep apprised of updates to the SACC and related technical guides published by ECCC.

8.12.1. GHG emissions

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

- a description of each of the Project's main GHG emission sources and their estimated annual GHG emissions over the lifetime of the Project;
- net GHG emissions by year for each phase of the Project based on its maximum throughput or capacity (additional guidance is provided in section 2.1 of the Technical Guide);
- each term of Equation 1 of the Technical Guide (Net GHG emissions = Direct GHG emissions + Acquired energy GHG emissions - Avoided domestic GHG emissions - Offset measures), per year for each phase of the Project (additional guidance is provided in section 2.1 of the Technical Guide);
- emissions intensity (Equation 4 of the Technical Guide) for each year of the operation phase of the Project in terms of kt CO_2 eq/t or equivalent (additional guidance is provided at section 2.1.5 of the Technical Guide);
- the quantity and a description of the "units produced" used in Equation 4 of the Technical Guide for each year of the operation phase of the Project (additional guidance is provided in section 2.1.5 of the Technical Guide);
- methodology, data, emission factors, and assumptions used to quantify each element of the net GHG emissions (refer to section 3.1.1 of the SACC and section 2 of the Technical Guide);
- a discussion on the development of emissions estimates and uncertainty assessment (refer to section 3.3 of the SACC); and
- when applicable, a description of large sources of GHG emissions that may be the consequence of accidents or malfunctions.

8.12.2 Carbon sinks

As described in section 5.1.2 of the SACC, the Impact Statement must provide:

[23] 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.

- a quantitative and qualitative description of the Project`s positive or negative impact on carbon sinks, as indicated in section 5.1.2 of the SACC (additional guidance on the methodology to estimate losses or gains to carbon sinks is provided in section 4 of the Technical Guide); and
- any mitigation measures planned to restore disturbed carbon sinks (described under section 3.5.3 of the Technical Guide).

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

As described in section 5.1.3 of the SACC, with regards to federal emissions reduction efforts and on global GHG emissions, the Impact Statement must provide an explanation of:

- how the Project may impact Canada's efforts to reduce GHG emissions, if applicable;
- how the Project could impact global GHG emissions, if applicable; and
- should the potential exist for the Project to result in increased forest fires in the region, a description of the impact of increased forest fires on climate change.

8.12.4 Mitigations for climate change and greenhouse gas emissions

In terms of mitigation measures and net-zero plan, the proponent must complete a Best Available Technologies / Best Environmental Practices (BAT/BEP) Determination that will assess potential GHG mitigation measures throughout all phases of the Project as described in section 5.1.4 of the SACC. Additional guidance is provided in section 3.2 of the Technical Guide. The proponent must also provide a credible net-zero plan that would use and build off the BAT/BEP Determination to describe the mitigation measures that will be taken to minimize GHG emissions throughout all phases of the Project and achieve net-zero emissions by 2050, and thereafter for the remainder of the lifetime of the Project, as described in section 5.3 of the SACC. Emphasis should be placed on minimizing net GHG emissions as early as possible and throughout the Project lifespan. The net-zero plan must follow the principles and include the information in sections 3.5.1 and 3.5.2 of the draft Technical Guide, respectively, or any final version of the Technical Guide that becomes available prior to submission of the Impact Statement.

9. Health Conditions

9.1. Baseline conditions

The Impact Statement must describe the current state of physical, mental and social well-being and incorporate a determinants of health approach to move beyond biophysical health considerations to assess the impacts on Indigenous Peoples. In line with the World Health Organization's expanded definition of

health, a determinants of health approach recognizes that health is more than the absence of disease but rather a state of physical, mental, and social well-being.

The Impact Statement must:

- be sufficient to provide a comprehensive understanding of the state of health of Indigenous Peoples;
- 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 for potentially affected Indigenous Peoples;
- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline conditions for the health of potentially affected Indigenous Peoples;
- identify the social area of influence of the Project;
- describe how Indigenous Knowledge from relevant Indigenous communities was used in establishing baseline conditions, including input from diverse population groups; and
- describe baseline conditions using disaggregated data for diverse population groups and their different access to resources, opportunities and services within the community to support GBA Plus.

To understand the community context and baseline health profile for Indigenous Peoples, the Impact Statement must:

- develop community health profiles that reflect the overall health of each potentially affected Indigenous community and the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls general, where information is available, that include:
  - health outcomes of interest, such as chronic diseases, communicable diseases (e.g. sexually transmitted infections), and mental health and addictions;
  - health factors of interest, such as health-related behaviours (e.g. food consumption; physical activity; substance use), and mental well-being (e.g. feelings of depression; real or perceived health risks reflecting the level of chronic biological stress); and
  - use, where known, secondary information sources (e.g. Public Health Agency of Canada, Statistics Canada, Indigenous Services Canada, Indigenous health authorities, provincial health authorities, municipalities);
- describe any context-specific definitions of health and well-being, from the perspective of the relevant Indigenous cultures and communities;
- describe relevant Indigenous history or context, including historical impacts on health;
- describe the baseline information for social determinants of health that may be relevant to the Project, including social and economic conditions as outlined in sections 10 Social Conditions and 11 Economic Conditions;
- describe the determinants of health for diverse population groups within each community (e.g. gender-based violence);

- illustrate the interconnections between the abovementioned factors, contributing positively or adversely to social/community well-being, and health factors related to mental and physical well-being, to identify potential interactions of effects;
- describe and characterize the existing health services and programs, including health care provider capacity;
- provide the approximate location on a map 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 the gathering, hunting, trapping and fishing areas used by Indigenous Peoples, as well as permanent and temporary residences of Indigenous Peoples (e.g. cottages and camps identified in collaboration with Indigenous Peoples) and any sensitive receptors near the Project;
- describe drinking water sources, both surface and/or groundwater (permanent, seasonal, periodic or temporary), including approximate wellhead capture zones and the distance from project activities;
- describe the access to, and consumption of, country foods (traditional foods) by Indigenous Peoples as a health-related behaviour, including what species are used, quantities, frequency, harvesting locations and how the data were collected (e.g. site-specific consumption surveys, First Nations Food, Nutrition & Environment Study), and if applicable what country foods are currently being avoided because of perceived contamination;
  - country foods refer to all foods that do not come from commercial systems. It includes all food that is trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes or has Indigenous cultural value;
- provide baseline contaminant concentrations in ambient air, drinking water, and tissues of traditional foods consumed by Indigenous Peoples. The proponent should work with local Indigenous communities to collect tissue samples where appropriate;
- describe the level of food security and food sovereignty within Indigenous communities. Refer to the Public Health Agency of Canada's website on food security and to the First Nations Food, Nutrition & Environment Study for more information; and
- provide a summary of identified data and explain the selection of methods for statistical analysis of available data, including identifying uncertainties and limitations of proposed methods and available data. If surrogate data from reference sites are used rather than project site-specific measurements, demonstrate how the data are representative of site conditions.

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

9.2. Effects to human health

The proponent must assess the potential effects of the Project on the health of Indigenous Peoples. Interconnections between human health and other VCs and interactions between effects must be described.

A dedicated Health Impact Assessment, supported by a Human Health Risk Assessment (HHRA[24]), should show an understanding of the Project's health, social, and economic impacts on Indigenous Peoples and will play a role in understanding the Project's impacts on rights and culture. The proponent should refer to the Agency guidance on Analyzing Health, Social and Economic Effects under the Impact Assessment Act and to Guidance from Health Canada regarding Human Health Impacts and the best practices for the conduct of Health Impact Assessment in Appendix 2 – Human health.

The Impact Statement must:

- apply a Human Health Impact Assessment approach, including consideration of determinants of health;
- describe any potential project effects on the health profile of each Indigenous community, and on the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls;
- describe any potential health effects resulting from changes in biophysical determinants of health (i.e. environmental conditions) and social determinants of health (i.e. social and economic conditions);
- describe how community and Indigenous Knowledge was used in assessing human health effects; and
- apply GBA Plus across all health effects and document how potential effects or changes to human health conditions could be different for diverse population groups.

9.2.1. Biophysical determinants of health

With respect to the biophysical determinants of health of Indigenous Peoples, the Impact Statement must:

- provide an assessment of the potential effects on human health in consideration of, but not limited to, potential changes in:
  - air quality;
  - noise exposure and effects of vibration;
  - light levels;
  - current and future accessibility, availability and quality of country foods (traditional foods); and

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

  - current and future accessibility, availability and quality of water for drinking, recreational and cultural uses;
- 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, or any relevant provincial water quality standards or guidelines;
- describe how the project-related contaminants (e.g. arsenic, mercury, cadmium, lead, chromium) that can potentially end up in the water, air, or soil, may be taken up in country foods (i.e. foods that are trapped, fished, hunted, harvested or grown for subsistence, cultural or medicinal purposes);
- provide the rationale if a determination is made that an assessment of the potential for contamination of country foods (traditional foods or other exposure pathways, such as inhalation) is not required or if some contaminants are excluded from the assessment;
- include a detailed HHRA of mercury exposure via consumption of country foods, especially fish, using the Tolerable Daily Intake (TDI) published by Health Canada (Health Canada, 2021)[25];
- identify other potential pathways of exposure to contaminants;
- provide a detailed justification for every contaminant of potential concern (COPC[26]) or exposure pathways that would be excluded and/or eliminated from the assessment of the human health risks;
- conduct a problem formulation exercise and/or preliminary model predictions to determine whether an HHRA is required. The proponent must provide a rationale if the problem formulation and/or preliminary model predictions indicate that an HHRA is not warranted;
  - problem formulation consists of identifying the main factors to consider. It briefly addresses the following factors:
    - identification of the boundaries of the study;
    - identification of the current and future COPCs;
    - identification of current and future human receptors;
    - identification of current and future exposure pathways; and
    - development of the conceptual site model illustrating the connections existing between the COPC, the receptors and the exposure pathways;
- if an HHRA is conducted, the assessment must examine all exposure pathways for COPC to adequately characterize potential biophysical risks to the health of Indigenous Peoples. A multimedia HHRA may need to be considered and conducted for any contaminant of potential concern with an

[25] Efforts should be made to ensure that existing methylmercury exposure in nearby human receptors are factored into the HHRA, particularly when assessing impacts on Grassy Narrows First Nation community members in the HHRA.
[26] COPC: Any chemical substance for which the concentration in an environmental medium 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 modeled 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.

identified risk and multiple pathways. Use best practices in health risk assessment methods (see Health Canada, 2023. Guidance for Assessing Human Health Impacts in Impact Assessments: Human Health Risk Assessment);

- provide an assessment of the carcinogenicity of diesel exhaust gases when diesel engines are a source of air pollutant emissions for the Project. Refer to Health Canada's Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality, 2023[27];
- assess 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;
- assess the cancer risks of human exposure to all potentially carcinogenic PAHs in the diesel mixture rather than to a single surrogate substance (refer to Health Canada's Guidance for Evaluating Human Health Impacts in Impact Assessments: Human Health Risk Assessment (2023);
- describe and quantify specific thresholds used for HHRA and document if different thresholds were considered for vulnerable populations, including by sex and age. Provide a justification if any applicable threshold was not used;
- in situations where project related air, water or noise emissions meet local, provincial, territorial or federal guidelines, and yet public concerns were raised regarding human health effects, provide a description of the public concerns and how they were or are to be addressed; and
- describe any project-related changes that could result in a positive health effect (e.g., remediation projects).

9.2.2. Social determinants of health

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

- describe the potential health effects arising from the effects on social and economic VCs, and their respective indicators, reflecting the input of the affected Indigenous Peoples;
- identify and describe anticipated changes to determinants of health that may be related to the Project, for example:
    - housing availability, home value, housing affordability and home ownership;
    - demographic information on the region, including available descriptive statistics (e.g. age, ethnicity, sex and gender, language);
    - access to health and social services;
    - community cohesion;
    - average income and wage inequality;
    - education level;

27 This resource provides guidance for assessing effects to human health. The Proponent is encouraged to use this guidance with a focus on assessing impacts to the health of Indigenous Peoples.

  - factors supporting mental health and community well-being (including perceived stress, feelings of isolation, of remoteness, of concern for future generations); and
  - safety of Indigenous women;
- identify any emotional or social stress factor that may result from the Project, particularly:
  - concerns regarding public safety raised by the construction or by the risk of accidents or malfunctions related to project operations; and
  - disturbance of normal daily activities;
- describe any pathways of effect (positive or negative) on the state of intergenerational trauma, mental wellbeing, cultural continuity, poverty, and, if applicable, substance use;
- describe the effects that temporary work camps have on the safety of women and girls;
- describe potential effects on access to social and health services, including the increased use of health services and related social services in the relevant communities and the region;
- indicate the potential health effects, short-term or long-term, resulting from changes on community cohesion and perception of well-being during the construction phase, and determine whether those effects would change again during the operation phase;
- describe how potential avoidance of land near project components by Indigenous Peoples due to perceived changes in environmental quality and tranquility was considered in assessing potential effects on the diet and health of Indigenous Peoples;
- document and take into account tolerance thresholds for potential adverse effects on health identified by Indigenous Peoples;
- with regard to potential effects on food security:
  - describe changes in terms of accessibility, availability, utilization (quality and use) and stability of country foods (traditional foods), and the potential effects related to these changes on physical and mental health of Indigenous Peoples[28];
  - identify possibilities of avoidance of certain country food sources or drinking or recreational water sources by the Indigenous Peoples due to the perception of contamination;
- describe and quantify potential effects to mental and social well-being (e.g., stress, depression, anxiety, sense of safety); and
- describe any positive health effects (e.g. resulting from improved economic opportunities, increased access to services).

The proponent should refer to the following guidance:

- Analyzing Health, Social and Economic Effects under the Impact Assessment Act;
- Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities; and

[28] Refer to: Health Canada, Eating Well with Canada's Food Guide - First Nations, Inuit and Métis and First Nations Food, Nutrition & Environment Study

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

9.3. Mitigation and enhancement measures

The Impact Statement must describe the proposed mitigation and enhancement measures for any potential effects on the health of Indigenous Peoples. In particular, the Impact Statement must:

- describe the mitigation and enhancement measures proposed separately for Indigenous Peoples and for each Indigenous community;
- if the level of emissions from a particular project or effluent discharge is below or at the applicable limits, identify if additional mitigation measures will still be considered. However, if the change may be substantial (even within established limits) as a result of local or regional circumstances or the extent of the change, the proponent must provide additional mitigation measures to minimize pollution and risks to human health;
- when potential effects on human health exist due to exposure to a non-threshold contaminant (e.g. certain air pollutants such as fine particulate matter and nitrogen dioxide, as well as arsenic, mercury, and lead in drinking water), describe mitigation measures aimed at reducing residual effects to as low a level as reasonably possible;
- identify any measures that would reduce negative effects or enhance positive effects on the state of mental health (e.g. shuttle services for safe and restful commuting, rest breaks for recovery on the job, life-skills training such as financial management and coping strategies);
    - if applicable, identify any measures to minimize any potential exacerbation of the opioid crisis currently being experienced in northern Ontario, and measures for preventing substance use on and off the worksite;
- identify mitigation and enhancement measures presented in other sections that are also applicable to health and well-being effects;
- identify mitigation to avoid human health effects caused by changes to the quality of country foods from potential changes in mercury methylation rates downstream of the project site;
- identify mitigation to avoid human health effects caused by changes to drinking water quality (such as signage, or alternative drinking water sources).

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. Social Conditions

10.1 Baseline conditions

The Impact Statement must describe the existing social conditions for Indigenous communities and the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls in general.

The Impact Statement must:

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

10.1.1. Community profile

To understand the community context, the Impact Statement must prepare community profiles for each Indigenous community and for the the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls Red Lake/Ear Falls Indigenous population in general, and describe:

- influences on community well-being (e.g. disposable income, cost of living, lifestyle, language, rates of alcohol and substance use, and rates of illegal activities and violence, and gender-based violence), including indicators proposed by Indigenous communities;
- community cohesion, including level of support and engagement in community or neighbourhood, social networks, and social activities;
- the psychosocial environment and its influence on community well-being;
- the socio-cultural environment;
- demographic characteristics and major socio-cultural values of Indigenous Peoples;
- access, ownership and use of resources (e.g. land tenure, minerals, food, water, social infrastructure);
- capacity (currently available or planned) of institutions to deliver public services and infrastructure, including road maintenance, health services, social services, mental health and addiction-related services;
- relevant historical community background; and
- applicable history with previous developers.

10.1.1. Services and infrastructure

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

- road infrastructure and traffic safety;
- power lines;
- utilities;
- emergency services (e.g. firefighters, police, ambulances);
- accommodation and lodging (e.g. affordability, availability, suitability);
- educational services and facilities;
- elder care and services;
- existing health services and programs, including mental health and addiction-related services, and the capacity of service providers;
- social services including women's shelters; and
- all other potentially affected infrastructure and services.

10.2. Effects to social conditions

The Impact Statement must assess the adverse and positive effects of the Project on social conditions of Indigenous Peoples. Interconnections between social VCs and other VCs and interactions between effects must be described.

As applicable to the assessment, the analysis should describe the goals of local or regional land use plans, development plans, or community wellness 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 explore and discuss opportunities by which benefits to local communities can be enhanced.

The proponent should refer to the Agency guidance on Analyzing Health, Social and Economic Effects under the Impact Assessment Act.

10.2.1. Effects to community well-being

The Impact Statement must describe effects to community well-being for Indigenous Peoples, including:

- assess potential adverse and positive effects, at the Indigenous community level and for the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls in general, of changes to social conditions including, but not limited to:
    - income inequity;
    - housing prices and availability;

  - changes that result from increased population (temporary or permanent) or increased cost of living;
  - prevalence of criminal activity; and
  - those conditions considered for analysis of determinants of health in section 9.2 Effects to human health;
- describe, at the community level, the expected interactions between the Project's construction, operation, decommissioning, and abandonment workforce and local communities, businesses and residents;
- describe in-and out-migration effects, including changes in population, and any differential and particular impacts on women and girls;
- identify whether social divisions might be intensified as a result of the Project;
- evaluate effects on access, ownership and use of resources (e.g. land tenure, minerals, food, water, social infrastructure);
- consider the potential for stresses on community, family and household cohesion, reliance on women's shelters, substance use, or illegal or other potentially disruptive activities;
- describe potential effects related to greater propagation of sexually transmitted infections and gender-based violence (e.g. harassment or human trafficking);
- document and take into account tolerance thresholds for potential adverse effects identified by Indigenous Peoples;
- describe how Indigenous Knowledge was used in assessing community well-being;
- describe any positive effects on well-being (e.g. resulting from improved economic opportunities, increased access to services); and
- apply GBA Plus within the information related to community well-being for Indigenous Peoples and document how potential effects of changes to community well-being could be different for diverse population groups (e.g. women, youth, or Elders).

10.2.2. Effects to services and infrastructure

The Impact Statement must:

- describe the predicted effects to the local and regional infrastructure facilities and services as they relate to the social conditions of Indigenous Peoples, including adverse and positive effects to:
  - road infrastructure and traffic safety;
  - power lines;
  - utilities;
  - emergency services (e.g. firefighters, police, ambulances);
  - accommodation and lodging (e.g. affordability, availability, suitability);
  - educational services and facilities;

- elder care and services;
- existing health services and programs, including mental health and addiction-related services and the capacity of service providers;
- social services including women's shelters; and
- all other potentially affected infrastructure and services;

- take into account potential effects arising from a higher risk of accidents for each phase of the Project, (e.g. a higher risk of impact on the road system and emergency services during the construction phase due to an increased use of roads); and
- describe any need for government and/or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects.

10.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on social VCs in relation to Indigenous Peoples, including:

- describe mitigation for changes to housing availability, health services, mental health and addiction-related services, emergency services, educational services and facilities;
- identify opportunities to enhance positive impacts, such as improving infrastructure; and
- take into account local and regional land use plans, development plans, and community safety and wellness plans where applicable mitigation or enhancement measures are proposed.

11. Economic Conditions

11.1. Baseline conditions

The Impact Statement must describe the local and regional economic conditions and trends, including for Indigenous communities and the Indigenous populations of the Municipality of Red Lake and the Township of Ear Falls in general, including the following:

- an overview of the main economic activities in the study areas, and demographic information for economically active members of the local and regional population;
- any local, provincial, or federal economic development plans or funding programs for the PA, LSA, and RSA, and the level of funding received by any community as a result of these initiatives;
- any relevant treaty provisions pertaining to economic development for Indigenous Peoples;
- existing employment rates, including principal employment and economic well-being in the study areas and impacted communities;

- workforce, including the availability of skilled and unskilled workers, existing working conditions, wages and average salary range, full-time and part-time employment and training and gender gaps such as for skilled trades and in wages and qualifications;
- existing local and regional workforce development and training programs, including those specific for Indigenous Peoples;
- the education graduation rates and implications to employment within the mining sector;
- a qualitative summary of conditions that influence workforce availability in the study areas over the short- and long-term, anticipated availability for the proposed project timelines, and a summary of best and worst case scenarios for Indigenous workforce availability considering various factors, including those outside of the proponent's control;
- an overview of the Indigenous businesses that may provide supplies and services required for the Project, including the affiliation of those businesses, if applicable, to potentially effected Indigenous communities identified in the Indigenous Engagement and Partnership Plan*;* and
- any current use of land and waterbodies in the study areas for traditional or non-traditional economic purposes by Indigenous Peoples (Refer also to section 12.2 Current use of lands and resources for traditional purposes).

Additionally, with respect to effects that are directly linked or necessarily incidental to federal permitting decisions for the Project, the Impact Statement must describe:

- any use of lands and water bodies for economic activities, by any people, in the applicable study areas including recreational and commercial fishing, baitfish harvesting, trapping, outdoor recreation, use of seasonal cabins, and outfitters.

Baseline conditions must be described using disaggregated data for diverse population groups (e.g. Indigenous women, youth, and Elders) and their different access to resources, opportunities and services within the community to support GBA Plus.

11.1. Effects to economic conditions

The Impact Statement must describe potential positive and adverse effects on Indigenous Peoples and to the local, regional, provincial, and national economy. The assessment of economic effects should take into consideration the temporal scale for construction, operation, decommissioning, and abandonment and the potential for boom-and-bust cycles associated with the Project. The proponent should refer to the Agency guidance on Analyzing Health, Social and Economic Effects under the Impact Assessment Act.

11.1.1. Employment

The Impact Statement must:

- describe the potential changes in employment including the following aspects:

- an estimate of the direct, indirect and induced employment at each phase of the Project, including an estimate of the full-time equivalent (FTE) employment and part-time employment created at each phase of the Project, and during each calendar year over the lifespan of the Project;
- an estimate of direct, indirect or induced income or wages and benefits, including a comparison to the industry average, the local average, the provincial average, the regional average, and the national average;
- a description of the types of employment created at each phase of the Project, including skill requirements for the types of employment;
- an estimate of the ability of the local and regional labour market (including Indigenous participants in the labour market) to meet demand under the anticipated scenario, best case scenario, and worst case scenario described in baseline conditions; to the extent practicable indicate the affiliation of the participants to Indigenous communities identified in the Indigenous and Engagement Partnership Plan;
- an estimate of the target workforce for each phase of the Project based on any plans to support hiring of underrepresented demographic profiles such as by biological (sex), socio-cultural (gender), and identity factors (race, ethnicity, religion, age, and mental or physical disability), as well as reasons for the levels of the targets and plans to achieve them;
- a description of the plans and the justification for hiring of temporary workers, including any temporary foreign workers, to make up for any local shortage of labour and skills;
- an estimate of introduced workers into the local and regional labour market to support the Project;
- situations where the Project may cause the displacement of local workers; and
- any potential long-term changes to the local and regional labour markets as a result of this Project;

- describe the potential changes in training including:
  - training programs and/or other initiatives to improve employment opportunities for Indigenous Peoples. Please specify the sources of funding including proponent and government programs, such as the Indigenous Skills and Employment Training Program service delivery network; and
  - potential economic effects from training related to the Project;
- describe the GBA Plus aspects of employment, including:
  - the potential effects on employment for Indigenous Peoples, including circumstances in which Indigenous Peoples could receive fewer benefits related to the Project than others;
  - any actions that will be taken to increase the employment of Indigenous Peoples that may face barriers to employment in the Project, to achieve inclusivity and well-being in the mining workforce, including training programs and measures to address gender-based violence and discrimination; and
  - the Project's diversity and inclusion workforce plans, policies and practices.

11.1.2. Business environment and local economy

The Impact Statement must:

- set out the investment in the Project for each phase and the total investment, including detailed forecast of capital and operating costs;
- describe economic benefits to the economy as a whole, including;
  - information on revenues from tax levies, royalties, changes to Gross Domestic Product (GDP), development of new technologies or intellectual property; and
  - an estimate and description of direct, indirect, and induced economic effects of the Project in the short and long term;
- describe any revenue/economic benefit agreements under consideration or concluded with Indigenous communities (details not necessary);
- provide an estimate of the anticipated levels of local and regional economic participation in the Project for Indigenous Peoples, in comparison to the total project requirements (e.g. total dollar value of contracts);
- describe situations when the Project may directly or indirectly create economic hardships for, or the displacement of, Indigenous businesses;
- describe any effects on Indigenous Peoples from changes to specific sectors such as forestry, trapping and commercial recreation and tourism;
- provide information on the economic viability of the Project, to support the net benefits assessment;
- describe the methodologies and assumptions used to estimate the economic benefits of the Project including:
  - forecasts of relevant commodity prices used, where these were acquired and, if available, how they were forecasted;
  - sources and methodologies used for developing multipliers and estimates and, where a generic multiplier may not accurately reflect the specific situation of the Project, provide evidence of specific economic activity that will result from the Project going ahead;
  - relevant sources of uncertainty in the estimate;
  - sensitivity analysis of how changes in global competitiveness of the Project, commodity prices, capital and operating costs or other relevant sources of uncertainty may affect the estimated economic benefits. Present best-case and worst-case scenarios to provide a realistic description of long-term economic effects of the Project; and
  - discussion of any environmental, social, and governance risks to project economics, including the cost of capital.

With respect to effects that are directly linked or necessarily incidental to federal permitting decisions for the Project, the Impact Statement must describe:

- changes to economic conditions for any people or businesses that use lands and water bodies for economic activities in the applicable study areas, including recreational and commercial fishing, baitfish harvesting, trapping, outdoor recreation, use of seasonal cabins, and outfitters.

An authorization may be required for any major work on navigable waters, whether listed or not in the Schedule to the CNWA (paragraph 5(1)(a)). A work, other than a major work or minor work, on a navigable

water body that is not listed in the Schedule to the CNWA, requires either an approval (paragraph 10(1)(a)) or a public notice and a deposit of information (paragraph 10(1)(b)). Proponents may wish to coordinate the collection of information for authorizations with associated requirements outlined in section 4.3.1.1 of the Permitting Plan. By fulfilling the requirements of the regulatory authorization during the impact assessment, authorizations may be granted in an accelerated manner. For further guidance, the proponent should consult Transport Canada's Guide to the Navigation Protection Program's Notification, Application, and Review Requirements.

11.2. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on the economic conditions, including:

- identify and describe opportunities for enhancing positive effects, such as creation of employment for Indigenous Peoples, including:
  - education, training and hiring practices that encourage employment and retention of Indigenous Peoples;
  - actions taken to increase access to education and training opportunities for different groups (e.g., provision of transportation, flexible hours);
  - actions to provide flexibility in work schedules to enable the continued participation of Indigenous employees 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;
  - 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 Indigenous Peoples, and diverse population groups (e.g. Indigenous women);
  - cultural competency training plans for non-Indigenous employees to ensure a respectful working relationship with Indigenous contractors; and
  - all cultural awareness training plans for non-Indigenous employees to promote a safe work environment that fosters the well-being of Indigenous employees;
- describe plans, programs and policies to encourage contracting and procurement opportunities for Indigenous Peoples:
  - describe supplier network development initiatives, including the identification of potential Indigenous suppliers, and plans to provide them with information on technical, commercial and other requirements, and to debrief unsuccessful bidders;
  - describe any procurement policies that facilitate the opportunities for Indigenous-owned companies;
  - describe technology transfer and research and development programs that will facilitate the use of Indigenous suppliers of goods and services and Indigenous employees;

- where appropriate, describe financial liability and compensation in place as required by regulation or the proponent's commitments in relation to decommissioning or abandonment; and
- describe and justify the need for compensation plans to mitigate potential effects on social and economic VCs related to Indigenous Peoples.

The consideration of mitigation and enhancement measures should elaborate on the potential of the Project to benefit Indigenous Peoples.

12. Indigenous Peoples

The Impact Statement must provide information on how the Project may affect Indigenous Peoples, as informed by the Indigenous communities involved in the assessment. The proponent should apply Agency guidance on engaging with Indigenous communities 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 communities, in order to identify and 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 a number of individual environmental, health, social, or economic value components. Where holistic VCs are identified, the proponent must combine the analysis of individual VCs into an assessment of the holistic VCs identified by Indigenous communities. For example, the proponent is expected to consider and describe the importance of Nibi (water) as a holistic VC to Indigenous communities, as noted in the Nibi Declaration of Treaty #3.

Engagement with Indigenous communities 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 impact on the quality of life of Indigenous Peoples.

In order to facilitate the participation of each Indigenous community in the development of the Impact Statement, the proponent is required to work with each Indigenous community identified in section 4 of the Indigenous Engagement and Partnership Plan to establish a mutually agreeable approach to their participation, should they wish to participate. Section 6 of the Guidelines provides direction to the proponent on the engagement requirements for the Indigenous communities identified in section 4 of the Indigenous Engagement and Partnership Plan. Participation and engagement with the Indigenous

communities may involve undertaking ceremonial practices (e.g. offering tobacco) prior to collecting Indigenous Knowledge and/or conducting baseline studies.

Engagement with Indigenous communities must involve ongoing information sharing and collaboration to the extent possible to help validate the information and assessment findings in the Impact Statement. In cases where a specific study addressing elements relevant to the impact assessment of the Project has been prepared by an Indigenous community, 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 community, except in cases where the information could be confidential in nature.

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

The proponent is also encouraged to work with Indigenous communities who demonstrate an interest in drafting sections of the Impact Statement that concern them, including sections describing Indigenous Knowledge, on the subject of current use of lands and resources for traditional purposes, on potential impacts to the rights of Indigenous Peoples, and for the identification of mitigation or enhancement measures. Where applicable, sections of the Impact Statement prepared by Indigenous communities must be clearly identified. All perspectives and the rationale for different conclusions should be documented in the Impact Statement.

Where Indigenous communities do not wish to participate, the proponent should continue sharing information and analysis with the Indigenous communities 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.

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

12.1.1. Baseline conditions

The Impact Statement must include a description of the baseline conditions associated with physical and cultural heritage and structures, sites, or things of significance for Indigenous Peoples. This description should give consideration to an understanding of the historical baseline conditions associated with ability to transmit culture (e.g. through language, ceremonies, harvesting, teaching of sacred laws, traditional laws, stewardship laws, traditional knowledge).

Information on heritage and structures, sites, and things of significance for Indigenous Peoples can include:

- burial sites;
- spiritual sites, including rivers and watercourses;
- cultural landscapes;
- oral histories;
- teaching areas used to transfer knowledge between generations;
- cultural values and experiences on the land;
- Indigenous governance systems and Indigenous laws tied to the landscape;
- place names, language, and other components that make up a culture;
- sacred, ceremonial, or culturally important places (e.g., Rice Lake and Chukuni River), plants (e.g., wild rice), animals (e.g., moose, wolverine, American pine marten), objects, beings, or things;
- places with archaeological potential or artefacts (e.g., east bank of Chukuni River); and
- sites occupied historically.

The Impact Statement must:

- include structures, sites, or things of historical, archaeological, paleontological, or architectural significance to Indigenous Peoples as a VC;
- describe the potential effects of changes to physical and cultural heritage and to structures, sites, or things of historical, archaeological, paleontological, or architectural significance to Indigenous Peoples;
- 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;
- describe how historical context and effects to environmental and socio-cultural conditions, including changes to those conditions, have already impacted physical and cultural heritage;
- include components of the environment identified by Indigenous communities as having heritage value, to reflect that natural and cultural heritage is a multidimensional concept which is not limited to particular sites or objects;
- provide the location, on maps, of physical and cultural heritage features whose use or function may be impacted by the Project, when 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;
- describe how input from potentially impacted Indigenous communities 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 on the Agency's Website.

12.1.2. Effects to Indigenous physical and cultural heritage

The Impact Statement must:

- describe the nature and current condition of the heritage of any structure, site, or thing
- assess potential effects to physical and cultural heritage, and structures, sites, or things of historical, archaeological, paleontological, or architectural significance to Indigenous communities, 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 post-project abandonment or decommissioning;
- take into account potential effects on physical and cultural heritage when assessing the effects on social and economic conditions;
- for all project activities that disturb the soil (surface or underground) conduct an archaeological assessment in consideration of provincial legislation in consultation with Indigenous communities, as appropriate, so as to integrate information about methods;
- include whether the Project could impact underwater archaeological resources;
- provide copies of correspondence with provincial or Indigenous authorities responsible for heritage resources with comments on any physical and cultural heritage resource assessment and proposed mitigation measures;
- describe contingency plans and field interventions that will be applied should any archaeological or heritage resources be discovered within the PA during any phase of the Project, or cultural heritage training programs for workers;
- explain the interconnections with and potential impacts to physical and cultural heritage from changes to pre-development and current baseline environmental, social, and economic conditions;
- describe the outcomes of engagement and consultation activities with Indigenous communities with concerns about heritage resources in the PA and indicate the participation of the members of these communities in the related studies (e.g., archaeological studies), if applicable;

- describe how Indigenous Knowledge informed studies, including the identification of the sites to assess and include studies conducted by Indigenous Peoples, if any;
- consider natural and cultural heritage as a multidimensional concept which is not limited to particular sites or objects and which can also include components of the environment identified by Indigenous Peoples as having heritage value; and
- list any other effects highlighted by Indigenous communities or other participants, if applicable.

The proponent should consult the Agency's Technical Guidance for assessing the Current Use of Lands and Resources for Traditional Purposes under the *Canadian Environmental Assessment Act, 2012*.

12.2. Current use of lands and resources for traditional purposes

12.2.1. Baseline conditions

The Impact Statement must include information on the current use of lands and resources for traditional purposes. The proponent should refer to the Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012, on the Agency's website.

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;
  - reserves and communities; and
  - any Indigenous Protected and Conserved Areas;
- resources important for traditional and cultural purposes (e.g., plants, fish, mammals, birds, other country foods, and other natural resources) including the following:
  - berries and medicinal plants;
  - lake whitefish, lake trout, lake sturgeon, and other large-bodied fish;
  - moose, boreal caribou, wolverine;
  - furbearers (e.g., American pine marten);
  - birds;
  - waterways, waterbodies, wetlands; and

    - other resources identified by Indigenous communities;
- springs and any other potable surface water resources;
- the traditional and cultural significance of identified resources;
- 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, such as berry harvesting, bait harvesting and fishing, big game hunting, and trapping of fur-bearing animals;
    - all 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; and
    - other current uses identified 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 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.

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

The Impact Statement must also outline methods used to collect information on traditional use of lands and resources by Indigenous communities, 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.

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

The Impact Statement must:

- assess the potential effects on the current use of lands and resources for traditional purposes due to the Project, within the historical context of the Indigenous communities, including to:
  - current and future availability and quality of country foods (traditional foods);
  - quality, quantity, and distribution of resources available for harvesting (e.g., species of cultural importance, traditional and medicinal plants);
  - access to culturally important harvesting areas or resources, access to traditional territory, and to/from the community and reserves;
  - access to the territory and to the distribution and availability of harvested wildlife (e.g., wildlife avoidance);
  - the use of travel ways, navigable waterways (see section 11.1.2 Business environment and local economy) and waterbodies;
  - experiences of being on the land (e.g., changes in air quality, noise exposure, increased road traffic, effects of vibrations from blasting or other activities, increase in artificial light at permanent and temporary sites, fragmentation of traditional territory, visual aesthetics);
  - sites of interest to communities including for commercial and non-commercial fishing, hunting, trapping and gathering, and cultural or ceremonial activities and practices;
  - economic burdens of, and increased time for, travelling further to hunting, fishing, trapping and gathering opportunities; and
  - impacts of changes in the sensory experience of being on the land, due to noise and change in soundscape, changes in the visual landscape, and odor, and any corollary wellness impacts as a result of these sensory changes;
- describe how information about effects to current land and resource use is integrated into section 12.1.2. including how:
  - changes to the access, cabins, travel ways, 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 travel ways, waterways and harvesting areas associated with sacred, ceremonial, or culturally important places, objects or things, use of placenames, languages, stories, and traditions;

  - changes to visual, auditory, or olfactory aesthetics over the life of the Project and during decommissioning or abandonment of the Project affects traditional use; and
  - impacts to harvesting and traditional use affects teaching and knowledge transfer between generations;
- describe how traditional land and resource use and cultural values informed the biophysical assessment and impact rating criteria;
- describe potential effects from increased population from in-migration of workers on traditional hunting, fishing, trapping, harvesting, and gathering activities;
- describe potential effects on the transmission of traditional knowledge, language, community tradition of sharing, and community cohesion linked to activities potentially affected by the Project;
- take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements and best practices in place concerning light pollution (the proponent needs to work with communities to ensure that any standards that are applied are protective of traditional uses and purposes and human health);
- describe the methods used to collect information on traditional use of lands and resources by Indigenous communities;
- describe how the traditions, perspectives, values, and knowledge of Indigenous communities have been considered in determining the severity of the Project in consideration of historic context and effects to environmental and socio-cultural conditions affecting Indigenous land and resource use (refer to section 7.6 Cumulative effects assessment)
- describe how the results of the biophysical assessment (refer to section 9 Health Conditions) were integrated in the traditional land and resource use assessment and considered in the determining residual effects and the severity of impacts;
- provide a detailed explanation of how comments from Indigenous communities and Indigenous Knowledge informed the assessment of potential effects to current use of lands and resources for traditional purposes;
- describe all reasonable alternatives considered that would avoid impacts on current use of lands and resources for traditional purposes considered during project development;
- 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;
- take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements in place concerning light pollution;
- describe how Indigenous Peoples who participated in the gathering of traditional use information took part in the impact assessment and in the development of proposed mitigation measures, including undertaking their own assessment of effects; and
- include all Indigenous comments on potential effects to current use of lands and resources for traditional purposes

12.3. Health, social, and economic conditions of Indigenous Peoples

12.3.1. Baseline conditions

The Impact Statement must meet the requirements set out in sections 9, 10, and 11 with regard to the effects to health, social, and economic conditions, which must take into account GBA Plus specific to Indigenous Peoples.

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

12.3.2. Effects to Indigenous health, social, and economic conditions

The Impact Statement must meet the requirements set out in sections 9, 10, and 11 with regard to the effects to health, social and economic conditions. The assessment of these effects to Indigenous Peoples must describe and take into account interactions with the effects on physical and cultural heritage, on structures, sites, or things of significance, and on the current use of lands and resources for traditional purposes. For example, an effect on a traditional food 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 diverse vulnerable population groups.

The proponent should refer to the following guidance:

- Analyzing Health, Social and Economic Effects under the Impact Assessment Act;
- Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities; and
- More-than-mental health: Indigenous identity, culture, community and relationship with land are integral to Indigenous wellbeing (training manual).

12.4. Rights of Indigenous Peoples

12.4.1. 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 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, to illustrate the location of treaties, traditional territories, and Métis harvesting zones;
- document the nature and extent of the exercise of rights of Indigenous Peoples, potentially impacted by the Project, as identified by the Indigenous community(ies);
- 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;
- consider how the information requirements related to historic context of Indigenous communities are applicable to the baseline conditions supporting the exercise of rights; and

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

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

- a general description of the rights of Indigenous Peoples potentially affected by the Project, including the historic, regional, and community context. The description should include maps, when 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, to illustrate the location of areas with titles, land claims and traditional territories;
- the quality and quantity of resources required to support the 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 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, including around the Dixie Creek, Rice Lake, Chukuni River, and Pakwash Lake;
- landscape, social and cultural conditions that support the Indigenous community’s exercise of rights (e.g. large, intact, and diverse landscapes, areas of solitude; connection to landscape, sense of place; language; Indigenous Knowledge; clean water, biodiversity, abundance, distribution, and quality of wildlife and vegetation);
- Indigenous governance systems and Indigenous laws associated with the exercise of rights;

- where possible, information about members within an Indigenous community, and their role in the exercise of rights (e.g. women, men, Elders, youth, two-spirited people, people with disabilities);
- how the Indigenous community's cultural traditions, laws and governance systems, social values, access, and patterns of occupation and preferences inform the manner in which they exercise the rights (the who, what, when, how, where, and why);
- where they exist, identification of thresholds identified by the community that, if exceeded, may impair the ability to meaningfully exercise 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 that are already interfering with the ability to exercise rights or to pass along Indigenous cultures and cultural practices (e.g. language, ceremonies, Indigenous Knowledge).

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

12.4.2. Impacts on rights of Indigenous Peoples

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

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

Where an Indigenous community has not provided its views on the impact of the Project on their rights to the proponent, or both parties agree that it is better to provide information related to the impact on the exercise of rights directly to the Agency, the proponent should describe a rationale for the approach taken to assessing impact on rights. Proponents should discuss with Indigenous communities their views on how best to reflect the assessment of impacts on rights in their Impact Statement. Impacts on rights may be assessed using a methodology identified by Indigenous communities, including community-led assessments, and agreed upon between the Indigenous community and the Agency. This may include supporting Indigenous-led studies and assessments to inform the assessment of effects to Indigenous Peoples including on their ability to practise their rights and the resources necessary to support those rights (e.g., for VCs, spatial and temporal boundaries, community health, social conditions, and community well-being) that are to be provided publicly and to the Government of Canada.

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

The Impact Statement must:

- document the Project's potential impacts on the exercise or practice of the rights of Indigenous Peoples or the rights arising from treaties in the PA, as expressed by potentially impacted Indigenous Peoples;
- describe the impact on the rights of Indigenous Peoples, taking into account the concept of the link between resources, access, and experience;
- document the views of potentially affected Indigenous Peoples regarding the severity of impact that the Project could have on their rights; and
- describe how the results of the traditional land and resource use assessment, the cultural heritage assessment, health and socio-economic assessment of Indigenous Peoples were integrated in the assessment of impacts on the exercise of rights of Indigenous Peoples and considered in the determining residual effects and the severity of impacts.

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

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

- how, given the historical context of Indigenous communities, the Project may contribute cumulatively to any existing impacts on the exercise of rights, as identified by the Indigenous community(ies);
- the interference of the Project on the quality and quantity of resources available for the exercise of rights;
- how the Project affects the ability to travel freely in the territory;
- the effects of the Project on the access to areas important to the exercise of rights;
- the effects of the Project on the experience associated with the exercise of rights, including the ability of Indigenous communities to exercise their rights in a peaceful manner (e.g., without changes in connection to land, well-being, knowledge of the landscape, air quality, noise exposure, effects of vibrations, artificial light, fragmentation, visual aesthetics, safety);
- the effects of the Project on Indigenous traditions, laws, and governance;
- how the Project will affect the planning, management, or stewardship of traditional lands and resources by Indigenous Peoples;
- how the Project will affect the ability of Indigenous Peoples to derive future economic benefits from the land or water, or to maintain an ongoing relationship with the land or water;
- the way that the Project is aligned with the values, political direction and/or objectives of Indigenous Peoples' actions to mitigate or to adapt to a changing climate;

- the manner in which the Project and its impacts weaken or strengthen the authority of Indigenous Peoples on their territory;
- how the Project affects all other components of significance identified by Indigenous communities; and
- the severity of the impacts on the exercise of rights, as identified by the Indigenous communities.

12.5. Mitigation and enhancement measures

The Impact Statement must:

- describe the proposed mitigation and enhancement measures for all potential effects to Indigenous Peoples, including potential impacts to the current use of lands and resources for traditional purposes (e.g., hunting, gathering, fishing, and any other traditional practices associated with these activities), potential effects to cultural and physical heritage, and potential impacts on the rights of Indigenous Peoples:
  - be clear about which specific measures are designed to manage each specific pathway of effect;
  - identify if these are measures for which the proponent or other parties would be responsible;
  - elaborate on how these measures may vary for each Indigenous community or Peoples;
  - elaborate on how input from Indigenous communities informed these mitigation and enhancement measures;
  - describe if and how these measures will be integrated into the project design, if applicable;
  - include perspectives of the potentially impacted Indigenous communities, on the effectiveness of particular mitigation measures on such impacts;
  - describe collaboration with Indigenous Peoples to identify preferred mitigation measures for potential adverse impacts on Indigenous communities or their rights, as well as to optimize the Project's benefits for their communities;
- demonstrate how the timing of Indigenous activities on the land was considered when establishing the schedule for project activities;
- 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 with provincial or Indigenous authorities responsible for heritage resources with comments on any physical and cultural heritage resource assessment and proposed mitigation measures;

- describe the measures that will be implemented by the proponent for the potential impacts of the Project on the exercise of rights, including how the measures directly address the possible impacts of the Project on the exercise of rights and the scope of the measures;
- describe the measures that would enhance or support the exercise of rights in the PA (e.g. employment, procurement, and monitoring measures);
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous communities and diverse vulnerable population groups, and they are not disadvantaged in sharing any positive effect resulting from the Project. These mitigation measures should be developed in collaboration with the potentially affected communities and diverse population groups;
- describe how the GBA Plus results on disproportionate effects have been used to inform mitigation and enhancement measures;
- describe predicted climate change considerations for VCs and incorporate climate change adaptation into reclamation planning;
- describe the measures that would return the site to a state that is safe and productive for traditional use activities, such as hunting, fishing, and gathering of traditional medicines or foods during the decommissioning and abandonment phases;
- describe how the proponent has addressed the suggestions and recommendations made by potentially affected Indigenous Peoples including where Indigenous Knowledge was provided and considered in respect of the design of mitigation measures;
- 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; 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 community(ies). In addition, the Impact Statement must include perspectives of the potentially impacted Indigenous communities on the effectiveness of particular mitigation measures on such impacts.

13. Effects of Potential Accidents or Malfunctions

The failure of certain works caused by technological malfunctions, human error, or exceptional natural events (e.g. flooding, earthquake, forest fire) could cause major effects. If certain events are expected to occur (e.g. minor spills, road accidents), they should be included as expected effects in the previous sections.

13.1 Risk assessment

The Impact Statement must:

- identify hazards for each project phase (construction, operation, decommissioning, and abandonment), that could lead to events of accidents and malfunctions related to the Project (e.g. structural failure of the open pit or tailings storage facility, or uncontrolled release of hazardous materials) and provide an explanation of how these events were identified (e.g. information sources, recognized risk assessment methodology, professional expertise, similar project, participants' input);
  - take into account the lifespan of different project components, design of different project components, complicating factors such as weather or external events, and the potential for vandalism or sabotage;
- conduct an analysis of the risk of each hazard and adverse event (including likelihood and consequences) and describe the potential consequences (including the environmental, health, social, and economic effects and effects to Indigenous Peoples);
- describe the plausible worst-case scenarios and the more-likely but lower-consequence alternative scenarios, including;
  - the magnitude, duration, and extent of effects;
  - the quantity, mechanism, rate, form, and characteristic of contaminants, greenhouse gases, and other materials released or discharged into the environment;
  - influence of local and regional terrain, topography, and weather conditions (e.g. difficult access for interventions);
  - modelling for any contaminants spilled, or released indirectly into water or air;
  - potential environmental, health, social, and economic effects, including effects to Indigenous peoples. With respect to human health specifically, consideration should be given to potential pathways of effects associated with groundwater and surface water, air, country foods, and other relevant media, including short-term and long-term risks to human health;
  - 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. migration and nesting periods of migratory birds, spawning periods for fish, hunting season, tourist season); and
  - 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 shores, streams, and wetlands frequented by fish and/or migratory birds, and likely routes to them. Shoreline classification surveys and mapping must be conducted along major waterways where large spills are possible.

13.2 Mitigation measures

The Impact Statement must:

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

13.3 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. The spatial boundaries identified for effects from potential accidents and malfunctions will generally be larger than the boundaries for the project effects alone;
- describe how the proponent will integrate its response operations into an incident management system (e.g. the Response Command System, Incident Command System) when deploying a significant incident response effort;
- describe the role of the proponent in the case of spill, collision, grounding, 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 communities 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 relative to likely accident and malfunction sites and/or likely pathways to sensitive environmental receptors;
- describe emergency communication and public notification plans, community awareness plans, and public reporting, including plans for translations in Indigenous languages, as appropriate;
- describe emergency communication plans that would provide emergency instructions to surrounding communities, including Indigenous communities, and how these will be informed by the public and Indigenous communities. 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, injured animal reports;
- describe liaison and continuous education plans linked to emergency preparedness for surrounding communities that may be affected by the consequences of a significant incident, including for Indigenous communities;
- explain how the proponent has made and will continue to make an outreach effort to ensure public and Indigenous communities understanding 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.

14. Effects of the Environment on the Project

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

The Impact Statement must:

- describe how environmental conditions, including natural hazards such as severe and/or extreme weather conditions and external events, could adversely affect the Project and how this in turn could result in effects to the environment, health, social, and economic conditions;
- 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 or in preparation for effects of the environment on the Project;
- describe possible mitigation measures to address adverse environmental, health, social, and economic effects resulting from effects of the environment on the Project;
- describe measures to enhance positive environmental, health, social, and economic effects resulting from effects of the environment on the Project;
- describe the Project 's climate resilience and how the impacts of climate change have been integrated into the project design and planning throughout the life of the Project, and describe the climate data, projections, and related information used to assess risks over the life of the Project (using regional climate data available through Ontario's Climate Data Portal and/or other data sources);
- identify the Project's sensitivities and vulnerabilities to changes in climate (both in mean conditions and extremes such as short-duration heavy precipitation events);
- describe all known and relevant trends in meteorological events, weather patterns, or physical changes in the environment that are expected to result from climate change, and incorporate this information into a risk assessment as contributing or complicating factors for accidents and malfunctions (e.g. increased risk of forest fires). Provide mitigation measures (both passive and active) that the proponent is prepared to take to minimize the frequency, severity, and consequences of these projected effects;
- identify any areas of potential wind or water erosion; and
- assess the potential effects of seismic events on facilities and specify the soil movement parameters that will be used with the probability of occurrence (e.g. 2% in 50 years) and the best practice codes and guides that are or will be used in the seismic effects analysis (e.g. National Building Code of Canada 2020, CAN/CSA-Z662 standard).

Additional guidance related to conducting climate change resilience assessments is included in the Strategic Assessment of Climate Change and the Draft Technical Guide Related to the Strategic

Assessment of Climate Change: Assessing Climate Change Resilience To support other planning processes, the proponent may also wish to refer to the provincial guide to Consideration of Climate Change in Environmental Assessment in Ontario.

15. 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 Government of Canada obligations and commitments.

Federal environmental obligations relevant to this Project include:

- the Convention on Biological Diversity, including the Kunming-Montreal Global Biodiversity Framework, and Canada's supporting national framework (e.g., the Canadian Biodiversity Strategy, Canada's Biodiversity Outcomes Framework and the current biodiversity goals and objectives in Canada), and legislation that supports the implementation of Canada's biodiversity commitments, including SARA and the *Canada Wildlife Act (*1985), as well as supporting policies and guidance documents;
- recovery strategies and action plans developed under SARA for all species at risk potentially affected by the Project, if present. In particular, the Impact Statement should consider effects on boreal caribou habitat and population at the range-level, as set out in the Amended Recovery Strategy for the Woodland Caribou, Boreal Population and reaffirmed in the Agreement for the Conservation of Caribou, Boreal Population in Ontario; and
- the Convention for the Protection of Migratory Birds in the United States and Canada, as implemented in part under the *Migratory Birds Convention Act* (1994), and supporting guidance documents on conservation objectives and strategies specific to Bird Conservation Regions;

The Impact Statement must:

- describe 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. The Agency, 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 (refer to the SACC). Although it is not required, the proponent may provide its views in the Impact Statement on the extent to which the effects of the Project would hinder or contribute to the Government of Canada's ability to meet its commitments in respect of climate change in order to inform the impact assessment.

16. 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 and must:
  - 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 communities 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 communities;
- describe the project-specific context, including key issues of importance to Indigenous communities, and key issues, community plans, and/or strategies of importance to 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 planning and design of the Project and the selection of the preferred alternative means and 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 risk of irreversible harm; and

- indicate how monitoring, management, and reporting systems consider the sustainability principles and attempt to ensure continuous progress towards sustainability.

17. Follow-up Programs

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

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

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

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

17.1 Follow-up program framework

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

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

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

17.2 Follow-up program monitoring

For the proposed follow-up framework, the Impact Statement must present the preliminary environmental, health, social and economic monitoring program, including, but not limited to the:

- identification of regulatory instruments that include a monitoring requirement for the VCs;
- description of the methodology for tracking environmental, health, social, and economic issues;
- description of the methodology and mechanism for monitoring the effectiveness of mitigation and reclamation;
- description of the characteristics of monitoring where foreseeable (e.g. location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, data management, human and financial resources required);
- a description of the indicators to be used to assess progress towards expected outcomes and a rationale for their selection;
- an explanation of how any differences in predicted effects versus actual measured effects will be attributed to either uncertainty related to predictions or to effectiveness of the mitigation measures;
- identification of the monitoring activities that could pose a risk to the environmental, health, social, and economic conditions and/or VCs and the measures and means planned to protect these conditions;
- guidelines for preparing monitoring reports (number, content, frequency, format, duration, geographic extent) that will be sent to the authorities involved; and
- plans, including funding options, to involve Indigenous communities and local communities in monitoring and follow-up programs, where appropriate.

17.3 Compliance monitoring

Proponents are responsible for verifying whether the required mitigation measures were implemented. The Impact Statement must present a framework by which it will undertake compliance monitoring for follow-up programs. This should include, but not be limited to:

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

17.4 Adaptive management plans

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

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

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

Opportunities may be provided for the involvement of Indigenous communities, where appropriate.

18. Assessment Summary

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

The Assessment Summary provides an opportunity for the proponent to demonstrate 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.

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

- potential environmental effects, and changes to health, social, and economic conditions and the potential impacts on Indigenous Peoples;
- potential mitigation and enhancement measures in relation to potential effects and impacts;
- description of the residual effects of the Project;
- cumulative effects and proposed mitigation measures to address them;
- any other commitments made by the proponent, such as adaptive management, or recommendations made by the proponent to other parties, such as program enhancements or other complementary measures that can help manage effects; 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 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, 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;
  - Wild Species;
  - Canadian Wildlife Federation;
  - Natural Heritage Information Centre;
  - Make a natural heritage area map;
  - Ontario GeoHub; and
  - Wildtrax

- land cover data, such as forest cover maps, provincial forest resource inventories or remote sensing data for important habitats features and important characteristics;
- 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;
  - Species at Risk Public Registry for information on federally listed species at risk and available recovery documents;
  - Species at Risk in Ontario for information on the provincial list of species at risk and available recovery documents; and
  - Ontario Species at Risk Guides and Resources (includes many best management practices);
- field measurements to gather data on ambient or background levels for air, water, soil and sediment quality, light levels or acoustic environment (soundscape);
- published literature;
- federal impact assessment and provincial environmental assessment documentation, including monitoring reports, from prior projects in the area and similar projects outside the area;
- regional studies or assessments, project assessments and strategic assessments;
- navigation studies;
- renewable harvest data;
- Indigenous Knowledge, including oral histories;
- expert, community, public and Indigenous engagement and consultation activities, including workshops, meetings, open houses, surveys;
- qualitative information gathered from interviews, focus groups or observation;
- census data;
- cultural heritage assessments or archaeological assessments and reports;
- human health impact assessments or risk assessments;
- information available from Canadian Institute for Health Information under Community and Health System Characteristics;
- 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 supplement to the requirements in Section 7.3 Spatial and temporal boundaries.

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

- areas potentially impacted by changes to water quality and quantity or changes in flow in the watershed and hydrologically connected waters;
- areas potentially impacted by airborne emissions or odours;
- air zone(s) and airsheds under the Air Quality Management System;
- local major emission sources;
- areas of importance to people, including recreational areas;
- international and provincial or territorial borders which require transboundary assessment;
- modelling domain size based on isopleths resulting from the Project-only case that represents 10% of the appropriate jurisdictional ambient air quality criteria (within the limits of validity of the model);
- areas within the range of vision, light, and sound;
- the locations and characteristics of the most sensitive receptors or areas;
- species habitat areas, usage timing, and migratory patterns;
- emergency planning and emergency response zones;
- the geographic extent of local and regional services;
- any affected communities;
- all potentially affected Indigenous communities;
- areas of known Indigenous land,[29] cultural, spiritual and resource use; and
- existing affected infrastructure.

For biophysical Valued Components (VCs), spatial boundaries should be defined using an ecosystem-centered approach. See document Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012 (2014) for more information on establishing spatial boundaries.

For habitat-related VCs potentially affected by the Project, a land cover analysis, including freshwater environments, should be conducted to determine appropriate ecological boundaries and buffer distances around the 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.

[29] 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:

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

The temporal boundaries of the impact assessment should span all phases of the Project. If potential effects are predicted after project decommissioning or abandonment, this should be taken into consideration in defining specific boundaries. Define temporal boundaries in a manner that enables detection of all species that use the 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. masting events, storms on migration, late snowfalls).

Developing mitigation measures and enhancements

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

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

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

- Offset: aimed at offsetting residual effects following consideration of elimination and reduction measures, through measures referred to as “compensation” or “restitution.” For example, where an effect on fish habitat persists, it may be possible to offset through the creation of new habitat (replacement) or to propose measures to restore degraded habitat conditions. These include measures referred to as replacement, restoration or (financial) compensation.

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. 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 community to align project goals with an aim to enhance positive project effects. Such an approach may include the modification of the design of the Project or relocation of project components.

Compensation and offset plans

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

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

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

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

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

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

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

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

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

For **fish and fish habitat**, each compensation and offsetting plan should include:

- an exact location for the proposed measures of the Project (e.g. latitude and longitude, lot number, municipality, regional municipality county) and property rights;
- baseline information including a description of the environment (e.g. biological, hydrological, physical, chemical), 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 (e.g. nature, extent, method, timetable);
- the fish species affected by the proposed measures, including the resulting fish habitat functions (e.g. 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 (e.g. parameters, frequency, duration) must be clearly identified and described. Deliverables must be identified (e.g. baseline information, follow-up protocol, plans and specifications, work report, follow-up report), 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 guidance:

- A review of functional monitoring methods to assess mitigation, restoration, and offsetting activities in Canada;
- Assessing the Effectiveness of Habitat Offset Activities in Canada: Monitoring Design and Metrics;
- Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program; and
- Policy for applying measures to offset adverse effects on fish and fish habitat under the Fisheries Act.

Guidance for biophysical components

Atmospheric, acoustic and visual environment

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

- project sources of air pollutant emissions should include the following types of sources:
  - point 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, docked marine vessels, idling train engines and other transport vehicles, fugitive emissions from storage tanks and leaks for gas pipes and other equipment. This should also include start-up and shut-down emissions, as appropriate;
  - area sources: including drilling and blasting activities, material handling and transport, wind erosion of material piles, fugitive emissions from exposed mine faces, fugitive emissions from process areas and tailings management areas; and
  - mobile/road sources: including tailpipe emissions and fugitive dust emissions. Fugitive dust emission factors and assumed mitigation (control efficiency) should be described and should be justifiable based on what is practicable. Tailpipe emission factors should be estimated using established methods. Include all off-road and on-road fleet vehicles used in the Project;
- baseline data should be taken from existing or new long-term monitoring with representative monitoring data, collected over an appropriate duration and geographic scope;
- if a long-term monitoring data are not available, then other techniques may be acceptable on a case-by-case basis – with a rationale provided – including:
  - limited or short-term monitoring;
  - data from a surrogate site that has similar meteorological and air quality to represent the site in question;
  - results of existing large scale modelling; and
  - dispersion modelling to indicate spatial distribution of contaminants;
- for requirements pertaining to the use of atmospheric dispersion modelling, the proponent should:
  - conduct modelling for an appropriate time period to account for variability in meteorology and baseline conditions, and use the most recent meteorological and emissions data available;
  - conduct dispersion modelling for all relevant temporal scenarios including; pre-development scenario, the base case (accounting for all existing emission sources plus projects approved and under construction, but excluding the Project), project alone scenario (representing emissions from the Project only), application case (base case plus the Project), and future development case (application case plus projects that are currently proposed but not yet approved);
  - use appropriate domain boundaries and identify transboundary considerations. 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, if modelling is warranted.

Wetlands

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

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

- complete a Level 1 assessment across the RSA using the Ontario Land Cover Compilation v2.0, and a Level 2 assessment for a representative selection of wetlands that the Project would directly impact and of wetland(s) that are hydrologically connected. In conducting this assessment, the proponent should ensure that wetlands are considered in the context of:
  - the larger watersheds of which they are a part;
  - adjacent land use with a focus on hydrological and other functions;
  - landscape and/or watershed considering topography, soil types and hydrological linkages; and
  - the global significance of peatlands across the RSA;
- be as specific as possible to the biological characteristics of the wetland and to the ecological services and functions it provides;
- collect data from representative wetlands in a manner that enables reliable extrapolations in space (i.e. at minimum to the PA, LSA and RSA) and in time (i.e. across years), including:
  - design survey in support of the assessment so that they represent the spatial and temporal targets of modelling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of mitigation effectiveness. Survey designs should be sensitive enough to detect and quantify the effects at the appropriate spatial and temporal scales, any departures from predictions, and the effectiveness of mitigations. Justify the selection of modelling techniques based on current and recent scientific literature; and
  - plan survey protocol for representative wetlands to include modelling and simulations to estimate sampling requirements, and analysis to evaluate resulting design options. Sample size must be planned to support evaluation of the PA within the context of the LSA and RSA. Appropriate design of surveys will need to consider multiple survey locations in order to represent the wetland heterogeneity of the RSA, and to yield multiple survey locations per wetland type, without requiring aggregation of habitat classes post-hoc.
- incorporate the value of wetlands from an Indigenous perspective and existing disturbance when making proposals for wetland offsets;
- provide this assessment in a quantitative form and include the collection of site-specific baseline information on wetland functions, including:

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

It is recommended that the proponent be prepared to:

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

Fish and fish habitat

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

- for watercourses, it is recommended that the description be provided on the basis of homogenous section. Parameters to be measured may include: length of the section, wetted width at the ordinary high water mark, depth, streamflow types and characteristics (e.g. depth, velocity, turbidity, peak and low flows), substrate type (shoreline and bottom), aquatic (e.g. grass flat) and riparian vegetation, natural (e.g. significant vertical drop, waterfalls, subsurface flow over large distances), and anthropogenic barriers (e.g. stream crossing structures) that impede or obstruct free passage of fish.

The obstacles must be documented (e.g. size, condition) and the ability of fish to pass must be assessed;

- Ordinary High Water Mark is the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (e.g. rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes and wetlands it refers to those parts of the water-body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (i.e. full supply level);

- it is recommended to establish watercourse reaches based on fluvial processes (i.e. sediment source, transport, deposition), morphology and gradient (i.e. step-pool, pool-riffle), and watershed characteristics (i.e. valley setting, surficial geology). Assessments should consist of field and desktop components with the level of assessment and analysis scoped appropriately based on specific Project requirements and objectives;
- for waterbodies, the parameters to be measured include, but are not limited to, size, bathymetry, littoral, sublittoral, bathyal, epipelagic, mesopelagic, bathypelagic zones, maximum and average depths, seasonal water level fluctuations, substrate type (sediment), aquatic (submerged, floating and emergent) and riparian vegetation, and water quality (temperature and dissolved oxygen profile, turbidity, transparency, pH, salinity); and
- 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). 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; and
- perform field data collection programs in a representative number of locations (including reference locations where applicable), using sampling methods appropriate to the aquatic system, and should be performed in multiple seasons.

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

- present potential habitat alteration, 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 can be referenced when addressing habitat risks, but the groundwater and surface water assessments should be based on the site and Project-specific findings, per section 8.6;

- refer to standard metrics for changes in habitat quality and quantity to choose an analysis that is appropriate to the type and scale of effects (see A framework for assessing fisheries productivity for the Fisheries Protection Program). For example, broader, ecosystem-wide effects may require a modelling approach. It is recommended that the information be collected in the form of a map at appropriate scales, as well as in the form of a table; and
- consider that the effects of chronic and acute disturbances to fish populations are often dependent on the state of the fish population. If the fish population is already quite depleted, the effect of an acute disturbance may have a disproportionate effect on the population, and population modelling may need to be undertaken, accordingly.

Birds and bird habitat

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

- data collection should come from surveys that are designed to meet the defined outcomes and goals for the Impact Statement. Designed data collection (as opposed to haphazard, opportunity or convenience-based sampling) ensures that goals are met, and the potential for biases in the data collected are minimized. Avian surveys should be designed based on a thorough review of the available scientific literature pertinent to the specific region, bird groups, and anticipated effects;
- in those situations where field surveys are necessary to be confident in a conclusion (e.g. to increase certainty that mitigation is not needed, or to improve specificity in the documentation of biodiversity loss), 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 RSAs) 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 that goal. As the number of sampling years increases so does the understanding of natural variability;

- use spatially balanced and randomly chosen sampling sites, preferably using stratified random sampling that covers all habitat types. When major habitat edges are identified, sampling should be designed such that it is possible to sufficiently describe the importance not only of the types of habitat, but also of the edges between the types of habitat;
- have sufficient sampling effort and sampling locations to reflect variability among habitat type in the project study area, LSAs and RSAs, with more intensive sampling effort:
    - in the PA;
    - in areas or habitats more likely to be affected by the project; and
    - 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; and
- provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g. mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g. 95% confidence intervals, credible intervals);

- where predictive modelling is required, provide the explanatory data (e.g. covariables such as associated land cover) 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;
    - analyses and descriptions of baseline conditions for bird species 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; and
    - migratory bird counts are dependent on length of stay as well as total number of birds using a site. Attempt 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 mast event), during which time the habitat becomes vital to these species;

- baseline description of bird habitats should include, at a minimum, characterization of biophysical conditions with regard to ecoregion and Bird Conservation Region, taking into account the specific conditions found near the borders of these regions;
  - habitat surveys need to be detailed enough within the LSA and RSA to provide context for local and regional habitat availability and quality;
- the analysis of predicted effects on birds should:
  - include separate analyses for each activity, component and project phase;
  - distinguish between birds listed under the *Migratory Birds Convention Act, 1994* and birds that are not listed under the *Migratory Birds Convention Act, 1994*;
  - consider sources of error for all analyses to ensure that the final effects predictions indicate the best estimate of precision;
  - explore, wherever possible, non-linear, indirect and synergistic responses to the Project; and
  - produce defendable forecasts of effects on bird species or groupings and of the effectiveness of mitigation measures.

The proponent should consult:

- Framework for the Scientific Assessment of Potential Project Impacts on Birds for examples of project types and potential techniques for assessing effects on migratory birds;
- Government of Canada's guidance on the website Avoiding harm to migratory birds to characterize effects on birds in terms of amount, duration, frequency, and timing of disturbances; and
- Guidelines to reduce risk to migratory birds and ECCC's website on General nesting periods for migratory birds to inform the development and application of mitigation measures;
- note that although the nesting period dates on ECCC's website cover the main nesting periods of migratory birds, in order to reduce the risk of taking nests or eggs, it does not authorize the disruption, destruction or taking of a migratory bird, its nest or its eggs outside these periods.

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

It is recommended that the proponent be prepared to:

- 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 those situations where field surveys are necessary to be confident in a conclusion (e.g. to increase certainty that mitigation is not needed, or to improve specificity in the documentation of biodiversity loss), in order to establish adequate baseline conditions for wildlife, take into account the following technical recommendations:

- data collection should come from surveys that are designed to meet the defined outcomes and goals for the Impact Statement. Designed data collection (as opposed to haphazard, opportunity or convenience-based sampling) ensures that goals are met, assumptions for analysis and statistical modelling are met, and the potential for biases in the data collected are minimized. Wildlife surveys should be designed based on a thorough review of the available scientific literature pertinent to the specific region, wildlife, and anticipated effects;
- collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of sampling is suggested as a minimum to achieve that goal. As the number of sampling years increases so does the understanding of natural variability. Repeated sampling of locations or spatial overlap of sampling between years is required to separate spatial variability from temporal variability;
- if recent existing data is available for the study area, it can be used to complement the data collected in the field. If data from prior surveys is used to replace further sampling (e.g., only one year of sampling is planned to be conducted), a demonstration must be presented that these data and survey designs meet the requirements outlined below;
- survey protocol planning should include development of statistical models, use of simulations to estimate sampling requirements and analyses to evaluate resulting survey options. It is recommended to:
  - collect data to represent sources of temporal variation between years, during and between seasons (e.g. spring migration, breeding, fall migration, wintering), and in the daily 24-hour cycle;
  - consider that rare species require more survey effort to detect than common species, and this needs to be accounted for in survey design by increasing the number and duration of surveys;
  - collect data in a manner to allow for reliable extrapolations in space (i.e. at minimum in 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 modeling techniques based on current and recent scientific literature;

- use spatially balanced and randomly chosen sampling sites, preferably using stratified random sampling that covers all habitat types. When major habitat edges are identified, sampling should be designed such that it is possible to sufficiently describe the importance not only of the types of habitat, but also of the edges between the types of habitat;
- provide the criteria and document any simulations used to select sample sites and sample sizes;
- plan the sample size and survey design to ensure sufficient assessment of the PA in the context of the LSA and RSA. Survey design will need 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 PA. 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 wildlife and species at risk 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; and
- provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g. mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g. 95% confidence intervals, credible intervals);
- describe the protocols used to conduct surveys using point counts, Autonomous Recording Units, and aerial survey methods and provide rationale for why the selected protocols are best suited for the Project;

- 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 a survey schedule would have been created to identify information gaps for these species, including for the designation of critical habitat.

It is recommended that the proponent be prepared to:

- 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).

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

A permit under the SARA must be previously obtained for surveys on federal lands that are likely to harm, harass, capture, or kill species at risk, other than migratory birds.

With respect to boreal caribou, the proponent should:

- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation);
- provide the best available information from the relevant jurisdiction concerning baseline range population size and trend;
- consult with experts of the relevant jurisdiction on appropriate survey methodologies for boreal caribou. Provide a justification for the selected methodologies as compared to other options;
- in designing surveys for boreal caribou, the following information sources should be consulted:
  - provide estimates of confidence or error for all estimates of abundance and distribution. Estimates should be defined (e.g. mean across years, mean across sites, modeled prediction) and, if appropriate, confidence or other intervals should be defined (e.g. 95% confidence intervals, credible intervals);
  - Integrated Assessment Protocol for Woodland Caribou Ranges in Ontario (IAP) (request from Ontario Ministry of Environment, Conservation and Parks);
  - General Habitat Description for the forest-dwelling Woodland Caribou (Rangifer tarandus caribou) (GHD);
  - Ontario's Woodland Caribou Conservation Plan (CCP);
  - Range Management Policy in Support of Woodland Caribou Conservation and Recovery (RMP);
  - Integrated Range Assessment for Woodland Caribou and their Habitat: Sydney Range 2012; and
  - Indigenous knowledge holders from across all of the potentially impacted Indigenous communities identified by the Agency.

Requirements specific to bats:

- include the following types of surveys:
  - acoustic surveys, ensure study design is statistically valid;
  - continuous acoustic monitoring throughout the night (as least sunset to sunrise; 30 minutes before sunset to 30 minutes after sunrise recommended) active season (spring dispersal/ migration, breeding summer/ fall migration and swarming), as well as appropriate hibernaculum surveys; and

  - locate and assess potential hibernacula and roosts for use by bats, accounting for inter-annual and within-season variability in use, including existing mine infrastructure;
- data or reports must include information on acoustic detection methods used, including the following:
  - detector make and model;
  - microphone model used;
  - location of detectors;
  - height of microphones;
  - orientation of microphones;
  - special housing that may affect microphone sensitivity (e.g. wind screen, cones, weatherproofing, etc.);
  - mounting method (e.g. meteorological tower, pole, etc.);
  - device specific settings (e.g. gain/ sensitivity, TBC, etc.);
  - recording mode (i.e. full spectrum or zero-crossing); and
  - a summary of any issues with equipment failure, and a description of procedures used to ensure equipment was operational during deployment (including ensuring microphone sensitivity remains within an acceptable range);
- clearly describe methods used to define a bat “pass” and be consistent with the definition used for any comparison group. Provide a rationale for the chosen method;
- clearly describe methods used for acoustic identification, including any validation procedures used, criteria used for deciding on species classifications, and software used (including versions and settings);
- where results are compared across years, timing of surveys compared, equipment and setup protocols must remain consistent across years; and
- note that study design, analysis and acoustic data interpretation of results require the services of a bat expert.

The Ontario Ministry of Environment, Conservation and Parks, Species at Risk Branch’s Bat Survey Guidance Technical Note can be acquired by the proponent by contacting SAROntario@ontario.ca.

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

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