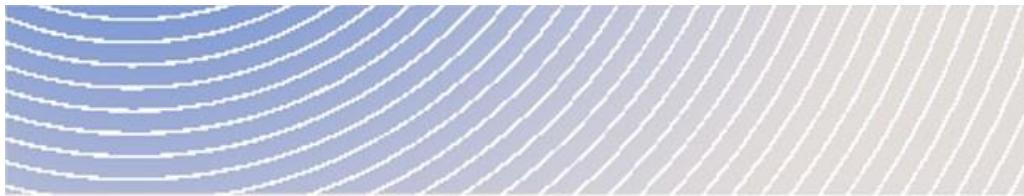

Impact Assessment Agency of Canada



DRAFT TAILORED IMPACT STATEMENT GUIDELINES:
MARTEN FALLS COMMUNITY ACCESS ROAD PROJECT

DECEMBER 2019





Impact Assessment
Agency of Canada

Agence d'évaluation
d'impact du Canada

Canada

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Abbreviations and Short Forms

Agency	Impact Assessment Agency of Canada
BCRs	Bird Conservation Regions
CAAQS	Canadian Ambient Air Quality Standards
CER	Canadian Energy Regulator
CER Act	Canadian Energy Regulator Act
CNSC	Canadian Nuclear Safety Commission
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
FA	Federal Authority
GBA+	Gender Based Analysis Plus
GHG	Greenhouse gas
HIA	Health Impact Assessment
IA	Impact Assessment
IAA	Impact Assessment Act
Minister	Minister of Environment and Climate Change
NOC	National Occupational Classification
Registry	Canadian Impact Assessment Registry
SARA	Species at Risk Act
Guidelines	Tailored Impact Statement Guidelines
VC	Valued component (including environmental, health, social, economic and potentially other elements of the natural and human environment)

1. Introduction

These draft Tailored Impact Statement Guidelines (TIS Guidelines), a key element for the federal impact assessment process, provides direction and requirements for the proponent in preparing the Impact Statement for the Marten Falls Community Access Road Project (the Project). The draft TIS Guidelines have been tailored for the Project and will be updated following a formal comment period based on consideration of input from the proponent, federal departments, provincial ministries, Indigenous groups and the public received by the Impact Assessment Agency of Canada (the Agency). The tailoring is based on the nature, complexity and context of the project, and is informed and guided by consultation and engagement that occurs with the public, Indigenous groups, federal authorities (FAs) and other interested parties during the planning phase.

The Agency uses the proponent's Impact Statement and other information received during the impact assessment process to prepare an Impact Assessment Report that informs the Decision Statement to be issued by the Minister. The TIS Guidelines are posted on the Canadian Impact Assessment Registry Internet site to ensure the process is clear and transparent for all participants.

While the TIS Guidelines do not prescribe a preferred structure for the Impact Statement, it is essential that the Impact Statement address all requirements outlined in the TIS Guidelines. The Agency will expect that the Impact Statement is structured in such a manner so as to ensure that a technical issue or topic is handled cohesively, incorporating the factors laid out in subsection 22(1), and in consideration of subsection 18(1.2) of the *Impact Assessment Act* (IAA), including ensuring incorporation of Indigenous Knowledge in each technical section and ensuring that interactions between effects are appropriately documented. The Proponent may present the information in the Impact Statement in the manner it deems most appropriate, while ensuring appropriate collaboration between the proponent's technical teams to ensure the information presented in the Impact Statement is cohesive, complete, and without inconsistencies. To facilitate review of the Impact Statement, the proponent must provide the Agency with a table of concordance that identifies where each requirement of the TIS Guidelines is located within the Impact Statement.

1.1 Factors to be considered in the Impact Assessment

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

- a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by the carrying out of the designated project, including:
 - i. the effects of malfunctions or accidents that may occur in connection with the

- designated project;
 - ii. any cumulative effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out; and
 - iii. the result of any interaction between those effects.
- b) mitigation measures that are technically and economically feasible and that would mitigate any adverse effects of the designated project;
 - c) the impact that the designated project may have on any Indigenous group and any adverse impact that the designated project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the *Constitution Act, 1982*;
 - d) the purpose of and need for the designated project;
 - e) alternative means of carrying out the designated project that are technically and economically feasible, including through the use of best available technologies, and the effects of those means;
 - f) any alternatives to the designated project that are technically and economically feasible and are directly related to the designated project;
 - g) Indigenous knowledge provided with respect to the designated project;
 - h) the extent to which the designated project contributes to sustainability;
 - i) the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change;
 - j) any change to the designated project that may be caused by the environment;
 - k) the requirements of the follow-up program in respect of the designated project;
 - l) considerations related to Indigenous cultures with respect to the designated project;
 - m) community knowledge provided with respect to the designated project;
 - n) comments received from the public;
 - o) comments from a jurisdiction that are received in the course of consultations conducted under section 21 of IAA;
 - p) any relevant assessment referred to in sections 92, 93 or 95 of IAA;
 - 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 IAA—that is in respect of a region related to the designated project and that has been provided with respect to the project;
 - s) the intersection of sex and gender with other identity factors; and
 - t) any other matter relevant to the IA that the Agency requires to be taken into account.

The scope of the factors in paragraphs 22(1)(a) to (f), (h) to (l), (s) and (t) that are to be taken into

account, including the extent of their relevance to the impact assessment, is determined by the Agency and will be outlined in the TIS Guidelines.

The information provided by the proponent is to be provided in machine-readable, accessible format to support the Government of Canada's commitment to Open Science and Data and facilitate the sharing of information with the public through the Agency's Registry and Internet Site, and the Government'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. OVERVIEW

2.1 The proponent

The Impact Statement must:

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

2.2 Project overview

The Impact Statement must describe the designated project, key project components and ancillary activities, scheduling details, the timing of each phase 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, including likely future developments by other proponents that will use project infrastructure, and activities that may be enabled by the current project.

2.3 Project location

The Impact Statement must describe the geographical setting and 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 or for a linear project, provide the beginning and end points;
- current land and/or aquatic uses in the area;

- distance of the project components to any federal lands and the location of any federal lands within the regional study area;
- all waterbodies and their location on a map;
- navigable waterways;
- the environmental significance and value of the geographical setting in which the project will take place and the surrounding area;
- environmentally sensitive areas, such as national, provincial, territorial and regional parks, UNESCO World Heritage Sites, geological heritage sites, ecological reserves, ecologically and biologically sensitive 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 or private);
- description of local communities and Indigenous groups;
- if the information is not confidential, provide a description and location of Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, Indian Reserve lands, Indigenous harvesting regions (with permission of Indigenous groups), Métis settlements; and
- culturally important features of the landscape.

Maps are to be provided to the Agency as electronic geospatial data file(s) compliant with the ISO 19115 standard.

2.4 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;
- any federal authority's provision of financial assistance to the proponent for the purpose of enabling the project to be carried out, in whole or in part;
- legislation and other regulatory approvals that are applicable to the project at the federal, provincial, regional and municipal levels or from any body—including a co-management body—established under a land claim agreement referred to in section 5 of the *Constitution Act, 1982*, or from an Indigenous governing body as defined in the *Impact Assessment Act* (IAA) that has powers, duties or functions in relation to the environmental effects of a

project, including a list of the federal, provincial or territorial GHG legislation, policies or regulations that will apply to the project, as per the draft Strategic Assessment of Climate Change (SACC);

- any coordinated EA that is ongoing, including the details of how the proponent is ensuring that requirements for both processes are being met (including technical work and consultation requirements);
- government policies, resource management plans, planning or study initiatives relevant to the project and/or impact assessment (IA) and their implications, including relevant regional studies and strategic assessments;
- any treaty, self-government, land claims or other agreements between federal or provincial governments and Indigenous groups that are pertinent to the project and/or IA;
- any relevant land use plans, land zoning, or community plans (including any Community Based Land Use Plans);
- any land designation processes that may be triggered;
- information on land lease agreement or land tenure, when applicable; and
- municipal, regional, provincial and/or national objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental, health, social or economic effects or impacts.

2.5 Qualifications of individuals preparing the Impact Statement

In support of ensuring transparency and the quality of the scientific information and analysis being applied, the proponent must provide information on the individuals who prepared the sections within the Impact Statement related to environmental, economic, social, and health impacts and impacts on Indigenous peoples. Proponents are required to demonstrate that a qualified individual has prepared the information or studies provided. A qualified individual would include someone who, through education, experience or knowledge relevant to a particular matter, may be relied on by the proponent to provide advice within their area of expertise. Knowledge relevant to a particular matter may include Indigenous and community knowledge.

3. PROJECT DESCRIPTION

3.1 Project components

The Impact Statement must describe the designated project, by describing the project components, associated and ancillary works, and other characteristics to assist in understanding the potential environmental, health, social and economic effects, and impacts on Indigenous peoples and rights of Indigenous peoples¹, as identified by the Indigenous group(s). This description must be supported with maps of key project components, boundaries of the proposed site with geographic coordinates, major existing infrastructure, proponent lands, properties or leased lands, adjacent resource lease boundaries, adjacent land uses and any important environmental features.

The Impact Statement must describe all project components including but not limited to:

- water management infrastructure to divert, control, collect and discharge surface drainage and groundwater seepage to the receiving environment;
- waterbody diversions/realignments, dewatering and deposition activities;
- the location and details of single and multi-span watercourse crossings and types of structure used for water crossings (crossing type, design, length, etc.);
- the location and details of culverts for water flow connectivity and water level balancing (type, design, length, etc.);
- final route for all permanent and temporary linear infrastructure, including the road corridor, access roads (permanent and temporary), and temporary crossings;
- description of the area to be cleared;
- construction workspace and laydown areas;
- storage for fuels, explosives and hazardous wastes;
- drinking and industrial water requirements (source, quantity required, need for water treatment);

¹ This document uses 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 potential or established Aboriginal and Treaty rights recognized and affirmed by section 35 of the *Constitution Act, 1982*.

- energy supply source;
- worker accommodations and camps (permanent and temporary)
- borrow pits, gravel or aggregate pits and quarries (footprint, location, ownership, and development plans including pit phases and lifespan), including their location in relation to permafrost terrain, where applicable;
- waste rock, overburden, topsoil, gravel and rock storage and stock piles (footprint, locations, volumes, development plans and design criteria);
- aggregate extraction and production (crushing/screening) facilities(footprint, technology, location);
- waste disposal (types of waste, methods of disposal, quantity, location of disposal sites);
- remediation of project site, including post-construction clean-up and restoration; and
- any other infrastructure relevant to the project.

3.2 Project activities

The Impact Statement must include descriptions of project activities to be carried out during each project phase, the location of each activity and the activity's duration, magnitude and scale.

The Impact Statement must provide a complete list of project activities and focus on activities with the greatest potential to have environmental, health, social and economic effects on Indigenous people and the impacts to the exercise of Aboriginal and Treaty rights of Indigenous peoples. Sufficient information must be included to adequately predict adverse and positive environmental, health, social and economic effects, the interaction between those effects and any disproportionate effects for diverse subgroups.

Evidence that input from diverse subgroups was sought through engagement activities to identify potential effects or other concerns and issues must be provided. The information must be sufficient to provide an analysis regarding the project's impacts in the context of potential interaction between each Valued Component (VC).

The Impact Statement must highlight activities that involve periods of increased disturbance to environmental, health, social and economic conditions or impacts on Indigenous peoples. The Impact Statement must include a schedule including time of year, frequency, and duration for all project activities.

The Impact Statement will include a summary of the changes that have been made to the project since originally proposed in the Detailed Project Description, including the benefits of these changes

to the environment, Indigenous peoples and the public. Project activities, where relevant to the project, may include, but are not limited to a description of the elements listed below:

3.2.1 Site preparation and construction

- physical surveying of road right-of-way width and alignment, as well as supportive temporary infrastructure (e.g., access roads, aggregate source area and camps);
- vegetation clearing, earth grading and granular placement for road construction;
- temporary clearing and grubbing for construction and for activities such as aggregate sourcing, temporary lay-down areas, staging areas, including work camps, and debris or timber stockpiles;
- management and stockpiling of topsoil and unsuitable earth material along the right-of-way;
- water management, including water diversions, dewatering or deposition activities, stormwater management required (location, methods, timing), potable water, water use requirements, and wastewater if applicable, including:
 - site plans showing all project components, such as, water management infrastructures, location of all material stockpiles, location of all release points to the receiving environment, location of all major water crossings, location of all relevant waterbodies, and any other components or infrastructures relevant to the project;
 - ditching and drainage excavation, including the construction of culverts for road drainage; and
 - construction of single and multi-span watercourse crossing structures, including culverts,
- borrow material and aggregate requirements (source and quantity), extraction, production and transportation;
- wetland drainage;
- blasting (frequency, duration, time of year, time of day and methods);
- explosives manufacture, storage and management;
- storage and management of material stockpiles, hazardous materials, fuels and residues;
- storage and handling of petroleum products, chemical products, hazardous materials and residual materials;
- waste management and recycling;

- earth and aggregate hauling operations;
- operation, maintenance and storage of machinery and equipment;
- transportation of employees;
- equipment and crew mobilization/de-mobilization; and
- earthmoving, levelling, grading, and construction of the roadbed (for all new right of ways or roads);
- operation and dismantling of temporary camps (capacity, wastewater treatment);
- post-construction decommissioning, clean-up and restoration (including of construction equipment and vehicles, work areas, borrow pits, gravel pits, rock quarries, and laydown areas, construction materials, and temporary access roads);
- construction of access roads (permanent and temporary);
- construction of site fencing;
- operation of light duty, heavy-duty and mobile off-road equipment (type, quantity);
- alteration of linked roadways needed for construction and operation;
- contribution to atmospheric emissions, including emissions profile (type, rate and source);
- transportation of equipment and supplies (type and quantity of equipment, and mode of transportation, including winter roads, air transport, rail, etc.); and
- use of the Anaconda/Painter Lake forestry road.

3.2.2 Operation

- surface repairs, both localized and full resurfacing of the road, including equipment requirements (type, quantity);
- dust control activities;
- vegetation management within the right of way;
- winter maintenance-snow clearing and de-icing; and
- water management, including:
 - maintenance of storm water and the road drainage system (culverts, ditches, outfalls, and any water diversions (location, methods, timing));
 - potable water, water use requirements; and
 - process water, wastewater, water recycling and effluent treatment (quantity, treatment requirements, release points and their receiving waterbodies).
- bridge and culvert maintenance;

- characterization and management of borrow material, including overburden, and aggregate (storage, handling and transport of the volumes generated, mineralogical characterization, potential for metal leaching and acid rock drainage)
- transportation of employees.
- description of any road access controls, including but not limited to:
 - access to and use of adjacent lands for traditional uses or other activities (e.g., mineral exploration, outfitters, etc.);
 - vehicle and operator licensing requirements;
 - insurance coverage requirements and general liability; and
 - enforcement/policing responsibility.
- anticipated road use by different users, including Indigenous groups, the general public, and mining proponents of reasonably foreseeable future projects (e.g., Eagle’s Nest, Blackbird, Black Thor, Black Label, Big Daddy);
- anticipated use of the Anaconda/Painter Lake forestry road;
-
- aggregate production and stockpiling, aggregate extraction, processing and treatment;
- drilling and blasting, explosives manufacture, storage and use, aggregate crushing and sorting (frequency and methods);
- management and disposal of wastes;
- and
- use of winter roads by the proponent during operations.

3.2.3 Suspension, abandonment or decommissioning

- the ownership, transfer and control of the different project components;
- the preliminary outline of a suspension, abandonment, decommissioning or reclamation plan for any components associated with the project;
- final site restoration;
- dismantling and removal of equipment;
- removal and reclamation of ancillary structures;
- long term care, monitoring and maintaining the integrity of the site and any remaining structures; and
- suspension, abandonment or decommissioning for temporary or permanent facilities, including aggregate pits and access roads.

If the proponent does not anticipate decommissioning and abandonment, it must state clearly under what circumstances decommissioning would occur, and demonstrate a commitment to following environmental and social best practice in all its activities.

3.3 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 how this will change during the various phases of the project;
- anticipated workforce region of origin (i.e., local, regional, out-of-province or international employees);
- the skill and education levels required for the positions;
- investment in training opportunities;
- expected workforce requirements based on the National Occupational Classification system and timelines for employment opportunities;
- working conditions and anticipated work scheduling for construction and operation (e.g., hours of work, rotational schedules, fly-in/fly-out);
- anticipated hiring policies, including hiring programs;
- workplace policies and programs for Indigenous employment, and employment of other underrepresented groups;
- employee assistance programs and benefits programs; and
- workplace policies and programs, including codes of conduct, workplace safety programs and cultural training programs.

In addition to the above, the Impact Statement must include Gender Based Analysis Plus GBA+² in its discussion of workforce requirements to describe any potential differential effects for diverse subgroups in the community. This must include a discussion of how hiring policies and programs, access to employment and training opportunities, investment in training, workplace policies and programs take into consideration vulnerable or underrepresented groups, including Indigenous people or other community relevant subgroups (e.g., women, youth, elders).

² Gender Based Analysis Plus (GBA+) provides a framework to describe the full scope of potential adverse and positive effects under the proposed IAA. GBA+ is an analytical framework that guides practitioners, proponents and participants to ask important questions about how designated projects may affect diverse or potentially vulnerable population groups or subgroups who may be less likely to benefit from project activities.

4. PROJECT PURPOSE, NEED AND ALTERNATIVES CONSIDERED

4.1 Purpose of the project

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

4.2 Need for the project

The Impact Statement must describe the underlying opportunity or issue that the project intends to seize or solve and should be described from the perspective of the proponent. In many cases, the need for the project can be described in terms of the demand for a resource, service or piece of critical infrastructure to further economic development goals. The proponent should provide supporting information that demonstrates the need for a project. 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 (e.g., the projected output of an operation does not excessively exceed the projected demand, or that the project has sufficient connections to necessary infrastructure). The proponent may report the comments or views of Indigenous peoples, the public and other participants on the proponent's need statement.

4.3 Alternatives to the project

In addressing alternatives to the designated project, the Impact Statement must provide a description of the functionally different ways that are technically and economically feasible to meet the project need and achieve the project purpose from the perspective of the proponent. For these technically and economically feasible alternatives to the project, the Impact Statement must provide sufficient information for the selection of alternatives to the project. The process of identifying and considering alternatives to the project must consider the views, information and knowledge from Indigenous peoples, the public and other participants, as well as existing studies and reports, and must be conducted in accordance with the Impact Assessment Agency of Canada's policy and

guidance documents. As relevant, the alternatives to the project should be informed by any study or plan that is conducted or prepared by a jurisdiction that is in respect of a region related to the designated project and that has been provided with respect to the project.

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 and is consistent with the aims of IAA.

4.4 Alternative means of carrying out the project

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

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;
- each alternative means in sufficient and appropriate detail; and
- those alternative means that are technically and economically feasible.

The Impact Statement must identify the elements of each alternative means and the associated adverse and positive environmental, health, social or economic effects or impacts on rights of Indigenous peoples, as identified by the Indigenous group(s). The application of Gender Based Analysis Plus (GBA+) to the effects analysis to describe disproportionate effects for diverse subgroups is required. The proponent must also consider the views or information provided by Indigenous people, the public and other participants in establishing parameters to compare the alternatives means. The determination of alternative means must be conducted in accordance with the Impact Assessment Agency of Canada's policy and guidance documents.

The Impact Statement must then identify:

- the criteria and parameters used to comparatively assess the alternative means based on their associated positive and adverse environmental, health, social and economic effects, impacts on rights of Indigenous peoples as identified by the Indigenous group(s), technical and economic feasibility, and any other relevant factors;
- the methodology used to comparatively assess the alternatives means using the above parameters, including consideration of the trade-offs between the alternative means and the use of best available technology; and

- the preferred alternative means of carrying out the project including a rationale for its selection and the unacceptability of the excluded alternative means, that includes consideration of the above analysis.

In its alternative means analysis, the proponent must address all project elements, including, but not limited to, the following project elements and components, where relevant to the project activities and design:

- highway route or corridor, including proposed widths of right-of-way, cleared area, and road surface;
- choice of engineering and design standards for roads;
- access roads (permanent and temporary);
- location of borrow pits, quarries, and gravel pits;
- aggregate mining activities (including mining method, location and design of any facilities required to produce aggregate, location of aggregate stockpiles and management of waste materials);
- route or corridor and means options for electrical transmission lines;
- project site location;
- access to the project site;
- location and type of bridges and culverts (permanent and temporary);
- energy sources to power the project site, including worker camps;
- location of other key project components;
- management of water supply and wastewater;
- management of non-mining solid wastes;
- construction alternatives;
- timing options for various components and phases of the project; and
- suspension, abandonment or decommissioning options.

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

The proponent should refer to any current Agency guidance on this topic.

5. DESCRIPTION OF PUBLIC PARTICIPATION AND VIEWS

The proponent must engage with local communities, associations and stakeholders. The engagement activities are to prioritize the participation of those who are most affected by the proposed project, while also ensuring that interested members of the public have an opportunity to share their views.

The proponent must engage with the public and provide timely notification of proposed engagement activities to seek community knowledge and views on:

- baseline conditions;
- VCs and indicators, taking into consideration the requirements under section 25 of this document;
- effects assessment and the assessment of the project’s contribution to sustainability;
- mitigation and follow-up measures; and
- conclusions.

In addition to its own engagement activities, the proponent is expected to participate meaningfully in engagement activities outlined in the *Public Participation Plan*. The Agency will organize meetings, as per the *Public Participation Plan*, during which the proponent is expected to present information about the designated project, including on baseline conditions, potential effects, assessment of effects and the assessment of the project’s contribution to sustainability, mitigation and follow-up measures, and its assessment conclusions. The proponent is expected to take into consideration the feedback received during these meetings as well as community knowledge in the development of the Impact Statement.

5.1 Analysis and response to questions, comments, and issues raised

The Impact Statement must provide an analysis of the input received from local communities and other stakeholders (e.g., associations, non-government organizations, academics, industry and public). This analysis is to include all input received prior to, and since commencing, the impact assessment process. This analysis is to take into consideration the requirements under section 25 of this document, relating to the Project's contribution to sustainability.

The Impact Statement and the analysis must include:

- issues, questions and comments raised by local communities and other stakeholders (associations, non-government organizations, academics, industry and public) during the engagement activities, by the proponent and when participating in Agency led engagement activities, and the proponent's responses, including how matters have been addressed in the Impact Statement, or will be addressed through the impact assessment process;
- where and how public perspectives and input, including community knowledge, were integrated into or contributed to decisions regarding the Project (e.g., project design), including:
 - scoping, development and collection of baseline information;
 - plans for construction, operation, and maintenance; and
 - follow-up and monitoring;
- where and how community knowledge and input were integrated in avoiding or mitigating identified effects; and
- identify public concerns that were not addressed, if any, and provide reasons why the concerns were not addressed.

Any proposed mitigation measures are to be clearly linked, to the extent possible, to VCs in the Impact Statement as well as to specific project components or activities, as well as comments raised during engagement activities.

The Impact Statement should also 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.

The proponent should refer to Agency guidance on this topic.

5.2 Record of engagement

The Impact Statement must provide a record of engagement that describes all efforts taken to seek the views of local communities and other stakeholders with respect to the Project. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement, including prior to and during the Planning Phase, and in the preparation of the Impact Statement. The proponent's public engagement strategy will be informed in part by the Public Participation Plan issued by the Agency. The Impact Statement must include, at a minimum:

- the list of local communities, associations, non-government organizations, academics, industry and stakeholders engaged by the proponent;
- the engagement activities undertaken, including the methods used, where and when engagement activities were held, the persons, organizations and diverse groups engaged, and results of engagement;
- a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the engagement process;
- a description of efforts to engage diverse populations, including groups identified by gender, age or other community relevant factors (e.g., recreational hunters) to support the collection of information needed to complete the GBA+;
- a description of the efforts to gather community knowledge and public views to discuss VCs, indicators, potential positive and adverse effects from the Project, effects assessment, assessment of the Project's contribution to sustainability, mitigation and follow-up measures and assessment conclusions; and,
- a description of the efforts to validate with communities and public stakeholders how community knowledge was applied to the selection of VCs, indicators, effects assessment, mitigation measures and follow-up programs, and conclusions.

In relation to the public record of engagement, appendices of the Impact Statement must include, at a minimum:

- Meeting summaries, including issues raised by local communities, associations, and stakeholders and
- Copies of the information and materials distributed at engagement activities, including, but not limited to, panels, presentations, and handouts.

6. DESCRIPTION OF ENGAGEMENT WITH INDIGENOUS GROUPS

The proponent must engage with Indigenous groups that may be impacted by the project. The *Indigenous Engagement and Partnership Plan*, issued by the Agency, is available to assist the proponent in further developing or refining their engagement strategy and supporting ongoing trust and relationship-building.

In addition to the requirements set out in section 6.1, 6.2 and 6.3, the proponent must provide Indigenous groups with an opportunity to:

- provide Indigenous knowledge during baseline data collection;
- comment on the list of VCs and indicators;
- inform the effects assessment and review its conclusions; and
- inform the development of mitigation measures and follow-up programs.

In addition, the Agency will organize a series of meetings, as per the *Indigenous Engagement and Partnership Plan*, in coordination with the proponent, to discuss technical matters as it progresses through its baseline data collection, effects assessment, impacts on the exercise of Aboriginal and Treaty rights, and mitigation and follow-up development. After each stage of this process, the proponent will participate in meetings with the Agency, federal authorities and Indigenous groups to discuss technical matters. These meetings would be in addition to engagement with Indigenous groups, including community meetings, and discussions regarding Indigenous knowledge, which the proponent would undertake during the preparation of the Impact Statement. The purpose of these meetings is to provide all parties opportunities to discuss key technical issues during the preparation of the Impact Statement and do not reduce the expectations for engagement with Indigenous groups that the Agency has of the proponent as outlined in this document. The proponent is expected to take into consideration the feedback received during these meetings in the development of the Impact Statement.

The Agency requires the proponent to engage with, at a minimum, the communities listed in the *Indigenous Engagement and Partnership Plan*.

6.1 Analysis of potentially impacted Indigenous groups

In addition to the Crown's preliminary scope of consultation as set out in the *Indigenous Engagement and Partnership Plan*, the preliminary list should be revisited as necessary during the course of the impact assessment process as new information comes to light. In undertaking its Indigenous engagement activities, the proponent may decide to augment this list with additional Indigenous groups, as necessary. The Impact Statement must describe the proponent's analysis and

rationale used to identify additional Indigenous groups that may be impacted by the designated project or otherwise engaged on the Project. This analysis must include:

- the list of Indigenous groups potentially impacted by the project;
- the source of information and analysis used in creating the list of potentially impacted Indigenous groups;
- a list of potential effects on the environmental, health, social and economic conditions of each Indigenous group and the predicted degree (e.g., high, moderate, low) of those effects and resulting impacts on the exercise of Aboriginal and Treaty rights of Indigenous people;
- the rights of each Indigenous group, that the groups themselves have identified, that may be impacted by the designated project; and
- the sources of information and analysis used to determine the extent of the potential effects on each Indigenous group.

6.2 Analysis and response to questions, comments, and issues raised

The Impact Statement must provide an analysis of the input received from Indigenous groups with respect to the designated project. This analysis is to include all input received by Indigenous groups prior to, and since commencing, the impact assessment process. This analysis is to include, and not be limited to, the identification of potential effects and impacts, including impacts on the exercise of Aboriginal and Treaty rights of Indigenous peoples and the identification of specific VCs where appropriate.

The analysis in the Impact Statement must also include consideration of Indigenous knowledge provided by Indigenous groups. Indigenous knowledge where written consent has not been provided by the Indigenous group(s) should not be included. Permission from the Indigenous group should be sought before including Indigenous knowledge in the Impact Statement, regardless of the source of the Indigenous knowledge.

Indigenous knowledge is holistic and in IA, it can provide insights related to knowledge of the environment, social, cultural, economic, health, Indigenous governance and resource use. It is important that Indigenous knowledge be included for all of these aspects of the technical assessments, not only to look at potential impacts of the project on Indigenous peoples. Given the holistic nature of Indigenous knowledge, it may be presented in one section of the Impact Statement. That said, it should also, as applicable be considered in technical sections or chapters (e.g., baseline data on fish and fish habitat would include baseline information gathered through collection of Indigenous knowledge). It is also important to capture the context in which Indigenous groups provide their Indigenous knowledge and to convey it in a culturally appropriate manner.

The Impact Statement must also document how the proponent responded to questions, comments and issues raised by Indigenous groups, and how unresolved matters have been addressed. Any proposed mitigation measures are to be clearly linked, to the extent possible, to VCs in the Impact Statement as well as to specific project components or activities. The analysis and responses are to include:

- issues, questions and comments raised during the engagement activities by each Indigenous group and the proponent's responses, including how matters have been addressed in the Impact Statement or will be addressed through the impact assessment;
- future planned engagement activities, and if none are planned, rationale for not undertaking future engagement activities;
- if engagement with certain groups is not possible, rationale must be provided, including, as applicable, an outline of efforts made;
- where and how Indigenous groups' knowledge, perspectives and input were integrated into or contributed to decisions regarding the designated project (e.g., project design), including:
 - scoping, development and collection of baseline information;
 - plans for construction, operation, decommissioning, abandonment, and maintenance; and
 - follow-up and monitoring.
- where and how Indigenous groups' knowledge, perspectives and input were integrated in the characterization of the nature of environmental, health, social and economic effects and impacts expected from the project for each Indigenous group;
- where and how Indigenous groups' perspectives and Indigenous knowledge and input were integrated in avoiding, mitigating or accommodating identified effects and impacts; and
- where potential impacts on rights of Indigenous peoples are identified, provide a description of how each potential impact would be avoided, managed, mitigated, or accommodated (and provide this information for each Indigenous group separately).

The proponent should refer to Agency guidance on these topics.

6.3 Record of engagement

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

- the list of Indigenous groups engaged by the proponent, including those that chose not to engage in the impact assessment process;
- the engagement activities undertaken with each Indigenous group, including the date, means and results of engagement. Include a description of efforts to engage with groups that chose not to engage in the impact assessment process;
- a description of efforts to engage diverse populations of each Indigenous group in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g., hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+;
- a description of how engagement activities by the proponent were intended to ensure Indigenous groups were provided an opportunity to evaluate the designated project's potential positive and negative effects and impacts on their members, communities, rights, and activities, as identified by the Indigenous group; and
- a description of the efforts to discuss and validate with Indigenous groups how the information they provided was applied to the selection of VCs, indicators, effects assessment, mitigation measures and follow-up programs, and conclusions.

In relation to the record of engagement of Indigenous groups, appendices of the Impact Statement must include, at a minimum:

- meeting summaries and responses to input received from Indigenous groups; and
- copies of material used at each meeting, including panels, presentations, handouts (if the same documents were used in each meeting, one set of documents can be appended to the Impact Statement with an indication of which Indigenous groups received the material).

7. BASELINE CONDITIONS

7.1 Methodology

The Impact Statement must provide a description of the environmental, health, social and economic setting directly and incidentally related to the designated project. This should include the existing environmental, health, social and economic components, interrelations and interactions as well as the variability in these components, processes and interactions over time scales and geographic boundaries appropriate to the project, including consideration for variability due to potential future climate change. Meaningful, two-way dialogue with communities and Indigenous groups provides input that may describe how these components and processes are interrelated.

The information describing the existing baseline conditions may be provided as a stand-alone chapter in the Impact Statement or integrated into clearly defined sections for relevant VCs, including effects assessment of each VC and VC interactions, identification of mitigation measures, residual effects analysis and cumulative effects assessment.

The application of GBA+ to these baseline descriptions to disaggregate and specify baseline conditions for diverse subgroups is necessary to support the GBA+ of effects. Both qualitative and quantitative data may be necessary to describe baseline conditions across diverse subgroups.

There is no need for the Impact Statement to provide detailed descriptions of existing features of environmental, health, social or economic components that would not be impacted by the project as determined by the Agency through engagements with FAs, lifecycle regulators, Indigenous groups, the public and interested parties.

In describing 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 with the ecosystem using scientific, community and Indigenous knowledge regarding ecosystem health and integrity, as applicable. The Impact Statement must provide a description of the indicators and measures used to determine ecosystem health and integrity, identified during early planning and reflected in the TISG. The presence of endangered ecosystems potentially affected by the designated project should be included in the description of the biophysical baseline conditions.

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: patterns and connectivity of habitat patches; continuation of key natural disturbance regimes; structural complexity; hydrogeological or oceanographic patterns; nutrient cycling; abiotic-biotic and biotic interactions; population dynamics, genetic diversity, Indigenous knowledge relevant for the conservation and sustainable use of relevant species populations, communities and associated habitats.

If the baseline data have been extrapolated or otherwise manipulated to depict environmental, health, social and/or economic conditions within the study area, modelling methods must be described and must include assumptions, calculations of margins of error and other relevant statistical information. Models that are developed should be validated using field data from the appropriate local and regional study areas.

The Impact Statement must establish appropriate study area boundaries to describe the baseline conditions. The study area boundaries need to encompass the spatial boundaries of the project, including any associated project components or activities, and the anticipated boundaries of the

project effects. Considerations in assigning appropriate study areas or boundaries would include, but not be limited to:

- 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;
- areas determined by dispersion and deposition modelling;
- areas within the range of vision, light and sound and the locations and characteristics of the most sensitive receptors;
- species habitat areas, usage timing and migratory patterns;
- emergency planning and emergency response zones;
- the geographic extent of local and regional services;
- any affected communities;
- all potentially affected Indigenous groups;
- areas of known Indigenous land, cultural, spiritual and resource use; and
- existing affected infrastructure.

7.2 Sources of baseline information

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

- Environment and Climate Change Canada;
- Ontario provincial government (e.g., Ministry of Environment, Conservation, and Parks), including from:
 - Ontario (Natural Heritage Information Centre): <https://www.ontario.ca/page/natural-heritage-information-centre>;
 - Ontario Species at Risk Guides and Resources (includes many best management practices): <https://www.ontario.ca/page/species-risk-guides-and-resources>

- Bird Conservation Region (BCR) plans³;
- academic institutions;
- field studies, including site-specific survey methods;
- database searches, including:
 - federal, provincial, territorial, municipal and local data banks;
 - Breeding Bird Atlas - Ontario (2001-2005):
<http://www.birdsontario.org/atlas/maps.jsp?lang=en>
 - Other monitoring program databases, including:
 - eBird: <https://ebird.org/canada/home>;
 - Breeding Bird Survey: <https://wildlife-species.canada.ca/breeding-bird-survey-results>
 - Christmas Bird Count:
<http://netapp.audubon.org/CBCObservation/Historical/ResultsByCount.aspx>
 - Canadian Migration Monitoring Network: <https://www.bsc-eoc.org/birdmon/cmmn/main.jsp>
 - NatureCounts:
<https://www.birdscanada.org/birdmon/default/searchquery.jsp>
 - iNaturalist: <https://www.inaturalist.org/> ;
- protected areas, watershed or coastal management plans;
- natural resource management plans;
- species recovery and restoration plans;
- field measurements to gather data on ambient or background levels for air, water, soil and sediment quality, light levels or acoustic environment (soundscape);
- Land cover data, including:
 - terrestrial ecosystem mapping products;
 - forest cover maps;
 - remote sensing resources;
 - important habitats and features to include:
 - water bodies, wetlands, watercourses;

³ <https://www.canada.ca/en/environment-climate-change/services/migratory-bird-conservation/regions-strategies.html>

- riparian habitat;
 - river banks or other eroded habitats;
 - artificial water sources;
 - forest, tree patches, solitary trees (especially old decaying trees);
 - forest edges and tree rows;
 - ridges, including eskers;
 - caves and mines;
 - cliffs, rock outcrops, exposed bedrock, talus, and other karst topography;
 - buildings, bridges, and other anthropogenic features, including linear features;
 - sources of artificial lighting attracting insects;
 - critical habitat;
 - and any other habitat features known to be important in the area;
- published literature, such as academic publications, reports by think tanks, and government reports;
 - environmental assessment documentation, including monitoring reports, from prior projects in the area and similar projects outside the area;
 - regional studies, project assessments and strategic assessments;
 - renewable harvest data;
 - Indigenous knowledge, including oral histories and knowledge gathered by spending time on the land with knowledge holders;
 - community based monitoring and studies conducted by Indigenous communities;
 - 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;
 - baseline human health risk assessments;
 - community and regional economic profiles; and
 - statistical surveys, as applicable.

The Impact Statement must provide detailed descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental, health, social and economic condition that is described, in order to corroborate the validity and accuracy of the baseline information collected.

Data directly relevant to the area surrounding the Project are limited. With the exception of existing count data that have been collected within the Regional Study Area, the use of existing information sources should be limited to the goals of estimating the species likely to occur in the study areas, and to identifying the potential timing of migration passage (for species that migrate through) or the general dates of breeding (for species that breed in the area).

If using existing data sources, the Impact Statement must provide justification to show that the data sources are relevant in spatial and temporal coverage to the Project. Some data sources may have good coverage in Southern Ontario or existing road networks but be unsuitable as a baseline for these northern areas where there are not roads.

Consult the Species at Risk Public Registry for information on the list of species at risk and available recovery documents and reference the documents and dates consulted. Ensure the most up to date documents are used and species statuses are up to date⁴.

With regard to field studies, survey work must be planned to include multiple sampling locations and multiple visits to each location to support all required assessment analyses. Existing data should be considered as a limited augmentation of this new data. See the “Establishing Baseline Conditions” (sections 8.5, 8.10, 8.11, 8.12) in this draft Tailored Impact Statement Guidelines for recommendations on survey design and methodology. Surveys and analyses should be conducted by qualified experts.

Baseline data must be collected in a manner that enables reliable analysis, extrapolations and predictions. Resulting data should be suitable for analyses to estimate pre-project baseline conditions, derive predictions of impacts, and evaluate and compare post-project conditions and at scales of within and across the Project, Local and Regional Assessment areas. Modelling methods, error estimates and assumptions should be reported (as per section 7.1). Modelling and simulations should be used early in the planning phase to estimate the necessary sampling intensity and to quantitatively evaluate the effectiveness of design options.

⁴ <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

7.3 Consideration and methodology in selecting VCs

The list of VCs must be informed and finalized through engagement with the public, Indigenous groups, lifecycle regulators, jurisdictions, federal authorities (FAs), and other interested parties. The Impact Statement must describe VCs, processes, and interactions that are identified to be of concern or that the Agency considers likely to be affected by the designated project and has included in the TIS Guidelines.

The Impact Statement must indicate to whom these concerns are important (e.g., the public, FAs or Indigenous groups) and the reasons why, including environmental, cultural, spiritual historical, health, social, economic, recreational, aesthetic considerations, and Indigenous knowledge. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it. VCs included in the TIS Guidelines are, in part, based on what communities and Indigenous groups identify as valuable to them in the planning phase.

Accordingly, the Impact Statement must provide the rationale for selecting specific VCs and for excluding any VCs or information specified in the TIS Guidelines. The priority in selecting VCs to be included and assessed should be project-specific and focused on appropriateness, not influenced by the quantity of information available or the use of the VCs in other assessments.

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

- VC presence in the study area;
- the extent to which the effects of the designated project and related activities have the potential to interact with the VC;
- the extent to which the VC may be under stress from other past, existing or future undertakings in combination with other human activities and natural processes;
- the extent to which the VC is linked to Indigenous interests or rights of Indigenous peoples and whether an Indigenous group has requested the VC;
- the extent to which the VC is linked to federal, provincial, territorial or municipal government priorities;
- the extent to which the VC is being addressed through any ongoing or completed regional assessment processes;
- the possibility that an adverse or positive effect on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and

- whether the potential effects of the project on the VC can be measured and/or monitored or would be better ascertained through the analysis of a proxy VC.

The VCs must be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential adverse and positive environmental, health, social and economic effects and impacts arising from the designated project activities.

Species at Risk⁵ should each individually be considered a VC (including but not limited to Barn Swallow, Canada Warbler, Chimney Swift, Common Nighthawk, Eastern Whip-poor-will, Olive-sided Flycatcher, Short-eared Owl, Yellow Rail, Wolverine, boreal caribou, Little Brown Myotis, and Northern Myotis).

7.4 Spatial and temporal boundaries

The spatial and temporal boundaries determined and established for the IA will vary depending on the VC and are considered separately for each VC, including VCs related to the environmental, health, social and economic conditions of Indigenous peoples, or other potential effects and impacts referred to above. The spatial and temporal boundaries to be used in the IA are outlined and discussed through the tailoring process, and include comments and input from federal and provincial government departments and agencies, local government, Indigenous groups, the public and other interested parties.

The Impact Statement must describe the spatial boundaries, including local and regional study areas, for each VC included in assessing the potential adverse and positive environmental, health, social and economic effects of the designated project and provide a rationale for each boundary. Spatial boundaries are defined taking into account the appropriate scale and spatial extent of potential effects and impacts of the project; community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; rights of Indigenous peoples, including cultural and spiritual practices; and physical, ecological, technical, social, health, economic and cultural considerations. It should be noted that in some cases, spatial boundaries may extend to areas outside of Canada. These transboundary spatial boundaries should be identified where transboundary effects are expected.

For VCs related to Wetlands, Eskers, Birds, Wildlife, and Species at Risk, establish three study area spatial boundaries to assess impacts to each VC:

⁵ Note that requirements relating to birds that are species at risk are found in section 15.2.

- 1) Project Study Area (PSA): defined as the project footprint for each alternative route;
- 2) Local Study Area (LSA): defined for each VC – see below;
- 3) Regional Study Area (RSA): defined for each VC – see below

Spatial boundaries should be defined using an ecosystem-centered approach for the PSA, LSA, and RSA, as wetlands and eskers are features that are likely to be most impacted. Ecoregion boundaries or their derivatives should not be used since the project occurs on, near and across ecoregion boundaries. See Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012 for more guidance on determining spatial boundaries.⁶

Delineate spatial boundaries (i.e., RSA, LSA, and PSA) to meet the following objectives:

- a. range of landcover types should be representative of the defined spatial extent;
- b. the spatial pattern of the landcover types should be well distributed across the defined spatial extent (e.g., revise if one or more landcover types is concentrated in one sub-area and uncommon in other parts of the area); and
- c. low to moderate rate of change in the prevalence of one or more landcover types with increasing distance from the PSA (i.e., to use landcover patterns to constrain the distances within which comparisons should be made).

For Habitat VCs: The spatial extent of the habitat and the habitat functions should influence the determination of an appropriate LSA and RSA, considering objectives a-c above.

For Species VCs: The LSA should correspond to the PSA plus a buffer defined with objectives a-c above. Use simulation modeling to help define a buffer that captures objectives a-c for each species or species group.

Contact provincial and/or local government authorities to verify appropriate boundaries for wildlife species.

For Wolverine: The LSA should be at a minimum: PSA plus a 10-kilometre buffer. Simulation modeling may indicate a larger buffer.

For Bats: The LSA should be at a minimum: PSA plus a 1-kilometre buffer. Simulation modelling may indicate a larger buffer.

⁶ <https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=B82352FF-1&offset=5&toc=hide>

For Caribou: the LSA should be at a minimum: PSA plus a 10-40-kilometre buffer. Simulation modeling may indicate a larger buffer. In addition to assessing project and cumulative effects at the scale of the three study areas defined above, also assess at the scale of the implicated Ontario caribou ranges (Missisa, Nipigon and Pagwachuan), and the federal Far North caribou range.

The temporal boundaries of the IA span all phases of the designated project determined to be within the IA. If potential effects are predicted after project decommissioning or abandonment, this should be taken into consideration in defining specific boundaries.

For VCs related to Wetlands, Eskers, Birds, Wildlife, and Species at Risk, define temporal boundaries in a manner that enables detection of all species that use the PA, LAA, and RAA throughout the year and between years, and to estimate their temporal pattern of use (e.g., breeding, or 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).

8. BASELINE CONDITIONS – BIOPHYSICAL ENVIRONMENT

Where baseline data are available in GIS format, this information is to be provided to the Agency as electronic geospatial data file(s) compliant with the ISO 19115 standard. This would support the Government of Canada's commitment to Open Science and Data and would facilitate the sharing of information with the public through the Agency's Registry and Internet Site and the Government's Open Science and Data Platform. GIS Data Supply Guidelines are currently under development.

8.1 Atmospheric, acoustic, and visual environment

The Impact Statement must:

- provide the results of a baseline survey of ambient air quality by identifying and quantifying emission sources for the following contaminants: total suspended particulates, fine particulates smaller than 2.5 microns (PM_{2.5}), respirable particulates of less than 10 microns (PM₁₀), carbon monoxide (CO), ozone, sulphur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), hydrogen sulphide (H₂S), and any other toxic air pollutants (mobile and stationary sources);
- address seasonal variability in the baseline survey and include a determination of background or ambient contaminant concentrations at key receptor points (e.g., traditional land users, sensitive human receptors such as: schools, hospitals, community centres,

retirement complexes or assisted care homes) with monitoring data of appropriate duration, representativeness, data completeness, data validation and quality control;

- provide dispersion modelling of a base case to account for existing pollutant sources and to determine the spatial distribution of pollutants within the study area;
- describe existing radon gas conditions;
- describe all direct and indirect sources of baseline air emissions, including mobile, stationary and fugitive;
- provide current ambient noise levels at key receptor points to traditional land users and sensitive human receptors, including the results of a baseline ambient noise survey and permissible sound levels for each receptor. Information on typical sound sources, geographic extent and temporal variations will be included. Ensure baseline data is representative of project site conditions. If surrogate data from reference sites is used rather than site-specific surveys, demonstrate how the data is representative of site conditions;
- for the aquatic environment, provide current underwater soundscape and vibration descriptions of the study area and at the project site from various sources based on acoustic measurements. Provide information on vibration and sound sources, geographic extent and spatial and temporal variations within the water column; and
- 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. The Impact Statement will describe night-time illumination levels during different weather conditions and seasons.
- provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be affected by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels. At minimum, provide a map showing approximate locations of permanent residences, temporary land uses (e.g., cabins and traditional sites) and known locations of sensitive human receptors (e.g., schools, hospitals, community centres, retirement complexes or assisted care homes).

Additional guidance regarding baseline information collection is identified in Appendix 1.

8.2 Meteorological Environment

The Impact Statement must:

- describe the local and regional climate including historical records of relevant meteorological information (e.g., total precipitation (rain and snow));
- provide mean, maximum and minimum temperatures;

- provide typical wind speed and direction;
- identify the potential for extreme weather events such as, wind, precipitation and temperature extremes;
- provide hourly meteorological data (wind speed and direction, air temperature, net radiation, turbulence and precipitation data) from a minimum of one year to support dispersion modelling that captures the normal variability of meteorological conditions; and
- provide pan evaporation measurements or estimates of monthly (or daily) evapotranspiration.

8.3 Geology, geochemistry and geological hazards

The Impact Statement must:

- describe the bedrock geology and lithological units, including a summary table of geologic descriptions, mineralization styles (if applicable) supported by geological maps and cross-sections at appropriate scale (normally 1:50 000);
- 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, 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 the geochemical composition of expected construction materials, in order to predict metal leaching and acid rock drainage including oxidation of primary sulphides and secondary soluble sulphate minerals.

8.4 Topography, soil and sediment

The Impact Statement must:

- describe the landforms, soils and sediments within the local and regional project areas, including sediment stratigraphy; surficial geology maps and cross-sections of appropriate scale;

- describe the soils and sediments within the local and regional project areas and their suitability for sourcing construction material;
- describe the geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components, including the presence and distribution of eskers and permafrost, if applicable;
- identify any areas of ground instability;
- provide maps depicting soil depth by horizon and soil order within the project site area to support soil salvage and reclamation efforts, and to outline potential for soil erosion;
- 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 contamination with the study area that could be re-suspended, released or otherwise disturbed as a result of the project; and
- identify ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants.
- describe permafrost conditions including distribution of frozen and unfrozen ground, if applicable ; and
- describe the potential for thaw settlement and terrain instability associated with ground thawing in permafrost areas, if applicable.

8.5 Riparian and wetland environments

The Impact Statement must:

- provide pre-project characterization of the shoreline, banks, current and future flood risk areas, wetland catchment boundaries;
- quantify, delineate and describe wetlands (fens, marshes, peat lands, bogs, etc.) within the local study area potentially directly, indirectly and/or cumulatively affected by the project in the context of:
 - wetland class, ecological community type and conservation status;
 - biodiversity with respect to both flora and fauna;
 - abundance at local, regional and provincial scales;
 - distribution; and
 - current level of disturbance.

- provide data files of mapped features depicting natural areas and wildlife presence within, and use of, the study area;
- identify and map all wetlands on federal lands, and all wetlands potentially directly or indirectly affected by the project and within the scope of federal permits, authorizations, or other approvals;
- determine whether these wetlands are within a geographic area of Canada where wetland loss or degradation has reached critical levels, or considered ecologically or socially or economically important to a region;
- identify and describe wetland capacities to perform hydrological and water quality functions, provide for wildlife and wildlife habitat or other ecological functions;
- provide a carbon budget of wetlands to identify and describe capacity to act as a carbon sink vs. source. Include rates of uptake and emission, and estimates of carbon pools in the wetlands that may be released when removed or altered during construction and operation;
- 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):
 - complete this assessment prior to the start of Project construction for all wetlands that the Project would directly impact and for any wetland(s) that are hydrologically connected. In conducting this assessment, the Proponent should ensure that wetlands are considered in the context of:
 - i. the larger watersheds of which they are a part;
 - ii. adjacent land use with a focus on hydrological and other functions; and
 - iii. landscape and/or watershed considering topography, soil types and hydrological linkages.
 - this assessment should be quantitative and include the collection of site-specific baseline information on wetland functions, including:
 - i. 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 impacted wetlands and associated riparian areas. Surveys should meet appropriate standards (see sections 8.10, 8.11, and 8.12), be species or bird group specific as appropriate, and be conducted during the appropriate times of the year as specified in section 8.10-12 of this document. 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).

- ii. The spatial location and a description of the biological characteristics of each potentially impacted 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.
 - iii. A supporting rationale and detailed description of the methods used in completing the wetland functions assessment.
- Submit complete data sets from any survey sites, including GIS files. Databases and GIS files should be accompanied by detailed metadata that meets ECCC metadata standards (ISO 19115 NAP).⁷Contact provincial and/or local government authorities to determine if other wetland conservation policies, regulations or wetland compensation guidelines apply (refer to The Wetland Network: www.wetlandnetwork.ca); and
 - identify a regional study area of sufficient size to capture effects to wetlands within the larger drainage area and include wetlands located outside of the local study area that may be affected by hydrological changes as a result of cumulative effects.

8.6 Groundwater and surface water

The Impact Statement must:

- provide complete hydrometeorological (temperature, precipitation, evapotranspiration) information based on data from nearby weather stations or from a weather station on site;
- provide the delineation of drainage basins, at appropriate scales (water bodies and watercourses), including intermittent streams, flood risk areas and wetlands, boundaries of the watershed and sub-watersheds, in relation to key project components;

⁷ <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16553>

- provide flow hydrographs for nearby streams and rivers showing the full range of seasonal and inter-annual variations; they may be based on data from nearby gauging stations or from gauging stations on site;
- provide stage hydrographs for nearby lakes showing the full range of seasonal and inter-annual water level variations;
- provide the timing of freeze/thaw cycles, ice cover, and ice conditions for surface water bodies in the project area;
- provide for each water body potentially affected by the project, the total surface area, bathymetry, bank and bottom features, biological components, flows, maximum and mean depths, and type of substrate (sediments);
- provide a delineation and characterization of groundwater–surface water interactions, including an identification of groundwater-dependent ecosystems, wetlands, discharge and recharge areas;
- develop a quantitative surface water balance for the local or regional watershed(s) containing the project;
- identify all springs and any other potable surface water resources within the local and regional project areas and describe their current use, potential for future use, and whether their consumption has Indigenous cultural importance;
- describe the surface water quality baseline characterization program, including sampling site selection, monitoring duration and frequency, sampling protocol, and analytical protocol, including quality assurance and quality control measures;
- provide baseline surface water quality data, for a minimum of two years, for physicochemical parameters (temperature, pH, electrical conductivity, dissolved oxygen, turbidity, suspended solids) and relevant chemical constituents (major and minor ions, trace metals, radionuclides, nutrients, and organic compounds, including those of potential concern); the data should illustrate the seasonal and inter-annual variability in baseline surface water quality, including possible changes due to groundwater–surface water interactions;
- provide baseline sediment quality and characteristic data for key surface water sites likely to be impacted by the road (i.e., from runoff, spills, erosion and sedimentation, etc.);
- identify all domestic, communal, or municipal water wells within the local and regional project areas, including their screened hydrostratigraphic unit and piezometric level;

describe their current use, potential for future use, and whether their consumption has any Indigenous cultural importance;

- identify any groundwater monitoring wells in proximity to rock quarries and borrow areas, including their location, completion details (diameter, screen depth), geological log, screened hydrostratigraphic unit, piezometric level, and monitoring frequency;
- provide groundwater elevation data from any monitoring wells showing seasonal water level variations when pertinent to the period of quarry and borrow area operation;;
- describe the groundwater quality baseline characterization program including sampling site selection, monitoring duration and frequency, sampling protocol, and analytical protocol including quality assurance and quality control measures;
- provide baseline groundwater quality data for physicochemical parameters (temperature, pH, electrical conductivity, dissolved oxygen, turbidity) and relevant chemical constituents (major and minor ions, trace metals, radionuclides, nutrients, and organic compounds, including those of potential concern); the data should illustrate the seasonal and inter-annual variability in baseline groundwater quality, including possible changes due to groundwater–surface water interactions;
- describe and provide the hydraulic properties of the hydrostratigraphic units;
- describe the structural geology of the hydrogeological environment, including major faults, fracture density and orientation with respect to groundwater flow directions;
- describe the groundwater flow boundaries of the hydrogeological environment for the purposes of the Impact Statement;
- provide hydrogeological maps and cross-sections of the study area showing water table elevations, potentiometric contours, interpreted groundwater flow directions, groundwater divides and areas of recharge and discharge. Ensure baseline data is representative of project site conditions. If surrogate data from reference sites is used rather than site-specific surveys, demonstrate how the data is representative of site conditions; and
- present a conceptual model of the hydrogeological environment, including a discussion of geomorphic, hydrostratigraphic, hydrologic, climatic, and anthropogenic controls on groundwater flow.

8.8 Vegetation

The Impact Statement must:

- within the local study area of the project, provide a description of:
 - the biodiversity, relative abundance and distribution of vegetation species and communities of ecological, economic or human importance (e.g., traditional use, forestry, tame pasture, native prairie, wetland or old growth);
 - the conservation status (i.e., listed under the *Species at Risk Act* (SARA) or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to be 'at risk', including species of concern) applicable to any particular species or communities;
 - the species critical habitat as described in final or draft recovery strategies or action plans;
 - the current level of disturbance associated with vegetation, including a description of level of habitat fragmentation; and
 - the amount, merchantability and location of any merchantable timber to be removed during project construction.
- identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection;
- provide data files of mapped features depicting vegetation presence within the study area;
- describe any weed species, other invasive species, and introduced species of concern;
- describe the natural disturbance regime (e.g., fire, floods, droughts, etc.);
- describe the use of local vegetation for medicinal purposes or as a source of country foods (traditional foods);
- describe any other plant species of concern for consumption or where use has any Indigenous cultural importance; and
- describe any herbicide use to control vegetation and it's potential effects on country foods, animal browse, surface waters as well as mitigation responses to herbicide application.

8.9 Fish and fish habitat

The Impact Statement must:

- provide a characterization of fish (as defined in subsection 2(1) of the *Fisheries Act*) and other aquatic species on the basis of resident and migratory species, food webs and trophic

levels, structural and functional linkages, life history and population dynamics, such as dispersion, fertility, recruitment, mortality rates, re-colonization, age structure, sex ratios, population regulation, stability, distribution (communities, stocks, subpopulations, metapopulations), movements, migratory patterns, routes and preferred corridor, seasonal and annual trends in abundance, sensitive habitats and periods in relation to the study area, behavioural habitat selection, mating strategies, social interactions, predator-prey interactions at multiple spatial and temporal scales, which are critical to identifying effects to population persistence and ecological processes;

- provide a description of the biodiversity within the freshwater environment, including: trophic state, periphyton, phytoplankton, zooplankton, fish and the interactions and relative significance of each species with the identified food chains;
- identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline biodiversity for fish and marine animals, including the rationale for their selection;
- provide information on the surveys carried out and the source of data available (e.g., location of sampling stations, catch methods, date of catches, species, catch-per-unit effort);
- describe primary and secondary productivity in affected water bodies with a characterization of biotic interaction processes (e.g., food web and trophic levels, nutrient cycling), season variability, ranges and sensitive periods;
- list any aquatic species at risk, including critical habitat, that are known to be present within the study area;
- provide a description and location of critical habitats for aquatic species at risk that are known to be present within the study area;
- describe habitat by mesohabitat (e.g., pool, riffle, run), including the length of the section, width of the channel from the high water mark (bankfull width), water depths, type of substrate (sediments), aquatic and riparian vegetation. Provide maps and photos;
- identify natural obstacles (e.g., falls, beaver dams) or existing structures (e.g., water crossings) that hinder the free passage of fish;
- provide a characterization of fish habitat features that may demonstrate the presence of fish species in terms of appropriate habitats—water quality and quantity characteristics, sediment type characteristics, benthic features, prey, shelter, refuge, feeding, spawning habitats, nursery habitats, rearing habitats, overwintering, migration routes and the sensitive times for these activities;
- provide a description of habitat information that includes water depths (bathymetry) and the littoral, sublittoral, bathyal, epipelagic, mesopelagic, bathypelagic zones;

- describe the use of fish and/or aquatic species (for example, lake sturgeon) for consumption or where use has Indigenous cultural importance
- describe any existing effects associated with previous or current activities (e.g., angling pressures, commercial fisheries); and
- identify sensitive habitat areas (e.g., Ecologically and Biologically Sensitive Areas) within the study area.

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).

8.10 Birds, migratory birds and their habitat

The Impact Statement must:

- describe biodiversity of bird species and their habitats that are found or are likely to be found in the study area, including identification of Bird Conservation Regions (BCRs) and BCR strategies. Possible information sources include, but are not limited to: wildlife experts/naturalists, Canadian Conservation Data Centres, BCR strategies, E-Bird, Breeding Bird Atlases, Environment and Climate Change Canada’s guidance on Bird Surveys (see Appendix 1);
- collect bird data to adequately represent the following temporal sources of variation:
 - among years,
 - within and among seasons (e.g., spring migration, breeding, fall migration, overwintering), and
 - within the 24 hour daily cycle;
- collect explanatory (i.e., covariate) data necessary for modeling in such a way as to adequately represent the following spatial sources of variation:
 - land cover composition,
 - soil type,
 - geomorphology,
 - hydrological processes, and
 - Inter- and intra-annual climatic variability;

- collect data in a manner that enables reliable extrapolations in space (i.e., at minimum to Project, Local and Regional Study areas) and in time (i.e., across years):
 - Design surveys so that they represent the spatial and temporal targets of modeling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of mitigation effectiveness. Survey designs should be sensitive enough to detect and quantify the impacts at the spatial and temporal scales identified above (i.e., PSA, LSA, and RSA), any departures from predictions, and the effectiveness of mitigations. Justify the selection of modeling techniques based on current and recent scientific literature.
 - Survey protocol planning should include modeling and simulations to estimate sampling requirements, and analysis to evaluate resulting design options:
 - Collect field data over at least two years, to account for natural variability in populations;
 - Sample size must be planned to support evaluation of the PSA within the context of the LSA and RSA. Appropriate design of surveys will need to consider multiple survey locations in order to represent the habitat heterogeneity of the RSA, and to yield multiple survey locations per land cover or habitat class, without requiring aggregation of habitat classes post-hoc.
 - Sampling effort per unit area - field survey effort should be most intensive within the PSA. 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 birds within that zone. Efforts outside the PSA should be carefully designed to ensure that estimates comparing and across the PSA, LSA and RSA are unbiased and as precise as possible.
 - 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.
 - Simulation modelling should be used to assess bias and precision between PSA, LSA, and RSA to ensure the estimates are useful for comparison. Field surveys should occur within the RSA since there are few existing sources of data that effectively describe regional bird populations in areas, including this area, that are distant from road networks.
 - At minimum, the combined information from existing data and field surveys needs to be detailed enough to describe the distribution and abundance of all bird species in relation to the study areas.

- 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 unsummarized form. Databases and GIS files should be accompanied by detailed metadata that meets ECCC metadata standards (ISO 19115 NAP).⁸
- 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 raw survey data and analysis results for 1) all birds, 2) each VC, and 3) BCR Priority Species showing the species ranked according to:
 - Frequency of occurrence,
 - Abundance,
 - Abundance in each habitat type, and
 - Map showing areas of highest concentrations of species;
- provide detailed descriptions of bird habitat that includes at a minimum, characterization of biophysical conditions with regard to ecoregion, Bird Conservation Region (BCR), and with respect to the particular conditions of boundary regions. The project crosses and is in close proximity to ecoregion and BCR boundaries. Since the PSA footprints are at the edges of the ecoregions and BCRs, habitat patterns are likely to reflect these border characteristics, with one of the outcomes being that habitat types common elsewhere in the ecoregion may be relatively uncommon and potentially more ecologically important in the border region. Surveys need to be detailed enough within the LSA and RSA to put the PSA into context of these wider areas:
 - Mixed wood forest landcover and other upland vegetation types may be particularly important for many forest associated birds, supporting birds during migration, breeding and through the winter. Eskers and related features are uncommon and potentially ecologically important elements of the landscape, and are likely to be disproportionately impacted by these projects. River riparian corridors are another relatively uncommon feature with adjacent mixed wood forest.

⁸ <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16553>

- Should there be some displacement of nesting birds, baseline data should provide evidence that there is enough equivalent habitat for birds to be displaced to and that the vegetation being removed (e.g., eskers) is not unique to the PSA.
- identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline avifauna biodiversity and discuss the rationale for their selection:
 - Species communities should not be collapsed into diversity metrics or the focus narrowed to indicator species. Species identity, distribution, abundance and where possible estimates of breeding status should be the primary targets of quantification.
 - Biodiversity metrics for each VC should include:
 - Distribution in space;
 - Frequency of occurrence;
 - Patterns of occurrence and abundance in time;
 - Abundance and, if possible, density; and
 - Associated habitat type(s) and strength of associations.
- provide estimates of the abundance and distribution, and information on the life history of migratory and non-migratory birds (including, but not limited to, waterfowl, raptors, shorebirds, marine birds, marsh birds and other land birds) in the study area. Estimates may be based on existing information, or additional surveys, as appropriate, to provide current data sufficient for reliable estimates. In doing so:
 - Generate measures of abundance and distribution using spatially balanced, randomly selected sample locations. Where important habitat edges are identified, sampling should be designed so that it is possible to describe the importance of not only the habitat types, but of the edges between habitat types:
 - Use simulation modelling prior to sampling to ensure coverage is broad enough to estimate and account for detection error as well as provide unbiased estimates of abundance and distributions.
 - Sampling within temporal boundaries should be spatially and temporally balanced so that all spatial areas receive comparable temporal coverage.
 - 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 confidence or other intervals should be defined (e.g., 95% confidence intervals, credible intervals). Use of hypothesis testing

p - values is generally not appropriate in this context and their use should be justified.

- Whenever estimating densities for species, consider observer-induced detection error for comparisons among counts (e.g., between, before and after surveys, or between impacted and un-impacted sites) to be valid. When accounting for detection error the method used should account for variable detection between landcover types, observers, weather, time of year, species, as well as random variation between visits. Simulation methods can help determine if a specific method is appropriate for a given survey design and analysis. Care should be taken to avoid affecting the reliability of abundance estimates by accounting.⁹
- A spatially dispersed stratified random sampling approach should be used. Sample sites should be selected with a randomization procedure that accounts for the project design footprint. To select specific sampling sites, care should be taken to ensure sites are spatially distributed across the area of interest and coverage is obtained across habitat types. Site locations should be randomly selected using an approach that avoids implicit bias in site selection.
- Provide a justification on the approach chosen. 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. Survey vegetation features of concern in a manner that is not disproportionate to other types. Avoid bias in estimates of abundance and impair extrapolation and statistical inference.
- Include all criteria used to choose plot locations in the Impact Statement;
- identify areas of concentration of migratory birds, including sites used for migration, staging, breeding, feeding and resting. The following must be considered when identifying areas of concentration of migratory birds:
 - Migratory bird concentrations can vary within year and between years. It is therefore important to survey across the PSA, LSA, and RSA both temporally and spatially,
 - Migratory bird counts can vary strongly between years and so survey length must be able to estimate the variation accurately,

⁹ Barker et al. 2018 Biometrics: <https://onlinelibrary.wiley.com/doi/full/10.1111/biom.12734>

- Migratory bird counts are dependent on length of stay as well as presence. Any attempt to estimate abundances across a migratory period must 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;
- describe food webs and trophic linkages to summarize biotic interactions;
 - Ensure described food webs or interactions are relevant to the study areas since these can vary geographically and by ecosystem. If necessary, Structural Equation Models can provide a useful technique for quantifying such linkages in the PSA and LSA.
- provide a characterization of habitat features found in the project area that are associated with the presence of those bird species that are likely to be affected, based on the best available existing information (e.g., land cover types, vegetation, aquatic elements), including habitat fragmentation. Classification should include local aerial and on-site photos;
- provide an estimate of year-round bird use of the area (e.g., winter, spring migration, breeding season, fall migration), based on data from existing sources and surveys to provide current field data if required to generate reliable estimates. In each portion of the year, survey effort must account for differences in species movements including: winter usage of highly habitat reliant species and highly mobile species that will accurately characterize the use of a site;
- describe the use of (magnitude, timing) migratory and non-migratory birds as a source of country foods (traditional foods) and whether consumption has Indigenous cultural importance; and
- identify any and all federal Species at Risk and/or Critical Habitat in the study area; sites that are likely to be sensitive locations and habitat for birds or environmentally significant areas. These include National Parks, Areas of Natural or Scientific Interest, Migratory Bird Sanctuaries or other priority areas or sanctuaries for birds, National Wildlife Areas or World Biosphere Reserves, offshore Marine Protected Areas and Ecologically and Biologically Significant Marine Areas.

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.

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. The Canadian Wildlife Service's *Framework for the Scientific Assessment of Potential Project Impacts on Birds* provides examples of project types and recommended techniques for assessing effects on migratory birds (see Appendix 1).

8.11 Terrestrial wildlife and their habitat

The Impact Statement must:

- identify wildlife species, other than avian species, of ecological, economic or human importance (particularly to Indigenous peoples), within the study area, that are likely to be directly or indirectly affected and describe each species':
 - biodiversity, distribution and location;
 - abundance and population status;
 - life cycle;
 - seasonal ranges, migration and movements;
 - habitat requirements; and
 - sensitive periods (e.g., seasonal, diurnal and nocturnal).

- for the species identified above, describe and quantify the habitat type, including its: function; location; suitability; structure; diversity; relative use, natural inter-annual and seasonal variability, and; abundance as it existed before project construction;
- identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline biodiversity for terrestrial wildlife and discuss the rationale for their selection;
- describe the use of terrestrial wildlife as a source of country foods (traditional foods) and whether its consumption has Indigenous cultural use and value;
- describe the use and harvesting of fur-bearing species and whether its harvesting has Indigenous cultural use and value;
- describe any locations within the study area that might constitute sensitive areas for terrestrial wildlife such as: species at risk critical habitat that has been designated or is under consideration, ecological reserves and protected areas, in proximity to the project location or that could be affected by routine project operations or any lands in the study area that

might constitute sensitive areas and habitat for wildlife, or nearby environmentally significant areas such as; National Parks, areas of natural or scientific interest, National Wildlife Areas, World Biosphere Reserves or UNESCO Natural World Heritage Sites;

- identify wildlife management areas and established or proposed sanctuaries; and
- describe the levels of disturbance currently affecting wildlife and wildlife habitat, such as habitat fragmentation and the extent of human access and use.

The Ministry of Environment, Conservation and Parks may be able to provide information on specific data sources and survey methodologies. Collect wildlife data to represent the following temporal sources of variation:

- among years,
- within and among seasons (e.g., spring dispersal, breeding, late summer/fall migration and swarming, hibernation),
- within the 24 hour daily cycle. 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.

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. Databases and GIS files should be accompanied by detailed metadata that meets ECCC metadata standards (ISO 19115 NAP).¹⁰

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).

8.12 Species at Risk

The Impact Statement must:

- provide a list of all provincially listed protected species at risk and species assessed by the COSEWIC that have the status of extirpated, endangered, threatened or of special concern and that may be directly or indirectly affected by the designated project. Use existing data

¹⁰ <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16553>

and literature as well as surveys to provide current field data that reflects the natural inter-annual and seasonal variability;

- provide a list of all species at risk listed under Schedule 1 of the federal *Species at Risk Act* that may be directly or indirectly affected by the designated project. Use existing data and literature as well as surveys to provide current field data that reflects the natural inter-annual and seasonal variability of each species;
- collect species at risk data to represent the following temporal sources of variation:
 - among years,
 - within and among seasons (e.g., spring dispersal, breeding, late summer/fall migration and swarming, hibernation),
 - within the 24 hour daily cycle;
- account for the fact that rare species will require more survey effort to detect, which should be reflected in survey design by increasing the number and duration of surveys:
 - Collect field data over at least two years, to account for natural variability in populations.
 - Sample size must be planned to support a robust evaluation of the PSA within the context of the LSA and RSA.
 - design of surveys will need to consider multiple number of survey locations in order to represent the habitat heterogeneity of the RSA, and to plan the number of survey locations per land cover or habitat class so that aggregation of habitat classes post-hoc is not required.
 - In terms of sampling effort per unit area, field survey effort should be most intensive within the PSA. The level of effort per unit area may be similar or somewhat less within the remainder of the LSA, but should be scaled to the likelihood that project effects will affect species at risk within that zone. Efforts outside the PSA should be carefully designed to ensure that estimates comparing and across the PSA, LSA and RSA are unbiased and precise.
 - A habitat-stratified random sampling approach should be used. Sample sites should be selected with a randomization procedure such as a GIS grid overlay.
 - Where Critical Habitat has not been defined or has been partially identified, a Schedule of Studies may have been created to identify gaps in information for these species. The Schedule of Studies information should be referred to when implementing or assessing survey protocols, in order to provide necessary information for these species;

- ensure that, at minimum, the combined information from existing data and field surveys must be able to describe the distribution and abundance of species at risk in relation to the study areas;
- contain 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 unsummarized form. Databases and GIS files should be accompanied by detailed metadata that meets ECCC metadata standards (ISO 19115 NAP)¹¹;
- provide documentation and digital files for 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);
- follow the survey requirements specific to Bats:
 - To augment existing information sources and collect data able to robustly establish baseline conditions and assess impacts, undertake site-specific surveys to:
 - Compile a species inventory (species present/not detected)
 - Quantify baseline bat activity to evaluate relative use of different habitats or features in the project area and to help support and evaluate project siting decisions and impact predictions
 - Document baseline conditions within the Project Area and Local Assessment Area to support study of impacts
 - Locate and confirm use of high value habitat features such as roosts (including cavity trees and buildings with potential for roosting) and hibernacula
 - Identify potential regional migration corridors
 - Identify site-specific travel corridors and movement patterns
 - The following types of surveys are required:
 - Acoustic surveys, ensure study design is statistically valid
 - Continuous acoustic monitoring throughout the night (at least sunset to sunrise; 30 minutes before sunset to 30 minutes after sunrise recommended) active season (spring dispersal/migration,

¹¹ <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16553>

- breeding summer/fall migration and swarming), as well as appropriate hibernaculum surveys
 - Locate and assess potential hibernacula and roosts for use by bats, accounting for inter-annual and within-season variability in use
- 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)
 - 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).
- Note that study design, analysis of acoustic data and interpretation of results would require the services of a bat expert.
- 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;
- follow the survey requirements specific to Caribou:
 - 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 caribou. Provide a justification for the selected methodologies.
- In designing surveys for caribou, the following information sources should be consulted:
 - 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)¹²
 - Ontario's Woodland Caribou Conservation Plan (CCP)¹³
 - Range Management Policy in Support of Woodland Caribou Conservation and Recovery (RMP)¹⁴
 - Integrated Range Assessment for Woodland Caribou and their Habitat: The Far North of Ontario 2013 (IRAR)¹⁵
 - Far North Technical Report (FNTR) (request from Ontario MECP)
- for the species identified:
 - provide any published studies that describe the regional importance, abundance and distribution of species at risk, including recovery strategies or plans;
 - Provide data and summary lists for each species at risk ranked according to:
 - i. Abundance
 - ii. Distribution across survey sites (i.e., percentage of survey stations at which they were recorded)
 - iii. Abundance in each habitat type
 - iv. Map showing areas of highest concentrations or areas of use by species;
 - data must be supplemented by surveys, as required;
 - survey protocols should optimize detectability and survey effort should provide for comprehensive coverage at the appropriate time of year (e.g., survey breeding habitat during breeding season, stopover habitat during migration);

¹² https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_ghd_car_en.pdf

¹³ <https://files.ontario.ca/environment-and-energy/species-at-risk/277783.pdf>

¹⁴ <https://www.ontario.ca/page/range-management-policy-support-woodland-caribou-conservation-and-recovery>

¹⁵ <https://files.ontario.ca/environment-and-energy/species-at-risk/Far-North-Ranges- EN.pdf>

- survey protocols should provide a rationale for the scope of and the methodology used for surveys including design, sampling protocols and data manipulation; and
- Where using recognized standards, provide details of any modifications to the recommended methods and rationale for these modifications and indicate who was consulted in the development of the baseline surveys (e.g., federal/provincial wildlife experts, specialists and local Indigenous groups).
- provide information and/or mapping at an appropriate scale (The PSA and LSA, as defined above for each VC, constitute the 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 of species at risk (e.g., breeding, foraging) that may occur in the project area, or be affected by the project.
- Identify and map all species at risk, critical habitat, and residences on federal land within the PSA and LSA (provincial and/or local government authorities should be contacted to determine any additional data sources and survey methodologies); and
- The PSA and LSA, as defined above for each VC, constitute the appropriate scale.

In relation to providing required information for Bats, the Impact statement must:

- Quantify baseline bat activity (e.g., using acoustic detection to calculate an index of bat activity) to evaluate relative use of different habitats or features in the project area to help support and evaluate project siting decisions or impact predictions. In addition, locate and confirm use of high-value features such as roosts, foraging areas and hibernacula.

In relation to providing required information for Caribou, the Impact Statement must:

- Describe boreal caribou use of the study areas (e.g., distribution, movement) over time using surveys to complement existing data if data within the project study areas are insufficient or unavailable to be able to understand how caribou use the habitat. Involve province of Ontario for data and survey requirements. Consider Indigenous knowledge and community knowledge;
- Provide a justification for the sensitive periods considered in the assessment. Sensitive periods are associated with caribou life-stages such as calving, wintering, and travel. Ontario has specific sensitive time periods for caribou that are used in the identification, delineation, and consideration of habitat features;

- describe the type and spatial extent of biophysical attributes, as defined in Appendix H of the 2019 proposed amended boreal caribou Recovery Strategy¹⁶ present in the study areas;
- conduct surveys to complement existing data if data within the project study areas are insufficient or unavailable, to be able to understand where the biophysical attributes occur. Note that identification of biophysical attributes is not dependent on boreal caribou currently being present in the area;
- provide the best available information from the Ontario Ministry of Environment, Conservation and Parks on the level of disturbance (anthropogenic vs fire) in the range, consistent with the methodology developed by Environment Canada (2011)¹⁷;

In some instances, provincial methodologies may differ from federal recommendations. Consider both methodologies in order to apply the federal 35% habitat threshold, and to determine the amount of habitat disturbance. If provincial disturbance information applies more recent information (i.e., best available), this information should also be considered.

COSEWIC provides an annual report listing the designated wildlife species on its website (see Appendix 1).

9. BASELINE CONDITIONS – HUMAN HEALTH

Baseline information is required on existing human health conditions and must include the current state of physical, mental and social well-being and incorporate a social determinants of health approach to move beyond biophysical health considerations. A social determinants of health approach recognizes that health is more than the absence of disease but includes broad factors that support well-being. The scope and content of the human health baseline will reflect the specific project context, taking into account input of public and Indigenous groups, and should include indicators that are meaningful for the effects analysis. The information provided must:

- be sufficient to provide a comprehensive understanding of the state of human health, including the health of members of potentially impacted Indigenous groups;
- describe how community and Indigenous knowledge from relevant populations was used in establishing health baseline conditions, including input from diverse subgroups;

¹⁶ <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-2019.html>

¹⁷ https://wildlife-species.canada.ca/species-risk-registry/document/doc2248p/toc_tdm_st_caribou_e.cfm

- provide disaggregated information for baseline health conditions for diverse subgroups within the community to support GBA+; and
- describe any relevant indicators.

In preparing the report on baseline health conditions, the proponent must identify the social area of influence of the project. Information on interested parties, those likely to be affected directly and indirectly by the project, should be provided in association with a consideration of those in the community who are considered particularly vulnerable to changes brought about by the project. As applicable, the baseline information must be sufficiently disaggregated and analysed to support the analysis of disproportionate effects as per the GBA+ and consideration of disproportionate effects to surrounding communities. To understand the community and Indigenous context and baseline health profile, the proponent must:

- complete a community health profile that describes the overall health of the community;
- describe any context-specific definitions of health and well-being, including from the perspective of the relevant Indigenous cultures;
- describe relevant community and Indigenous history or context, including historical impacts on health;
- use a social determinants of health approach to identify and describe relevant health outcomes across diverse subgroups. This baseline health description may include issues such as income, poverty, access to health services and may interact with other sections of these guidelines. Relevant social determinants of health should be selected based on community input, if possible, to reflect the setting and circumstances of the affected communities and may be selected from the suite of determinants commonly recommended by the Public Health Agency of Canada (<https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html>)
- complete a community health profile that describes the overall health of the community which may include information on birth rates, death rates, sexually transmitted infections, injuries, chronic disease rates, mental health status and other community-relevant health issues (e.g. issues of specific concern to the community), where available through secondary information sources (e.g., Public Health Agency, Statistics Canada, provincial health authorities);
- describe and characterize the existing health services and programs, including health care provider capacity;
- provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be affected by changes in air, water,

country food quality (e.g., dust deposition on vegetation), and noise levels. At minimum, provide a map showing approximate locations of permanent residences, temporary land uses (e.g., cabins and traditional sites) and known locations of sensitive human receptors (e.g., schools, hospitals, community centres, retirement complexes or assisted care homes);

- describe drinking water sources which may be impacted by the project, including surface and/or groundwater (permanent, seasonal, periodic or temporary), their distance from project activities and approximate wellhead capture zones;
- describe the consumption of country foods (traditional foods) outside of the commercial food chain, including food that is trapped, fished, hunted, harvested or grown for consumption, medicinal purposes or has cultural value;
- provide baseline contaminant concentrations in the tissues of country foods (traditional foods) consumed by Indigenous groups and local communities. Ensure baseline data is representative of project site conditions. If surrogate data from reference sites is used rather than site-specific surveys, demonstrate how the data is representative of site conditions; and
- describe the status of food security within the Indigenous groups and local communities;

Guidance for developing the appropriate baseline information relevant to human health is identified in Appendix 1.

10. BASELINE CONDITIONS – SOCIAL

Baseline information is required on existing social conditions and must include social well-being and social activities for individual communities and Indigenous groups. The scope and content of the social baseline conditions should be tailored to the specific project context, take into account community and Indigenous input, and should include indicators and information that are useful and meaningful for the effects analysis. The information provided must:

- be sufficient to provide a comprehensive understanding of the current state of each VC, including relevant trends;
- describe how community and Indigenous knowledge from related populations was used in establishing social baseline conditions, including input from diverse subgroups;
- describe baseline social conditions using disaggregated data for diverse subgroups within the community to support GBA+; and
- describe any relevant indicators.

In preparing a baseline, the proponent must identify the social area of influence of the project and prepare a community profile. To understand the community context, the information provided must describe:

- influences on community well-being;
- access, ownership and use of resources (e.g., land tenure, minerals, aggregate, food, water, social infrastructure), including ownership of land surrounding water crossings;
- capacity (currently available or planned) of institutions to deliver public services and infrastructure;
- relevant historical community background; and
- applicable history with previous developers.

Information related to interested parties, those likely to be affected directly and indirectly by the project should be provided in association with a consideration of those in the community who are considered particularly vulnerable to changes brought about by the project.

Baseline information must be sufficiently disaggregated and analysed to support the analysis of disproportionate effects as per GBA+. The Impact Statement must provide information on the following social conditions:

Social Services

- major public services available (e.g., education, childcare, eldercare).
- Recreation
 - describe the current use of land and water bodies in the study area for outdoor recreational purposes, including recreational hunting, fishing, and trapping.
- Navigation
 - existing navigable waterways and navigation use including type, volume, seasonality, manoeuvrability, etc.;
 - current use of all waterways and waterbodies, including recreational uses by Indigenous groups and the public (including special events, fishing, cottagers, etc.); and
 - Potential to obstructions, restrictions, or expansions of access to navigable waterways (e.g., portage routes and access roads).
- Community Cohesion

- Basic demographic characteristics of the community; and
- relevant community background and historical experience with similar infrastructure and/or resource development projects.
- Public Safety
 - crime rates and how they compare to regional/provincial/territorial averages; and
 - existing police, fire services, and other public safety services.
- Culture
 - structures, sites and things of historical, archaeological, paleontological, cultural, spiritual or architectural significance.

Baseline data can often be found in secondary information sources, such as census data, government publications and academic literature. Where secondary sources are unable to provide the required information, primary sources such as surveys, key informant interviews, focus groups or other primary research methods should be used.

11. BASELINE CONDITIONS – ECONOMIC

This economic baseline should document the local and regional economic conditions and trends based on the spatial and temporal boundaries selected. The scope and content of the economic baseline should reflect the specific project context, take into account community and Indigenous group input, and should include indicators and information that are useful and meaningful for the effects analysis. The information provided must:

- be sufficient to provide a comprehensive understanding of the current state of each VC, including relevant trends;
- describe how community and Indigenous knowledge from related populations, including input from diverse groups, was used in establishing baseline conditions;
- describe baseline economic conditions for diverse subgroups within the community to support GBA+; and
- describe any relevant indicators.

Information on those likely to be affected directly and indirectly by the project should be provided in association with a consideration of those in the community who are considered particularly

vulnerable to changes brought about by the project. As applicable, the baseline information must be sufficiently disaggregated and analysed to support the analysis of disproportionate effects as per GBA+.

The Impact Statement must provide information on the following economic conditions:

- Labour market
 - labour force characteristics, disaggregated by age and gender, where appropriate, including the employment rate, the unemployment rate, employment by industry, employment status (e.g., full-time, part-time, self-employed, seasonal), average monthly earnings; and known barriers to employment for underrepresented groups.
- Housing and consumer prices
 - the general patterns of human occupancy (including permanent residences and seasonal/temporary ones) within the project area;
 - overview of the local housing market, including any issues related to excess supply or excess demand, and the general condition of the housing stock; and
 - any issues or concerns related to the cost of living, particularly with respect to food prices, energy prices, and housing/rental costs.
- Business Environment
 - the main industries and largest employers, and any opportunities for local/regional businesses to benefit from the project;
 - any commercial fisheries that may be affected, including species fished, number of licences, and value of fisheries, where applicable; and
 - access, ownership and use of resources (e.g., land tenure, minerals, aggregate, food, water, social infrastructure), including ownership of land surrounding water crossings.
- Infrastructure
 - details on the existing road network (all weather and winter roads) and traffic patterns, including any projections of future traffic patterns;
 - information on the nearest railways and airports; and
 - an overview of other infrastructure (e.g., power plants, transmission lines, pipelines, dams, water mains, sewage lines) relevant to the project.
- Public Finances
 - a brief overview of the state of local public finances
- Overall Economy

- a brief overview of the regional economy in recent years (e.g., if there have been any major investments or closures, if the area's resources and products have been in high or low demand, etc.);
- a summary of any existing local or regional economic development plans and forest management plans;
- a brief overview of the community's power source and any issues related to power distribution in the community.

12. BASELINE CONDITIONS - INDIGENOUS PEOPLES

Proponents are required to engage with Indigenous groups in developing baseline conditions, in order to identify and understand the potential impacts of their projects on Indigenous peoples, the exercise of Aboriginal and Treaty rights and to incorporate Indigenous knowledge into the impact assessment. The results of any engagement should be presented in the Impact Statement, and, as best as possible should reflect the perspective of the Indigenous peoples involved. If an Indigenous group has chosen not to participate, the proponent should identify the community and provide evidence of efforts to engage.

The proponent is required to provide an opportunity for Indigenous groups to review the information prior to submission of the Impact Statement. The Impact Statement must indicate where input from Indigenous groups has been incorporated, including Indigenous knowledge. To the extent possible, information should be specific to the individual Indigenous group(s) involved in the assessment, and describe contextual information about the members within an Indigenous group (e.g., women, men, elders and youth).

Where Indigenous groups do not wish to participate, the proponent is encouraged to continue sharing information and analysis with the Indigenous groups of the potential effects of the project, and to use available public sources of information to support the assessment.

The proponent is encouraged to consult Agency guidance on engaging Indigenous groups, in particular, *Interim Guidance on Assessing Potential Impacts on the Rights of Indigenous Peoples under the Impact Assessment Act*.

Where possible, the Impact Statement should include contextual information, both historic and current, regarding an Indigenous group's history and cultural practices, land use, as well as the manner in which rights of Indigenous peoples are, or may be, exercised and impacted by the project, as identified by the Indigenous groups. The contextual information may include the following:

- the physical and cultural heritage of each Indigenous group;
- the current use of lands and resources for traditional purposes;
- the health, social, and economic conditions of Indigenous peoples; and
- nature and extent of the rights exercised.

12.1 Physical and Cultural Heritage

The Impact Statement should include a description of the historical baseline conditions associated with Indigenous cultures. This description should give consideration to understanding 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).

Indigenous physical and cultural heritage is considered to include, but is not limited to, any site, structure or thing of archaeological, paleontological, historical or architectural significance.

Information with respect to Indigenous groups can include:

- burial sites;
- cultural landscapes;
- oral histories;
- cultural values and experiences of being on the land;
- Indigenous governance systems and Indigenous laws tied to the landscape;
- sacred, ceremonial or culturally important places, plants, animals, objects, beings, or things; and
- archaeological potential and/or artefact places.

12.2 Current Use of Lands and Resources for Traditional Purposes

The Impact Statement should include information on the current use of lands and resources for traditional purposes (e.g., hunting, fishing, trapping, plant gathering, ceremonial or spiritual practices) of all potentially impacted Indigenous groups. Proponents are encouraged to refer to guidance on the Agency's website on how to consider the current use of lands and resources for traditional purpose.

In general, the Impact Statement should consider:

- location and description of Treaty rights, title area, land claims, or traditional territory (including maps where available) of all Indigenous groups identified by the Agency;

- location of reserves and communities;
- traditional activities presently or historically practiced (e.g., hunting, fishing, trapping, gathering of plants or medicines, ceremonial or spiritual practices, passing on of Indigenous knowledge and/or language);
- location of traditional uses, including hunting, trapping, and fishing camps, cabins, and gathering or teaching grounds;
- types of traditional resources such as fish, wildlife, birds, plants, or other natural resources and their habitats of importance for supporting traditional use;
- places where culturally important fish, wildlife, birds, plants, or other natural resources are harvested;
- access and travel routes for conducting traditional practices;
- frequency, duration, and/or timing of traditional practices;
- where known, efforts of the groups to bring back traditional practices;
- description of country foods (traditional foods);
- the quality and quantity of resources (e.g., preferred species and perception of quality);
- access to resources (e.g., physical access to harvest specific species, culturally important harvesting locations, timing, seasonality, distance from community);
- 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
- other current uses identified by Indigenous groups.

Should this type of information be found through public sources, the proponent should advise the Indigenous group and offer a reasonable opportunity to review and comment before including it in the Impact Statement.

12.3 Health, social and economic conditions

The baseline conditions requirements set out in the sections above for health, social and economic conditions, include Indigenous peoples and GBA+ specific to Indigenous peoples.

12.4 Conditions Related to the Rights of Indigenous Peoples

The Impact Statement should document the nature and extent of the exercise of rights of Indigenous peoples, potentially impacted by the project, as identified by the Indigenous group(s). Indigenous groups may also provide their perspective through consultations with the Agency. This information related to rights may include, but is not limited to:

- a general description of the section 35 rights exercised in the area of the project, including the historic, regional and community context;
- the quality and quantity of resources required to support exercise of the right (e.g., preferred species, level of health of preferred species, volume of preferred species);
- access to the resources required to exercise rights (e.g., physical access to culturally important places, timing, seasonality, distance from community);
- the experience associated with the exercise of rights (e.g., noise and sensory disturbances, air quality, visual landscape);
- specific areas of cultural importance where rights are exercised;
- landscape conditions that support the Indigenous group's exercise of rights (e.g., large, intact and diverse landscapes, areas of solitude; connection to landscape);
- where possible, information about members within an Indigenous group, and their role in the exercise of rights (e.g., women, men, elders, youth, people with disabilities);
- how the Indigenous group's cultural traditions, laws and governance systems inform the manner in which they exercise the rights (the who, what, when, how, where and why);
- where they exist, identification of thresholds identified by the community that, if exceeded, may impair the ability to meaningfully exercise of rights;
- maps and data sets (e.g., overlaying the project footprint, places of cultural and spiritual significance, traditional territories, fish catch numbers); and
- pre-existing impacts and cumulative effects that are already interfering with the ability to exercise rights or to pass along Indigenous cultures and cultural practices (e.g., language, ceremonies, Indigenous knowledge).

13. EFFECTS ASSESSMENT

13.1 Methodology

The Impact Statement must describe in detail the project's potential adverse and positive effects in relation to each phase of the designated project (construction, operation, maintenance, suspension, decommissioning, and abandonment). The environmental, health, social or economic effects should be described in terms of the context, magnitude, geographic extent, ecological context timing,

duration and frequency, and whether effects are reversible or irreversible. The spatial scoping of the assessment will vary depending on the VC and should be consistent with the spatial boundaries that were established for baseline data collection. If there is an ongoing or completed regional assessment in the proposed project area, the proponent should use the information generated through that process to inform the effects assessment. As applicable, the effects assessment must be sufficiently disaggregated and analysed to support the analysis of disproportionate effects as per the GBA+.

The assessment of the effects of each of the project components and physical activities, in all phases, must be based upon a comparison of baseline environmental, health, social and economic conditions and the predicted future conditions with the project and the predicted future conditions without the project. Predictions must be made on clearly stated assumptions and the Impact Statement must clearly describe how it has tested each assumption.

The description of the effect can be either qualitative or quantitative. Effects must be described using criteria to quantify or qualify adverse effects, taking into account any important contextual factors. With respect to quantitative models and predictions, the Impact Statement must detail the model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained. For other effects, it may be more appropriate to use other criteria, such as the nature of the effects, directionality, causation and probability. The effects assessment should also set out the probability or likelihood of that effect occurring and describe the degree of scientific uncertainty related to the data and methods used. With respect to qualitative predictions, the effects assessment should also present information on the parameters measured, and sources and quality of data.

Effects may impact communities, Indigenous groups and stakeholders in different ways, and therefore they may respond differently to them. Characterizing effects should be based largely on the level of concern expressed through engagement with the impacted Indigenous groups and community members. There are tools that can assist with these predictions and analyses, including multi-criteria analysis, risk assessment, modelling, in addition to seeking out expert and stakeholder input. Effects should be characterized using language most appropriate for the effect (e.g., impacts on Aboriginal and Treaty rights of Indigenous peoples and social effects may be described differently from biophysical effects).

13.2 Interactions between effects and VCs

Although the requirements set out in these guidelines are separated by environmental, health, social or economic conditions and elements, the Impact Statement must consider and describe the

interactions between the environmental, health, social and economic effects as well as the interaction and interconnectedness of selected VCs taking into account community values.

For example, an adverse environmental effect on water could also have an adverse effect on human health. That same adverse environmental effect on the physical component, water, could result in an adverse environmental effect on the biological component fish, that could in turn, have an adverse social effect on fishing and/or an adverse economic effect on an outfitter that provides guiding services. Alternatively, this pathway could also be impacted by a positive effect on water (e.g., in remediation-related projects). Considering and describing effects holistically, both positive and negative, requires taking a systems approach that considers interactions between VCs and with other environmental, health, social and economic factors. The holistic nature of Indigenous Knowledge that is provided, may contribute to this approach.

14. PREDICTED CHANGES TO THE PHYSICAL ENVIRONMENT

Changes to the components of the physical environment outlined below are interrelated with other components as part of the broader ecosystem. The description of changes to the physical environment is to be integrated into the effects assessment of each VC and the interaction between VCs in the Impact Statement.

14.1 Changes to the atmospheric, acoustic, and visual environment

The Impact Statement must:

- provide a quantitative assessment of criteria air contaminants (total particulate matter, PM₁₀, PM_{2.5}, sulphur oxides, nitrogen oxides, volatile organic compounds, and carbon monoxide), as well as any air contaminants potentially associated with the project such as dust resulting from construction activities and ongoing vehicle use during operations or maintenance of the gravel road bed;
- provide an assessment of project emissions potentially contributing or adding to existing ground ozone levels;
- include an atmospheric dispersion model of the criteria air contaminants in order to estimate the contaminant concentrations present in the entire area that could potentially be affected by atmospheric emissions resulting from various project-related activities (sources), such as, but not limited to:
 - the use of heavy machinery such as construction equipment;
 - vehicles and diesel generators during construction;

- exhaust emissions due to increased vehicular traffic; and
- dust generation from transportation and road maintenance during construction and operation.

Provide appropriately scaled contour map(s) plotting the predicted emissions. The choice of air quality model must be appropriate for the complexity of sources, terrain and meteorology.

- provide details of all air quality model configuration, including meteorology, land-use, gridded and sensitive receptors and chemical and physical transformation settings;
- assess the potential for emissions from the project to contribute to acid deposition and exceedances of critical loads for terrestrial and aquatic ecosystems;
- describe the source characteristics (e.g., point emissions, area sources, incineration emissions, and fugitive sources, including dust generated by exposed soils that are cleared and stockpiled);
- provide emission rates for all project and regional sources within the study area, including emission factors (with methodology, uncertainty assessment and references) and all assumptions and related parameters that would enable calculations to be reproduced;
- use established methods for estimating emissions from on-road and off-road activities;
- provide a comparison of predicted air quality concentration against the *Canadian Ambient Air Quality Standards* (CAAQS) for fine particulate matter (PM_{2.5}), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) and ozone (O₃). Predicted concentrations for other air pollutants relevant to the project, such as dust resulting from construction activities and ongoing vehicle use during operations or maintenance of the gravel road bed, should be compared with appropriate provincial and territorial guidelines. The assessment against CAAQS should be based on the principles of “keeping clean areas clean” and “continuous improvement”, and in the context of air sheds and air zones with the Air Quality Management System;
- describe participation in national or regional air emission tracking and reporting programs or provide rationale why participation is not required;
- provide a description of all methods and practices (e.g., dust suppression strategies and guidelines, control equipment) to be implemented to reduce and control emissions. If the best available technologies are not included in the project design, the proponent needs to provide a rationale for the technologies selected;
- provide details of the achievement of emission standards for all mobile and stationary engines used in the project;

- 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;
- describe changes in ambient vibration and sound levels resulting from the project;
- quantify sound levels at appropriate distances from any project facility and/or activities and describe the frequency, duration and character of sound;
- describe the locations and characteristics of the most sensitive receptors including species at risk;
- describe consultation with regulators, stakeholders, community groups, landowners and Indigenous groups about potential effects to the atmospheric, acoustic, and visual environment.
- identify and justify the approach to determine the extent to which sound effects resulting from the project are adverse and describe any changes in night-time light levels as a result of the project; and
- describe any positive changes.

Additional guidance regarding air quality, health and noise impacts is identified in Appendix 1.

14.2 Changes to groundwater and surface water

With respect to potential project effects on the physical hydrogeological system, the Impact Statement must:

- provide a project-specific water use assessment identifying and describing the quantity and quality of water resources potentially affected by the project, including:
 - any withdrawal of groundwater or surface water;
 - changes to the groundwater recharge/discharge areas;
 - temporal and spatial changes in groundwater quantity, quality and low (e.g., long-term changes in water levels), including how these changes may relate to domestic, communal or municipal water supply wells;
 - the flow or volume of water available in the water bodies; and
 - how and where any waste waters or dewatering water would be discharged.

With respect to potential project effects on water quality in the receiving environment, the Impact Statement must:

- present any applicable water management plan, including for any aggregate sources and stockpiles;

- present estimates of surface water runoff rates for major project components, including aggregate and overburden stockpiles;
- present an integrated site water balance model incorporating surface and groundwater fluxes to or from all major project components, for the construction, operation and decommissioning and abandonment periods;
- describe any applicable water quality treatment measures and provide evidence supporting the effectiveness of these measures;
- describe the quantity and quality of all effluent streams released from the site to the receiving environment, including surface runoff from aggregate and overburden stockpiles, and dewatering discharge;
- compare the quality of all effluent streams to the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life, and to provincial water quality objectives for contaminants of concern that do not have CCME guidelines. CCME's Water Quality Guideline values are national science-based voluntary guidelines developed collaboratively among provincial, territorial, and federal jurisdictions for the protection of freshwater and marine life;
- describe changes to groundwater quality due to effluents from the project, including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen), chemical constituents (major and minor ions, trace metals, nutrients, organic compounds);
- describe any changes to groundwater quality that could affect surface water quality;
- 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 changes to surface water quality due to effluents and atmospheric deposition from the project including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen, turbidity), chemical constituents (major and minor ions, trace metals, nutrients, organic compounds); and
- describe groundwater and surface water monitoring programs during the construction, operation and decommissioning and abandonment.

With respect to potential project effects on water quality resulting from acid rock drainage and/or metal leaching, the Impact Statement must:

- provide estimates of the potential for mined aggregate materials to be sources of acid rock drainage or metal leaching; including estimates of potential time to the onset of acid rock drainage or metal leaching;
- describe the types of method used to predict acid rock drainage and/or metal leaching for construction materials;
- provide estimates of surface and seepage water quality from the aggregate and overburden stockpiles and project infrastructure during construction, and operation and post-closure periods, decommissioning and abandonment;
- provide aggregate volumes and tonnage, and construction methods;
- describe methods to prevent or control acid rock drainage and metal leaching during construction, operation and decommissioning and abandonment; and
- describe contingency plans, monitoring during operation and decommissioning and abandonment, and maintenance plans.

14.3 Changes to riparian, wetland and terrestrial environments

The Impact Statement must:

- provide an overall description of changes related to landscape disturbance including fragmentation of habitats and project effects on areas of ground instability;
- describe any hydrological or drainage changes that may alter moisture regimes and how that may affect vegetation and wetland function;
- describe how hydrological or drainage changes may disturb soils, peat or muskeg and result in the release of mercury or methylmercury from disturbed soils, which may affect water and groundwater quality, fish, wildlife and human health;
- describe any contaminants of concern potentially associated with the designated project (including from spills or accidental discharges) that may affect soil, sediment, wetlands, and surface and ground water (including substances used during summer and winter maintenance activities);
- describe direct, incidental and cumulative predicted positive and/or adverse effects to riparian, wetland and terrestrial biodiversity metrics, effects of fragmentation, changes to regional biodiversity that could be caused by all project activities, including but not limited to:
 - effects to wetland ecological functions, including impacts that may alter the wetland's capacity to perform hydrological, biogeochemical cycling, habitat, and climate functions. Describe the methodology used to identify effects;

- describe the historical land use and the potential for contamination of soils and sediments and potential for loss of soil fertility. Describe any known or suspected soil contamination within the study area that could be re-suspended, released or otherwise disturbed as a result of the project;
- describe any changes in risk to forest fires that may result from the project;
- describe the vegetation standards and controls to be implemented while constructing and operating the project. Describe any integrated vegetation management programs, including:
 - the criteria and circumstances for applying chemical, biological or mechanical control methods; and
 - the methods to be used to prevent spread of non-native, invasive species such as *Phragmites australis* (European Common Reed); and
 - the selection of plant species to be kept and planted to promote naturally low-growing plant communities.
- describe any revegetation procedures to be implemented as part of the project, including:
 - revegetation techniques and the locations where they would be implemented;
 - seed mixes to be used, application rates and location of application;
 - fertilizers to be used, application rates and locations, and criteria for determining these specifications; and
 - contingency planting and seeding plans that include a description of species to be replanted, the locations for replanting and criteria for determining these specifications.
- describe any positive changes (e.g., from offsets that result in re-vegetation, new wetlands etc.)

15. EFFECTS TO VALUED COMPONENTS – ENVIRONMENT

Within the context of the predicted changes to the physical environment, the proponent must assess the effects of the project on environmental VCs. Interconnections between environmental VCs and social, health and economic VCs and interactions between effects must also be described.

15.1 Fish and fish habitat

The Impact Statement must:

- describe any direct, incidental or cumulative predicted positive and/or adverse effects to fish (all developmental stages) and fish habitat as defined in subsection 2(1) of the *Fisheries*

Act, including the calculations of any potential habitat loss (temporary or permanent) including spawning grounds, nursery, rearing, food supply, and migration areas, or death of fish. The assessment must include a consideration of:

- the geomorphological changes and their effects to hydrodynamic conditions and fish habitats (e.g., modification of substrates, dynamic imbalance, silting of spawning beds);
 - the modifications of hydrological, and hydrometric conditions on fish habitat, critical habitat for aquatic species at risk, and on the fish species' life cycle activities (e.g., reproduction, fry-rearing, migration);
 - potential effects to riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat (e.g., structure, cover);
 - changes to water quality both at the discharge point and in the receiving environment;
 - changes to water quality due to runoff from any temporary and permanent project components;
 - describe effects to fish biodiversity considering identified biodiversity metrics;
 - any potential imbalances in the food web and trophic levels in relation to baseline conditions;
 - effects to the primary and secondary productivity of water bodies and how project-related effects may affect fish food sources;
 - potential for direct effects of contamination downstream of the project on fish and bioaccumulation of contaminants (e.g., selenium, mercury, chromium) in fish
 - potential direct and incidental effects on fish behaviour, distribution, abundance, migration patterns; and
 - potential losses of individuals and relationship to population density and the resiliency of a population.
- describe the effects of changes to the aquatic environment on fish and fish habitat, including:
 - the anticipated changes in the composition and characteristics of the populations of various fish species, especially those of cultural significance to Indigenous communities with traditional land use practices in the area (including walleye and pike), and provincially or federally listed aquatic species at risk (including lake sturgeon);

- describe any modifications in migration, local movements (e.g., upstream and downstream migration, and lateral movements) or stranding of fish, following the construction, operation or closure of works (e.g., physical, chemical and hydraulic barriers to fish passage);
 - identify any reduction in fish populations as a result of potential overfishing due to increased access to the project area;
 - contaminant levels in harvested species and their prey; and
 - describe any modifications and use of habitats, including the ability to access the habitat.
- include a discussion of how project construction timing correlates to key fisheries timing windows for freshwater and anadromous/catadromous species, and any potential effects resulting from overlapping periods;
 - a discussion of how vibration caused by project activities (e.g., blasting) may affect fish habitat and behaviour, such as spawning or migrations;
 - describe potential effects from impingement and entrainment of fish and other aquatic biota through water withdrawal;
 - describe any need for an *Fisheries Act* authorization and/or a *Species at Risk Act* permit and describe any consideration of Department of Fisheries and Oceans guidance documents;
 - for linear projects, describe and justify watercourse-crossing techniques to be used and the criteria for determining the techniques proposed for each watercourse-crossing;
 - include a risk assessment of the potential introduction and intrusion of aquatic invasive species;
 - describe effects from changes in light level;
 - describe any positive changes, such as habitat creation;
 - describe the anticipated changes in the composition and characteristics of the populations of fish, following modifications to the aquatic environment, including but not limited to:
 - disruption of life stages or habitat with regard to their productivity, life cycles, migration, or local movements, including a consideration of spawning, rearing, feeding, and overwintering;
 - disruption of feeding activities of fish;
 - distribution and abundance of fish;
 - contaminant levels in harvested species and their prey;
 - a consideration of a change in: behavior, displacement, access to habitat, habitat structure, species composition, ecosystem structure and function and habitat

- quality; and
 - freshwater animal health and condition.
- describe any project effects to other aquatic organisms; and
- describe any changes to aquatic plants, including all benthic and detached algae and phytoplankton.

15.2 Birds, migratory birds and their habitat

The Impact Statement must:

- describe direct, incidental and cumulative predicted positive and/or adverse effects to migratory birds and non-migratory birds, including population level effects that could be caused by all project activities, including but not limited to:
 - site preparation/vegetation removal;
 - air emissions and dust;
 - deposit of harmful substances in waters that are frequented by migratory birds;
 - changes to the aquatic flow regime and sediment load;
 - sensory disturbance;
 - increased predation opportunities;
 - disruption of wildlife movement corridors;
 - increased poaching opportunities; and
 - site reclamation.
- consult *A Framework for the Scientific Assessment of Potential Project Impacts on Birds* Appendix 2 and 3 for overview of potential impacts to birds from road projects¹⁸;
 - analyze predicted effects for all birds, each VC, and for BCR Priority Species and include relevant impacts from Appendix 2 and 3. Include separate analyses for each project activity, component, and phase. Incorporate sources of error for all analyses to insure final impacts estimates show the best available estimate of precision.

¹⁸ <http://publications.gc.ca/site/eng/367511/publication.html>

- Non-linear, indirect and synergistic responses to the project should be explicitly explored where reasonable.
- Any assumption of displacement should be justified with scientific references and surveys should provide evidence that there is available habitat to accommodate displacement under a range of population scenarios. For example, it should be clear that a growing population will not be limited by the habitat loss along the PSA.
- describe short term and long term changes to habitats and food sources of migratory and non-migratory birds (types of cover, ecological unit of the area in terms of quality, quantity, distribution and functions), with a distinction made between these two birds categories, including losses, structural changes and fragmentation of riparian habitat (aquatic grass beds, intertidal marshes), terrestrial environments (e.g., uplands, grasslands, forested, old growth, post fire) and wetlands frequented by birds. Important habitats to consider include: eskers, forest, riparian, bog/fen, other wetlands, open water;
- describe the changes to the bird-habitat relationships; the change in biodiversity, abundance, and density of the avian community that utilise the various habitat types or ecosystems;
- account for changes in detection pre- and post-project construction. For instance, roads allow for greater detection distances and therefore any estimates of abundance or presence need to account for differential detectability¹⁹;
- describe the effects caused by the new habitat types created in the project area by clearing vegetation. The new habitats created may attract migratory birds, which were not present before (such as the Eastern Whip-poor-will or the Common Nighthawk). Describe how these species at risk may be impacted by the project.
- describe the potential direct, incidental and cumulative adverse effects of the designated project on migratory bird species (such as SARA-listed Yellow-Rail) who inhabit the project area during breeding season as well as during migration (as staging and stopover sites);
- describe the change in mortality risk, including as a result of collision of migratory birds with any project infrastructure, vessels and vehicles;
- ensure surveys cover temporal window that incorporates a variety of road usage by both diurnal and nocturnal species;

¹⁹ www.ace-eco.org/vol12/iss1/art11/ACE-ECO-2017-997.pdf

- account for indirect effects such as the increased movement of predators in the predictions of mortality effects;
- describe the incidental effects caused by increased disturbance (e.g., sound, artificial light, presence of workers), relative abundance movements, considering the critical periods for the birds, including but not limited to breeding, migration and overwintering; and
- support any assumption of temporary displacement during construction and operation of the project through evidence or through study and monitoring within the PSA.

15.3 Terrestrial wildlife and their habitat

The Impact Statement must:

- describe the potential direct, incidental and cumulative adverse effects to other wildlife and wildlife habitat, including population level effects that could be caused by all project activities, including but not limited to: project noise and sensory disturbances, habitat alteration, air emissions and dust, increased predation, poaching opportunities, any linear access corridors (roads, rights of way) particularly in the vicinity of wetland, lake and riparian habitats and on migratory corridors;
- describe effects to terrestrial wildlife biodiversity considering biodiversity metrics, effects of habitat fragmentation, changes to regional biodiversity;
- describe any potential imbalances in the food web and trophic levels in relation to baseline conditions;
- describe the potential adverse effects of the designated project on species noted as important to Indigenous groups and local communities and their habitat that are not currently listed under the *Species at Risk Act* or provincial statutes;
- provide an evaluation of the effect of any new road access or rights of way on wildlife mortality risk and movement patterns;
- describe the potential adverse effects of the designated project on wildlife as a result of poaching;
- describe changes to key habitat for species important to current use of lands and resources for traditional purposes, including moose; and
- describe changes to vegetation species important to Indigenous peoples.

The Ontario Ministry of Environment, Conservation and Parks should be considered a source of information on appropriate methodologies to predict impacts to wildlife.

15.4 Species at risk and their habitat

The Impact Statement must:

- describe the potential direct, incidental and cumulative adverse effects of the designated project on species at risk listed under Schedule 1 of the *Species at Risk Act* and, where applicable, its critical habitat (including its extent, availability and presence of biophysical attributes). Species at risk which may inhabit the project area include:
 - Lake sturgeon;
 - Northern Myotis;
 - Brown Myotis;
 - Caribou (Missisa, Nipigon, and Pagwachuan ranges);
 - Rusty Blackbird;
 - Barn Swallow;
 - Canada Warbler;
 - Common Nighthawk;
 - Olive-sided fly-catcher; and
 - Wolverine;
- analyse predicted effects for each species at risk. To fully understand the impacts and/or benefits of one alternative versus another, all relevant metrics and evaluators for species at risk should be considered;
- include separate analyses for each project activity, component, and phase;
- conduct post-construction surveys to verify predicted impacts;
- in relation to describing effects on Bats, the Impact Statement must:
 - take into account any impacts to foraging habitats as well as hibernacula, roosts and travel corridors when assessing effects to local and regional populations;
 - Identify potential roosts, hibernacula, foraging habitat and travel corridors in the local area and determine whether the project will impact these habitats or their functions as bat habitat. Where artificial roost structures (i.e., buildings) are rare in the landscape, particular attention should be paid to identifying natural roost structures;
- in relation to describing effects on Caribou, the Impact Statement must:
 - provide an assessment of the potential adverse effects on boreal caribou habitat (e.g., at the range and sub-range scales) considering the direction provided in the RMP and GHD (see section 8.12) and informed by NHIC information layers and the

General Habitat Description Mapping Product (available through the Ontario Ministry of Environment, Conservation and Parks);

- assess the effects of all linear disturbances (e.g., new road access or rights of way) on caribou, including movements between seasonal habitats to account for functional habitat loss and effects of increased predation. In this assessment, apply a 500 meter buffer to mapped anthropogenic features to best represent the combined effects of increased predation and trends in the disturbance on the critical habitat of caribou population at the national scale²⁰;
 - Use population-level modeling to assess the effects of proposed disturbance on caribou at the scale of federal range boundaries and provincial range boundaries.
 - With respect to effects on undisturbed habitat at the scale of the range:
 - Provide an account (and GIS file if available) of added project disturbance using a 500-metre buffer, using the following formula: (Project footprint + 500-metre buffer) - overlapping area(s) already considered disturbed habitat.
 - Determine whether the project is expected to compromise the ability of ranges to be maintained at the disturbance management threshold and provide a rationale for the conclusion.
- With respect to effects on biophysical attributes as defined in Appendix H of the boreal caribou Recovery Strategy:
 - Determine whether the project is expected to remove or alter biophysical attributes necessary for boreal caribou recovery or survival and provide a rationale for the conclusion (provide GIS file if available)
- With respect to effects on connectivity:
 - Determine whether the project is expected to result in a reduction of connectivity within or between the ranges and provide a rationale for the conclusion.
 - Evaluate habitat and range connectivity at the local, regional and range scales using quantitative methods (e.g., habitat suitability analysis etc.).

²⁰ Environment Canada, 2011: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/ri_boreal_caribou_science_0811_eng.pdf

- In addition, where telemetry data is available, evaluate movements of collared individuals using quantitative methods (e.g., step analysis), to determine existing movement corridors, and how these may be affected by project development.
- With respect to the effects of predation:
 - Determine whether the project is expected to result in an increase of predator and/or alternate prey access to undisturbed areas and provide a rationale for the conclusion.
- With respect to effects on individuals and population condition at the range scale:
 - Provide best available information from the Ontario MECP concerning baseline range population size and trend.
 - Provide an assessment of the potential adverse effects of the project on the population condition of the range (i.e., size and trend) at both the provincial range scale and the federal range scale.
 - Provide an assessment of the potential adverse effects on boreal caribou individuals (e.g., sensory disturbance, mortality, pollution) including legal harvest from indigenous groups.
- Provide an evaluation of the following:
 - Caribou (Habitat Protection) – Range Condition
 - Caribou (Species Protection) – Population Size Estimates at the Range Level
 - e.g., minimum animal count based on available information
 - Caribou (Species Protection) – Population Trend Estimates at the Range Level
 - Caribou (Habitat Protection) – Cumulative Disturbance at Range Level
 - Quantify additional disturbance being added to the range (footprint and footprint + 500 metre buffer)
 - Alignment with existing disturbance
 - Length of new linear disturbances
 - Caribou (Habitat Protection) – Habitat Amount and Arrangement
 - Caribou (Habitat Protection) – Categorized Habitat at the Sub-range Level
 - Category 1: High Use Area – Nursery Areas Habitat potentially impacted
 - Number of Nursery Areas within the Range

- Number of Nursery Areas potentially impacted by the Project (e.g., how many intersect with project footprint, are within 2 kilometres, within 10 kilometres)
- Relevant information on that habitat, such as average age of forest, condition of forest, etc., for each Nursery Area potentially impacted by the Project
- Area (ha) of each Nursery Area potentially being impacted
- Area (ha) of each Nursery Area removed by Project
- Category 1: High Use Area – Winter Use Areas potentially impacted
 - Number of Nursery Areas within the Range
 - Number of Nursery Areas potentially impacted by the Project (e.g., how many intersect with project footprint, are within 2 kilometres, within 10 kilometres)
 - Relevant information on that habitat, such as average age of forest, condition of forest, etc. for each Nursery Area potentially impacted by the Project
 - Area (ha) of each Nursery Area potentially being impacted
 - Area (ha) of each Nursery Area removed by Project
- Category 1: High Use Area – Travel Corridors potentially impacted
 - Number of Nursery Areas within the Range
 - Number of Nursery Areas potentially impacted by the Project (e.g., how many intersect with project footprint, are within 2 kilometres, within 10 kilometres)
 - Relevant information on that habitat, such as average age of forest, condition of forest, etc. for each Nursery Area potentially impacted by the Project
 - Area (ha) of each Nursery Area potentially being impacted
 - Area (ha) of each Nursery Area removed by Project
- Category 2: Seasonal Ranges impacted
 - Area (ha) of Seasonal Ranges potentially being impacted
 - Relevant information on that habitat, such as average age of forest, condition of forest, etc., for Seasonal Ranges potentially impacted by the Project
 - Area (ha) of Seasonal Range removed by Project

- Category 3: Remaining Areas in the Range impacted
 - Area (ha) of Seasonal Ranges potentially being impacted
 - Relevant information on that habitat, such as average age of forest, condition of forest, etc., for Seasonal Ranges potentially impacted by the Project
 - Area (ha) of Seasonal Range removed by Project
 - Caribou (Species Protection) – Incidental mortality due to anthropogenic impacts (e.g., vehicular collisions, increased hunting pressure)
 - Caribou (Species Protection) – Indirect mortality due to increase in alternate prey sources (moose and deer) leading to increased predation (wolves, bears, etc.) and increased potential for spread of disease (e.g., brainworm)
 - Caribou (Species Protection) – Indirect impacts due to sensory disturbance (e.g., light, sound, vibration, olfactory) within 10 kilometres of the Project.
 - The following sources of information should be consulted:
 - Documents provided by Ontario:
 - IAP, CCP, RMP, and GHD (defined in section 8.12)
 - Draft Selected Wildlife and Habitat Features: Inventory Manual for use in Forest Management Planning v1.0 (1997)
 - Indigenous knowledge
- science-based evidence from the relevant jurisdiction that is consistent with the Recovery Strategy. Clearings created for the project may create new habitat types thereby attracting species at risk which were not present before (such as the Eastern Whip-poor-will or the Common Nighthawk). Describe how new habitat types will impact species at risk in the project area.
- with respect to caribou, describe how all new road access or rights of way will effect corridor (seasonal movement) habitat between summer and winter core habitat;
- With respect to caribou, use population-level modelling to assess the effect proposed disturbance (i.e., range-level disturbance in relation to the federal disturbance threshold). Increases in predation/mortality rates need to be considered.
- With respect to caribou, describe the impacts of construction pits and quarries on or near esker deposits on caribou populations
- describe the potential adverse effects of the project on species protected by provincial statutes and assessed by the COSEWIC as extirpated, endangered, threatened or of special

concern (flora and fauna) and their habitat that are not currently listed under the *Species at Risk Act*;

- identify critical timing windows (e.g., denning, rutting, spawning, calving, breeding, roosting), setback distances, or other restrictions related to these species;
- identify provincial, territorial or federal permits or authorizations that may be required in relation to the species at risk;
- provide survey results and detailed mapping of each species at risk and their habitat, including important habitat features, for all federal lands;
- clearly identify the locations of federal lands/non-federal lands within the study area and differentiate between these land tenures in the presentation of information regarding all species at risk. For example, total habitat disturbance for boreal caribou should be presented at the range scale, but it should also be presented in a way that clearly indicates habitat disturbance specifically within federal lands; describe all reasonable alternatives to the project that would avoid the potential effect on species and their habitat, with particular attention to critical habitat, such as upland habitat which is important for caribou migration habitat and which contains roosting habitat for bats;
- describe all feasible measures that will be taken to avoid or lessen the impact of the project on the species and its critical habitat;
- Demonstrate that avoidance and minimization measures will be applied for species at risk. Recovery Strategies will provide information such as Population and Distribution Objectives, and Strategic Direction for Recovery;
- 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:
 - the number of individuals killed, harmed, harassed; and
 - the number of residences damaged or destroyed.
- describe the area, biophysical attributes and location of habitat including critical habitat affected (e.g., destroyed, permanently altered, disrupted); describe all feasible measures that would be taken to eliminate the effect of the work or activity on species and their habitats, including critical habitat; and
- provide an account of how the project and mitigation measures are consistent with the recovery strategy, action plan, or management plan for the species.

15.5 Climate Change

The Impact Statement must:

- provide a description of each of the project's (including all activities incidental to the project) main sources of GHG emissions;
- provide the estimated annual GHG emissions from each source, including calculation methods, assumptions and related parameters that would enable calculations to be reproduced;
- provide an estimate of yearly net GHG emissions for each year of the project lifetime, including an uncertainty assessment, as per section 3 of the draft Strategic Assessment of Climate Change
- provide a qualitative description of a project's positive or negative impacts on carbon sinks, including from the removal and alteration of wetlands;
- describe how the project may contribute to Canada's efforts to reduce GHG emissions, if applicable (e.g., the Impact Statement could explain how the project would result in emission reductions in Canada by avoiding emissions from another source);
- describe how the designated project could impact global GHG emissions;
- if the project is expected to displace emissions internationally, the Impact Statement should describe how the project is likely to result in global emission reductions. For example, a project that enables the displacement of high-emitting energy abroad with lower emitting energy produced in Canada could be considered as having a positive impact.

Additional guidance related to greenhouse gas emissions and climate change is included in the [draft Strategic Assessment of Climate Change](#) developed by Environment and Climate Change Canada.

16. EFFECTS TO VALUED COMPONENTS – HUMAN HEALTH

Of note, many human health effects will have close linkages to social and economic effects. Social, economic, health, and environmental effects are interconnected. Change in any one of these domains will often lead to changes in the others. Within the context of the predicted changes to the biophysical environment, social and economic conditions resulting from the designated project, the proponent must assess the adverse and positive effects of the project on human health. The assessment must consistently take into account real and perceived risk and carry out baseline studies using recognized methodological best practices and as reflected in these guidelines, to determine perceived risk. Interconnections between human health and other VCs and interactions between effects must be described.

VCs that require assessment are listed below. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided. If, after engaging with Indigenous groups and the public, the proponent determines that further VCs require assessment, it should do so with a rationale for the selections, and an explanation of how engagement informed them. If, after engaging with communities and conducting further analysis, the proponent determines that the information and VCs listed below could be more meaningfully organized and presented in an alternate way, it may do so with an explanation and rationale for these changes.

The proponent must describe how community and Indigenous knowledge was used to collect baseline data and assess health effects and disaggregate the source of community or Indigenous knowledge, as well as social, economic, and health data, by representation by sex, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+. In assessing effects to VCs listed below, the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the designated project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders).

The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Applying a “determinants of health approach” in the assessment of human health effects will support the identification of these linkages, as well as of disproportionate effects across subgroups.

All interconnections between human health and other VCs and interactions between effects must be described. A detailed HIA inclusive of other reasonably foreseeable future projects would be appropriate to capture potential positive and adverse effects on social factors and economic factors (and where applicable cultural factors) in addition to the biophysical environmental factors. An HIA may be able to assess the differential between potential adverse and positive impacts on the environment and human health of those communities whose territories are removed from the road alignment.

16.1 Human Health Risk Assessment

With respect to human health risk assessment, the Impact Statement must:

- provide an assessment of adverse and positive effects on human health or changes to the baseline community health profile based on changes to the environment, health, social and

economic conditions, focusing on effects to health outcomes, risks or social determinants of health in consideration of, but not limited to, potential changes in:

- air quality;
 - noise exposure
 - effects of vibration;
 - current and future availability (including contamination/quality) of country foods (i.e., food that is trapped, fished, hunted, harvested or grown for subsistence, cultural or medicinal purposes); and
 - current and future availability (including contamination/quality) of water for drinking, recreational and cultural uses.
- employ best practices in Health Impact Assessment methods;
 - conduct a problem formulation exercise/preliminary model predictions to determine whether a Human Health Risk Assessment is required. The proponent must provide a rationale/explanation if problem formulation/preliminary model predictions indicate that a Human Health Risk Assessment is not warranted;
 - provide a detailed rationale for any contaminants of potential concern (COPCs) or exposure pathways that are excluded and/or screened out of the human health risk assessment;
 - describe and quantify the health risk from exposure to COPCs, including mercury, via consumption of country foods.
 - if a Human Health Risk Assessment is conducted, the assessment must identify all potential contaminant exposure pathways for contaminants of concern to adequately characterize potential biophysical risks to human health. A multimedia Human Health Risk Assessment may need to be considered and conducted for any contaminant of potential concern with an identified risk and multiple pathways;
 - provide a detailed rationale/explanation if a determination is made that an assessment of any COPCs or exposure pathways should be excluded and/or screened out of the assessment and if the proponent decides to deviate from the suggested assessment approaches and methods or determines that such assessment is not warranted.;
 - describe and quantify the project-related activities, and provide an inventory of contaminants of potential concern and their sources, potential exposure pathways, adverse human health effects and the potential human receptors of these effects;
 - describe nuisances and environmental, social and economic changes that could potentially be sources of adverse human health effects and the potential human receptors of these effects;

- 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;
- identify predicted effects of the project on the quality and quantity of ground or surface water used for domestic uses;
- food security: describe effects to availability, use and consumption of country foods (traditional foods) and health impacts of this effect;
- describe any positive health effects (e.g., remediation projects).

16.2 Social Determinants of Health

With respect to Social Determinants of Health, the Impact Statement must:

- describe and quantify potential effects to mental and social well-being (including to stress, depression, anxiety, sense of physical and emotional safety, substance use, self-esteem, working conditions, respect for community values and practices);
- describe how community and Indigenous knowledge was used in assessing human health effects;
- describe and quantify potential effects to physical well-being (including to rates of heart disease, diabetes, malnutrition, sexually-transmitted diseases, sexual and other physical violence);
- identify predicted visual or other aesthetic effects of the project on existing land use in the study area;
- document potential effects on access to health services, including increased use of health and related health-social services in relevant communities;
- apply GBA+ across all health effects (including health-social services) and document how potential effects or changes to human health conditions could be different for diverse subgroups, including Indigenous peoples or other community relevant subgroups (e.g., children, women, youth, elders);
- describe and quantify specific thresholds and document if different thresholds were considered for vulnerable populations, including by gender and age; provide rationale and justification if specific thresholds not used; and
- describe any positive health effects (e.g., resulting from improved economic opportunities, increased access to health-social services).

The variation of effects during different project phases and times of year should be described. Additional guidance from Health Canada regarding human health impacts is identified in Appendix 1.

17. EFFECTS TO VALUED COMPONENTS – SOCIAL

Of note, many social effects will have close linkages to health and economic effects.

Within the context of the predicted changes to the biophysical environment, health and economic conditions resulting from the designated project, the proponent must assess the effects of the project on social conditions. Interconnections between social VCs and other VCs and interactions between effects must be described. The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain (health, social and/or economic) is predicted, there is an understanding of what other effects or consequences may be felt across the other domains.

VCs that require assessment are listed below. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided. If, after engaging with Indigenous groups and the public, the proponent determines that further VCs require assessment, it should do so with a rationale for the selections, and an explanation of how engagement informed them. If, after engaging with communities and conducting further analysis, the proponent determines that the information and VCs listed below could be more meaningfully organized and presented in an alternate way, it may do so with an explanation and rationale for these changes.

The proponent must describe how community and Indigenous knowledge was used to collect baseline data and assess social effects, and disaggregate the source of community and Indigenous knowledge by representation by gender, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+. In assessing effects to VCs listed below, the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the designated project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders).

As applicable to the assessment, the analysis should describe the goals of local or regional land use plans or local or regional development plans and the extent to which the project is aligned with such plans to avoid or enhance social effects. For the VCs listed below, the effects assessment should explore and discuss opportunities by which benefits to local communities can be enhanced.

17.1 Services and infrastructure

The Impact Statement must:

- Describe the predicted effects to services and infrastructure in the study area, including but not limited to the positive and adverse effects to:
 - quality of road infrastructure;
 - traffic safety;
 - educational facilities and childcare;
 - health care facilities;
 - social services facilities;
 - emergency services (e.g., police, ambulance, health care, fire fighting); and
 - accommodations/lodging;
- Describe any need for government and/or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects.

17.2 Land and resource use and recreation

The Impact Statement must:

- describe predicted effects to recreation (e.g., hunting, fishing, hiking, wildlife viewing, aesthetic enjoyment) by the community and Indigenous groups, including effects to:
 - access to the resources;
 - quantity and quality of the resources; and
 - overall experience when undertaking recreational activities, including noise, odours/air quality, and effects on landscapes ;
- describe the potential interactions of the designated project with local and regional land use and resource activities, including adverse and positive effects to:
 - transportation and utilities corridors (including community airports and winter roads);
 - residential land use;
 - forestry and logging operations;
 - commercial outfitters; and
 - other land uses.

- identify predicted effects of the project on the quality and quantity of ground or surface water and implications for recreational uses.

17.3 Navigation

The Impact Statement must:

- describe navigable waterways that could be impacted by the project, including details such as physical characteristics, bank/bottom features, biological components, flow/tides, etc.;
- describe ancillary project components that will be constructed in, on, under, over, through or across navigable waterways to support the project;
- describe potentially affected waterway users and describe consultation with waterway users and Indigenous groups regarding navigational use, issues raised and how issues were addressed; and
- describe project effects to navigation and navigation safety, including potential obstructions to navigation (natural/man-made, other works, navigation aids, etc.);

17.4 Community Cohesion

The Impact Statement must assess potential changes to local demographic conditions, including changes to population size and changes in the relative population of men and women, and younger and older people.

17.5 Community well-being and public safety

The Impact Statement must:

- assess potential adverse and positive effects of changes to social conditions including, but not limited to:
 - food security;
 - violent crime (with particular consideration of any GBA+ aspects);
 - gender-based violence;
 - human trafficking;
 - vandalism;
 - poaching;
 - drug distribution; and,

- trafficking illegal or counterfeit goods.
- income inequity;
- changes at the community level that affect social conditions as a result of increased population, workers camps, economic activity, cost of living, among other factors;
- non-commercial/trade economy;
- trafficking of illegal goods counterfeit goods;
- other crimes, including sexual and physical violence;
- cost of living;
- social services;
- describe in-and out-migration effects, including changes in social and cultural make-up of affected communities and changes in populations;
- identify whether social divisions might be intensified as a result of a project and evaluate effects to social cohesion;
- evaluate potential social effects associated with changes in disposable income, including potential cost-of-living effects, adverse and positive lifestyle changes, distribution of benefits among affected people;
- describe any anticipated effects to language;
- describe effects to community well-being due to changes to viewsapes and soundscapes resulting from the project; and
- consider the potential for stresses on community, family and household cohesion, alcohol and substance use, or illegal or other potentially disruptive activities.

17.6 Culture

The Impact Statement must assess potential effects to changes to:

- structures, sites or things of historical, archaeological, paleontological or architectural significance and associated effects on other social and economic conditions, specifically burial sites.
- traditional cultural activities (such as religious ceremonies, traditional hunting, etc.) that might be caused by the project; and
- culturally significant plants or wildlife.

18. EFFECTS TO VALUED COMPONENTS – ECONOMIC

Within the context of the predicted changes to the biophysical environment, and health and social conditions, the proponent must assess the effects of the project on the economic VCs. All interconnections between these economic VCs and other VCs and interactions between effects must be described. The assessment must illustrate an understanding of linkages and effect pathways, so that when a change in one domain is predicted, there is an understanding of what other effects or consequences may be felt across the other domains. Indicators should be developed by the proponent using best practice, Agency guidance, and through engagement with Indigenous groups and the public. Rationale for the indicators chosen should be provided. If, after engaging with Indigenous groups and the public, the proponent determines that further VCs require assessment, it should do so with a rationale for the selections, and an explanation of how engagement informed them.

The proponent must describe how community and Indigenous knowledge was used to collect baseline data and assess economic effects and disaggregate the source of community and Indigenous knowledge by representation by gender, age and other community-relevant identity factors to support identification of disproportionate effects through the application of GBA+. In assessing effects to VCs listed below, the analysis should discuss circumstances in a community where diverse subgroups, because of their particular circumstances, could experience adverse effects from the designated project more severely than others, or be excluded from potential benefits, including Indigenous peoples or other community relevant subgroups (e.g., women, youth, elders).

The assessment of economic effects should take into consideration the temporal scale for construction, operation and beyond, to assess the potential for, and avoidance of, boom-and-bust cycles potentially associated with the project.

Of note, economic effects might extend over a larger geographic area than most other effects. For example, road construction affects not only the communities on the actual road, but also every community connected to the same regional road network. In some, but not all, cases, local economic effects may be smaller than regional economic effects: for example, a project could create several hundred local jobs, while improving business conditions for thousands of people elsewhere in the region.

18.1 Labour Market

The Impact Statement must:

- describe the effect of the project on the local and regional labour markets, including
 - the number of new jobs (for each stage of the project), and the expected rates of pay, and a GBA+ analysis of these effects;

- longer-term labour market local and regional labour market impacts as a result of the project.
- describe any skills-matching issues related to the project, including
 - whether there is a sufficient number of local workers with sufficient technical skills;
 - if not, whether the project will require workers from outside the region;
 - skills training and education opportunities as a result of the project.

18.2 Housing and Consumer Prices

The Impact Statement must:

- describe the effect of the project on the local housing market, both during the construction and operation phases;
- describe the effect of the project on availability of goods and services and consumer prices, in particular for
 - food;
 - fuel; and
 - electricity.

18.3 Business Environment

The Impact Statement must:

- describe the potential positive and negative effect of the project on local and regional businesses, during both construction and operation phases of the project, including
 - procurement and contracting opportunities; and,
 - an estimate of potential effects of the project on the traditional economy, including the potential loss of traditional economies and jobs.

18.4 Infrastructure

The Impact Statement must:

- describe the impact on infrastructure, including:
 - the extent of new road to be built, the number of connections to existing roads, the effect on travel times, and the additional traffic due to the replacement of winter roads;
 - effects on levels of traffic and road safety;

- whether the project will result in, or facilitate the construction of other infrastructure (such as railways, airports, power plants, transmission lines, pipelines, dams, water mains, sewage lines, etc.); and
- whether the project will damage any existing infrastructure (same categories as above), how quickly this will be repaired, and how much the proponent will contribute to the repair cost.
- describe how the project will affect the local/regional energy system, including
 - how power will be provided during the construction phase;
 - once complete, how much power the project is likely to use; and
 - whether the project will improve, or could improve, the local energy transmission system (e.g., by facilitating new transmission lines, by making it easier for repair crews to access the area, etc.).

18.5 Public Finances

The Impact Statement must:

- describe the project's effect on local/municipal, provincial/territorial, federal, and Indigenous group public finances, including:
 - revenue from tax levies, royalties, revenue sharing and other means, and how this could vary over time; and
 - the cost of any public contribution, subsidies or tax incentives to support the project.

18.6 Overall Economic Impact

The Impact Statement must:

- describe the project's impact and consistency with any existing local or regional plans for
 - economic development;
 - energy production;
 - transportation and utilities corridors (including community airports and winter roads);
 - residential land use;
 - commercial zoning;
 - forestry and logging operations;
 - commercial outfitters; and
 - other land uses.

- provide a description of the extent to which the project will facilitate developments, including mining projects, in the area;
- provide an estimate and description of the project’s direct, indirect, and induced economic impact, such as
 - any measurable impact on provincial/territorial GDP; and
 - increased consumer spending.
- provide the sources and methodologies used for developing multipliers and estimates to calculate the figures above.

Where a generic multiplier may not accurately reflect the specific situation of the project being assessed, evidence should be provided of specific economic activity that will result from the project going ahead.

19. EFFECTS TO INDIGENOUS PEOPLES AND IMPACTS TO THE EXERCISE OF ABORIGINAL AND TREATY RIGHTS

The proponent must engage with their community and other Indigenous groups, in order to identify and understand the potential impacts of their projects on Indigenous peoples, and to include Indigenous knowledge into the impact assessment. Engagement with Indigenous groups is required to inform the impact assessment and identify measures to avoid or minimize potential impacts on Indigenous peoples 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. Engagement should involve ongoing information sharing and collaboration between the proponent and other Indigenous groups potentially affected by the project. This collaboration will help validate the assessment findings. The results of any engagement should be presented in the Impact Statement, and, as best as possible should reflect the perspective of the Indigenous peoples involved.

The proponent must provide an opportunity for Indigenous groups potentially impacted by the project to review the information prior to submission of the Impact Statement. The Impact Statement must indicate where input from Indigenous groups has been incorporated, including Indigenous knowledge. Information should be specific to the individual Indigenous group(s) involved in the assessment, and describe contextual information about the members within an Indigenous group (e.g., women, men, elders and youth).

Where Indigenous groups do not wish to participate, the proponent is encouraged to continue sharing information and analysis with the Indigenous groups of the potential effects of the project,

and to use available public sources of information to support the assessment. The proponent must show that effort to engage with all Indigenous groups potentially impacted was made.

Requirements for engagement with Indigenous groups are discussed in further detail in section 6 of this document.

19.1 Effects to Indigenous Peoples

The Impact Statement should provide information on how the Project may impact Indigenous peoples, as informed by the Indigenous groups involved. Information on measures proposed to address adverse effects should also be provided, including the perspectives of Indigenous groups on potential mitigation measures. The proponent is encouraged to apply Agency guidance on engaging with Indigenous groups and appropriate methodologies for assessing effects and impacts on Indigenous peoples and their rights. Where not possible, the proponent should provide a rationale and show efforts made to engage with all Indigenous groups.

The potential effects, to consider assessing include both adverse and positive effects to the current use of land and resources for traditional purposes, physical and cultural heritage, and environmental, health, social and economic conditions of Indigenous peoples impacted by the designated project, including interferences of the project with the following:

- quantity and quality of resources available for harvesting (e.g., species of cultural importance including effect on migration paths of the Woodland Caribou herds in the area, traditional and medicinal plants);
- access to culturally important harvesting areas or resources of importance;
- experiences of being on the land, including ability to pass on Indigenous knowledge and language (e.g., impacted from: changes in air quality, noise exposure, effects of vibrations from blasting and other activities);
- current and future availability and quality of country foods (traditional foods);
- the use of travel ways, navigable waterways and water bodies;
- commercial and non-commercial fishing, hunting, trapping and gathering and cultural or ceremonial activities and practices;
- commercial, non-commercial and trade economies; and,
- cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance to groups, including, but not limited to:
 - the loss or destruction of physical and cultural heritage;
 - changes to access to physical and cultural heritage;

- changes to the cultural value, spirituality, or importance associated with physical and cultural heritage;
- sacred, ceremonial or culturally important places, objects, or things, including languages, stories and traditions; and
- visual aesthetics over the life of the project and post-project abandonment or decommissioning.

As a best practice, proponents are encouraged to also include the following:

- a description of plans to encourage employment, procurement and contracting opportunities for Indigenous peoples and communities, including training plans (disaggregated by gender, at a minimum);
- a description of the timeframe for the employment or opportunity (e.g boom and bust activities; indigenous people typically only get short-term jobs) how long such opportunities will be available, types of jobs available;
- inter-generational impacts of the project on community members, including future economic opportunities associated with the project;
- impacts on the baseline social and health conditions of Indigenous groups;
- an estimate of the anticipated levels of Indigenous economic participation in the project in comparison to the total project requirements (e.g., number of workers, disaggregation by gender and age);
- a description of any plans for cultural sensitivity training for non-Indigenous employees to promote a safe work environment that supports the well-being of Indigenous employees;
- a description of any plans for cultural competence training for non-Indigenous employees to ensure a respectful professional relationship with Indigenous businesses;
- a description of how Indigenous knowledge was used in assessing environmental, health, social and economic effects to Indigenous peoples, groups and communities;
- a description of inter-generational impacts of the project on community members, including by future economic opportunities associated with the project;
- a description of impacts on the baseline social and health conditions of Indigenous groups in the community; and
- above information disaggregated by sex, age, and other community relevant identify factors to support GBA+ analysis;

19.2 Impacts to the Exercise of Aboriginal and Treaty rights of Indigenous peoples

The Impact Statement should describe the level of engagement with Indigenous groups regarding potential impacts of the project on the exercise of rights, and where possible, the project's potential interference with the exercise of rights. Where an Indigenous group has not provided this information 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 Government of Canada, the proponent should describe a rationale for the approach taken. Proponents are encouraged to discuss with Indigenous groups their views on how best to reflect the assessment of impacts on rights in their Impact Statement. This may include supporting Indigenous-led studies that are to be provided publicly and to the Government of Canada.

For more information on identifying and assessing impacts on the exercise of rights, please see: the *Interim Guidance on Assessing Potential Impacts on the Rights of Indigenous Peoples under the Impact Assessment Act*.

The proponent and Indigenous groups may consider:

- how the project may contribute cumulatively to any existing impacts on the exercise of rights, as identified by the Indigenous groups;
- the interference of the project on the quality and quantity of resources available for the exercise of rights;
- the interference of the project on the access to areas important to the exercise of rights;
- the interference of the project on the experience associated with the exercise of rights;
- the interference of the project on Indigenous traditions, laws and governance; and,
- the severity of the impacts on the exercise of rights, as identified by the Indigenous groups,

Proponents are encouraged to work together with Indigenous groups to find mutually agreeable solutions to concerns raised about a proposed project, especially for those concerns raised by Indigenous peoples about impacts on the exercise of their rights. The Impact Statement should detail:

- any measures identified in an attempt to avoid, minimize, offset or otherwise address potential adverse impacts of the project on the rights of Indigenous peoples;
- where measures are proposed by Indigenous groups, the proponent should respond with its intent to implement them, as appropriate; and,

- with respect to mitigation measures proposed by the proponent, the Impact Statement should include perspectives of the potentially impacted Indigenous groups, on the effectiveness of particular mitigation measures on such impacts.

Where no mitigation measures are proposed or mitigation is not possible, the Impact Statement should identify potential level of severity of the adverse impacts on the rights of Indigenous peoples, as identified by the Indigenous group(s).

Mitigation measure are further discussed in section 20.

20. MITIGATION AND ENHANCEMENT MEASURES

Every IA conducted under IAA must identify measures that are technically and economically feasible and that would mitigate any adverse environmental, health, social and economic effects of the designated project. Conversely, the proponent must identify enhancement measures to increase positive effects. Under IAA, mitigation measures include 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, compensation or other means. Measures to enhance positive project effects may include skills training, local procurement strategies, investments in community infrastructure (e.g., roads, services). Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation.

Mitigation and enhancement measures that are proposed are discussed during the review of the Impact Statement and may be modified as a result of the review. Mitigation and enhancement measures may be considered for inclusion as conditions in the IA decision statement. If there is an ongoing or completed regional assessment in the proposed project area, the proponent should use the information generated through that process to inform possible mitigation and enhancement measures.

As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the adverse effects at the source. The proponent must engage with Indigenous groups when developing mitigation measures. The proponent is also 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. The Impact Statement must:

- describe the 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 regardless of location as well as any new or innovative mitigation measures being proposed;

- In relation to Birds:
 - To avoid harm to migratory birds, clearing and construction should be conducted outside of the core breeding period. Follow ECCC guidance for avoiding harm: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds.html>;
 - For nesting periods see <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html>;
 - It should be noted that these dates cover the core period for nesting activity of migratory birds, reducing the risk of taking a nest or eggs of a migratory bird. This recommendation does not authorize the disturbance, destruction, or take of a migratory bird, its nest, or its eggs outside of these date ranges.
- In relation to Bats:
 - Follow decontamination protocols for White-nose Syndrome. Canadian Wildlife Health Cooperative²¹;
 - Apply appropriate mitigation measures, such as timing windows and setbacks, to all areas with potential roosting habitat, unless each structure is individually assessed and verified to not be used for roosting:
 - Employ a setback distance of 120m;
 - Timing window: Clearing of trees considered bat habitat should only occur outside of the window between April 30 and September 1;
- In relation to Caribou:
 - The following provincial guidance documents should be followed:

²¹ http://www.cwhc-rcsf.ca/docs/WNS_Decontamination_Protocol-Nov2016.pdf

- Best Management Practices for Renewable Energy, Energy Infrastructure and Energy Transmission Activities and Woodland Caribou in Ontario²²;
 - Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits²³;
- describe the Sediment and Erosion Control Plan, including the proposed mitigation measures and their effectiveness on the contaminants of concern;
- describe the designated project’s environmental protection plan and its environmental management system through which the proponent will deliver this plan. The plan must provide an overall perspective on how potentially adverse effects would be minimized and managed over time;
- discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs;
- describe mitigation measures that are specific to each environmental, health, social or economic effect identified. Mitigation measures are to be written as specific commitments that clearly describe when and how the proponent intends to implement them, what decision-making criteria will be used, and the outcome these mitigation measure are designed to address;
- assess impacts of each potential route option for impacts to VCs and provide a quantitative comparison;
- in addition to mitigation measures related to the impacts of the road itself, include mitigation/decommissioning plan for access roads and other temporary sites as well as the existing winter road (if it will no longer used);
- include measures to address sensory disturbance and the resulting functional loss of habitat;
- include measures to prevent the road from being a conduit for the spread of invasive species such as European Common Reed (*Phragmites australis*)

²² https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_bmp_ener_car_en.pdf

²³ https://files.ontario.ca/environment-and-energy/species-at-risk/stdprod_093115.pdf

- describe measures to be used for stockpiling all stripped peat for use during site reclamation, or describe the plan for stockpiling stripped peat and mitigate effects related to its long term stockpiling or removal;
- describe mitigation measures that are specific to identified effects to Indigenous peoples;
- identify and describe mitigation measures, including alternative means of carrying out the project that would avoid or lessen potential adverse effects to terrestrial and aquatic species and/or critical habitat listed under Schedule 1 of the *Species at Risk Act*, including but not limited to woodland caribou and lake sturgeon. These measures:
 - are to be consistent with any applicable recovery strategy, action plan or management plan and will also identify and describe mitigation measures to avoid or lessen adverse effects to COSEWIC-assessed species; and
 - must be described in terms of the effectiveness of each measure to avoid the adverse effect and include a comprehensive science-based rationale for proposing the selected mitigation measures.
- identify measures to prevent and mitigate the risk of engaging in harmful, destructive or disruptive activities in key sensitive periods and locations (e.g., breeding bird season, migration and nesting) to migratory birds, their nests and eggs, in areas frequented migratory birds;
- identify measures to prevent and mitigate the risk of engaging in activities that cause harmful alteration, disruption or destruction in key sensitive periods and locations (e.g., spawning) for fish;
- identify measures to prevent and mitigate the risk of engaging in harmful, destructive or disruptive activities in key sensitive periods and locations (e.g., hunting season) to wildlife and wildlife habitat;
- identify measures to avoid the deposit of substances harmful to fish or migratory birds in water or areas frequented by fish and/or migratory birds;
- identify opportunities to involve Indigenous groups in monitoring activities during the construction and operations phases to mitigate effects on traditional activities.
- provide best technically and economically feasible mitigation approaches to habitat mitigation that follow the hierarchy:
 - avoid potential impact;
 - minimize potential impact;

- provide biodiversity offsets to address any residual adverse environmental effects that cannot be avoided or sufficiently minimized; and
- provide justification for moving from one mitigation alternative to the next.
- In relation to Wetlands:
 - Demonstrate what efforts have been made to avoid and minimize impacts on wetlands, and that the mitigation hierarchy has been followed;
 - Explain why alternative locations or means to carry out the project, or alternatives to the project were not possible, and how impacts to the wetlands will be minimized;
 - Explain how avoidance was considered as the first option and how it can be achieved by identifying alternate means of carrying out the project (e.g., project location or design) and by considering alternatives to the project;
 - Explain how minimization can be achieved through project modification or implementation under special conditions after alternative means to the project have been considered. Describe how the following were considered:
 - Standard procedures and techniques if available for sector or jurisdiction.
 - Procedures and techniques based on sound ecological principles and the best science available.
 - Proven measures over new or experimental techniques.
 - Minimization techniques that take natural succession into account, and should provide for environmental variability over time.
 - Compensation for any residual effect that couldn't be minimized through the following order: restoration, enhancement of existing wetlands, or creation of new wetlands.
 - Evidence that functions can be replaced by the proposed offset activities.
- In relation to Birds:
 - Specifically address mitigation of impacts to eskers and related features rich in aggregate material, as these features are likely to be strongly impacted, to a degree much higher than their prevalence on the landscape. Describe, at a landscape scale rather than a single assessment of multiple hectares, how these measures address this uncommon high value landcover for forest birds during migration and breeding.
 - Describe the cumulative effects of development on this type of landscape
- In relation to Bats:
 - Describe the effectiveness of different mitigation options taking into consideration the configuration of resources in the environment, and how local bat populations are using these resources. Describe how bat behavior (differentiated by species) was taken into account by considering the geographic location and time-period.

- At a minimum, the following mitigation should be applied:
 - Spatial avoidance (setbacks):
 - 120 metre is recommended; for tree roosts, apply setbacks to the entire maternity roost complex and for hibernacula apply setback to entire underground cave/mine network.
 - Temporal avoidance (timing of disturbance, roost destruction or exclusion):
 - Avoid disturbance, destruction and exclusion between April 30 – September 1.
 - Underpasses and wildlife bridges:
 - Incorporate wildlife-friendly road design principles and features.
 - Include bat monitoring at these sites to estimate mortality.
 - Manage vegetation at bridges and other commuting corridors that intersect highways:
 - manage vegetation height and tree canopy height so that it is not in line with the height of traffic.
 - Include bat monitoring at bridges and identified bat commuting corridor locations to estimate mortality.
 - Lighting:
 - Avoid or minimize the use of artificial light in bat habitats.
 - Select lower intensity lighting.
 - Use lighting fixtures that restrict or focus illumination to target areas.
 - Avoid lights that emit blue/green/white/UV wavelengths.
 - Other compensation (offsets / tradeoffs)
- In relation to Caribou:
 - Demonstrate that avoidance and minimization measures 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; a description of how these alternatives means have been considered; and a rationale to confirm that the best solution has been adopted to address 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.
 - Minimize the footprint of development and consider locations where habitat is already disturbed; restore habitat to provide availability of undisturbed habitat over time.

- Avoid destruction of biophysical attributes (see Appendix H of the recovery strategy²⁴).
 - Mitigate noise, light, smell, vibration.
 - Develop an access management plan.
 - Use techniques to prevent use of the corridor by predators;
- provide offsetting or compensation plans to address all residual effects to species at risk, and their critical habitat, migratory birds, fish and fish habitat and/or wetland functions (if applicable) for review during the IA process; the plans should:
 - describe the baseline condition of the species at risk, critical habitat, migratory birds and wetland functions potentially impacted by the designated project;
 - apply the mitigation hierarchy;
 - identify and describe residual effects;
 - identify a compensation ratio with rationale, including how any policies or guidance provided by FAs, provincial authorities and Indigenous groups have been considered;
 - identify the location and timing of implementation of compensation projects (where feasible);
 - identify and describe the success criteria;
 - identify and detail non-habitat measures;
 - describe how the proposed measures align with published provincial and federal recovery, management, or action plans and strategies for species at risk;
 - identify the parties responsible for implementation, including monitoring and review;
 - identify indicator species for setting compensation objectives. Identification should be based baseline data, Bird Conservation Strategies, and other information where available (note: species at risk should not be used as indicator species; compensation efforts need to be directed specifically to these species);
 - describe the functions gained at the compensation site(s);
 - provide evidence that functions can be replaced by the proposed offset activities;

²⁴ <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-2019.html>

- describe the process of selecting proposed compensation site(s) and associated baseline condition(s); and
- provide a description of the monitoring schedule and activities to be completed to monitor the success of compensation activities.
- if offsets are required to address residual impacts, the following guidance should be used: <https://www.canada.ca/en/environment-climate-change/services/sustainable-development/publications/operational-framework-use-conservation-allowances.html>;
- In relation to designing offsets for Wetlands:
 - Indicate if it isn't possible to compensate for lost functions in cases where wetlands are unique, or have habitat functions that support large proportions of migratory birds, or provide habitat required by species at risk, and take that into account when designing offsets;
 - Use a minimum ratio of 2:1 of area of wetland restored/created to original wetland area;
 - Clearly indicate the amount of wetlands (location, extent) for which residual effects should be addressed through offset measures;
 - Prioritize restoration of drained or altered naturally occurring wetlands of the same type and function as those impacted. Restored wetlands are preferred over enhanced wetlands, both of which are preferred over newly created wetlands;
 - Compensate lost wetland functions on-site if site conditions are suitable for wetland functions. Second preference is in the same watershed from which they were lost. Third preference is in the same ecosystem from which they were lost;
 - Incorporate compensation measures to minimize the time lag in availability of habitat and functions between when the adverse effects occur to when they have been fully replaced.
- In relation to Species at Risk:
 - See Template 2 in the proposed Species at Risk Act Permitting Policy for guidance on preparing an offsetting plan²⁵;

²⁵ https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/policies-guidelines/proposed-policy-2016.html#_6

- specify the actions, works, minimal disturbance footprint techniques, best available technology, best environmental practices, corrective measures or additions planned during the project's various phases to eliminate or reduce adverse effects;
- describe measures included in the design of the project to mitigate its GHG emissions. These could include design decisions such as the use of low-emitting technologies, the use of low-carbon or renewable fuel or carbon capture and storage;
- describe practices that will be taken to mitigate the project's GHG emissions, such as anti-idling practices for mobile equipment, or continuous monitoring systems;
- describe information on habitat banks or any habitat credits that have been or will be obtained, including the regime that issued them, project type, project start date and vintage year. Proponents may also provide information on their intent to acquire or generate international habitat credits;
- Provide an assessment of the likely effectiveness of the proposed technically and economically feasible mitigation measures and describe all relevant uncertainties on the effectiveness of the measures;
 - describe all relevant uncertainties on the effectiveness of the measures to address the project residual adverse effects;
 - 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;
 - assess any potentially adverse environmental effects associated with the mitigation method itself;
 - identify and describe the use and application of best available technology and best environmental practice, including its effectiveness on the contaminants of concern, to prevent adverse effects on the receiving environment in identifying, assessing and implementing mitigation measures, other than for GHG reduction purposes;
 - describe the measures included throughout all phases of the project to mitigate GHG emissions. These could include design decisions such as the use of low-emitting technologies, the use of low-carbon renewable fuel, and electrification;
 - describe the practices that will be taken to mitigate the project's GHG emissions, such as anti-idling practices for mobile equipment, leak detection and repair systems, continuous monitoring systems, or fleet optimization, as appropriate;

- identify the party responsible for the implementation of mitigation measures and the system of accountability;
- where appropriate, provide details regarding financial liability and compensation in place as required by regulation or company commitment in relation to decommissioning or abandonment;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on vulnerable populations, and 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;
- document specific suggestions raised by each Indigenous group for avoiding, mitigating or otherwise accommodating the project’s environmental, health, social and economic effects, including potential effects and impacts on Indigenous peoples and:
 - for those mitigation measures intended to address effects of changes to the environmental, health, social and economic conditions of Indigenous peoples or impacts on rights of Indigenous peoples, provide a description of the consultation with Indigenous groups regarding the residual effects; 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;
- describe supplier development initiatives, including identification of potential local suppliers, providing them with information about technical, commercial and other requirements, and debriefing unsuccessful bidders.
- describe any procurement policies (e.g., bid packaging) that facilitate the opportunities for local companies.
- describe education, training, hiring practices that encourage employment of local people;
- describe technology transfer and research and development programs that will facilitate the use of local suppliers of goods and services, local employees, develop new capabilities related to project requirements; and
- describe how disproportionate effects that were identified in the GBA+ results were used to inform mitigation and enhancement measures.

Where mitigation measures for which there is little experience or for which there is some question as to their effectiveness are proposed to be implemented, the potential risks and effects should those measures not be effective must be clearly and concisely described. In addition, the Impact Statement must identify the extent to which technological innovations may help mitigate effects. Where possible, it will provide detailed information on the nature of these measures, their implementation, management and the requirements of the follow-up program.

21. RESIDUAL EFFECTS

After considering the consequences of technically and economically feasible mitigation measures, the Impact Statement must describe any residual environmental, health, social or economic effects of the designated project and whether those effects would occur in the local or regional study area. This includes consideration of both positive and negative effects of the project and input received from the public, Indigenous groups, lifecycle regulators, jurisdictions, federal authorities (FAs) and other interested parties. If an Indigenous group identifies that there are residual effects to rights or interests, those effects should be carried through for residual effects analysis. Where appropriate, information regarding residual effects should be disaggregated by sex, gender, age and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups as per the GBA+.

Proponents must describe the extent to which residual effects are adverse. Where relevant, or where best practice or evidence-based thresholds exist, effects should be described using criteria to quantify adverse effects. This includes criteria such as whether the effects are high or low in magnitude, the geographical extent, timing, frequency, duration and reversibility of the effects, taking into account any important contextual factors. Where the potential for human health effects exist due to exposure to a particular contaminant at any level (e.g., non-threshold air pollutants), mitigation measures should aim to reduce the residual effects to as low as reasonably achievable.

In addition, effects should be characterized using language most appropriate for the effect (for example, impacts on the rights of Indigenous peoples and social effects may be described differently from biophysical effects). The description of the effect can be either qualitative or quantitative. It may be more appropriate for other effects to be described using other criteria, such as the nature of the effects, directionality, causation and probability.

Impacts may affect the communities and stakeholders in different ways, and therefore they may respond differently to them. Characterizing effects should be based largely on the level of concern expressed through engaging with the affected Indigenous groups and community members. There are tools that can assist with these predictions and analyses, including multi-criteria analysis, risk assessment and modelling, in addition to seeking out expert and stakeholder input.

The Impact Statement must:

- characterize the residual effects using criteria most appropriate for the effect;
- where applicable, consideration should be given to the following criteria for residual effects:
 - magnitude;
 - geographic extent;
 - timing;
 - duration;
 - frequency;
 - reversibility; and
 - the ecological, health, social and economic context within which potential effects may occur should be taken into account when considering the criteria above.
- provide the rationale for the choice of criteria used to determine the extent to which the predicted effects are adverse. The information provided must be clear and sufficient to enable the Agency, review panel, technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of effects;
- describe any differential effects as per GBA+ (e.g., is the effect more severe for some groups than others)
- consider the views of the Indigenous groups and the public in assigning the criteria to be used and in characterizing the effects; and
- set out the probability or likelihood of that effect occurring and describe the degree of scientific uncertainty related to the data and methods used within the framework of this analysis.

In relation to valued components discussed in sections 14.3, 15.2, 15.3 and 15.4 of this document, the following methodology for characterizing impacts meets the expected criteria²⁶:

Scope (extent): Most commonly defined spatially as the proportion of the VC within the study areas that can reasonably be expected to be affected by the impact within ten years. For ecosystems and

²⁶ The assessment of residual effects on valued components discussed in sections 14.3, 15.2, 15.3 and 15.4 of this document should follow the text above, which was adapted from NatureServe Conservation Status Assessments: Factors for Evaluating Species and Ecosystem Risk. https://www.natureserve.org/sites/default/files/publications/files/natureserveconservationstatusfactors_apr12_1.pdf

ecological communities, measured as the proportion of the VC's occurrence. For species, measured as the proportion of the VC's population.

- Pervasive: The impact is likely to be pervasive in its scope, affecting the VC across all or most (71 to 100 percent) of its occurrence/population.
- Large: The impact is likely to be widespread in its scope, affecting the VC across much (31 to 70 percent) of its occurrence/population.
- Restricted: The impact is likely to be restricted in its scope, affecting the VC across some (11 to 30 percent) of its occurrence/population.
- Small: The impact is likely to be very narrow in its scope, affecting the VC across a small proportion (1 to 10 percent) of its occurrence/population.

Severity: Within the scope, the level of damage to the VC from the impact that can reasonably be expected. For ecosystems and ecological communities, typically measured as the degree of destruction or degradation of the VC within the scope. For species, usually measured as the degree of reduction of the VC population within the scope.

- Extreme: Within the scope, the impact is likely to destroy or eliminate the VC, or reduce its population by 71 to 100 percent within ten years or three generations.
- Serious: Within the scope, the impact is likely to seriously degrade/reduce the VC or reduce its population by 31 to 70 percent within ten years or three generations.
- Moderate: Within the scope, the impact is likely to moderately degrade/reduce the VC or reduce its population by 11 to 30 percent within ten years or three generations.
- Slight: Within the scope, the impact is likely to only slightly degrade/reduce the VC or reduce its population by 1 to 10 percent within ten years or three generations

Irreversibility: The degree to which the effects of an impact can be reversed and the VC affected by the impact restored, if the impact no longer existed.

- 4 = Very High: The effects of the impact cannot be reversed and it is very unlikely the VC can be restored, and/or it would take more than 100 years to achieve this (e.g., wetlands converted to a shopping center).
- 3 = High: The effects of the impact can technically be reversed and the VC restored, but it is not practically affordable and/or it would take 21 to 100 years to achieve this (e.g., wetland converted to agriculture).
- 2 = Medium: The effects of the impact can be reversed and the VC restored with a reasonable commitment of resources and/or within 6 to 20 years (e.g., ditching and draining of wetland).

- 1 = Low: The effects of the impact are easily reversible and the VC can be easily restored at a relatively low cost and/or within 0 to 5 years (e.g., off-road vehicles trespassing in wetland).

Magnitude = scope x severity as below:

Severity	Irreversibility			
	Very High	High	Medium	Low
Very High	Very High	Very High	Very High	High
High	Very High	High	High	Medium
Medium	High	Medium	Medium	Low
Low	Medium	Low	Low	Low

Impact = magnitude x irreversibility:

Severity	Scope			
	Pervasive	Large	Restricted	Small
Extreme	Very High	High	Medium	Low
Serious	High	High	Medium	Low
Moderate	Medium	Medium	Medium	Low
Slight	Low	Low	Low	Low

22. CUMULATIVE EFFECTS ASSESSMENT

The proponent must identify and assess the designated project’s cumulative effects using the approach described in the Agency’s guidance documents related to cumulative environmental, health, social and economic effects. If there is an ongoing or completed regional assessment in the proposed project area, the proponent should use the information generated through that process to inform the cumulative effects assessment.

Cumulative effects are defined as changes to the environment, health, social and economic conditions as a result of the project's residual environmental, health, social and economic effects combined with the existence of other past, present and reasonably foreseeable physical activities, as well as within activities of the project itself from multiple emissions and discharges (e.g., simultaneous operations) to understand synergistic or additive effects. Cumulative effects may result if:

- the implementation of the project may cause direct residual adverse effects to the VC, taking into account the application of technically and economically feasible mitigation measures; and
- the same VC may be affected by other past, present and future physical activities.

A cumulative effect on an environmental, health, social or economic component may be important even if the project's effects to this component by themselves are minor. The tailoring process for developing TIS Guidelines identifies and prioritizes the list of VCs on which the cumulative effects assessment must focus and also substantiates the rationale for the final selection. Finalizing the choice of VCs and the appropriate boundaries, including potential transboundary areas, to assess cumulative effects, is informed and confirmed as part of the tailoring process through consultation with the public, Indigenous groups, lifecycle regulators, jurisdictions, federal authorities (FAs) and other interested parties.

The cumulative effects assessment must include consideration of cumulative effects to rights of Indigenous peoples and cultures, for all potentially impacted groups including those located in the Greenstone mineral belt which will be impacted by increased access to the region by exploration and mineral development projects. Both the content and means of presenting this information is to be developed in consultation with each potentially impacted Indigenous group. Proponents are encouraged to collaborate with Indigenous groups in the cumulative effects assessment. Where Indigenous groups do not wish to participate in the cumulative effects assessment with the proponent, the proponent is to share a preliminary draft of the cumulative effects assessment on an Indigenous group's rights and culture with them in order to receive feedback prior to submitting the Impact Statement to the Agency.

The Impact Statement must:

- identify and provide a rationale for the VCs that will constitute the focus of the cumulative effects assessment. The selected VCs are those most likely to be affected by the project in combination with other projects and activities;
- include a rationale to justify the exclusion of other VCs from the cumulative effects assessment, as applicable;

- identify and justify the spatial and temporal boundaries for the cumulative effect assessment for each VC selected. The boundaries for the cumulative effects assessments may differ for each VC considered and must not be constrained by jurisdictional boundaries:
 - The cumulative effects spatial boundaries will generally be larger than the boundaries for the project effects alone, and may extend beyond Canada’s jurisdiction; and
 - temporal boundaries must include an appropriate baseline and should look at all potential effects throughout the lifecycle of the project, including decommissioning and abandonment.
- assess cumulative effects using a hierarchy, with impacts to both local populations and large populations assessed;
- describe the methodology used to determine boundaries;
- refer to Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012, for more guidance on determining spatial boundaries: <https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-ceaa2012.html>
- In relation to Caribou:
 - assess cumulative impacts to caribou at the scale of the three project study areas (defined above), as well as the implicated Ontario caribou ranges, and the federal Far North caribou range;
- identify the sources of potential cumulative effects. Specify other projects or activities that have been or that are likely to be carried out that could cause effects to each selected VC within the boundaries defined, including potential induced effects, and whose effects would act in combination with the residual effects of the project. This assessment must consider the results of any relevant regional study conducted. At a minimum, the following projects or activities should be included in the cumulative effects assessment:
 - the Webequie Supply Road Project;
 - construction of upgrades to the Anaconda/Painter Lake Forestry Road;
 - the construction and operation of the Northern Road Link (proposed road linking the northern portion of the Marten Falls Community Access Road to the Ring of Fire area);
 - the Eagle’s Nest Mine;
 - mining activities associated with the following deposits: Black Thor, BlackBird, Big Daddy, Black Label;

- road use past Nakina, including transportation of ore to the proposed future Ferrochrome Production Facility in Sault Ste Marie, or to the smelter in Sudbury; and
- advanced mineral exploration activities in the Ring of Fire area.
- Past projects, including the Ogoki and Long Lac diversions;
- assess the cumulative effects to each VC selected by comparing the future scenarios with the project and without the project. Effects of past activities (activities that have been carried out) are to be used to contextualize the current state of the VC. This assessment must also assess the cumulative effects to rights of Indigenous peoples and their cultures, and effects to Ontario's largest caribou range (Missisa);
- describe the mitigation measures that are technically and economically feasible to eliminate or reduce adverse cumulative environmental, health, social and economic effects. The Impact Statement must:
 - describe and provide an assessment of the effectiveness of the measures applied to mitigate the cumulative effects;
 - In cases where measures to mitigate these effects are beyond the control of the proponent, the Impact Statement must 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; and
 - assess the implications of applying project-specific mitigation and enhancement measures within a regional context taking into account all reasonably foreseeable development of the area.
- describe and, where appropriate, quantify the level and severity of the adverse cumulative effects; and
- develop a follow-up program to verify the accuracy of the assessment or the effectiveness of mitigation measures for cumulative effects

23. OTHER EFFECTS TO CONSIDER

23.1 Effects of potential accidents and 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. The proponent must

therefore conduct a Hazard Identification and Risk Assessment of accidents and malfunctions across all phases of the Project, determine their potential effects, and present preliminary emergency response measures, systems, and associated response capacities.

The Impact Statement must:

- identify, taking into account the lifespan of different project components, and contributing and complicating factors such as weather or external events, potential accidents and malfunctions related to the project, and the potential for vandalism or sabotage, including an explanation of how those potential events were identified, potential consequences (including the environmental, health, social and economic effects), the plausible worst case scenarios for each major incident type and the unmitigated effects of these scenarios;
- plausible accident and malfunction response scenarios should be supported by environmental sensitivity mapping that identifies site-specific conditions and sensitive receptors that are situated adjacent to project activities, including shorelines, streams and wetland areas frequented by fish and/or by migratory birds, as well as likely pathways thereto;
- worst-case scenarios should account for the timing that coincides:
 - migration periods involving high concentrations of migratory birds;
 - nesting periods for migratory birds;
 - spawning periods for fish;
 - the presence of sensitive wildlife and/or seasonally-important habitat;
- 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;
- describe the magnitude and duration of project-related accident and/or malfunction, based on the worst-case scenarios and the more-likely but lower-consequence alternative scenarios, including a description of the quantity, mechanism, rate, form and characteristics of the contaminants, greenhouse gases and other materials likely to be released or spilled into the environment during these scenarios and any potentially adverse environmental, health, social or economic effect;
- describe the preventive measures and design safeguards that will be established to protect against such occurrences and the contingency and emergency response procedures that would be put in place if such events do occur;

- describe the expected effectiveness of the response measures and systems;
- assess the potential for minor and major accidental spills of fuel, or loss of containment of dangerous goods;
- where appropriate, provide an analysis of the potential environmental, health, social and economic effects of these discharges on aquatic and terrestrial environments and on human health within spatial boundaries described for the study area;
- describe existing emergency preparedness and response systems and existing arrangements and/or coordination with qualified response organizations in the spatial boundaries associated with the project;
- describe exercise and training regimes for emergency response;
- identify any critical infrastructure such as local drinking water treatment plants or facilities that may treat water sources impacted by the project and the capacity of the drinking water treatment plant or facilities to treat water sources impacted by an accidental release from the designated project during all project phases;
- describe the role of the proponent in the case of spill, collision, grounding or other accidents or malfunctions associated with the project;
- detail the equipment that will be available to be deployed to respond to spills;
- describe mutual aid agreements in place in the event that the incident exceeds the resources of the proponent and how these resources would be accessed;
- describe volunteer management plans;
- describe or provide for a waste management plan as it pertains to waste generated during an emergency response;
- where appropriate, provide details regarding financial liability and compensation in place as required by regulation or company commitment;
- describe Emergency Communications Plans that would provide emergency instructions to surrounding communities. Procedures should include a combination of urgent immediate actions, such as public notification of safety issues, shelter-in-place and evacuation directions, as well as longer term actions such as general website and hotlines, incident status updates, injured wildlife reporting, etc. as appropriate; and
- describe possible mitigation measures to deal with adverse environmental, health, social and economic effects resulting from accidents or malfunctions.

23.2 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 (e.g., earthquakes, flooding, drought, ice events, landslides, , erosion, subsidence, fire), could adversely affect the designated project and how this in turn could result in effects to the environment, health, social and economic conditions. These events are to be considered in different probability patterns (e.g., 5-year flood vs. 100-year flood) with consideration of how these may change under a range of potential future climate scenarios. The focus should be on credible external events that have a reasonable probability of occurrence and for which the resulting environmental effects could be major without careful management. The Impact Statement should also consider how effects of the environment on the project could have positive effects to the environment, health, social and economic conditions.

The Impact Statement must:

- provide details of planning, design and construction strategies intended to minimize the potential adverse effects of the environment on the project;
- identify any areas of potential wind or water erosion, slumps and slope instability, and geologic movements;
- describe any mitigation measures that can be implemented in anticipation or in preparation for effects of the environment on the project;
- describe possible mitigation measures to deal with adverse environmental, health, social and economic effects resulting from effects of the environment on the project;
- identify the project's sensitivities/vulnerabilities to change in climate (both in mean conditions and extremes such as short-duration heavy precipitation events), describe climate resilience of the project and how climate change impacts have been incorporated into the project design (e.g., water crossings) and planning over the lifetime of the project and describe the climate data, projections used, and related information used to evaluate these sensitivities (i.e., risks) over the full project lifetime (additional guidance related to conducting climate change resilience assessments is included in the draft Strategic Assessment of Climate Change developed by Environment and Climate Change Canada);
- describe any identified trends in meteorological events, weather patterns, or physical changes to the environment that are anticipated to result from climate change, and incorporate this information in a risk assessment as contributing and complicating factors for possible accidents and malfunctions. Provide mitigation measures (both passive and active) that the proponent is prepared to undertake in order to minimize the frequency, severity and consequences of such projected effects; and

- describe measures to enhance positive environmental, health, social and economic effects resulting from effects of the environment on the project.

Additional guidance related to conducting climate change resilience assessments is included in the draft Strategic Assessment of Climate Change developed by Environment and Climate Change Canada.

24. CANADA’S ABILITY TO MEET ITS ENVIRONMENTAL OBLIGATIONS AND ITS CLIMATE CHANGE COMMITMENTS

The Government of Canada, through IAA, recognizes that IA contributes to Canada’s understanding and ability to meet, first, its environmental obligations, and second, its commitments in respect of climate change.

To inform the factors to consider described in paragraph 22(1)(i) of IAA, the Impact Statement should describe the effects of the project in the context of environmental obligations, with a focus on Government of Canada obligations and commitments relevant to decision-making. For support on this section, the proponent should refer to Agency guidance on this topic.

The relevant environmental obligations identified for this project include the:

- (1) Convention on Biological Diversity as implemented in part through the Species at Risk Act, including
 - a. Recovery Strategies and Action Plans developed under the Species at Risk Act for all species at risk potentially affected by the project. Of particular importance is the “2019 Proposed Amended Recovery Strategy for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada” Far North range (and the Nipigon range for Marten Falls), and smaller ranges within that range as identified by the Province of Ontario.
- (2) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar), as implemented in part through the *Federal Policy on Wetland Conservation* (1991).²⁷
- (3) Convention for the Protection of Migratory Birds in the United States and Canada, as implemented in part through the Migratory Birds Convention Act (1994).

When taking into consideration the list above, the Impact Statement should describe:

²⁷ <http://publications.gc.ca/collections/Collection/CW66-116-1991E.pdf>

- a) How the project's effects (including contribution to cumulative effects) may contribute to Canada's ability to meet these obligations (e.g., foster biodiversity); and
- b) How the project's effects (including contribution to cumulative effects) may hinder Canada's ability to meet these obligations (e.g., decrease biodiversity).

Where the project may contribute to Canada's ability to meet these obligations/commitments, the Impact Statement should describe plans to ensure that positive contributions are met. Likewise, where the project may hinder Canada's ability to meet these obligations/commitments, the Impact Statement should describe how the project will mitigate these potential impacts, including management plans, risk assessments, and relevant follow-up and monitoring activities. Where relevant, the Impact Statement should include expected indicators and data collection methods to support the plans outlined above.

In addition to presenting the proponent's views, the Impact Statement should include how community and Indigenous knowledge may be incorporated in assessing whether the project presents a contribution or a hindrance to meeting these obligations/commitments.

25. DESCRIPTION OF THE PROJECT'S CONTRIBUTIONS TO SUSTAINABILITY

Sustainability, as defined in IAA, "...means 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".

As part of the planning phase, the public, Indigenous groups and stakeholders will be engaged to identify key issues of importance to them. This engagement will help identify the elements that will frame the assessment of the project's contribution to sustainability. When assessing a project's contribution to sustainability, practitioners should consider those VCs that participants characterize as important. Sustainability is contextual and project dependent; as such, it may be defined differently by communities, or even groups within communities. Furthermore, practitioners should also consider VCs:

- that could experience long-term effects;
- that may interact with other VCs;
- that are relevant to Indigenous groups;
- that may interact with potential effects of the designated project; or
- that may interact with project activities.

The Impact Statement must characterize a project's contribution to sustainability. The Impact Statement should describe the context of a particular project, including the issues of importance to participants, the diversity of views expressed and the selection of VCs.

Once the analysis on potential effects of a project is conducted, the sustainability principles should be applied:

- *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 designated project; and*
- *Apply the precautionary principle by considering uncertainty and risk of irreversible harm.*

The Impact Statement must describe how sustainability principles were applied (outlined above) and identify conclusions drawn from this analysis. This summary should be qualitative in nature, but may draw on quantitative data as necessary.

In addition, the Impact Statement must:

- indicate how the planning and design of the project, in all phases, considers the sustainability principles;
- describe the process in selecting the preferred alternative means and alternatives to the project and how the sustainability principles were considered;
- indicate how monitoring, management and reporting systems consider the sustainability principles and attempt to ensure continuous progress towards sustainability;
- describe the ecological, health, social and economic benefits of the project to local communities within the study area, potentially affected Indigenous groups, regional, provincial, territorial and/or federal governments; and
- describe engagement with potentially affected Indigenous groups and describe measures and commitments to ensuring the sustainability of Indigenous livelihood, traditional use, culture and well-being.

The proponent should refer to Agency guidance on this topic.

26. FOLLOW-UP PROGRAMS

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. This information may be used to determine whether additional actions are necessary (adaptive management) to address unanticipated outcomes. Adaptive management is not considered as a mitigation measure; it is a best management practice in environmental management. If the follow-up program indicates that corrective action is required, the proposed approach for managing the action must be identified and implemented. The follow-up program will explain the uncertainty of the effects outcomes and whether it is related to the IA predictions or the effectiveness of mitigation measures.

Follow-up programs are an opportunity to continue engaging with impacted Indigenous groups, and if undertaken collaboratively, can support solutions-oriented approaches to adaptive management through the early identification of issues in follow-up programs and appropriate solutions with Indigenous knowledge. If there is an ongoing or completed regional assessment in the proposed project area, the proponent should use the information generated through that process to inform considerations for a follow up program. Follow-up program timing should take into account future activities that will use project infrastructure.

Considerations for developing a follow-up program for environmental, health, social or economic effects, as applicable, include:

- VCs identified during the IA for which residual adverse effects are predicted or uncertain;
- the nature of concerns raised by the public and Indigenous groups about the project;
- suggestions from Indigenous groups and local communities regarding the design of, and involvement in, follow-up and monitoring programs;
- incorporation of community and Indigenous knowledge, where available;
- the accuracy of predictions;
- an evaluation of the effectiveness of mitigation measures;
- the efficacy of new or unproven techniques and technology;
- disproportionate effects highlighted by GBA+;
- the nature of cumulative effects;
- the nature, scale and complexity of the program;
- the degree of uncertainty about the effectiveness of proposed mitigation measures;
- any technically and economically feasible measures to manage effects if the applied mitigation measures do not work as intended;
- whether there was limited scientific knowledge about the effects in the IA;

- which parties will participate in the conduct of the follow-up program and reviewing its results;
- the duration of the follow-up program activities, which may vary depending on the VCs assessed and the future activities in the region that will utilize project infrastructure; any existing follow-up or monitoring programs relevant to the proposed project;
- how the results of the follow-up program will be shared with interested parties; and
- triggers for adaptive management of any unacceptable or unexpected results.

Monitoring is a key component of effective follow-up programs. Monitoring can identify the potential for environmental, health, social or economic degradation during all phases of project development. Monitoring, as well, can assist in developing clearly defined action plans and emergency response procedures to account for environmental, health, social economic protection and human safety.

26.1 Follow-up program framework

The duration of the follow-up program shall be as long as required to verify the accuracy of the environmental, health, social and economic impacts predicted during the IA and to evaluate the effectiveness of the mitigation measures.

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

- objectives of the follow-up program and the VCs targeted by the program;
- list of elements requiring follow-up;
- number of follow-up studies planned, as well as their main characteristics (list of parameters to be measured, planned implementation timetable, etc.);
- intervention mechanism used in the event that an unexpected deterioration of the environment or impacts on rights of Indigenous peoples and cultures is observed or experienced;
- mechanism to disseminate follow-up results among the concerned interested parties;
- accessibility and sharing of data for the general population;
- opportunity for the proponent to include the participation of Indigenous groups and stakeholders on the affected territory during the development and implementation of the program; and
- involvement of local and regional Indigenous organizations in the follow-up program design and implementation, evaluation of the follow-up results, as well as any updates, including a communication mechanism between these organizations and the proponent.

26.2 Follow-up program monitoring

The Impact Statement must describe the environmental, health, social and economic monitoring to be established, as part of the follow-up program.

Specifically, the Impact Statement must present an outline of the preliminary environmental, health, social and economic monitoring program, including, but not limited to the:

- identification of the monitoring activities that pose risks to the environmental, health, social and economic conditions and/or VCs and the measures and means planned to protect these conditions;
- identification of regulatory instruments that include a monitoring requirement for the VCs;
- identification of those positions accountable and responsible for monitoring and ensuring compliance;
- description of the methodology for tracking environmental, health, social and economic issues;
- similar guidance and methodologies should be applied to follow up monitoring as are applied to establishing baseline conditions;
- post construction monitoring surveys should be undertaken for:
 - Ongoing monitoring of project and control sites to evaluate whether there are changes in the bat community following project construction; and
 - evaluating the effectiveness of applied mitigation;
- description of the methodology and mechanism for monitoring the effectiveness of mitigation and reclamation;
- In relation to Wetlands:
 - monitor all reclamation plantings biannually (i.e., late spring and fall) during consecutive years, and undertake supplementary planting, as necessary, until the vegetation cover becomes established and continues to grow without further intervention;
 - monitor post-construction impacts to wetland functions. A program to monitor wetland functions should be designed in such a way as to ensure that the type and amount of each wetland function would be considered individually in determining recovery success and that each wetland function would be recovered to at least the same type and amount of function as assessed during baseline.
- In relation to Caribou:

- monitor effects on boreal caribou and their critical habitat to verify EA predictions, ensure that mitigation measures are effective, and determine whether any unanticipated effects are occurring within the project area;
 - monitoring methods should follow standardized/established methods and include a robust before-after-control-impact design (or similar field-based approach) to allow for quantitative assessment of potential impacts of the project and identify any adaptive management that may be necessary;
 - the methodology provided should include the monitoring schedule;
 - the methodology should include a description of the performance indicators that will be used to evaluate the effectiveness of the mitigation measures; and
 - identify circumstances and mechanisms under which corrective/adaptive measures may be implemented to address any issue or problem identified through the follow-up programs or environmental monitoring. For example, if unanticipated effects occur or the effects are greater than anticipated;
- description of the characteristics of monitoring where foreseeable (e.g., location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);
 - 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;
 - guidelines for preparing monitoring reports (number, content, frequency, format, duration, geographic extent) that will be sent to the authorities involved;
 - plans, including funding options, to involve Indigenous groups and local communities in monitoring, where appropriate;
 - 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.

27. ASSESSMENT SUMMARY

The proponent must prepare a stand-alone plain language summary of the Impact Statement in both of Canada's official languages (French and English). The summary must contain sufficient details for the reader to understand the project, any potential environmental, health, social and economic

effects, potential adverse impacts on Indigenous peoples, proposed mitigation measures, residual effects and any required follow-up programs.

The Assessment Summary provides an opportunity for the proponent to demonstrate correspondence between issues raised during the planning phase and issues addressed in the assessment. This Assessment Summary should be presented by VC, which allows the proponent to demonstrate the completeness of the assessment and provide the results of the analysis. The summary must include key maps or figures illustrating the project location and key project components and will include locations of townships and municipalities, Indigenous communities, traditional territories and Treaty areas.

APPENDIX 1 –RESOURCES AND GUIDANCE

Human Health

Canadian Ambient Air Quality Standards (CAAQS) available at https://www.ccme.ca/en/current_priorities/air/caaqs.html. Canadian Council of Ministers of the Environment.

Evaluating Human Health Impacts in Environmental Assessments: Air Quality available at <http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-air-quality.html>. Health Canada. 2017.

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

Evaluating Human Health Impacts in Environmental Assessments: Noise available at <http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-noise.html>. Health Canada. 2017.

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

Evaluating Human Health Impacts in Environmental Assessments: Water Quality available at <http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-water-quality.html>. Health Canada. 2017.

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

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

Water Quality

Guidelines for the Assessment of Alternatives for Mine Waste Disposal available at <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/publications/guidelines-alternatives-mine-waste-disposal.html>. Compiled by Environment and Climate Change Canada

Mine Environment Neutral Drainage (MEND) Report 1.20.1 Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Prepared by William A. Price. Natural Resources Canada. 2009.

Birds, Migratory Birds and their Habitat

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

Bird Survey Inventories in Canada. Available at <http://www.ec.gc.ca/reom-mbs/default.asp?lang=En&n=B944A67D-1>. Compiled by Environment and Climate Change Canada

Bird Conservation Region (BCR) plans. Available at <https://www.canada.ca/en/environment-climate-change/services/migratory-bird-conservation/regions-strategies.html>

Richard J. Barker, Matthew R. Schofield, William A. Link, John R. Sauer. 2018. *On the reliability of N-mixture models for count data*. *Biometrics* 74(1). Available at <https://onlinelibrary.wiley.com/doi/full/10.1111/biom.12734>

A Framework for the Scientific Assessment of Potential Project Impacts on Birds. Available at <http://publications.gc.ca/site/eng/367511/publication.html>

Yip, D. A., L. Leston, E. M. Bayne, P. Sólymos, and A. Grover. 2017. *Experimentally derived detection distances from audio recordings and human observers enable integrated analysis of point count data*. *Avian Conservation and Ecology* 12(1):11. Available at www.ace-eco.org/vol12/iss1/art11/ACE-ECO-2017-997.pdf

ECCC guidance for avoiding harm to migratory birds. Available at <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds.html>

ECCC guidance on general nesting periods. Available at <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html>

Wetlands

Canadian Wetland Classification System. Developed by the National Wetlands Working Group. Available at <http://www.wetlandpolicy.ca>

Wetland Ecological Functions Assessment: An Overview of Approaches. Available at <http://publications.gc.ca/site/eng/343283/publication.html>.

The Wetland Network. www.wetlandnetwork.ca

Species at Risk

COSEWIC Status Reports. Developed by the Committee on the Status of Endangered Wildlife in Canada. Available at: <https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html>

Species at Risk Public Registry. Available at <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

Proposed Species at Risk Act Permitting Policy. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/policies-guidelines/proposed-policy-2016.html#_6

General Habitat Description for the Forest-dwelling Woodland Caribou (Rangifer tarandus caribou) (GHD). Available at https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_ghd_car_en.pdf

Integrated Assessment Protocol for Woodland Caribou Ranges in Ontario (IAP) (request from Ontario Ministry of Environment, Conservation and Parks).

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Ontario's Woodland Caribou Conservation Plan (CCP). Available at <https://files.ontario.ca/environment-and-energy/species-at-risk/277783.pdf>

Range Management Policy in Support of Woodland Caribou Conservation and Recovery (RMP). Available at <https://www.ontario.ca/document/range-management-policy-support-woodland-caribou-conservation-and-recovery>

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Best Management Practices for Renewable Energy, Energy Infrastructure and Energy Transmission Activities and Woodland Caribou in Ontario. Available at https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_bmp_ener_car_en.pdf

Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits. Available at https://files.ontario.ca/environment-and-energy/species-at-risk/stdprod_093115.pdf

Greenhouse Gas Emissions and Climate Change

Strategic Assessment of Climate Change available at

<https://www.strategicasessmentclimatechange.ca/> . Environment and Climate Change Canada.

General

Government of Canada's Operational Framework for the Use of Conservation Allowances. Available at: <https://www.canada.ca/en/environment-climate-change/services/sustainable-development/publications/operational-framework-use-conservation-allowances.html>

NatureServe Conservation Status Assessments: Factors for Evaluating Species and Ecosystem Risk.

Available at:

https://www.natureserve.org/sites/default/files/publications/files/natureserveconservationstatusfactors_apr12_1.pdf