



ENVIRONMENTAL IMPACT STATEMENT GUIDELINES

for the

Valentine Gold Project

Prepared by:

The 2015 Environment Assessment Committee for the Minister of the Department of Municipal Affairs
and Environment, Government of Newfoundland and Labrador

January 2020

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Glossary of Acronyms and Abbreviations

| | |
|--------------------------------------|---|
| ACCDC | Atlantic Canada Conservation Data Centre |
| ANFO | Ammonium Nitrate/Fuel Oil |
| ARD | Acid Rock Drainage |
| BACT | Best Available Control Technology |
| CCME | Canadian Council of Ministers of the Environment |
| CEAA | <i>Canadian Environmental Assessment Act</i> |
| CEPA | <i>Canadian Environmental Protection Act (1999)</i> |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| CWCS | Canadian Wetland Classification System |
| DFO | Fisheries and Oceans Canada |
| EA | Environmental Assessment |
| ECCC | Environment and Climate Change Canada |
| EIS | Environmental Impact Statement |
| EMP | Environmental Management Plan |
| EEMP | Environmental Effects Monitoring Plan |
| EPP | Environmental Protection Plan |
| EPR | Environmental Preview Report |
| GHG | Greenhouse Gas |
| GNL | Government of Newfoundland and Labrador |
| HC | Health Canada |
| MAE | Municipal Affairs and Environment |
| MBCA | <i>Migratory Birds Convention Act</i> |
| MEND | Mine Environment Neutral Drainage Program |
| mg/m ³ | Milligrams per cubic metre |
| ML | Metal Leaching |
| MDMER | <i>Metal and Diamond Mining Effluent Regulations</i> |
| NL | Government of Newfoundland & Labrador |
| NLEPA | Newfoundland and Labrador <i>Environmental Protection Act</i> |
| NLESA | Newfoundland and Labrador <i>Endangered Species Act</i> |
| NO _x | Nitrogen Oxides |
| NWWG | National Wetlands Working Group |
| PAG | Potentially Acid Generating |
| PLS | Plain Language Summary |
| PM _{2.5} , PM ₁₀ | Particulate Matter (subscript indicates size threshold, in microns) |
| t/d | Tonnes per day |
| t/yr | Tonnes per year |
| SAR | Species at Risk |
| SARA | <i>Species at Risk Act</i> |
| SO ₂ | Sulphur Dioxide |
| SSAC | Species Status Advisory Committee |
| VEC | Valued Ecosystem Component |

1.0 INTRODUCTION

The proponent is proposing to develop a gold mine approximately 55 kilometres southwest of Millertown in the west-central region of the Island of Newfoundland. The project includes four potential mining deposits: Leprechaun, Sprite, Marathon, and Victory deposits. Standard surface mining techniques will be used in open pit construction and operation. The project will involve waste rock disposal piles; crushing and stockpiling areas; heap leach processing; conventional milling; processing facilities; and a tailings management area. It will require personnel accommodations and supporting infrastructure including roads; power lines; buildings; and water and sewage effluent management facilities. The construction period is expected to last 18-24 months followed by an estimated mine operation life of 13 years. The project will operate 24 hours per day, seven days a week on a 12-hour shift basis.

The Project requires Environmental Assessment (EA) under the Newfoundland and Labrador *Environmental Protection Act (NLEPA)*, specifically, the preparation of an Environmental Impact Statement (EIS). These requirements are discussed in further detail in Section 2.2.

The Project is also undergoing EA under the *Canadian Environmental Assessment Act* and the final guidelines can be found at the Impact Assessment Agency of Canada's (formerly the Canadian Environmental Assessment Agency) website at <https://ceaa-acee.gc.ca/050/evaluations/proj/80169?culture=en-CA>.

1.1 Purpose of the Environmental Impact Statement Guidelines

On June 13, 2019, the Minister of Municipal Affairs and Environment (MAE) informed the proponent that an environmental impact statement (EIS) is required for the proposed Valentine Gold Project undertaking. The purpose of these guidelines is to identify for the proponent the nature, scope, and minimum information and analysis required in preparing the EIS.

These guidelines shall not be regarded as either restrictive or exhaustive. Concerns other than those identified herein may arise during the investigations associated with the EIS and additional detail, studies, and/or examination of components may be required. The provincial government is prepared to provide advice and assistance throughout the preparation of the EIS and the required baseline studies with regard to the identification of environmental concerns and appropriate assessment methodology.

The EIS is a statement of the proponent's environmental conclusions and commitments related to the undertaking, and shall be explicitly endorsed by the proponent.

For the purpose of these guidelines:

"Environment" includes:

- a) air, land and water;
- b) plant and animal life, including human life;
- c) the social, economic, recreational, cultural and aesthetic conditions and factors that influence the life of humans or a community;
- d) a building, structure, machine or other device or thing made by humans;
- e) a solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of humans; or
- f) a part or a combination of those things referred to in subparagraphs (a) to (f) and the interrelationships between two or more of them.

"Environmental effect" means a change in the present or future environment that would result from an undertaking.

"Follow-up Program" means a program:

- (a) to determine the effectiveness of mitigation measures, and
- (b) for compliance with terms and conditions applicable to the release.

"Minister" means the provincial Minister of the Department of Municipal Affairs and Environment.

"Undertaking" means an enterprise, activity, project, structure, work or proposal and a modification, abandonment, demolition, decommissioning, rehabilitation and an extension of them that may, in the opinion of the minister, have a significant environmental effect. The term undertaking refers to a project that shall be registered for environmental assessment. The terms "project" and "undertaking" are used interchangeably in these guidelines.

A "proponent" may be a person, corporation or government department that owns, manages, or controls a proposed project.

1.2 Guiding Principles

1.2.1 Environmental Assessment as a Planning Tool

Environmental assessment is a planning tool used to ensure that projects are considered in a careful and precautionary manner in order to avoid or mitigate the possible adverse effects of development on the environment. EA also encourages decision makers to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy.

The EA of this project shall, in a manner consistent with the purposes above:

- consider and evaluate alternatives to the Project, or its components, and alternative means of carrying out the Project, or its components, and assess their technical and economic feasibility;
- document public consultation activities in a manner that is transparent;
- propose measures to avoid or mitigate adverse environmental effects;
- propose measures to enhance or prolong beneficial environmental effects;
- describe residual (post-mitigation) environmental effects that are beneficial or harmful that are likely to be caused by the undertaking regardless of the proper application of all control, mitigation, enhancement and remedial measures to be proposed in the EIS;
- assess the cumulative environmental effects of the Project in combination with other projects and activities that have been or will be carried out;
- predict whether or not the project, in combination with other projects or activities that have been or will be carried out, is likely to cause adverse environmental effects after mitigation measures are implemented;
- specifically list and cite all sources of information in the EIS;
- outline the design of studies necessary to provide additional information for the preparation of the EIS;
- address concerns identified during the public information sessions by including within the EIS specific responses to those concerns and, where appropriate, specific proposals for measures to deal with them; and
- as soon as they have been completed, provide copies of all reports or studies undertaken in order to satisfy these guidelines.

1.2.2 Sustainable Development

Sustainable development means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. The EIS shall consider the extent to which the Project would meet this objective.

EA provides a systematic approach for identifying, predicting and evaluating the potential environmental effects of projects before decisions are made. In addition, EA provides the means to identify mitigation measures for adverse effects. EA enables the integration of environmental factors into the planning and decision-making process in a manner that promotes sustainable development and contributes to decision making that can ultimately provide net ecological, economic and social benefits to society.

The EA of the Project, including its analysis of alternatives, shall take into account the relationships and interactions among the various components of the ecosystems, including the extent to which biological diversity may be affected by the Project, and how the Project meets the needs of the present as well as future populations.

1.2.3 Precautionary Approach

One of the purposes of EA is to ensure that Proponents consider the Precautionary Principle. If an undertaking has the potential to cause a threat of serious or irreversible damage to the environment, the Proponent shall take all reasonable environmental protection measures to protect the environment, even if full scientific knowledge is lacking.

The Proponent shall indicate how the Precautionary Principle was considered in the design of the Project in at least the following ways:

- demonstrate that all aspects of the Project have been examined and planned in a careful and precautionary manner to prevent or minimize serious or irreversible damage to the environment, especially with respect to environmental functions and integrity, considering system tolerance and resilience, and/or the human health of current or future generations;
- outline and justify the assumptions made about the effects of all aspects of the Project and the approaches to minimize these effects;
- evaluate alternative means of carrying out the Project and compare them in light of risk avoidance and adaptive management capacity;

- in designing and operating the Project, demonstrate that priority has been given to strategies that avoid the creation of adverse effects;
- develop contingency plans that explicitly address accidents and malfunctions, e.g., environmental emergency plans;
- identify any proposed follow-up and monitoring activities, particularly in areas where scientific uncertainty exists, in the prediction of effects or effectiveness of proposed mitigation measures; and
- present public views on the acceptability of all of the above.

2.0 THE ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Contact for the Environmental Assessment

Eric Watton (EAC Chair)

Environmental Scientist

Environmental Assessment Division

Department of Environment and Climate Change

PO Box 8700

St. John's NL A1B 4J6

Telephone: (709) 729-0834

Email: ericwatton@gov.nl.ca

2.2 Environmental Assessment Requirements

2.2.1 Newfoundland and Labrador *Environmental Protection Act*

Any mining of a mineral as defined in the *Mineral Act* in Newfoundland and Labrador is subject to EA under the *NLEPA* and *Environmental Assessment Regulations, 2003*. The Environmental Assessment Division of the Newfoundland and Labrador Department of Municipal Affairs and Environment (MAE) administers the process including:

- consulting at every stage with interested government departments and the public;
- evaluating submissions by Proponents and reviewers;
- advising the Minister on potential environmental effects prior to decisions; and

- monitoring released projects to ensure compliance and effectiveness of mitigation.

An undertaking that is triggered under the *Environmental Assessment Regulations* is required to be registered for examination by MAE. The registration outlines the proposed project and describes how it will affect the bio-physical and socio-economic environments. The Registration is referred to provincial and federal government departments for review and comment. The Registration is also publicly available for comment. At the conclusion of the review period, the Minister has four options: release the undertaking from further assessment, require an Environmental Preview Report (EPR), require an EIS, or notify the Lieutenant-Governor in Council if the undertaking is contrary to law or to a policy that the Lieutenant-Governor in Council has declared to be the policy of the government of the province. On June 13, 2019 the Minister advised Marathon Gold Corporation that an EIS was required.

2.2.2 Delegated EIS Preparation

Pursuant to the requirements of Section 51(1)(b) of the *NLEPA*, the Proponent has been delegated the task of preparing the EIS. The EIS should be prepared according to these guidelines and, once completed, the Proponent shall submit printed and electronic copies of the EIS to the involved government agencies in the quantities specified in Table 1. In addition, the Proponent shall make printed copies of the EIS and the Plain Language Summary (PLS) of the EIS available at public viewing centers (to be designated) in the project vicinity.

Baseline studies will be required to define baseline conditions, and to support the evaluation of environmental effects and/or the development of mitigation measures as well as monitoring and follow up programs.

Table 1 Environmental Impact Statement Copy Requirements

| Organization | Electronic Copies * | Printed copies | |
|--------------------------------|---------------------|--------------------|--------------------|
| | | EIS | PLS |
| MAE | 10 | 10 | 10 |
| DFO | 1 | 1 | 0 |
| ECCC (federal) | 2 | 1 | 0 |
| Public Viewing Locations (TBD) | NA | 1 at each location | 1 at each location |

*Electronic copies to be provided on CD or thumb drive

The required baseline studies are discussed further in section 4.2.

2.3 Consultation

The public will have several opportunities to participate in the EA and provide their views on the potential environmental effects of the Project. These are outlined in Table 2.

Table 2: Public Participation Opportunities

| Opportunity | Duration |
|--|-----------------|
| Comment on Draft EIS Guidelines | 40 days |
| Comment on Proponent's EIS or Plain Language Summary (PLS) | 50 days |
| Comment on any additional EIS requirements, i.e., Addendum (if required by the Minister) | 50 days |

Electronic and hard copy versions of documents will be provided to MAE and these will be made available for public review. Key documents will be available on the MAE Environmental Assessment webpage for this EA, https://www.mae.gov.nl.ca/env_assessment/projects/Y2019/2015/index.html .

Public comment periods will be announced in newspapers and on the MAE Environmental Assessment webpage mentioned above. Interested parties may contact the EA Committee Chair identified in Section 2.1 for further information regarding comment periods.

The Proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project as early as possible in the review process. This will ensure that all parties have an opportunity to gain an understanding of the proposed Project and may facilitate their continued involvement in the EA process. During the preparation of the EIS, the Proponent hold public information sessions to provide information concerning the Project to the people whose environment may be affected by the undertaking. The Proponent record and respond to the concerns of the local communities regarding the potential environmental effects of the Project (see Section 4.1.15). Appendix A provides additional information on the notification requirements for the information sessions.

2.3.1 Record of Public Consultation

The EIS describe all public consultation activities undertaken by the Proponent during, the EA. It should describe key stakeholder groups, summarize comments heard, identify key issues of concern raised by the public and the Proponent's responses.

3.0 SCOPE OF PROJECT, FACTORS TO BE CONSIDERED AND SCOPE OF THE FACTORS

3.1 Scope of Project

The EIS will examine all activities and physical works associated with the different phases of this Project, i.e., construction, development, production, operation and maintenance, rehabilitation and closure of the proposed Project, as described in the Proponent's registration document dated April 5, 2019 and registered on April 16, 2019. These activities and physical works include but are not limited to, the activities listed below.

- all open pits, including dewatering infrastructure to dewater and to manage groundwater levels;
- all upgrades to existing access roads and details on the alternate access road(s);
- transmission line from Star Lake to the project area;
- waste rock disposal areas;
- organics and overburden piles;
- storm water management infrastructure;
- process plant facilities;
- ROM stockpile;
- heap leach process facilities;
- tailings management facility (TMF), including treatment plant and CN destruction plant;
- ancillary infrastructure to support the mine (e.g., administrative and dry buildings, substation and distribution lines, communication lines, pumphouse, sewage and water treatment units, fuel supply and storage, etc.);
- progressive rehabilitation, closure and reclamation activities;
- accommodation camp facilities and related structures;
- all effluent generation, treatment systems, handling and discharge locations, as well as all anticipated effluents and contaminants, including ammonia residue from blasting operations;

- air emission sources including dust lift-off (e.g., diesel generators, heavy equipment, roads, waste rock, crushing, grinding, process heaters, dryers, blasting, roads, pits, laydown areas, stockpiles, waste rock storage, parking lots, etc.);
- greenhouse gas (GHG) emissions sources;
- noise sources, expected noise levels and noise monitoring locations;
- sources and frequency of vibrations including seismic loading (Victoria Dam and wildlife);
- water management control structures or diversions that may be required to facilitate the project;
- all other infrastructure construction;
- fuel storage systems, including secondary containment (dykes) and a list of fuels and quantities;
- storage, transport, preparation and usage, quantities, and final discharge of all process reagents and effluents;
- storage, transport, preparation, quantities, usage and management of explosives;
- water quality sampling locations in the watersheds potentially affected by the project;
- locations for real time water monitoring stations including hydrometric (water level/flow); water quality, groundwater and climate stations to be established in partnership with GNL;
- any quarries that are contemplated as part of the Project;
- viewsapes that could be affected by the Project;
- sources of lighting emissions associated with the project; and
- cyanide management.

3.2 Factors to be Considered

The EIS shall consider:

- the purpose of the Project;
- alternatives to the Project;
- the need for the Project;
- alternative means of carrying out the Project or components of the Project and assess their technical and economic feasibility, and the environmental effects of any such alternative means;
- the environmental effects of the project, including the environmental effects of malfunctions, spills or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out in relation to the identified valued ecosystem components;
- measures that would mitigate any adverse environmental effects of the Project;

- measures that would enhance or prolong beneficial environmental effects;
- residual (post-mitigation) environmental effects that are beneficial or harmful that are likely to be caused by the undertaking regardless of the proper application of all control, mitigation, enhancement and remedial measures to be proposed in the EIS;
- whether or not the project, in combination with other projects or activities that have been or will be carried out, is likely to cause significant adverse environmental effects after mitigation measures are implemented;
- comments from the public that are received in accordance with NLEPA and regulations by including within the EIS specific responses to those concerns and, where appropriate, specific proposals for measures to deal with them;
- local knowledge;
- the capacity of renewable resources that are likely to be affected by the Project to meet the needs of the present and those of the future; and
- the requirements of a follow-up program for the Project.

3.3 Scope of the Factors to be Considered

In addition to the factors listed above, the EIS shall document any additional issues or concerns that may be identified through regulatory, stakeholder, and public consultation.

The assessment of environmental effects shall focus on valued ecosystem components (VECs). A VEC is a component or attribute that is important for its ecological, legal, scientific, cultural, economic or aesthetic values. VECs for the project should be selected based on defined criteria and their selection justified. The assessment shall consider potential environmental effects that the Project may have on each VEC.

In considering VECs, the Proponent will recognize that:

- the value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans;
- culture and way of life of those using the area affected by the Project may also be considered as VECs; and
- functional relationships within the environment may also be considered as VECs.

The EIS will define the study areas and time frames, or spatial and temporal boundaries used in the analysis of environmental effects, including cumulative effects. It is expected that the spatial and temporal

boundaries shall vary between VECs to reflect the nature of both the VEC and the predicted effects.

Temporal and spatial boundaries reflect:

- the geographic range over which the project's environmental effects may occur, recognizing that some effects shall extend beyond the project area;
- timing/scheduling of project activities;
- natural variations of each VEC (e.g. species ranges and/or habitat suitability);
- the time required for recovery from an effect; and
- cumulative effects of other projects, land use, and activities on VECs.

The VECs to be considered shall include:

- Victoria Dam and reservoir;
- wildlife including caribou, avifauna, and other wildlife and their habitats (including Sensitive Wildlife Areas);
- water bodies (surface water and groundwater including wetlands);
- freshwater fish, fish habitat and fisheries;
- landforms and soils;
- atmospheric environment including Greenhouse Gases (GHG);
- Species at Risk and species of conservation concern;
- economy, employment and business; including outfitter businesses;
- community services and infrastructure (including other downstream dams); and
- health and community health.

The Proponent may add other VECs. In addition, the EIS shall include a consideration of key organisms that live off or rely on bio-physical VECs during their life cycle. Rationale for the selection of the above VECs, as well as a proposed study approach, is provided in Section 4 of these guidelines and is to be presented in the EIS for all VECs. The required baseline studies in Section 4 serve to provide additional information to one or more VECs in the list above. The baseline study may or may not have the same name as the VEC depending on the nature of the additional information required. The baseline studies shall describe, in detail, study methods and analytic methods, including incorporation of information gathered through public consultation.

4.0 PREPARATION OF THE EIS

The EIS is a statement of the Proponent's environmental conclusions and commitments related to the Project; it be explicitly endorsed by the Proponent.

The EIS shall employ the clearest language possible. However, where the complexity of the issues addressed requires the use of technical language, a glossary defining technical words and acronyms shall be included. The Proponent shall also prepare a Plain Language Summary (PLS) to accompany the EIS. The PLS is described in Section 4.1.2 and will be used to aid public review of the conclusions of the EIS.

The EIS shall be a stand-alone document with reference to the required baseline studies upon which a critical review can be undertaken. Where external sources of information or data are used, they shall be referenced within the body of the EIS and listed completely at the end. Where conclusions that are critical to the assessment of environmental effects are cited from other reports, the EIS shall provide sufficient detail of the originating data and analysis to enable a critical review of that material and submit reference material as an appendix to the EIS.

It is recommended that the EIS be presented in the sequence outlined in these Guidelines. The EIS shall include a Table of Concordance to these Guidelines, so that information requirements identified herein can be easily located in the EIS. The EIS shall refer to, rather than repeat, information previously presented in other sections of the document. However, it is important that underlying limitations, uncertainties and assumptions of all environmental predictions, especially those that support major statements or conclusions, be described in the body of the EIS rather than simply referencing supporting studies. A key subject index is to be provided giving locations in the text by volume, section and sub-section.

The EIS shall provide charts, diagrams and maps wherever useful to clarify the text, including a depiction of how the developed Project sites will appear from both an aerial and terrestrial perspective. Where possible, maps shall use common scales to allow for comparison and overlay of mapped features and shall indicate common and accepted local place names. Where technically feasible, provide geographic information in standard Geographic Information System (GIS) mapping (digital) format. The EIS and all associated reports and required baseline studies shall use System International (SI) units of measure and terminology.

The following sections describe the different topics to be addressed in the EIS. The EIS shall provide sufficient information to allow readers to understand the potential environmental effects of the Project, as identified by the Proponent and through these guidelines.

Section 4 is organized into two parts:

- Section 4.1 is the Content of the EIS and describes the layout and required content of the EIS; and
- Section 4.2 is the Detailed Guidance on Select Environmental Components which provides an overview of the required baseline studies and approach.

The information included in this document is not intended to be exhaustive and additional detail, studies, or examination of additional components may be required.

4.1 Content of the EIS

4.1.1 Executive Summary

The EIS should begin with an Executive Summary, including a concordance table that describes where each information requirement of the EIS Guidelines has been addressed in the EIS.

4.1.2 Plain Language Summary

In order to enhance understanding of the EIS and facilitate consultation activities, a Plain Language Summary (PLS) of the EIS shall be prepared. The PLS will summarize the Project and the major findings and conclusions of the EIS. It shall be a stand-alone document no longer than approximately 50 pages, excluding annexes and appendices. It should clearly describe the Proponent, the Project (including rehabilitation and closure activities), and the environmental effects of the Project. Maps at appropriate sizes and scales shall be included to clearly show the location of all Project components and/or environmental components. As the name implies, the PLS should avoid unnecessary use of technical terms or jargon and be written so that an average reader with no specialist knowledge of mining or EA can comprehend the Project, the analysis of environmental effects, the conclusions reached, and the supporting rationale. The PLS should be organized as follows:

Introduction

- Project Overview
- Environmental Assessment Process
 - Purpose of the EIS
 - Provincial EA Requirements

Project Description

- Purpose of and Need for the Project
- Project Description
 - Location
 - Components
 - Activities
 - Schedule

Scope of the Assessment

- Scope of the Project
- Factors to be Considered
- Scope of the Factors
 - Identification of VECs
 - Spatial and Temporal Boundaries

Project Alternatives

- Alternatives to the Project
- Alternative Means of Carrying out the Project
 - Description of Alternative Means
 - Environmental Effects of Alternative Means
 - Technical and Economic Feasibility of Alternative Means
 - Selection of a Preferred Alternative Means

Consultation

- Public Consultation and Engagement Activities undertaken for the EA (Proponent and Government)

Existing Environment

Environmental Effects Assessment

- Method and Approach
- VECs
 - Potential Environmental Effects
 - Mitigation Measures
 - Residual Environmental Effects

- Government, Public Comments and Proponent’s Response
- Effects of the Environment on the Project
 - Method and Approach
 - Potential Effects
 - Mitigation
 - Residual Effects
 - Government and Public Comments and Proponent’s Response
- Effects of Possible Accidents or Malfunctions
 - Method and Approach
 - Potential Effects
 - Mitigation
 - Residual Effects
 - Government, Public Comments and Proponent’s Response
- Effects on Capacity of Renewable Resources
- Cumulative Environmental Effects
 - Approach
 - Scoping
 - Potential Cumulative Effects
 - Mitigation Measures
 - Residual Effects
 - Government, Public Comments and Proponent’s Response

Follow-Up Program

Benefits of the EA to Newfoundlanders and Labradoreans

Overall Conclusions of the Proponent

It is understood that the Proponent can only provide Government, Public comments and the Proponent’s responses to the extent known at the time of writing, as there will be further comment periods after the EIS.

4.1.3 Project Information

4.1.3.1 The Proponent

The EIS shall:

- identify the Proponent and the name of the legal entity that would develop, manage and operate the Project;
- provide contact information for the Proponent (e.g., name, address, telephone, facsimile, e-mail);
- explain corporate and management structures, as well as insurance and liability management related to the Project;
- explain corporate environmental and community relations policies;

- specify how the Proponent would ensure that corporate policies are implemented and respected for the Project;
- summarize key elements of its environmental management system and how it would be integrated into the Project; and
- identify key personnel and consultants responsible for preparing the EIS. The qualifications of all contracted scientific experts, including biologists conducting surveys for migratory birds, species at risk and species of conservation concern and wetland delineations should be provided in an appendix to the EIS.

4.1.3.2 Project Overview

The EIS shall briefly summarize the development proposal. If the Project is a component of a larger operation, the EIS shall outline the larger context and present the relevant references, if available. The Project location should be described in the context of surrounding land uses and infrastructure. The intent of this overview is to provide the key components and the location of the Project, rather than a detailed description, which shall follow as described in Section 4.1.4 of this document.

4.1.3.3 Regulatory Framework and the Role of Government

The EIS should identify the EA process and the government bodies involved in the assessment. It should also describe the process used to determine the requirement for the provincial EA. In addition, the EIS shall:

- identify the environmental regulatory approvals and legislation that are applicable to the Project at federal, provincial and municipal levels, including:
 - activities requiring regulatory approval;
 - names of permits or regulatory approvals;
 - names of legislation applicable in each case; and
 - names of the regulatory agencies responsible for each permit or approval;
- identify environmental government policies, resource management, planning or study initiatives pertinent to the Project and discuss their implications;
- identify any relevant Land Use Plans, Land Zoning and/or Community Plans;
- describe land tenure in and adjacent to the Project area;
- identify and delineate major components of the Project and identify those being applied for and constructed within the jurisdiction of these approvals processes under provincial legislation; and

- provide a summary of the 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 effects.

4.1.3.4 Non-Government Participants in the Environmental Assessment

The EIS shall identify the main participants in the EA including community groups and environmental organizations.

4.1.3.5 Other Registrations

The Proponent shall indicate whether any other registrations have previously been submitted in relation to this Project, or are to be submitted for EA in the future as a result of this Project.

4.1.4 Project Description

4.1.4.1 Purpose of and Need for the Project

The EIS shall state the purpose of the Project, from the Proponent's perspective and clearly describe the need for the Project (i.e., the problem or opportunity the Project is intended to solve or satisfy). This is the fundamental rationale for the Project and provides the context for the consideration of alternatives to the Project.

The statement of the Project's justification shall be presented in economic terms, shall provide a clear description of methods, assumptions and conclusions used in the analysis and shall include an evaluation of the following:

- current and forecasted gold demand;
- market opportunities, forecasts and expected evolution;
- risks to the Project, including market prices and schedule delays, interest rates and other risk factors relevant to the decision to proceed with the Project; and
- projected financial costs and benefits at the regional, provincial and national levels.

4.1.4.2 Alternatives to the Project

The EIS shall include an analysis of alternatives to the Project; describing functionally different ways to meet the Project's need and purpose. The EIS shall:

- identify the alternatives to the Project that were considered;
- develop criteria to identify the major environmental, economic and technical costs and benefits of the alternatives; and
- identify the preferred alternatives to the Project based on the relative consideration of the environmental, economic and technical costs and benefits

The level of detail for this analysis shall be sufficient to allow the reader to understand the alternatives and how they compare to the Project. The analysis of alternatives to the Project is to provide clearly described methods and criteria for comparing alternatives and sufficient information for the reader to understand the reasons for selecting the preferred alternative and for rejecting others. This analysis shall include a description of the conditions or circumstances that could affect or alter these choices, such as market conditions, regulatory changes and other factors, either prior to construction or during the life of the Project.

The EIS shall include a comparative analysis of the environmental effects and technical and economic feasibility of alternatives that led to the choice of the selected Project alternative. The EIS shall demonstrate how the preferred alternative contributes to sustainable development. The Proponent shall include an evaluation of the thresholds for economic viability of the Project and considerations respecting the timing of phases and components of the Project.

4.1.4.3 Project Location

The EIS shall provide a concise description of the geographic setting in which the Project shall take place. The description shall focus on aspects of the environment that are important for understanding the potential environmental effects of the Project, including:

- any existing, designated or planned environmentally sensitive or significant areas; national, provincial and regional parks; protected natural areas and watersheds; ecological reserves; impacted watersheds from the project; watersheds, sub-watersheds, waterbodies, and wetlands directly impacted by the project footprint; riverine and lacustrine fish habitats; mature and interior forest habitat for migratory birds; habitats of designated species at risk, including critical habitat for the designated species; areas of concentration of other wildlife; and other sensitive areas and habitat;
- the current land use in the area and the relationship of the Project facilities and components with any existing or future land use including private and crown lands; and

- a description of the nearest potentially sensitive human receptors (e.g. residences, cabins, outfitters, etc.) and of local communities that may be affected by project activities.

The location of the mine site, power transmission lines, transportation corridors, and watersheds shall be described and clearly indicated on maps of appropriate scale. The location map should include the boundaries of the proposed site and transportation corridors, any existing infrastructure, adjacent land uses and important environmental features. In addition, site plans/sketches and photographs showing project location, site features and the intended locations of project components should be included.

4.1.4.4 Project Description

4.1.4.4.1 Facilities and Components

The EIS shall describe all of the Project's facilities and components in detail, focusing on those with the most potential for environmental interactions and risk (e.g., Project "footprint" wastes and emissions and associated zones of influence). The EIS shall present descriptions, locations, plans, figures and/or drawings for each facility, as appropriate, to convey information on potential environmental interactions, including:

- waste rock storage (including discussion of ore contaminants that may affect processing and volume of waste rock) including a description of any water bodies (streams, wetlands, etc.) within the footprint and whether they are waters frequented by fish or have any connectivity to waters frequented by fish;
- overburden storage areas including a description of any water bodies (streams, wetlands, etc.) within the footprint and whether they are waters frequented by fish or have any connectivity to waters frequented by fish;
- tailings management area and associated dams (the tailings and polishing pond dams) shall be classified, designed, operated and closed out according to the Canadian Dam Association (CDA), *Dam Safety Guidelines*, including the *CDA Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams*. Dam break inundation modeling and mapping (including examination of a cascade failure of the Victoria Dam and other downstream dams) and a determination of whether the tailings are acid generating or not will be needed in order to help determine the dam consequence classification. Depending on the dam consequence classification this may entail requirements for dam safety reviews; an operation, maintenance and surveillance manual; and an emergency preparedness and response plan.). This shall include a description of any water bodies (streams, wetlands, etc.) within the footprint and whether they are waters frequented by fish or have any connectivity to waters frequented by fish;

- processing facility;
- heap leach facility;
- all effluent generation, treatment systems, handling and discharge locations, as well as all anticipated effluents and contaminants, including ammonia residue from blasting operations;
- air emission sources including dust lift-off (e.g., diesel generators, heavy equipment, roads, waste rock, crushing, grinding, process heaters, dryers, blasting, roads, pits, laydown areas, stockpiles, waste rock storage, parking lots, etc.);
- ambient air sampling stations and their locations;
- noise sources, expected noise levels and noise monitoring locations;
- water control structures or diversions that may be required to facilitate the project;
- all utility installations, including transmission lines and generators;
- all infrastructure construction, including haulage roads and ancillary structures;
- fuel and chemical storage systems, including secondary containment (dykes and double piping) and a list of fuels and chemicals to be stored;
- any quarries that are contemplated as part of the Project;
- sources of lighting emissions associated with the project;
- explosive storage facilities;
- worker accommodations and related facilities;
- viewsapes that could be affected by the Project; and
- water quality sampling locations and real time water monitoring station locations in the watersheds potentially affected by the project. This will ensure baseline data prior to start of the project.

4.1.4.4.2 Activities

The EIS shall include descriptions of the construction, operation, maintenance, foreseeable modifications, including the expansion and lengthening of the operations and, where relevant, rehabilitation and closure of sites and facilities associated with the Project. Detailed descriptions of activities to be carried out during each phase of the Project should include the location, magnitude and scale of each activity, including labour force requirements. A schedule shall be provided, showing time of year, frequency and duration of project activities.

The description of the construction and operation activities shall include:

- estimates of emission quantities (use units of t/yr and mg/m³);

- solid waste, hazardous waste and waste reduction strategies;
- spill potentials and prevention strategies (e.g., hydraulic hose ruptures, fueling mishaps, tank failure, failure of heap leach pad liner system, fuel and chemical transmission piping failure, etc.);
- long-term operation, maintenance and surveillance of the tailings management area (including the closure phase);
- long-term operation, maintenance, rehabilitation, closure and surveillance of the heap leach pile; and
- rehabilitation strategy for open pits, waste rock, overburden storage or other areas.

Operation activities shall make use of best available control technology and utilize best practices in the industry. The proponent shall demonstrate how the Heap Leach process of extracting gold from low-grade ore meets these criteria (best available technology and best practices).

The EIS shall describe proposed means to treat waste resulting from the Project and/or the capacity of contractors to do so.

The EIS shall describe any regular inspection and maintenance that may be required for the open pit mine, any underground workings, associated facilities and infrastructure. Activities involving periods of increased environmental disturbance or the release of materials into the environment are to be highlighted.

The level of detail in the description of the Project's facilities and activities shall be sufficient to enable prediction of environmental effects.

4.1.4.4.3 Labour Force Requirements

The EIS shall include descriptions of the construction, operations, rehabilitation and closure labour force requirements, including:

- National Occupation Classification (NOC 2011) codes at the 4-digit level associated with each position for construction and operations phases of the project (including the number of positions associated with each NOC code);
- A commitment to develop a Gender Equity and Diversity Plan (GEDP) to improve employment and training opportunities for women and other underrepresented groups. The Plan's main components should include a women's employment plan, a diversity plan for

other underrepresented groups (i.e. people with disabilities, Indigenous people and visible minorities) and a business access strategy for these target populations;

- The approximate time lines for each of the positions during the construction phase of the project. This would include the number of positions for each 4-digit NOC 2011 code throughout the project at specified time intervals (monthly or at least quarterly) which would show levels of employment throughout the project timeline;
- The approximate time lines for each of the positions during the operations phase of the project. This would include the number of positions for each 4-digit NOC 2011 code throughout the project at specified time intervals (monthly or at least quarterly) which would show levels of employment throughout the project timeline;
- An indication of whether the positions are full-time equivalent or if they are the actual number of positions; if they are indeed the actual number of positions, how many are full-time vs. part-time;
- An estimate of the number of apprentices (by level and trade/4-digit NOC code) and journeypersons required;
- Qualifications, certifications and other requirements, including the need for, location and availability of related training opportunities (e.g., post-journeyperson training) associated with key positions for all phases of the project;
- The anticipated source of the workforce, including an estimate of local employment (local area, provincial) and any strategies for recruitment. This should also include clarification on which positions would be direct hires, and which would be from companies contracted to carry out project work; and
- A commitment to provide quarterly summary reports for each phase of the project. These reports would include information on the number employed by 4-digit NOC, the number of full-time/part-time employees, the number of apprentices (by level) and journeypersons for each applicable 4-digit NOC code, gender and source of the workforce.

4.1.4.5 Alternative Means of Carrying out the Project

The EIS shall identify and describe alternative means of carrying out the Project or components of the Project, and assess their technical and economic feasibility. The analysis shall describe:

- the alternative means considered, an assessment of their technical and economic feasibility, and the rationale for rejecting alternatives;

- a description of the conditions or circumstances that could affect or alter these choices, such as market conditions, regulatory changes and other factors, either prior to construction or during the life of the Project;
- the environmental effects of the alternatives, in sufficient detail to allow comparison with the effects of the Project;
- the costs associated with failure of key components of the Project including failure of the tailings management area and heap leach process (to inform the viability of the alternate means), and;
- the preferred means of carrying out the Project or its components based on the relative consideration of environmental effects including the criteria and rationale for their selection.

The EIS shall analyze and compare the design alternatives for the Project in relation to their environmental and social costs and benefits, including those alternative means that cost more to build and/or operate but which result in reduced adverse environmental effects or more durable social and economic benefits.

At a minimum, the discussion of alternative means of carrying out the Project shall include:

- waste rock storage management and location;
- location of the tailings management area;
- all options for methods of tailings disposal, including dry stacking and in-pit disposal;
- specifications, design, operation, closure and post-closure monitoring of the engineered tailings management facility (TMF);
- overburden storage and management;
- specifications, design, operation, closure and post-closure monitoring of the heap leach processing facility;
- all options for the processing of ore, including not requiring the use of heap leach in the gold extraction process;
- pit dewatering options;
- contracting or lengthening of the operations;
- labour supply;
- working conditions, including shift and rotation lengths;
- mining methods; and
- reclamation methods.

Mapping indicates there are water bodies within the proposed project footprint. If those water bodies are frequented by fish then those water bodies may need to be added to Schedule 2 of the Metal and Diamond

Mining Effluent Regulations under the federal *Fisheries Act*. Environment and Climate Change Canada (ECCC) will require a detailed assessment of alternatives before considering the addition of the waterbodies to Schedule 2. A copy of the ECCC Guidelines for Alternatives Assessment is attached as an Appendix. Compliance with the ECCC Guidelines is required if the project intends to use waters frequented by fish or waters that may enter waters frequented by fish for the purpose of tailings disposal or other infilling.

4.1.5 Description of the Existing Environment

The EIS shall provide a description of the biophysical and socio-economic environments that could be affected by the Project, both in the immediate vicinity and beyond. This shall include the components of the existing environment and environmental processes, their interrelations and interactions, as well as their variability over time scales appropriate to the effects analysis. The level of detail shall be sufficient to:

- identify and assess any adverse environmental effects that may be caused by the Project;
- identify and characterize the beneficial effects of the Project; and
- provide the data necessary to enable effective follow-up.

A description of the existing environment shall be developed for the following environmental components:

- atmospheric environment;
- geology (bedrock and surficial), geomorphology and geochemistry;
- bodies of water (wetlands, streams, etc.) including water quality and quantity;
- topography;
- hydro dams including the Victoria Lake reservoir and Victoria Lake dam, dykes and canal;
- land and resource use;
- Species at Risk and species of conservation concern;
- caribou habitat and migratory behaviour;
- fish and fish habitat;
- avifauna (migratory and non-migratory), other wildlife birds and their habitats (including Sensitive Wildlife Areas);
- heritage resources;
- tourism and outfitting resources (operators, assets, viewscapes, etc.);
- communities;
- community services and infrastructure; and
- population health status including but not limited to:

- demographics;
- rates of chronic disease (e.g. cancer, heart disease, chronic pain, and others);
- rates of communicable disease (e.g. hepatitis, sexually transmitted infections, influenza, enteric illness, and others);
- healthy living indicators;
- rates of disability;
- mental health status;
- rates of substance use;
- rates of domestic violence and crime; and
- economy, employment, household incomes, and business.

VECs for each environmental component shall be described.

The baseline description shall characterize environmental conditions resulting from historic and present activities in the local and regional study area. The physical and biological environments shall be described based on an ecosystem approach that considers scientific knowledge and perspectives regarding ecosystem health. The EIS shall identify and justify the selected indicators and measures of ecosystem health (i.e., measurable parameters). These indicators should be transferable to future project monitoring and other follow-up.

In assessing effects to the biological environment, the EIS shall consider the resilience of relevant species populations, communities and their habitats. It shall summarize all pertinent historical information on the size and geographic extent (i.e. ranges) of relevant animal or floral populations as well as density, based on best available information. Where little or no information is available, and when appropriate, specific studies shall be designed to gather information on species populations and densities that could be adversely affected by the Project. Habitat at regional and local scales shall be defined when mapping aquatic and terrestrial vegetation types and/or communities.

Habitat use at regional and local scales should be characterized by type of use (e.g., spawning, breeding, migration, feeding, nursery, rearing, wintering), frequency and duration. Emphasis shall be on those species, communities and processes most sensitive to project effects. However, the interrelations of these components to the greater ecosystem and communities of which they are a part shall be indicated. The EIS shall address issues such as habitat, migratory behavior, nutrient and chemical cycles, food chains and productivity, to the extent that they are appropriate to understanding the effects of the Project. Range and probability of natural variation over time shall also be considered.

The EIS shall provide a description of the communities likely to be affected by the Project, including demographic, economic, social and community health information. If the information available from government or other agencies is insufficient or no longer representative, the Proponent shall complete the description of the environment with current surveys and studies. The Proponent shall outline how the potential negative impacts of the “boomtown effect” on neighbouring communities may be mitigated.

The EIS shall indicate the Project’s proximity to sensitive features such as dams, residences, cabins, outfitters, tourism assets and operators, and locations of hunting and gathering activities (i.e., country foods collection). Depending on the type of potential effects the Project may have on these receptors, appropriate baseline evaluation should be undertaken (e.g., seismic loading, hydrometric loading, baseline noise, current levels of access, surface soil, air quality, drinking water, groundwater resources (including any private water supply wells), etc.).

The EIS shall also describe existing geology, geochemistry, geomorphology, soils and terrain at the project site and in the immediate vicinity.

The EIS shall explain any extrapolation, interpolation or other manipulation applied to the baseline data used to describe environmental conditions in the study area. Any information gaps from a lack of previous research or practice shall be described indicating information that is not available or existing data that cannot accurately represent environmental conditions in the study area over four seasons. If data gaps remain, the Proponent shall describe its efforts to resolve the data gaps, including any direct consultation with groups, individuals and others.

4.1.6 Environmental Effects and Assessment

The EIS shall contain a comprehensive analysis of the Project’s predicted effects on the environment, including cumulative effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out. The assessment shall include, but not be limited to, the effect of any environmental change on health and socio-economic conditions. Potential effects from all components of the Project at the site and within the Project’s zone of influence shall be discussed. The EIS shall predict the Project’s effects during all project phases (e.g., construction, operation, maintenance, foreseeable modifications, closure, decommissioning and reclamation) and describe them using appropriate criteria.

The environmental effects assessment in the EIS shall be based on best available information and methods. The methods employed shall be clearly explained. All conclusions shall be substantiated and the supporting logic clearly traceable. The Proponent is encouraged to make use of existing information relevant to the project. When relying on existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent shall include the information directly in the EIS or clearly direct (e.g., through cross-referencing) the reader to where they may obtain the information. With respect to pre-existing baseline studies, the Proponent will append these to the EIS as distinct appendices. When relying on existing information, the Proponent shall also comment on how the data have been applied to the project, clearly separate factual lines of evidence from inference and state any limitations on the inferences or conclusions that can be drawn from them according to the criteria for information quality set out in the EIS Guidelines.

For instance:

- assumptions should be clearly identified and justified;
- all data, models and studies shall be documented such that the analyses are transparent and reproducible;
- the uncertainty, reliability and sensitivity of models used to reach conclusions shall be indicated;
- conclusions should be substantiated; and,
- the studies should be prepared using best available information and methods.

Modeling methods and equations presented shall include information on margins of error and other relevant statistical information (e.g., confidence intervals, possible sources of error, etc.).

The Proponent shall prepare a table describing the proposed Project's anticipated effects, which shall enable the reader to review and consider those effects.

Views of the public relative to the EA, including any perceived changes in the environment from the Project, shall be acknowledged and considered. The EIS shall clearly articulate how relevant issues raised by the public have been considered, including any changes to the Project, or mitigation or follow-up measures arising from such consideration.

4.1.6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed

The EIS shall describe the predicted future condition of the environment with respect to the key issues, if the project does not proceed. The predicted future condition of the environment shall help to distinguish project-related effects from environmental change due to natural processes.

4.1.6.2 Accidents and Malfunctions

The EIS shall identify and describe accidents and malfunctions that may occur as a result of project activities, including:

- an explanation of how those events were identified, potential consequences (including potential environmental effects);
- a quantitative analysis of the risks of accidents and malfunctions across all phases of the Project; and
- the plausible worst case scenarios and the effects of these scenarios and associated environmental effects.

The EIS should identify potential accidents, malfunctions, unplanned events (e.g., premature or permanent shutdown), or emergency situations that could be associated with all phases of the Project, including:

- product spills,
- fires,
- floods,
- potential impacts on hydro dams, including the Victoria Dam (seismic loading effects from blasting, effects of a tailings dam failure),
- fuel transportation and storage,
- resource road conflicts with wildlife and other users as well as the probabilities and hazards associated with them, and
- the preventive measures and design safeguards that have been established to protect against such occurrences and the contingency/emergency response procedures in place in the event that an accident/malfunction occurs.

Factors which contribute to the uncertainty of detecting and mitigating effects associated with accidents and malfunctions shall be assessed.

The proponent should conduct a quantitative analysis of the risks of accidents and malfunctions across all phases of the Project, determine their effects, and present preliminary emergency response measures and associated capacities.

Taking into account the lifespan of different project components, the proponent will identify the probability of potential accidents and malfunctions related to the project, including an explanation of how those events were identified, potential consequences, the plausible worst case scenarios and the effects of these scenarios. Fate and behaviour modelling of potential spills of hazardous materials, including hydrocarbons and sodium cyanide, to waters frequented by fish should be considered for all seasons.

The EIS will describe the preventive measures and design safeguards that have been established to protect against such occurrences and the contingency and emergency response procedures that would be put in place if such events do occur. Environmental sensitivity mapping, including likely pathways, will identify areas sensitive to accident and malfunction scenarios that are located adjacent to project activities, including streams and wetland areas frequented by fish and/or by migratory birds.

4.1.6.3 Capacity of Renewable Resources

The EIS shall consider the capacity of renewable resources that are likely to be affected by the Project to meet the needs of the present and those of the future. The EIS shall identify any VECs predicted to experience adverse residual environmental effects, describe how the Project could affect their sustainable use and describe the criteria used in the analysis.

4.1.7 Avoidance and Mitigation Measures

Mitigation is the elimination, reduction or control of the adverse environmental effects of the Project. It includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. The EIS shall consider measures that would mitigate adverse environmental effects of the Project. Such measures should also be assessed for their technical and economic feasibility. The approach to mitigation shall be premised on a preference for avoidance and reduction of effects at their source, including modifying the Project design or its components as well as relocation of certain components, and assess their technical and economic feasibility.

The EIS shall describe the standard mitigation practices, policies and commitments and the mitigation measures and that will be applied. The Proponent, where possible, should refer to similar situations where the proposed mitigation has proven to be successful. Mitigation failure should be discussed with respect to risk and severity of consequence.

The EIS shall describe the Proponent's Environmental Protection Plan (EPP) which shall provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The Proponent shall describe its commitments, policies and arrangements directed at promoting beneficial or mitigating adverse socioeconomic effects and explain how it will ensure compliance among its contractors and sub-contractors and how compliance will be audited and enforced.

The EIS shall specify the actions, works, minimal disturbance footprint techniques, best available technology, monitoring and surveillance, corrective measures or additions planned during the Project's phases (construction, operation, modification, decommissioning, abandonment or other undertaking related to the Project) to eliminate or reduce the magnitude of adverse effects. The EIS shall also present an assessment of the effectiveness of the mitigation measures. The Proponent shall discuss the application of the Precautionary Principle in the identification of mitigation measures. The Precautionary Principle is defined in Section 1.2.3.

If there are mitigation measures that were considered and rejected, the EIS shall discuss these and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation shall be justified. The Proponent shall identify who is responsible for the implementation of these measures and the system of accountability.

Should the Project be released, the Proponent shall ensure that measures are taken to avoid or lessen any potential adverse effects on listed or designated species, their critical habitat or the residences of individuals of those species. Potential effects shall be monitored and mitigation shall be consistent with any applicable recovery strategy and action plans. The EIS shall include information that will allow the Province to meet this requirement.

In addition, the EIS shall identify the extent to which technology innovations will help mitigate environmental effects. Where possible, it shall provide detailed information on the nature of these measures, their implementation and management, as well as whether follow-up will be required.

4.1.7.1 Acid Rock Drainage and Metal Leaching

If there is a potential for ARD/ML to occur, the proponent's ARD/ML program report investigation shall include the following:

- the design of the ARD/ML program and, if a phased program, the chronology of ARD/ML investigations (include all mineralogy, elemental analysis, static and kinetic test work conducted to date);
- determination of the distribution of sample test results for each lithological/alteration/waste management unit. The assessment should account for vertical and horizontal distribution, as well as sampling biases, to permit proper characterization of the unit including the units range of variability;
- the rationale, advantages and disadvantages including a description, for all test work;
- predictions of the ARD/ML potential of all material management units (ore, waste rock, overburden, quarry materials and tailings) to be disturbed or created during all phases (construction, operation, decommissioning, reclamation and post-closure) of the proposed project. This shall include an interpretation of the results, an estimation of risk for the onset of ARD for each lithological/alteration/waste management unit and the predicted drainage chemistry for each unit (including the types and concentrations of major trace elements); and
- clear, concise cross-sections which relate the ARD/ML assessment (static/kinetic sample locations and results), geology, and Project development plans.

4.1.8 Cumulative Effects Assessment

The EIS shall include an analysis of cumulative effects of the Project in combination with other projects or activities that have been or will be carried out. An effective cumulative effects assessment will take into account the aggregate effect of the Project in the context of other foreseeable developments and activities.

The analysis of cumulative effects shall consider different types of effects (e.g., synergistic, additive, induced, spatial or temporal) and identify impact pathways and trends. The EIS shall assess any residual cumulative environmental effects that remain after mitigation has been implemented.

The EIS shall:

- identify and justify the VECs that will constitute the focus of the cumulative effects assessment. For greater certainty, cumulative effects shall be assessed in relation to each VEC for which a residual effect of the Project is predicted to be adverse and likely. The assessment should examine the likelihood, nature and extent of the predicted cumulative effects of the Project in combination

with other projects and activities that have been or will be carried out. It may be appropriate, during the course of the EA, to refine the definition of VECs selected for cumulative effects assessment;

- present a justification for the spatial and temporal boundaries of the cumulative effects assessment. The boundaries for the cumulative effects assessment will depend on the VECs being considered (e.g., will generally be different for different VECs). The boundaries for the cumulative effects assessment will also generally be different from (larger than) the boundaries for assessing effects of the Project;
- describe and justify the choice of activities for the cumulative effects assessment. These shall include past activities and projects, those being carried out and future projects or activities likely to be carried out;
- describe the cumulative effects on neighbouring communities and/or other large development projects in other regions of the province with regards to community services, and health and social impacts;
- describe the mitigation measures and assess their technical and economic feasibility; and
- assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the Proponent's responsibility that could be effectively applied to mitigate these effects, the Proponent shall identify these effects and the parties that have the authority to act. In such cases, the Proponent shall summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.

Other projects and activities (e.g., hydro development, transmission lines, road development, tourism, outfitters, etc.) should be considered in assessing cumulative effects to VECs. Notably, the cumulative effects assessment should be focused on key VECs and their potential stressors, rather than on providing detailed descriptions of other projects.

The methods used to scope and assess cumulative effects should be clearly described in the EIS, demonstrating how conclusions have been reached.

4.1.9 Effects of the Environment on the Project

In addition to describing environmental effects on the environment as a result of the undertaking, the EIS should also describe the climatic conditions at the project site and in local and regional study areas and provide a description of seasonal variations and trends in climatic conditions, to allow the assessment of effects on the Project. Any use of off-site data shall be described and an analysis of its degree of

representativeness for Project conditions shall be included. The use of the data should be qualified with an understanding of local and regional variability and the geographic locations of any onsite and offsite meteorological stations. The geographic locations of any onsite and offsite meteorological stations shall be provided. Climate data should also be provided and taken into account when evaluating effects of the project on air quality, hydrology, hydrogeology, and water management. The influence of local and regional topography or other features that could affect conditions in the study area should also be considered, as appropriate. Specifically, the EIS shall include a description of the following components:

- Physiography: topography, drainage network;
- Climate: historical records of total precipitation (rain and snow), mean, maximum and minimum temperatures;
- Geological context: bedrock and surficial cover stratigraphy and composition, geotechnical properties and structural geology features such as fractures and faults in the mine area and where major project infrastructures and earthworks are proposed (e.g., open pits, heap leaching facility, TMF, etc.);
- Hydrogeological context: hydrogeological characteristics of the different geological units (hydraulic conductivities, porosity, storage coefficients); groundwater geochemistry and groundwater levels for the areas that are adjacent to, and/or will be disturbed by project activities; occurrence of wetlands in the vicinity of the project, and potential effect of activities on wetlands;
- Streamflow data records (levels and yields) of surroundings lakes, rivers and brooks; and
- Geotechnical properties of the area, such as slope stability and bearing capacity of facility foundations under both static and dynamic conditions, including ground ice and thermal conditions.

The EIS shall predict how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g., flooding, dam breach, ice jams, rock slides, landslides, fire, outflow conditions and seismic events) could adversely affect the project and how this in turn could affect the environment (e.g., environmental emergencies due to extreme environmental conditions). The EIS should describe measures that will be implemented to prevent and respond to such events. The EIS should discuss the sensitivity of the project to changes in specific climate and related environmental parameters, including total annual rainfall, total annual snowfall, frequency and/or severity of precipitation extremes, watercourse levels and stream flow, groundwater flow and potential effect on wetlands.

In addition, the EIS shall discuss:

- potential geotechnical and geophysical hazards within the Project area, including potential seasonal subsidence, seismicity and faulting, risks associated with tailings dam, polishing pond dam and Victoria Dam, cut/fill slopes and constructed facilities. Where appropriate, the assessment should be supplemented by illustrations such as maps, figures, cross sections and borehole logs;
- potential effects on foundation stability of major Project components from geological fractures and faults and associated implications of these features on project planning and engineering design. Those Project components assessed shall include, but are not limited to: tailings management facility, waste rock stockpiles, heap leach pad, overburden and organic stockpiles, tunnels, stopes and open pits;
- potential effects of the groundwater level on mining operations or potential effects of mining operations on groundwater flow and occurrence; and
- potential effects of climate change on the Project.

The EIS shall provide measures and strategies to mitigate the potential effects of the environment on the project.

4.1.10 Environmental Management

4.1.10.1 Planning

The EIS shall describe the proposed Environmental Effects Monitoring Plans (EEMPs) for all stages of the Project and include a commitment by the Proponent to implement the EEMPs, should the Project proceed. EEMPs shall be developed in consultation with government agencies, the public and other stakeholders. This may occur after the EA, but shall be consistent with the information presented in the EIS. Pertinent legislation, regulations, industry standards, documents and legislative guides shall be used when developing EEMPs.

The entire project should be designed with closure in mind.

The EIS shall also outline a preliminary decommissioning and reclamation plan for the Project. The plan shall address ownership, transfer and control of the different Project components, as well as the responsibility for monitoring and maintaining structures. The EIS shall include a conceptual discussion of how decommissioning of permanent facilities may occur.

4.1.10.2 Monitoring and Follow-up Programs

The EIS shall describe the environmental and socio-economic monitoring, rehabilitation studies and follow-up programs (collectively environmental effects monitoring programs or EEMP) to be incorporated into the Project (planning, design, construction, operation, closure and post-closure phases) in order to determine the effectiveness of mitigation measures and to restore the affected environment to ecologically and socially acceptable levels.

Monitoring studies and programs will ensure that the Project is implemented as proposed, that the mitigation or compensation measures proposed to minimize the Project's environmental effects are effectively implemented, and that the conditions set at the time of the Project's authorization and the requirements pertaining to the relevant laws and regulations are met. The monitoring program will also make it possible to check the proper operation of works, equipment and facilities. If necessary, the program will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

The purpose of the follow-up program is to verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of the mitigation measures. The follow-up program shall be designed in consultation with the Environmental Assessment Committee members for this project to incorporate project baseline information (including modeling data), as well as compliance data (e.g., established benchmarks, regulatory documents, standards or guidelines) and real-time data (e.g., observed data gathered in the field). Effects predictions, assumptions and mitigation actions that will be tested as part of the follow-up program shall be framed as field-testable monitoring objectives. The monitoring design should include a statistical evaluation of the adequacy of existing baseline data, to provide a benchmark against which to test for project effects and the need for any additional pre-construction or pre-operational monitoring to augment baseline data. The duration of the follow-up program shall be as long as is needed to evaluate the effectiveness of the mitigation measures.

If either of these programs identifies unforeseen adverse environmental effects, the Proponent shall commit to adjust existing mitigation measures, or, if necessary, develop new mitigation or compensation measures. The Proponent shall describe how the results of monitoring and follow-up programs will be used to refine or modify the design and implementation of management plans, mitigation measures and Project operations. The Proponent shall distinguish as appropriate between monitoring (compliance) and effects follow-up programs.

A schedule for follow-up frequency and duration is required after an evaluation of the length of time needed to detect effects, given estimated baseline variability, likely magnitude of environmental effect and desired level of statistical confidence in the results.

The proposed approach for monitoring shall be described and shall include:

- (a) The objectives of the monitoring program and a schedule for collection of the monitoring data required to meet these objectives;
- (b) The sampling design, methodology, selection of the subjects and indicators to be monitored, and their selection criteria;
- (c) The frequency, duration and geographic extent of monitoring, and justification for the extent;
- (d) The application of the principles of Adaptive Environmental Management;
- (e) Reporting and response mechanisms, including criteria for initiating a response and procedures;
- (f) The approaches and methods for monitoring the cumulative effects of the Project with existing and future developments in the Project area;
- (g) Integration of monitoring results with other aspects of the Project including adjustments to operating procedures and refinement of mitigation measures;
- (h) Experience gained from previous and existing monitoring programs;
- (i) The advisory roles of independent experts, government agencies, communities, and renewable resource users;
- (j) Procedures to assess the effectiveness of monitoring and follow-up programs, mitigation measures and recovery programs for areas disturbed by the Project; and
- (k) A communications plan to describe the results of monitoring to interested parties.

The Proponent shall explain how the public shall continue to be involved, including participation in the design and implementation of environmental management and monitoring and follow-up programs.

The Proponent shall describe plans to maintain communications and working relationships with the affected communities, municipalities and government agencies throughout the life of the Project. The intent of these plans is to involve those groups in monitoring and follow-up programs, including in the identification and work towards the reduction of adverse physical, biological or socio-economic effects, and the enhancement of beneficial effects.

To design complete and comprehensive program proposals, the Proponent shall prepare and submit these documents subsequent to the completion of the environmental assessment, but before the initiation of the Project itself.

An example is seen in the NL *Endangered Species Act* and the federal *Species at Risk Act* (SARA) that contain provisions requiring that measures be taken to monitor adverse effects of a project on listed wildlife species and their habitat. If potential adverse effects on a listed wildlife species or its habitat are identified, a monitoring plan shall be developed to identify the circumstances under which corrective measures may be needed to address any issue or problem identified through the monitoring (i.e., if unanticipated effects occur or the importance of effects is greater than anticipated). The monitoring plan should clearly describe how government departments responsible for the species in question would be engaged in reviewing proposed adaptive management measures, in the event that mitigation measures are not effective.

4.1.11 Residual Adverse Environmental Effects

The EIS shall describe any expected residual effects of the Project on the biophysical and human environments, after mitigation measures have been applied. The residual effects should be described. The EIS shall provide sufficient detail so that the environmental effects of the Project and the degree to which they can be mitigated, can be clearly understood.

The criteria for evaluating residual effects (including cumulative effects) shall be described. The criteria may include: magnitude; duration and frequency; ecological or socioeconomic context; geographic extent; and degree of reversibility. Professional expertise and judgment may also be applied. The EIS shall contain enough detail to enable readers to follow the reasoning and process by which the Proponent assessed effects.

The EIS shall state the Proponent's conclusion, for each VEC, as to whether the Project in combination with the cumulative effects of other projects and activities is likely to cause adverse effects.

4.1.12 Economic and Social Benefits of the Project

Information on the predicted economic and social benefits of the Project should be presented. This information shall be considered by Government in assessing the justifiability of any adverse environmental effects, if necessary.

The Proponent shall demonstrate prudent resource management in compliance with Section 6.(1b) of the *Mining Act*, to the satisfaction of the Minister of Natural Resources.

4.1.13 Benefits of the EA to Newfoundland and Labrador

The EIS shall describe how the EA process for the Project benefits Newfoundlanders and Labradorians, focusing on aspects such as:

- maximized environmental benefits: describe the expected environmental benefits as a result of the project;
- contribution of the EA to sustainable development: describe how the EA process for the project is expected to contribute to the concept of sustainable development for a healthy environment and economy;
- public participation: describe how public participation in the EA is expected to influence the project design and the environmental effects analysis;
- technological innovations: describe new technologies expected to be developed to address environmental effects that could be used for other projects;
- increases in scientific knowledge: describe any new scientific information expected to be collected through the EA or follow-up that could benefit the assessment of other projects;
- community and social benefits: describe any expected changes in project design that would result in indirect benefits to communities and/or social benefits; and
- a commitment to develop a Benefits Agreement and Gender Equity and Diversity Plan that meets the approval the Minister of Natural Resources and Minister for the Status of Women.

4.1.14 Assessment Summary and Conclusions

The EIS shall summarize the overall findings of the EA, with emphasis on the main environmental issues identified. For all VECs, the EIS shall include a table that summarizes:

- the Project's potential adverse environmental effects;
- proposed mitigation and compensation measures;
- proposed follow-up;
- potential residual effects;
- potential cumulative effects;
- potential effects of accidents and malfunctions on the VEC;
- applicable standards or guidelines;

- comments from the public and responses; and
- commitments made by the Proponent, including the timing and responsibility of each.

4.1.15 Public participation

The EIS shall describe a planned program of public participation and consultation, including, but not limited to the following:

- a) an opportunity for interested members of the public to meet with the proponent at a place adjacent to or within the geographical area of the undertaking, or as the minister may determine, in order to:
 - i. provide information concerning the undertaking to the people whose environment may be affected by the undertaking;
 - ii. describe the rationale for the gold mine, impacts to wildlife, impacts to tourism, and any other pertinent details to address public concerns;
 - iii. record and respond to the concerns of the local community raised during the public meeting regarding the environmental and socioeconomic effects of the undertaking, and to describe those concerns and the proponent's response to those concerns in a separate section of the EIS; and
 - iv. conduct the meeting in compliance with the legislation and with divisional policy included in Appendix A.

4.1.16 Environmental Protection Plan (EPP)

The proponent shall prepare an EPP for construction and operation of the Valentine Gold Project, for approval by the Minister of Municipal Affairs and Environment, prior to commencing any construction. The EPP shall be a stand-alone document that targets the site foreperson, the proponent's occupational health and safety staff, the proponent's environmental staff and any government environmental surveillance staff. The EPP shall address construction, operation and maintenance activities associated with the project. A proposed Table of Contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major construction and operational activities, permit requirements, mitigation measures and contingency plans, as follows:

- proponent's environmental policies,
- environmental compliance monitoring,
- environmental protection measures,
- mitigation measures,

- permit application and approval planning,
- contingency planning for accidental and unplanned events,
- statutory requirements, and
- revision procedures and contact lists.

The proponent shall prepare and submit the EPP for approval subsequent to the completion of the EIS, and prior to the initiation of project construction.

4.1.17 References

The proponent shall include a complete and detailed bibliography of all data and information sources used to prepare the EIS. The same requirement applies to each baseline study.

4.2 Detailed Guidance on Select Environmental Studies

The following section provides an overview of the baseline studies and approach to be undertaken in the EIS for each VEC. Detailed study approaches and analytic methods and assumptions shall be provided in each baseline study.

4.2.1 Baseline Studies

Baseline studies are required for this EIS. The baseline studies shall describe and provide data on specific components such as to address baseline data requirements to support the evaluation of one or more VECs, environmental effects and/or to develop mitigation measures and follow-up monitoring programs. Each baseline study shall be a stand-alone document which may be appended to the EIS upon submission. The results of each baseline study shall be included and referenced in the EIS. Where new information becomes available, additional baseline studies may be required.

Baseline studies should generally have the following format:

- (a) Rationale/Objectives: In general, the baseline studies should be conducted to obtain all required data for use in determining the potential for effects on one or more VEC as well as for monitoring and follow-up programs.
- (b) Study Area: The boundaries of the study area shall be defined depending on the characteristics of one or more VECs being investigated.
- (c) Methods: Methods shall be proposed by the Proponent, in consultation with resource agencies, as appropriate. The methods used in each baseline study shall be described in the EIS.
- (d) Study Outputs:
 - Study outputs shall be proposed by the Proponent. Information and data generated shall be sufficient to adequately predict the effects on one or more VEC and to determine monitoring and follow-up requirements;
 - All maps are to be presented using Geographic Information System (GIS) with shape files;
 - Raw data shall be included in the Appendices in electronic tabular form and shape files for GIS; and
 - Identification of all information sources.

Baseline studies shall be prepared for the following:

- dam safety (Project dams and potential effects on the Victoria Lake reservoir, dam, dykes and canal);
- woodland caribou (including habitat, migratory behaviour, and cumulative effects);
- water resources;
- fish, fish habitat and fisheries;
- acid rock drainage and metal leaching (ARD/ML) assessment, prediction, and mitigation;
- atmospheric environment including greenhouse gas (GHG) emissions;
- avifauna (migratory and non-migratory), other wildlife and their habitats (including Sensitive Wildlife Areas);
- species at risk and species of conservation concern;
- population health and community services infrastructure; and
- historic resources.

4.2.1.1 Dam Safety

Dam safety relates to the actions taken to protect the public and the environment from the effects of dam failure, as well as the release of any or all of the retained fluids or materials behind the dam. The standard of care to be exercised in the management of dam safety shall be commensurate with the consequences of a dam failure and due diligence shall be exercised at all stages of a dam's life cycle. A dam owner shall establish dam safety management systems that incorporates policies, responsibilities, plans and procedures, documentation, training, and review and correction of deficiencies and non-conformances. The potential effects of tailings management area dams and other dams of the Project shall be assessed properly so that suitable mitigative measures can be established.

4.2.1.1.1 Definition and Rationale for Selection

Dam safety has been included in the baseline studies because of the potential impact project dams may have on a number of different identified VECs. Dam safety has the potential to have significant impacts on the downstream public and environment. A dam is a barrier constructed for the retention of water or other substances including tailings. VECs potentially impacted by dam safety include the Victoria Dam and reservoir, waterbodies, fish and fish habitat, the economy, community services and infrastructure, and community health.

4.2.1.1.2 Potential Project-VEC Interactions

Potential Project-VEC interactions include:

- proximity of the Project site to the Victoria Dam owned and operated by Nalcor;
- effects of a possible tailings dam failure and cascade effects on the Victoria Lake reservoir, Victoria dam, other downstream dams, downstream communities, infrastructure and the environment;
- impacts of non-tailings dam failures;
- impact on the operational reservoir levels of the Victoria Lake reservoir;
- impact of blasting activities at the Project site on the Victoria Dam;
- need for communication, coordination and cooperation between the Proponent and Nalcor concerning dam safety, site access, etc.; and
- impacts of the Project on water quality in the Victoria Lake reservoir and downstream watersheds, and whether this may impact Nalcor dams.

4.2.1.1.3 Existing Environment

The baseline study shall describe natural site conditions and the proposed Project site with any dams. The description of the existing environment in the EIS shall include:

- information on the Proponent's existing dam safety management practices and programs covering the life cycle of a dam from design to closure;
- description of the foundation material proposed dams shall be constructed upon;
- current level of communication, coordination and cooperation with Nalcor concerning dam safety;

4.2.1.1.4 Effects Assessment and Mitigation

The adverse environmental effects of the Project on dam safety shall be assessed for all phases of the Project and potential accident scenarios including dam failure. In conducting the analysis on dam safety, the EIS shall consider best practices as per the Canadian Dam Association, Dam Safety Guidelines and Bulletins. The EIS shall provide a description of measures to mitigate effects and list potential residual effects.

The Dam Safety Baseline Study shall describe the design for any proposed Project site dams including dam location, an assessment of alternate locations, dimensions, embankment slopes, materials, number of construction phases and phased construction type (upstream, centerline, or downstream raise). Project site dams may include tailings dams, polishing pond dams, containment dams, solution pond dams, and stormwater management dams. A determination of the dam consequence classification as per the Canadian Dam Association, *Dam Safety Guidelines*, shall be provided for all dams as this will form the basis of the dam design and requirements for the dam safety management program to be established by the Proponent.

The Dam Safety Baseline Study shall include:

- rationale and justification for the selected tailings management area site and design including an assessment of potential impacts and associated costs at alternative site locations;
- dam break inundation modelling and mapping to help determine the consequence classification of any dams associated with the Project and for inclusion in a future Emergency Preparedness and Response Plan;
- an assessment of Project impacts on the Victoria Dam, other water control structures on the Victoria Lake Reservoir, other downstream dams on both the Exploits River system and Bay d'Espoir system, downstream communities, infrastructure and environments in consultation with 3rd party dam owners (Nalcor), including a possible cascade failure of the Victoria Dam and other downstream dams. The Proponent should discuss the development of a cascade failure analysis model of the tailings dam on the Victoria Dam, other Victoria Reservoir control structures, and

other downstream dams on both the Exploits River system and Bay d'Espoir system using existing dam break model information developed by the dam owner;

- an assessment of water quality impacts from regular discharge from the tailings management area, or a leak or failure of the tailings dam on the Victoria Lake reservoir and dam;
- the provision of input parameters (e.g., seismic loads, ground acceleration, dam break flood flows, etc.) to be used in hydrologic, hydraulic and geotechnical models by 3rd party dam owners (Nalcor) whose dams may be impacted by the Project to help determine possible impacts in consultation with 3rd party dam owners;
- determination if tailings are acid generating or not, as this will inform the closure phase of the tailings management area, and provide details on plans for closure of the tailings management area that also incorporate consideration for climate change;
- provide an overview of the closure plans for other Project dams and associated infrastructure that also incorporate consideration for climate change. Outline who will be responsible for long-term closure activities in the event of changes to the status of the Proponent (e.g., bankruptcy, change in ownership) and how closure activities will be financed;
- identification of components of the dam safety program to be established by the Proponent based on the consequence classification of Project dams including the Emergency Preparedness and Response Plan, frequency of inspections and Dam Safety Reviews, annual inspection reports, training of staff, monitoring and surveillance instrumentation to be installed and operated, operations curves, etc. Provide a plan for how the Proponent will prove and validate the safety of its dam structures to regulators and affected 3rd party dam owners (Nalcor); and
- a plan for how communication and the transfer of information between the Proponent and affected 3rd party dam owners (Nalcor) will be achieved including but not limited to updates to Emergency Preparedness and Response Plans, notification of spilling, notification of blasting, joint emergency exercises, updating of dam break flood mapping, access road issues, and review of reports and design drawings.

4.2.1.2 Woodland Caribou (Habitat, Migratory Behaviour and Cumulative Effects)

The effects of the Project on woodland caribou, including their habitat and migratory behaviour will be assessed within the Project study area and throughout the range of affected caribou herds. A cumulative effect is defined as a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time and a cumulative effects assessment is a systematic process of identifying, analyzing, and evaluating cumulative effects. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out will generally be different from (larger than) the boundaries for assessing the effects of the Project.

4.2.1.2.1 Definition and Rationale for Selection

Woodland caribou, in the context of VEC definition, refers to woodland caribou that are potentially using, breeding, moving and/or migrating through the Project area and potentially impacted by the Project and associated infrastructure/activities, including from cumulative effects due to other land use in the area. Woodland caribou are important to local residents, regional stakeholders, and regulatory authorities (i.e. municipal, provincial and federal) for recreation, economic and/or management considerations.

The Newfoundland population of caribou are of significant conservation concern for the Province, with population levels declining from a peak of 93,000 (in the mid-1990's) to just over 30,000 today. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended listing the herds as Special Concern in 2014. The herds will be reassessed by COSEWIC in 2024. There are four woodland caribou herds that interact with the proposed Project, specifically the Buchans, Grey River, Gaff Topsails and Lapoile caribou herds. These herds represent approximately 32 to 35 per cent of the island of Newfoundland caribou population, and represent approximately 89 per cent of the South Coast Study Area caribou population. The Project is located directly within the migration corridor between spring/summer/fall and winter ranges for the Buchans and Gaff Topsails caribou herds and is located within the spring, summer and fall ranges for the Grey River, Lapoile and Buchans caribou herds. Migration corridors are also paralleled by the proposed transmission line and intersected by the proposed road. Caribou are known to avoid industrial mining activities and migration routes are extremely sensitive to disturbance.

4.2.1.2.2 Potential Project-VEC Interaction

Potential Project-VEC interactions include:

- Habitat loss and avoidance, or degradation due to construction and operation of Project facilities and associated infrastructure;
- Impacts of increased access and related land use;
- Effects of emissions/discharges (including dust) from the Project and associated infrastructure/activities on habitat quality and habitat use;
- Direct and indirect effects (e.g. mortality, avoidance, calf recruitment, etc.) of construction, operation and/or decommissioning and/or accidents and malfunctions during these Project phases; and
- Effects of noise, lights, and/or presence of the Project and associated infrastructure/activities on migratory corridors and connectivity between seasonal habitats, and implications to seasonally important habitats.

Cumulative effects of the Project and associated infrastructure/activities in relation to other land use through space and time in the Project region and within the affected caribou ranges.

4.2.1.2.3 Existing Environment

The Woodland Caribou Baseline Study shall describe woodland caribou, their habitat and migratory behavior within the Project study area and throughout the range of the affected caribou herds. Caribou, their habitat, and migratory behaviour that could be affected by the Project and associated infrastructure/activities shall be characterized using existing data, supplemented by surveys as appropriate. The Proponent is required to contact the Department of Fisheries and Land Resources for further detail on the information requirements and to access existing caribou information/data.

The Woodland Caribou Baseline Study should give particular consideration to migratory corridors and seasonal connectivity between spring/summer/fall and winter ranges; and seasonally important habitats such as breeding, calving/post-calving, and wintering areas.

4.2.1.2.4 Effects Assessment and Mitigation

The adverse environmental effects of the Project on woodland caribou, their habitat and migratory behavior shall be assessed for all phases of the Project. In addition, the effects of potential accidents and malfunctions

and cumulative effects associated with other industrial use (e.g. hydro reservoirs) of the area, including roads and transmission lines, shall be assessed.

The Woodland Caribou Baseline Study shall present an analysis of the Project's effects on caribou, their habitat and migratory behaviour, giving consideration to, and demonstrating linkages to, predicted physical and biological changes resulting from the Project. Management tools (i.e. federal and provincial laws and policies, guidance, and provincial or regional strategies and plans) applicable to the protection of caribou and caribou habitat shall be considered in the EIS. The Woodland Caribou Baseline Study shall:

- assess the Project's effects of noise, light, and/or presence of the Project and associated infrastructure/activities on migratory corridors and connectivity between seasonal habitats, and implications to seasonally important habitats, and to also include:
 - Creation of zones of avoidance,
 - Physical hazards and attractants for wildlife (e.g. roads, pits, and other structural features), and
 - Chemical hazards and attractants for wildlife (e.g. identified contaminants of potential concern).
- quantify and describe overall loss, avoidance or alteration of caribou habitat that could result from the Project and its effect on caribou. Where possible, rank habitat value for caribou so that the loss of high-value areas can be assessed in the context of their regional availability and significant/uniqueness. Regional boundaries for assessment of relative habitat loss should be based on the population ranges for the affected caribou herds.

The Woodland Caribou Baseline Study shall describe measures to mitigate effects on caribou, their habitat and migratory behaviour and predict adverse residual effects. Such measures should also be assessed for their technical and economic feasibility. This includes plans and predictions for rehabilitation of the Project area, taking into account growth rates of local vegetation. The Woodland Caribou Baseline Study shall:

- Outline mitigations that resolve the Project's effects on caribou migratory corridors and connectivity between seasonally important habitats based on clearly defined scientific research and literature, and best industry practices;
- Outline mitigations that resolve the Project's effects on seasonally important caribou habitat;
- Contain original research to refine timing and duration of spring and fall migration periods, connectivity between seasonal habitats and migratory behavior of local caribou herds; and
- Contain original research to refine timing and duration of calving and post-calving periods of local caribou herds.

4.2.1.3 Water Resources

The effects of the Project on water resources will be assessed within the local and regional drainage areas that can be reasonably expected to be affected by the Project. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out may be different from (larger than) the boundaries for assessing the effects of the Project. The water resources baseline study shall be comprised of three parts: i) groundwater, ii) surface water, iii) and wetlands. This baseline study shall act as a water resources management plan that includes information requirements pursuant to the Water Resources Act, SNL2002 cW-4.01 and its regulations and policies.

4.2.1.3.1 Definition and Rationale for Selection

Water resources include the quality and quantity of groundwater and surface water resources in the vicinity of the Project, including wetlands. It has been selected because of:

- its importance to ecosystem function (including recreational use and protection of aquatic life);
- concerns regarding potential for release of hazardous materials on-site and potential contamination associated with mine and process water management;
- possible lowering of water table and effects on surface water / groundwater interactions (e.g., wetlands, baseflow from headwaters of two major watersheds, etc.); and,
- provisions of the NL *Water Resources Act*.

4.2.1.3.2 Potential Project-VEC Interactions

Potential Project-VEC interactions include:

- the potential loss of natural waterbodies as part of the project;
- effects related to mine water management as well as effects on water quality from effluent discharges and seepage;
- potential ammonia contamination from incomplete combustion of exploded materials (e.g., directly to surface waters, or to groundwater via bedrock fractures);
- effects on water quantity and hydrology/hydrogeology;
- effects related to mine water use (demand);

- effects to wetlands within the Project footprint and for areas that could be reasonably expected to be affected by the Project; alteration or loss of wetland quantity due to vegetation clearing, infilling, heavy equipment use and other vehicle traffic;
- alteration of wetland quality (including ecosystem integrity and ability to function) due to changes in surface water hydrology, such as ponding, disruption of baseflow or surface water diversion; and
- alteration of surface water and/or groundwater quality resulting from construction and/or operation (e.g. siltation, effluent discharge, spills) affecting wetlands and subsequent indirect effects to wetland plant communities;
- wetlands that may be affected by Project activities according to their location, size, type (wetland class and form), species composition and ecological function;
- effects of accidents and malfunctions; and
- erosion and sedimentation, including dust deposition.

4.2.1.3.3 Existing Environment

4.2.1.3.3.1 Groundwater

The Water Resources Baseline Study shall describe the hydrogeologic conditions at the Project site, including a complete assessment of groundwater resources within the project property. This should include a) a conceptual model of groundwater flow at the site both plan view and cross-sectional b) identification of locations for installation of monitoring wells to further delineate the shallow and deep groundwater regimes; and a groundwater flow model to use as a planning tool to evaluate the effects of the project on groundwater and vice versa. This computer model should be calibrated to evaluate whether or not there is any adverse effect on groundwater or surface water quality or quantity. It shall examine all available existing hydrogeology information required to assess the effects of the Project. Where knowledge gaps exist, the Proponent shall collect additional baseline information and provide it in the EIS.

The Water Resources Baseline Study shall include:

- a review of the geology of the Project area as it pertains to local and regional groundwater flow systems in the Project area (see list in Section 4.1.9);
- the physical and geochemical properties of hydrogeological units, such as aquitards (see list in Section 4.1.9);
- groundwater levels and a piezometric map for both shallow and deep groundwater regimes;
- identifying any preferential flow paths for groundwater (both shallow and deep);

- hydrogeologic maps and cross-sections for the Project area that outline the extent of aquifers, including stratigraphy, piezometric levels at different depths (to estimate vertical hydraulic gradients and show confined aquifers)/potentiometric contours; locations of wells, boreholes, springs, lakes and streams; groundwater flow direction;
- groundwater flow patterns and chemistry, identifying recharge and discharge areas and identifying groundwater interaction with surface waters including for Long Lake, Valentine Lake, and Victoria Lake;
- evaluation of aquifer characteristics and discharge rates;
- assessment of groundwater quality; and
- a description of any local and regional potable groundwater resource in the area.

Baseline information shall include existing water supply wells (if any) identified within the area of influence of the Project property. In the event there are existing wells, baseline water quality should be documented.

4.2.1.3.3.2 Surface Water

The Water Resources Baseline Study should describe existing surface water quality, hydrology, bathymetry, sediment quality and transport within the area of influence of the Project. The baseline should provide the basis for the assessment of potential effects to surface water, presenting the range of water quality, sediment quality and transport, and surface water hydrology. A time-series graph of key variables and stream flows shall be provided to illustrate patterns and variability. The full range of stream flow characteristics, in addition to mean values, should be described. An assessment should be undertaken for watersheds and sub-watersheds within the footprint of the Project and regional watersheds potentially affected by discharge from the Project including Valentine Lake, Victoria Lake, Victoria River, Red Indian Lake, Exploits River, Bay d'Espoir drainage system and White Bear River.

The Water Resources Baseline Study shall:

- include delineation of pre-development drainage basins, at appropriate scales;
- include delineation of drainage basins altered by development including direction of flow;
- describe and present monitored hydrological data, such as water levels, bathymetry and flow rates in local streams and selected local lakes;
- ensure that monitoring stations are included in the receiving environment as well as at end of pipe;

- outline plans for the installation of Real Time Water Monitoring Stations (including possible quality, quantity, groundwater and climate stations) in all potentially affected watersheds and prior to the start of construction;
- describe and assess hydrological regimes, including monthly, seasonal and year-to-year variability, normal flows, low flows, environmental (maintenance) flows and flood flows for selected return period flood events;
- include flows or design peak flows for selected periods for the Project area, including an estimate of runoff to delineated altered drainage basins from diverting flows around the pit and underground workings area;
- describe the interactions between surface water and groundwater flow systems under pre-development conditions and potential effects on these interactions during the various phases of the Project;
- identify any local surface water users (i.e., potable or recreational use);
- provide seasonal water quality field and lab analytical results and interpretation at several representative local stream and lake monitoring stations established at the Project site; and
- establish precipitation monitoring at higher elevations above mean annual sea level to assist with runoff assessments.

4.2.1.3.3.3 Wetlands

Wetlands are defined as the wetlands within the vicinity of the Project or that could be affected by the Project. They have been included as a VEC because of their importance to project planning and potential to be affected by Project activities.

Wetlands within the Project areas will be classified according to the *Canadian Wetland Classification System* (CWCS) (National Wetlands Working Group [NWWG] 1997). Efforts should focus on collection of data for wetlands with the greatest potential to be affected (i.e., within the Project footprint), while collecting data at the appropriate scale for regional comparisons.

An overview of the key plant communities and animals that rely on wetlands shall be presented.

Wetlands may be affected by Project activities associated with the open pit mine and infrastructure associated with the Project that will result in clearing of or disturbance to natural vegetation, site drainage or ground disturbance (e.g., grubbing, grading, and excavation).

4.2.1.3.4 Effects Assessment and Mitigation

The adverse environmental effects of the Project on water resources shall be assessed for all phases of the Project and potential accident scenarios. The Water Resources Baseline Study will describe the potential effects to any waterbodies within the Project footprint.

With respect to accident scenarios, the discussion of effects to both ground and surface water resources shall include an analysis of effects of malfunctions and accidents events, taking into account:

- the proposed transportation routes through the Project site (i.e., roads);
- the use of explosive products (e.g., emulsion explosives, ANFO);
- possible failure of heap leach or other harmful chemical containment;
- transportation of fuel for the Project. The EIS shall describe potential accidents and malfunctions associated with the transportation of fuel on the Project site; and
- the management, storage and disposal of used oil and associated potential for malfunctions and accidents events.

4.2.1.3.4.1 Groundwater

The Water Resources Baseline Study shall assess the effects of the Project on groundwater at the mine site. The effects assessment should provide a quantitative groundwater analysis to determine how Project-related facilities and activities will affect groundwater flows, quality and quantity, such as any effects to nearby lakes, streams and wetlands, during all Project phases, including day-to-day operations and for malfunctions and accidental events. The assessment should describe the duration, frequency, magnitude and spatial extent of any effects and outline the need for mitigation and/or monitoring measures. Seepage rates, locations, quality and direction into or from the pits, underground workings, overburden/waste rock/ore stockpiles, settling pond and effects on groundwater stream flows and groundwater quality within the Project area should be assessed. Potential seepage to existing water bodies should be assessed (in relation to potential effects to fish and fish habitat, including baseflow recharge from groundwater). Mitigation strategies should be proposed.

The environmental considerations, including effects on groundwater resources that have influenced the location and management of proposed groundwater monitoring and water supply wells, shall be provided.

In summary, the following components should be provided:

- a monitoring plan for groundwater levels and quality, before, during and after the Project;
- estimation of water inflows into the open pits and underground workings and withdrawal rates from the open pits and underground workings;
- assessment of a hydrological budget, including runoff, evapotranspiration and recharge rates under the various operation phases of the mine;
- a description of the duration, frequency, magnitude and spatial extent of any effects to surface and groundwater resources caused by the Project (e.g., use maps and cross-sections developed in Section 4.18.3.1 to show effects); and
- a description of potential cumulative and residual effects of the overall Project on regional water resources.

The Water Resources Baseline Study shall also specify what groundwater supply wells, if any, are proposed on site as part of the Project and how they will be constructed and located in relation to the various mining activities in order to minimize effects on groundwater quality.

The analysis shall be based on acts, policies, guidelines and directives relating to groundwater quality and quantity, such as the *Guidelines for Canadian Drinking Water Quality* (1996). The EIS shall describe measures to mitigate effects on groundwater quality and quantity and predict adverse residual effects.

4.2.1.3.4.2 Surface Water

The Water Resources Baseline Study shall assess the effects of the Project on surface water quality and quantity within the Project's zone of influence. Potential watershed effects associated with the dewatering, the creation of waste rock and overburden storage areas, water diversion, chemical storage, and the heap leach process shall be described. The assessment should describe the duration, frequency, magnitude and spatial extent of any effects and outline the need for mitigation and/or monitoring measures. The analysis of effects to surface water should include malfunctions and accident events.

The Water Resources Baseline Study shall:

- include a detailed environmental water balance for the mine site, focused on predicted water balance inputs/outputs for a climate normal condition, dry- and wet- year conditions undertaken for major Project facilities including the open pits, underground workings, waste rock, tailings management facility, and overburden storage areas. For Project areas whose footprint will expand

over time, the EIS will assess the respective change in environmental water balance over Project life including the decommissioning and post-closure period;

- provide a detailed operational and post-closure water balance for mine water management plan identifying Project water demands/uses and water source(s), potential effects on water sources and proposed mitigation to avoid or minimize effects;
- identify water and sediment quality objectives, including the receiving water criteria of the Canadian Council of Ministers of the Environment (CCME) including the *Canadian Environmental Quality Guidelines for the Protection of Aquatic Life* and the *Guidelines for Canadian Drinking Water Quality*, as applicable;
- provide details on stormwater management infrastructure design including ditching and detention ponds for the Project site;
- identify potential risks and impacts of the mine development on water quality and quantity from construction, operation, decommissioning, and long-term tailings storage;
- include modeling of water quality contaminant plumes from various failure scenarios and spills, including failure of the tailings management area and heap leach process, on affected watersheds including watersheds to the north (Exploits River) and south (Bay d'Espoir system and associated spillway rivers including White Bear River and Grey River);
- provide details on potable drinking water and sewage infrastructure design for the proposed work camp;
- outline plans for the long-term operation and maintenance of Real Time Water Monitoring Stations (including possible quality, quantity, groundwater and climate stations) in all potentially affected watersheds over the life time of the project (in consultation with MAE);
- provide an overview of the closure plans for the mine site and associated water related infrastructure;
- include a description of potential cumulative and residual effects of the overall Project on surface water resources; and
- assess predicted wastewater effluent quality in relation to the requirements of the *Metal and Diamond Mining Effluent Regulations (MDMER)* of the *Fisheries Act*. The assessment should detail how proposed effluent is predicted to mix in the receiving environment for effluents discharged from the Project.

In conducting the analysis, the Proponent should consider pertinent acts, policies, guidelines and directives relating to surface water quality and quantity. The Water Resources Baseline Study shall describe measures to mitigate effects to surface water quality and quantity and predict adverse residual effects. The Water

Resources Baseline Study should also address what measures would be taken by the Proponent if water quality or quantity were to be affected by the Project and how real time water monitoring stations will be used for this purpose.

4.2.1.3.4.3 Wetlands

In conducting the analysis, the Water Resources Baseline Study shall consider pertinent acts, best practices, policies, guidelines and directives. The Water Resources Baseline Study shall provide a description of measures to mitigate effects and list potential residual effects.

Specifically, the Water Resources Baseline Study shall discuss the following:

- The adverse environmental effects of the Project on wetlands shall be assessed for all phases of the Project, as well as accidental events. Wetland alteration is defined as changes to the wetland class or form, or changes to the performance of wetland functions resulting from disturbance to vegetation, soils, or hydrology. Wetland loss is defined as conversion of wetland to non-wetland (e.g., upland, lake, pond or watercourse) due to infilling, excavation or alteration to the hydrology. Wetland loss and wetland alteration shall be assessed within the context of wetland supply and wetland function.
- The study shall describe the measures that will be applied to mitigate effects on wetlands and predict residual adverse effects. Proposed mitigation should be consistent with the provincial policy directive, *Policy for Development in Wetlands*. The EIS should provide justification for situations where avoidance of wetlands is not possible.
- The study shall assess the potential effects of accidents and malfunctions during the construction and operations phases of the Project to wetlands (e.g., fuel spills).
- In conducting the analysis, the Water Resources Baseline Study should consider pertinent federal, provincial, municipal and local acts, policies, guidelines and directives relating to wetlands.
- Further guidance related to the assessment of effects to wetlands can be found in the Environment Canada publication *Wetland Ecological Functions Assessment: An Overview of Approaches* (Hanson *et al.*, 2008) and in *Wetland Mitigation in Canada: A Framework for Application* (Cox and Grose, 2000).

4.2.1.4 Fish, Fish Habitat and Fisheries

The upstream and downstream effects of the Project on fish, fish habitat and fisheries will be assessed for all potentially-affected water bodies. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out will generally be different from (larger than) the boundaries for assessing the effects of the Project.

4.2.1.4.1 Definition and Rationale for Selection

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

Fish habitat means water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas.

Fishery with respect to any fish, includes,

- (a) any of its species, populations, assemblages and stocks, whether the fish is fished or not,
- (b) any place where fishing may be carried on,
- (c) any period during which fishing may be carried on,
- (d) any method of fishing used, and
- (e) any type of fishing gear or equipment or fishing vessel used.

There is a recreational fishery which has significant financial impact linked to this area.

4.2.1.4.2 Potential Project-VEC Interactions

Potential Project-VEC interactions include:

- Potential impacts, including non-compliance with the Fish and Fish Habitat protection Provisions of the Fisheries Act, associated with:
 - the construction of Project facilities or infrastructure including but not limited to; open pits, underground workings, tailings management facility, waste rock disposal sites, overburden storage areas, haul roads and surface and groundwater management activities;

- water use and mining activities during operations; and
- turbidity, siltation and other contamination from surface runoff.

4.2.1.4.3 Existing Environment

The Fish, Fish Habitat and Fisheries Baseline Study shall describe the limnology, hydrology, freshwater biota, fish species, associated habitats and habitat distribution that have the potential to be affected by project activities. Information can be based on available published data, community consultation, and results of on-site baseline surveys. Baseline surveys should be conducted in accordance with direction as provided by DFO and shall be designed to:

- provide necessary baseline data to support assessment of effects on the recreational fishery;
- contribute to the development of mitigation measures to avoid non-compliance with the Fish and Fish Habitat protection Provisions of the Fisheries Act, and an offsetting plan to mitigate and compensate for the harmful impacts of the Project;
- contribute to the development of a conceptual reclamation and closure plan; and
- provide necessary baseline data to support on-going monitoring programs that assess the effectiveness of mitigation measures and offsetting plans.

Furthermore, the Fish, Fish Habitat and Fisheries Baseline Study shall:

- characterize fish, fish populations and habitat where project activities have the potential to result in non-compliance with the Fish and Fish Habitat protection Provisions of the Fisheries Act (i.e., project footprint, upstream and downstream);
- classify and quantify fish habitat, as per the:
 - *Standards Methods Guide for the Classification/Quantification of Lacustrine Habitat in Newfoundland and Labrador; and*
 - *Standards Methods Guide for the Classification and Quantification of Fish Habitat in Rivers of Newfoundland and Labrador for the Determination of Harmful Alteration, Disruption or Destruction of Fish Habitat (Draft).*
- enumerate stream discharge measurements and water quality parameters upstream and downstream of affected water bodies; and
- list any rare fish species that are known to be present.

4.2.1.4.4 Effects Assessment and Mitigation

The adverse environmental effects of the Project on fish and fish habitat shall be assessed for all phases of the Project, as well as for accidents and malfunctions. The Fish, Fish Habitat and Fisheries Baseline Study shall describe measures to mitigate effects to fish and fish habitat and predict residual adverse effects including:

- measures to mitigate adverse effects to fish and fish habitat due to project related construction and operation related activities including but not limited; open pits, underground workings, waste rock disposal sites, overburden storage areas, haul roads, dewatering, blasting and surface and groundwater management activities;
- measures to prevent adverse effects to fish, fish habitat and water quality resulting from site water run-off or soil erosion;
- measures to mitigate flow changes resulting from open mine pits, underground workings, dewatering activities, ground water management, stockpiling and waste management, and diversions, including upstream and downstream; and
- a description and quantification of fish and fish habitat where Project activities may result in non-compliance with the Fish and Fish Habitat protection Provisions of the Fisheries Act, the provision of offsetting measures (i.e. fish habitat compensation strategy) to compensate for the potential impacts of the project, by maintaining or improving the productivity in the proposed offsetting area.

4.2.1.5 Acid rock drainage and metal leaching (ARD/ML) assessment, prediction, and mitigation

Acid Rock Drainage and Metal Leaching (ARD/ML) resulting from mining activities can have serious environmental effects long into the future and shall be considered throughout the life of the project as well as at the environmental assessment stage.

4.2.1.5.1 Definition and Rationale for Selection

ARD/ML has been included as a component because of the potential impact acidic drainage and metal leaching may have on the surrounding and downstream environment. Waste rock materials from mining, mineral processing and related operations, which contain sulphide minerals such as pyrite, have the potential to be the source of acidic contamination and elevated metals in the environment. Such contamination is termed acid rock drainage / metal leaching (ARD/ML). The VECs that may be impacted by ARD/ML include dam safety surface waters, fish and fish habitat, and soils and vegetation.

4.2.1.5.2 Potential Project-VEC Interactions

As described in 4.2.1.5.1, VECs that may be impacted by ARD/ML include dam safety, surface waters, fish and fish habitat, and soils and vegetation.

4.2.1.5.3 Existing Environment

ARD/ML occurs naturally within some environments as part of the rock weathering process but is exacerbated by large-scale disturbances characteristic of mining activities that may expose rocks containing an abundance of sulfide minerals to oxidation processes that create acid drainage and metal leaching.

In a mining setting it is leading practice to carry out a geochemical assessment of mine materials during the early stages of a project to determine the potential for ARD/ML. The geochemical assessment aims to map the distribution and variability of key geochemical parameters, acid generating and element leaching characteristics.

An ARD/ML program report for the project shall be established and approved by the Department of Natural Resources (NR) prior to the submission of the EIS. The phased ARD/ML sampling and testing program shall address characterization, prevention, mitigation, and monitoring of ARD/ML for all project phases

(construction, operation, closure, post-closure), mining methods (open pit and underground), and material management units (ore, heap leach material, waste rock, overburden, quarry materials and tailings). The ARD/ML shall follow the “Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials”, MEND Report 1.20.0 December, 2009.

The results of the ARD/ML program shall be interpreted by an ARD/ML qualified person (QP) and the conclusions shall clearly state the potential for ARD/ML (using MEND, 2009 terminology) for each project phase, mining method and management unit. All QP recommendations regarding ARD/ML prevention, mitigation, and management strategies shall be carried out by the proponent and shall be integrated into the project design. The proponent should contact NR for details on QP qualifications.

The ARD/ML report shall address the types of tests conducted on the samples, recommendations for further testing and investigation, and provide specific details regarding the ongoing testing and monitoring program used to verify the initial ARD/ML program results. The ARD/ML report shall include the geologic unit and spatial distribution (x,y,z) for each sample to ensure that an adequate number of samples were taken from each unit. The results shall be representative of the unit in question considering the unit’s variability and/or homogenous nature. As per the MEND (2009) guidelines, the QP should use the Neutralization Potential Ratio (NPR) in assessing ARD potential. Considerations in setting NPR criteria for classification of Potentially Acid Generating (PAG) vs Non-PAG material shall include site specific factors that may alter the relative magnitude of acid generating potential and neutralizing potential as well as safety factors that account for limitations in the precision and accuracy of sampling.

4.2.1.5.4 Effects Assessment and Mitigation

The QP’s ARD/ML report shall assess the potential leachate risks and make recommendations regarding ARD/ML prevention, mitigation and management strategies. These strategies shall be carried out by the proponent and shall be integrated into the project design. The QP’s ARD/ML report shall provide specific details regarding the ongoing testing and monitoring program to verify the initial ARD/ML program results as well as recommendations for further testing, including:

- the ARD/ML prediction information (based on MEND guidelines) and historical site databases (if available) and experience that will be used to assess the potential leachate risks and determine mitigation requirements for the project. Site specific information should be provided for: mine waste rock, ore characterization, volumes, segregation/disposal methods, mitigation/management

plans, contingency plans (e.g., environmental emergency contingency plans) operational and post-closure monitoring and maintenance plans;

- the feasibility of successfully segregating PAG and Non-PAG waste materials during operations, proposed geochemical segregation criteria and identification of operational methods that will be required to achieve geochemical characterization during operations (i.e., geochemical surrogates, on site lab, procedures needed etc.);
- sensitivity analysis to assess the effects of imperfect segregation of PAG rock;
- estimates of potential lag time to ARD/ML onset for PAG materials (including various waste rock, ore) and ability to fully saturate appropriate PAG materials during operation and post-closure based on regional experience, if any;
- open pit and underground water chemistry (existing, during operation & post-closure) and pit closure management measures (e.g., flooding). This should include geochemical modeling of pit water quality in the post-closure period;
- surface and seepage water quality from the mine waste rock stockpiles, other stockpiles and other infrastructure during operation and post-closure; and
- ARD/ML prevention and management strategies under a temporary or early closure scenario, including for ore.

4.2.1.6 Atmospheric Environment including Greenhouse Gas (GHG) Emissions

The effects of the Project on atmospheric environment will be assessed within the area that can reasonably be affected by the Project, based on the distance to sensitive receptors. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out may be different from (larger than) the boundaries for assessing the effects of the Project.

The Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study will provide information relative to the predicted effects of climate change on the project, e.g., the possibility of flooding or other infrastructure damage. Provincial climate change projections for Port Aux Basques, Burgeo, Bay d'Espoir and Exploit's Dam should be considered when constructing and upgrading the access and haul roads, pit, underground workings and buildings.

Although global in scale, greenhouse gas (GHG) emissions will be considered under this study. Both the federal government, as part of the 2015 Paris Agreement, and the provincial government, as part of The Way Forward on Climate Change (2019), have committed to reducing GHG emissions by 30 percent below 2005 levels by 2030. These GHG reduction targets are linked to carbon pricing. The 2016 Pan-Canadian Framework on Clean Growth and Climate Change included commitments to introduce carbon pricing in all provinces and territories. The Province's carbon system went into effect on January 1, 2019 and includes performance standards for large industrial facilities and large scale electricity generation, measured in terms of GHG emissions per unit of output within a facility boundary, and a carbon tax on fuels combusted outside regulated facilities' boundaries. Certain new industrial facilities are also required to utilize best available control technologies (BACT). The *Management of Greenhouse Gas Act* (MGGA) and its regulations are the mechanisms to implement performance standards and BACT, and the *Revenue Administration Act* (RAA) and its regulations are the mechanisms to implement a carbon tax.

Using a project boundary as defined in section 2(c) of the MGGA and the reporting requirements described in sections 4 to 6 and 7(4)(q) of the *Management of Greenhouse Gas Reporting Regulations*, the Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study will provide details on projected annual production by type and annual materials moved, annual energy consumption by type during construction, operating and decommissioning phases (i.e., on-site stationary combustion, electricity generation, mobile transportation and blasting but excluding purchased electricity generated off-site), and associated annual GHG emissions by source during construction, operating and decommissioning phases. This information will determine whether the facility will be regulated under the MGGA (sections 4 and

either 5 or potentially 5.1) and its regulations, and specifically whether it will be subject to BACT requirements of the *Management of Greenhouse Gas Regulations* (section 12.1). If GHG emissions within the project boundary are not regulated under a performance standard pursuant to the MGGGA (section 5 or 5.1), they will be subject to RAA carbon tax provisions.

The Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study should separately provide details on annual energy consumption by type and annual GHG emissions by source for activities outside the project boundary such as on-road, air and marine transportation, purchased electricity (i.e., from Newfoundland and Labrador Hydro), and significant purchased services from providers outside the project boundary (e.g., a marine port facility). These GHG emissions will be subject to RAA carbon tax provisions.

4.2.1.6.1 Definition and Rationale for Selection

Atmospheric environment is defined as air quality and the acoustic and visual environments (e.g., noise, vibrations, light) within the vicinity of the Project. Atmospheric environment has been selected based on:

- protection of human health and safety, as well as ecological health and aesthetics;
- potentially sensitive human and wildlife receptors;
- provisions of the *Canadian Environmental Protection Act (1999)*(CEPA), and provisions of the *Air Pollution Control Regulations, 2004* under the NLEPA;
- potential effects of climate change on the project and its infrastructure; and
- potential for GHG emissions, under the *Management of Greenhouse Gas Act, 2016*.

GHG emissions have been included within this study because total annual project emissions will result in an increase in provincial GHG emissions totals while, at the same time, the provincial government has committed to significant reductions in GHG emissions by 2030. (The Province also has a 2020 GHG reduction target; however, project activities will not occur until after this date.). GHG emissions, both within and outside the project boundary, will be subject to provincial carbon pricing regulations.

4.2.1.6.2 Potential Project-VEC Interactions

Potential Project-VEC interactions include:

- Effects on ambient air quality due to;

- particulate matter (e.g., dust) and other potential air contaminants during construction activities;
- particulate matter (e.g., dust) and other contaminant releases during the operations phase including those potentially caused by:
 - mining operations;
 - handling or loading and unloading;
 - road dust (e.g., vehicle use on-site and off-site);
 - dust along hydro lines;
 - emissions from blasting; and
 - vehicle emissions.
- Effects on ambient sound levels associated with:
 - construction activities (both at the mine and off-site); and
 - mining and concentrating operations (including blasting).
- Effects of artificial lighting at the project site during operation on the environment;
- Effects of climate change, i.e., predicted increases in precipitation and more frequent extreme weather events, on the project and risks to its activities and infrastructure; and
- GHG emissions generated within and outside the project boundary during the construction, operations and decommissioning phases of the project.

4.2.1.6.3 Existing Environment

The Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study shall describe the following:

- ambient air quality in the Project areas and, for the mine site, the results of a baseline survey of ambient air quality, focusing on, but not limited to the contaminants PM_{2.5}, PM₁₀, CO, SO₂ and NO_x;
- current ambient noise levels at the mine site and within the local area, including the results of a baseline ambient noise survey. Information on typical sound sources, geographic extent and temporal variations shall be included;
- existing ambient light levels at the Project site and at any other areas where Project activities could have an effect on light levels. The study should describe night-time illumination levels during different weather conditions and seasons;

- provincial climate change precipitation projections for Port Aux Basques, Burgeo, Bay d'Espoir and Exploit's Dam (nearest regional sites);
- historical and current provincial GHG emissions including emissions specifically from the industrial sector; and
- compare and assess project GHG emissions in the context of the MGGA, the RAA and the provincial GHG reduction target for 2030.

4.2.1.6.4 Effects Assessment and Mitigation

The adverse environmental effects of the Project on the atmospheric environment shall be assessed for all phases of the Project. In addition, the effects of potential accidents and malfunctions and cumulative effects associated with other industrial use of the area, shall be assessed.

All potential Project emissions shall be estimated and an emissions inventory table shall be included in the Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study, listing emission sources (e.g., jaw crusher, the gyratory cone crushers, ball mills and associated conveyors, emergency backup generator etc.), operating periods and pollution control equipment (where applicable). A Best Available Control Technology (BACT) analysis may be required pending the details of the air pollution controls. Typical construction and operation-related emissions include, but are not limited to, particulates (PM₁₀ and PM_{2.5}) and metals in dusts and fuel combustion by-products such as sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and carbon dioxide (CO₂).

Potential odours from Project emissions at a local level (i.e., near Project equipment) shall be discussed and assessed. Quantities are to be expressed in mg/m³ and should be compared with provincial and national totals and mining sector totals.

The Atmospheric Environment including Greenhouse Gas (GHG) Emissions Baseline Study shall identify sources and types of variation in Project-related light levels by providing information on duration, frequency and levels of light emissions. It should provide an assessment of effects of night-time light levels on wildlife and migratory birds. Include light emissions during different weather conditions and seasons.

Mitigation measures shall be proposed to reduce or minimize adverse effects. The EIS will provide a prediction of adverse residual effects, including cumulative effects.

The effects of the project on provincial GHG emissions levels shall be assessed for all phases of the project and mitigation measures proposed to minimize GHG emissions during the operations phase of the project.

Annual estimates of production and materials moved, energy consumption by type and associated GHG emissions by source for all phases of the project should be provided as described in the *Management of Greenhouse Gas Reporting Regulations*. GHG emission for activities outside the project boundary should be reported separately from GHG emissions inside the project's boundary. GHG emissions should be measured as tonnes of CO₂ equivalent per year as per section 4 and Schedule C of the *Management of Greenhouse Gas Reporting Regulations*.

If a facility emits at least 15,000 tonnes GHG emissions per year within the project boundary during the operations phase of a project, it may be regulated under either section 5 or 5.1 of the MGGGA and the *Management of Greenhouse Gas Regulations*, and it will therefore be subject to BACT requirements for activities inside the project's boundary as outlined in section 12.1 of the *Regulations*. With respect to section 12.1, the EIS should propose a range of mitigation measures to reduce or minimize GHG emissions within the context of other regulatory requirements such as air pollutant, occupational health and safety, and fire and life safety regulations, and identify the recommended approach for consideration by the Minister.

4.2.1.7 Avifauna (migratory and non-migratory), Other Wildlife and Their Habitats (Including Sensitive Wildlife Areas and any Protected Areas)

The effects of the Project and associated infrastructure/activities on birds, and other wildlife and their habitats (including Sensitive Wildlife Areas and any Protected Areas) will be assessed within the Project study area and areas that could reasonably be affected by the Project activities in consultation with the Department of Fisheries and Land Resources. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out will generally be different from (larger than) the boundaries for assessing the effects of the Project.

4.2.1.7.1 Definition and Rationale for Selection

Birds, and other wildlife and their habitat refers to migratory and non-migratory species that are potentially feeding, breeding, moving and/or migrating through the Project area and impacted by the Project and associated infrastructure/activities. Species and other ecosystem components are important to local residents, regional stakeholders, and regulatory authorities (i.e., municipal, provincial and federal) for recreation, economic and/or management considerations.

4.2.1.7.2 Potential Project-VEC Interactions

Potential Project-VEC interactions include:

- Habitat loss, avoidance or degradation due to construction and operation of Project facilities and associated infrastructure;
- Impacts of increased access and related land use;
- Effects of emissions/discharges (including dust) from the Project on habitat quality and use;
- Direct and indirect effects (e.g. mortality, avoidance, etc.) of construction, operation and/or decommissioning and/or accidents and malfunctions during these Project phases; and
- Impacts of noise, light and presence of Project facilities and associated infrastructure/activities on feeding, breeding, movement and/or migratory patterns.

4.2.1.7.3 Existing Environment

The Avifauna, Other Wildlife and Their Habitats Baseline Study shall describe migratory and non-migratory birds (including waterfowl, raptors, shorebirds, marsh birds and other landbirds), small mammals, furbearers, and their habitat at the Project site and within the local and regional areas.

4.2.1.7.4 Migratory Birds

Migratory birds are protected under the *Migratory Birds Convention Act* (MBCA) and associated Regulations. Birds protected under the *Migratory Birds Convention Act* are specifically named in the Environment Canada publication, “Birds Protected in Canada under the Migratory Birds Convention Act, Canadian Wildlife Service Occasional Paper No. 1.” Preliminary data from existing sources should be gathered on year-round migratory bird use of the area (e.g., winter, spring migration, breeding season, fall migration). In addition to information obtained from the Atlantic Canada Conservation Data Centre (ACDC) and naturalists, other relevant datasets should be consulted, such as those available from:

- Bird Studies Canada’s “Nature Counts” web portal (<http://www.birdscanada.org/birdmon/default/datasets.jsp>);
- the Quebec Breeding Bird Atlas 1984-89 (*Les oiseaux nicheurs du Québec: atlas des oiseaux nicheurs du Québec méridional*). A copy of this atlas is available at: http://www.atlasoiseaux.qc.ca/1eratlas_en.jsp; and
- other data and projects, based on consultation with government and other agencies.

Existing data should be supplemented by surveys, where necessary. Surveys should be designed with reference to the Canadian Wildlife Service’s Technical Report No. 508, *A Framework for the Scientific Assessment of Potential Project Impacts on Birds* (Hanson et al. 2010). Appendix 3 of the Framework provides examples of project types and recommended techniques for assessing effects on migratory birds. Survey protocols for migratory birds should be reviewed by ECCC-CWS prior to implementation.

4.2.1.7.5 Other Wildlife

Other wildlife includes:

- Small mammals;
- Large mammals; e.g., moose
- Furbearers

Other wildlife and their habitats that could be affected by Project activities shall be characterized using existing data, supplemented by surveys as appropriate. The Proponent is required to contact Fisheries and Land Resources for further detail on the information requirements. The study must give particular consideration to areas, such as breeding, denning and/or wintering areas.

4.2.1.7.6 Effects Assessment and Mitigation

The adverse environmental effects of the Project on birds, and other wildlife and their habitats should be assessed for all phases of the Project, and for malfunctions and accidental events. The Avifauna, Other Wildlife and Their Habitats Baseline Study shall present an analysis of the Project's effects on habitats, giving consideration to, and demonstrating linkages to predicted physical and biological changes resulting from the Project. Management tools (i.e., federal and provincial laws and policies, guidance, and provincial or regional strategies and plans) applicable to the protection of wildlife and/or wildlife habitat shall be considered in the study. The Avifauna, Other Wildlife and Their Habitats Baseline Study shall:

- Quantify and describe overall loss, avoidance or alteration of terrestrial habitat that could result from the Project and its effect on key species. Where possible, rank habitat value for each VEC species so that the loss of high-value areas can be assessed in the context of their regional availability and significance/uniqueness. Regional boundaries for assessment of relative habitat loss should be based on population ranges and/or regional assessment area; and
- Assess the Project's potential effects on wildlife behaviour, such as feeding, breeding, migration and movement, with respect to:
 - physical hazards and attractants for wildlife (e.g., roads, pits, and other structural features),
 - chemical hazards and attractants for wildlife (e.g., identified contaminants of potential concern), and
 - sensory disturbance causing wildlife attraction or deterrence (e.g., noise, light, and human presence).

The Avifauna, Other Wildlife and Their Habitats Baseline Study shall describe measures to mitigate effects on birds, and other wildlife, and their habitats and predict adverse residual effects. This includes plans and predictions for rehabilitation of the Project area, taking into account growth rates of local vegetation.

4.2.1.8 Species at Risk and Species of Conservation Concern

The effects of the Project on animal and plant Species at Risk (SARs) and species of special conservation concern will be assessed within the Project study area and areas that could reasonably be affected by the Project activities in consultation with the Department of Fisheries and Land Resources. Boundaries for assessing the cumulative effects of the Project in combination with other projects and activities that have been or will be carried out will generally be different from (larger than) the boundaries for assessing the effects of the Project.

4.2.1.8.1 Definition and Rationale

The definition and selection for SARs include:

- Species that are listed under the federal *Species at Risk Act* (SARA) and relevant provincial legislation such as the NL *Endangered Species Act* (ESA), and
- Species recommended for legal listing by COSEWIC, the NL Species Status Advisory Committee (SSAC), and ranked by the Atlantic Canada Conservation Data Centre (ACCDC) as S1, S2, or S3 or general status (Fisheries and Land Resources– Wildlife Division General Status of Wildlife Ranks) as may be at risk or undetermined.

Preservation of SARs is important for maintaining ecological integrity and species biodiversity. There are also legislative and policy requirements to protect SARs and their habitats. Any measures undertaken to mitigate and monitor effects must be consistent with applicable federal recovery strategies, federal action plans, or provincial recovery plans.

4.2.1.8.2 Potential Project-VEC Interactions

Potential Project-VEC interactions for SARs include:

- Habitat loss, avoidance or degradation due to construction and operation of Project facilities and associated infrastructure;
- Impacts of increased access and related land use;
- Effects of emissions/discharges (including dust) from the Project on habitat quality and use;
- Direct and indirect effects (e.g. mortality, avoidance, etc.) of construction, operation and/or decommissioning and/or accidents and malfunctions during all Project phases; and

- Impacts of noise, lights, and presence of Project facilities and associated infrastructure/activities on disruption of feeding, breeding, movement and/or migratory patterns.

Project activities that will result in clearing of or disturbance to natural vegetation, or ground disturbance (e.g., grubbing, grading, and excavation) may affect rare plant species by:

- Altering or destroying individual rare plants, or habitat capable of supporting rare plant species;
- Altering preferred habitat due to changes in surface water hydrology (e.g., ponding, surface water runoff patterns);
- Destroying plants, or reducing health conditions of individuals and /or their habitat due to soil erosion, structural soil changes, or soil contamination; or
- Displacing rare plants due to non-native and invasive species introduction.

4.2.1.8.3 Existing Environment

As background for the analysis of the Project's effects on SARs, the Species at Risk and Species of Conservation Concern Baseline Study shall:

- Identify all SARs that may be affected by the Project, using existing data and literature as well as surveys to provide current field data, as appropriate;
- Provide assessments of regional importance, abundance and distribution that optimize the ability to detect all species at risk and sufficient survey effort to obtain comprehensive coverage; and
- Identify residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and/or recovery habitat (where applicable) and general life history of SARs that may occur in the Project area, or be affected by the Project.

The following information sources on species at risk and species of conservation concern should be consulted:

- *Species at Risk Act* (SARA (www.sararegistry.gc.ca));
- Newfoundland and Labrador *Endangered Species Act* (NLESA);
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Species Status Advisory Committee (SSAC);
- Department of Fisheries and Land Resources (FLR) – Wildlife Division General Status of Wildlife Ranks;
- Atlantic Canada Conservation Data Centre (ACDC);
- Relevant Government agencies; and

- Local naturalist and interest groups.

4.2.1.8.4 Effects Assessment and Mitigation

The Species at Risk and Species of Conservation Concern Baseline Study should identify the adverse effects of the Project and associated infrastructure/activities on SARs, including individuals, critical habitat, recovery habitat, important habitat, and residences of species listed under SARA and the NLESA, species recommended for legal listing by COSEWIC, the SSAC, as well as adverse effects on species of conservation concern ranked by the ACCDC as S1, S2, or S3.

The Species at Risk and Species of Conservation Concern Baseline Study should describe specific measures that will be taken to avoid or reduce adverse effects and to monitor them (consistent with any applicable federal recovery strategy, federal action plans, and/or provincial recovery/management plan). The effects analysis shall include project-specific effects and cumulative effects on SARs and their critical habitat, recovery habitat, important habitat, and/or residences.

The analysis shall take into account pertinent acts, policies, guidelines and directives relating to species at risk, such as:

- Addressing Species at Risk Act Considerations Under the *Canadian Environmental Assessment Act* for Species Under the Responsibility of the Minister responsible for Environment and Climate Change Canada and Parks Canada (SARA-CEAA 2010),
- The *Species at Risk Act* Environmental Assessment Checklists for Species Under the Responsibility of the Minister Responsible for Environment and Climate Change Canada and Parks Canada,
- Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada (Environment Canada 2004), and
- Newfoundland and Labrador: A Provincial Policy Regarding the Conservation of Species at Risk.

4.2.1.9 Population Health and Community Services Infrastructure

The effects of the Project on the health of nearby human receptors including nearby cabin/cottage users and population health and community services infrastructure in the nearby communities of Millertown, Buchans, Badger, Grand Falls-Windsor and any other affected community (in accordance with Newfoundland and Labrador requirements) will be assessed.

4.2.1.9.1 Definition and Rationale for Selection

Health and Community Health includes human health, wellness and family life, and can be influenced by socioeconomic factors as well as the programs and services available to promote and protect health. Human health includes perceptions related to quality of life. Community services and infrastructure includes:

- employment and social services;
- health services and social programs;
- training and education services and programs;
- safety and security;
- housing and accommodation (residential and tourist);
- municipal administrative capacity;
- recreational services (e.g. walking trails);
- transmission lines and other infrastructure;
- municipal services and infrastructure; and
- transportation infrastructure.

Health is a resource for living, and can be positively or negatively impacted by changes to the physical and socioeconomic environment. The services and infrastructure listed above are important to maintaining and promoting the health of area residents and their availability may be reduced or otherwise impacted by the Project.

4.2.1.9.2 Potential Project-VEC Interactions

Individual and population health may be affected by physical environmental changes caused by the Project (e.g., dust, noise, light, recreational land use and/or aesthetic changes) as well as changes to the socioeconomic environment (e.g. income, education and housing). The interaction of the Project with

community services and infrastructure is related to the Project's labour force. Project employment related effects will likely incur demographic change, and a subsequent increase in demand on services and infrastructure.

4.2.1.9.3 Existing Environment

4.2.1.9.3.1 Population Health

Baseline conditions for applicable measures of population health shall be defined through a review of information from the Government of Newfoundland and Labrador and other relevant agencies and organizations. Where additional information is required, studies and/or interviews with local individuals shall be conducted.

4.2.1.9.3.2 Community Services Infrastructure

Baseline conditions for population demographics and labour force, as well as existing community services and infrastructure, including housing and accommodations shall be defined through a review of information from the Government of Newfoundland and Labrador and other relevant agencies and organizations (e.g., municipalities, Indigenous governments and organizations, emergency service providers and tourism and accommodation agencies). Where additional information is required, field surveys and/or interviews with local individuals shall be conducted. In establishing the baseline for community services and infrastructure, particular attention should be paid to the capacity to handle any Project-induced increase in demand. Information relative to expected lifespan of infrastructure such as roads, water and sewer distribution and treatment facilities should be included in those baseline studies.

4.2.1.9.4 Effects Assessment and Mitigation

The Population Health and Community Services Infrastructure Baseline Study shall describe and evaluate both positive and negative changes to population health and well-being (e.g., physical and mental health) and community services infrastructure that may occur as a result of Project-related effects to the environment, including concern about potential changes to the quality of life as a result of the Project.

4.2.1.9.4.1 Population Health

This Population Health and Community Services Infrastructure Baseline Study shall describe and assess the following:

- characterization of all possible sources of contaminants/emissions, exposure pathways and consumption patterns that may generate health effects (e.g., respiratory concerns for sensitive components of the population), if any;
- the potential for health effects that may arise from changes in water quality and quantity;
- the potential for health effects that may arise from noise or vibrations;
- the effects of the Project on the health and safety of Project workers, and those working in the areas affected by the Project, including the possible effects of any accidents or spills;
- effects of the Project on social factors such as social connectivity, family cohesion, substance use, domestic violence and crime; and
- implications of the Project on residents' perceptions of quality of life (e.g., from changes in recreational patterns and country foods consumption, light, noise, changes in landscape etc.).

The Population Health and Community Services Infrastructure Baseline Study shall describe measures to mitigate negative effects, and to promote positive effects, to Population Health for both the construction and operation phases and predict the potential for adverse residual effects and their significance. Such measures should also be assessed for their technical and economic feasibility. Safety zones established in relation to Project blasting should be described. Pertinent acts, policies, guidelines and directives relating to health shall be considered.

4.2.1.9.4.2 Community Services Infrastructure

The Population Health and Community Services Infrastructure Baseline Study shall describe:

- the existing inventory of infrastructure for both men and women in the community;
- the effects of Project-related demand on community services and infrastructure, including water and sewage treatment;
- plans for electrical power requirements for the Project and the impact on existing infrastructure and residents;
- the potential traffic increase due to the Project, and associated health and safety implications;
- assess the decrease in lifespan of physical infrastructure based on increased use that can be attributed to the project and its spinoffs;

- quantify the value of any lost lifespan for infrastructure as a factor of overall replacement cost of that infrastructure (e.g., if a road has an estimated 10 years of wear remaining before it shall be reconstructed, and the project will reduce the lifespan of that road to 8 years, there should be quantification of the value of the lost two years of road use);
- potential increase in passenger and freight traffic on the Trans-Canada Highway and through Gander International Airport or other nearby landing strips;
- potential increase in passenger and freight traffic on ferry services across the Strait of St. Lawrence;
- plans for supplying worker accommodations during construction and operation of the Project, including consideration of accommodations for supporting contractors and potential for supplying low-income and senior housing; and
- the potential for blasting from the Project to effect municipal and/or residential infrastructure.

The Population Health and Community Services Infrastructure Baseline Study shall describe measures to mitigate effects on community services and infrastructure for both the construction and operation phases, as well as predicted adverse residual effects and their significance. Such measures should also be assessed for their technical and economic feasibility. That Plan should reduce, to the extent possible, acceleration of the effective lifespan of infrastructure. This should include specific consideration of mitigation to prevent displacement of current residents by Project employees/contractors from existing accommodations. Safety zones established in relation to Project blasting should be described.

Pertinent acts, policies, guidelines and directives relating to community services and infrastructure shall be considered, including the Municipal Plans of nearby communities, as applicable.

4.2.1.10 Historic Resources

The impact of the Project on Historic Resources within the area of the development shall be subject to archaeological assessment. Such assessment will be conducted by the proponent who is required to hire an archaeological consultant to conduct the necessary archaeological impact studies to the satisfaction of the Provincial Archaeology Office.

4.2.1.10.1 Definition and Rationale for Selection

"Historic Resource" means a work of nature or of humans that is primarily of value for its archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest, including an archaeological, prehistoric, historic or natural site, structure or object. Historic Resource is included based on the potential effect of the Project upon historic resources as protected by RSNL1990 CHAPTER H-4 *Historic Resources Act*.

4.2.1.10.2 Assessment and Mitigation Requirements

The proponent shall assess, protect, and where necessary, mitigate the impact of the development upon historic resources. This shall require, but not be limited to, a commitment to undertake the following:

- Archaeological overflight surveys to identify high-potential locations not evident in aerial imagery.
- Archaeological surveys including ground-truthing of selected areas as having enhanced archaeological potential within the Project Development Area.
- Intensive ground-truthing of any archaeological sites that may be discovered within the project area.
- Testing of power corridor, road routes and other infrastructure requirements (new and upgraded) at selected river crossings and lakeshores.
- Archaeological assessment outside of the Project Area at locations where new development is, or may be, proposed.

4.3 Commitments made in the EIS

The EIS should provide a list of all commitments made regarding environmental mitigation, monitoring and follow-up. Each commitment shall be cross-referenced to the section of the EIS where it has been made.

5.0 EIS GUIDELINE DATA AND INFORMATION SOURCES

Canada Transportation Act: <http://laws.justice.gc.ca/eng/acts/C-10.4/index.html>

Canadian Environmental Assessment Agency. 1992. *Canadian Environmental Assessment Act and Regulations*. <http://laws-lois.justice.gc.ca/eng/acts/C-15.2/>

Canadian Environmental Assessment Agency. 1996. *Reference Guide on Physical and Cultural Heritage Resources*. <http://www.ceaa.gc.ca/default.asp?lang=En&n=1BE75513-1>

Canadian Environmental Assessment Agency. 2003. *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*. <http://ceaa.gc.ca/default.asp?lang=En&n=DACB19EE-1>

Cox, K. and Grose, A., 2000. *Wetland Mitigation in Canada: A Framework for Application*. Sustaining Wetlands Issues paper, No, 2000-1. Published in partnership with Ontario Ministry of Natural Resources, Environment Canada, Ducks Unlimited Canada, and the Joint Ventures of the North American Waterfowl Management Plan, North American Wetlands Conservation Council Canada, Ottawa, Ontario. <http://www.wetlandscanada.org/Wetland%20Mitigation%202000-1.pdf>

Environment Canada – Parks Canada. 2010. *The Species at Risk Act Environmental Assessment Checklists for Species Under the Responsibility of the Minister Responsible for Environment Canada and Parks Canada – Support Tool for the Required Information Elements Under the Species at Risk Act for Environmental Assessments Conducted Under the Canadian Environmental Assessment Act*: <http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=DA30C3BC-F7ED-45F2-868B-17A0B33B6FDF>

Environment Canada, 1991. Birds Protected in Canada under the Migratory Birds Convention Act, Canadian Wildlife Service Occasional Paper No. 1. <http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=97AC4B68-69E6-4E12-A85D-509F5B571564>

Environment Canada. 2004. Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada. First Edition, Canadian Wildlife Service, Environment Canada. 68 Pages.

Environment Canada. 2008. Environment Canada Guidance Related to the Environmental Assessment of Aggregate Pit Mines and Quarries in the Atlantic Provinces. 13 Pages.

Environment Canada. *Implementation Guidelines for the Environmental Emergency Regulations 2011*. <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/implementation-guidelines-emergency-regulations.html>

Environment of Canada. 1991. The Federal Policy on Wetland Conservation. Canadian Wildlife Services, Environment Canada, Ottawa, Ontario. 15 pages.
<http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=BBAAE735-EF0D-4F0B-87B7-768745600AE8>

Explosives Act: <http://laws.justice.gc.ca/eng/acts/E-17/index.html>

Fisheries and Oceans Canada. 1986. *Policy for the Management of Fish Habitat* <http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14155/fhm-policy/index-eng.asp>

Government of Canada. 2003. *A Framework for the Application of Precaution in Science-based Decision Making About Risk*.

Guidelines for Canadian Drinking Water Quality. 1996. (http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2010-sum_guide-res_recom/index-eng.php)

Hanson, A., I. Goudie, A. Lang, C. Gjerdrum, R. Cotter and G. Donaldson. 2009. *A Framework for the Scientific Assessment of Potential Project Impacts on Birds*. Canadian Wildlife Service's Technical Report Series No. 508. Atlantic Region. 61 pp.

Hanson, A., L. Swanson, D. Ewing, G. Grabas, S. Meye, L. Ross, M. Watmough, and J. Kirby. 2008. *Wetland Ecological Functions Assessment: An Overview of Approaches*. Canadian Wildlife Service Technical Report Series No. 497. Atlantic Region. 59 pp. <http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=B8737F25-B456-40ED-97E8-DF73C70236A4>

Health Canada. 2010. *Useful Information for Environmental Assessments*. Ottawa, Ontario. 17 pages. http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/envIRON_assess-eval/index-eng.php

MEND Report 1.20.0, "Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials", December, 2009 (MEND (2009)). <http://mend-nedem.org/mend-report/prediction-manual-for-drainage-chemistry-from-sulphidic-geologic-materials/>

Minister of the Department of Indian Affairs and Northern Development. March 2011. *Aboriginal Consultation and Accommodation - Updated Guidelines for Federal Officials to Fulfill the Duty to Consult*. <http://www.ainc-inac.gc.ca/eng/1100100014664>

National Wetlands Working Group (NWWG). 1997. *The Canadian Wetland Classification System, second edition*, B.G. Warner and C.D.A. Rubec (ed.). Wetlands Research Centre, University of Waterloo, Waterloo. 68 p.

Navigable Waters Protection Act: <http://laws.justice.gc.ca/eng/acts/N-22/>

Newfoundland and Labrador Department of Environment and Conservation. *Guidance for Plume Dispersion Modeling* (GD-PPD-019.1).

Newfoundland and Labrador Department of Environment and Conservation. *Determination of Compliance with the Ambient Air Quality Standards* (GD-PPD-009.3).

Newfoundland and Labrador *Endangered Species Act*: <http://assembly.nl.ca/Legislation/sr/statutes/e10-1.htm>

Newfoundland and Labrador *Environmental Protection Act*:
<http://assembly.nl.ca/Legislation/sr/statutes/e14-2.htm#58>

Newfoundland and Labrador *Historic Resources Act*:
<http://assembly.nl.ca/Legislation/sr/statutes/h04.htm>

Newfoundland and Labrador *Management of Greenhouse Gas Act*:
<https://assembly.nl.ca/Legislation/sr/statutes/m01-001.htm>

Newfoundland and Labrador *Management of Greenhouse Gas Regulations*:
<https://assembly.nl.ca/Legislation/sr/regulations/rc180116.htm>

Newfoundland and Labrador Mining Act: <https://www.assembly.nl.ca/legislation/sr/statutes/m15-1.htm>

Newfoundland and Labrador *Mineral Act*: <http://assembly.nl.ca/Legislation/sr/statutes/m12.htm>

Newfoundland and Labrador *Municipalities Act, 1999*:
<http://assembly.nl.ca/Legislation/sr/statutes/m24.htm>

Newfoundland and Labrador *Revenue Administration Act*:
<https://www.assembly.nl.ca/Legislation/sr/statutes/r15-01.htm>

Newfoundland and Labrador *Sustainable Development Act*: (to be proclaimed)
<http://assembly.nl.ca/Legislation/sr/statutes/s34.htm>

Newfoundland and Labrador *Urban and Rural Planning Act, 2000* :
<http://assembly.nl.ca/Legislation/sr/statutes/u08.htm>

Newfoundland and Labrador *Sustainable Development Act*: (to be proclaimed)
<http://assembly.nl.ca/Legislation/sr/statutes/s34.htm>

Newfoundland and Labrador *Water Resources Act*:

<http://assembly.nl.ca/Legislation/sr/statutes/w04-01.htm>

Ramsar Convention Secretariat. 2006. The Ramsar Convention Manual, 4th edition. *A Guide to the Convention on Wetlands*. http://www.ramsar.org/pdf/lib/lib_manual2006e.pdf

SARA-CEAA Guidance Working Group (Canada). 2010. *Addressing Species at Risk Act considerations under the Canadian Environmental Assessment Act for Species Under the Responsibility of the Minister Responsible for Environment Canada and Parks Canada*. http://www.registrelep-sararegistry.gc.ca/document/dspDocument_e.cfm?documentID=2100

The Government of Newfoundland and Labrador's Policy for Development in Wetlands, 2001
<http://www.env.gov.nl.ca/env/waterres/regulations/policies/wetlands.html>

APPENDIX A: PUBLIC NOTICES AND MEETINGS

The purpose of this section is to clarify for proponents and the public, the format, scheduling, number, notification requirements, etc. for public consultations in relation to undertakings required under the Environmental Protection Act, SNL 2002 cE-14.2, (Section 58) to prepare an Environmental Impact Statement (EIS).

1. The proponent is required to conduct a public meeting(s)/information session(s) under an EIS process as specified in the legislation. This requirement shall be specified in the project EIS guidelines.
2. A public meeting shall normally be held in the largest local population centre within the project area. This shall be the minimum requirement. In addition, when demonstrated public interest or concern warrants, additional meetings may be required. This may take the form of additional meetings to be held in major regional or provincial population centres, or possibly additional meetings within the original community. Such requirements are at the discretion of the Minister based on consensus advice from the environmental assessment committee (EAC) chairperson, and based upon public interest as evidenced by public submissions received.
3. The format of the public meeting may be flexible, and the proponent is free to propose a suitable format for approval by the EAC. The format may range from formal public meetings chaired by the proponent or representative with presentations followed by questions and answers, to a less formal open house forum where the public may discuss the proposal with the proponent or representatives. Other formats may be considered by the EAC. The purpose of the public information session is to 1) provide information concerning the proposed undertaking to those who may be affected, and 2) to record the concerns of the local community regarding the undertaking. Any format shall meet these objectives.
4. The proponent shall ensure that each public meeting is advertised in accordance with the following specified public notification requirements, which shall form part of the project guidelines when appropriate (proponent to substitute appropriate information for italicised items):

Public Notice

Public Information Session on the Proposed

Name of undertaking

Location of undertaking

Shall be held at

Date and Time

Location

This session shall be conducted by the Proponent,

Proponent name and contact phone number,

as part of the environmental assessment for this Project,

to describe the activities associated with and to provide an opportunity for all interested persons to request information or state their concerns.

ALL ARE WELCOME

Minimum information content of public advertisement - (Proponent to substitute appropriate information for italicized items).

Minimum newspaper ad size: 2 column widths.

Minimum posted ad size: 7" x 5"

Minimum newspaper ad coverage: Weekend preceding meeting and 3 consecutive days prior to meeting date; to be run in newspaper locally distributed within meeting area or newspaper with closest local distribution area.

Minimum posted ad coverage: Local Town or City Hall or Office and local Post Office, within town or city where meeting is held, to be posted continually for 1 full week prior to meeting date.

Any deviation from these requirements for any reason shall receive prior written approval of the Minister of Municipal Affairs and Environment.