

**DRAFT ENVIRONMENTAL IMPACT STATEMENT
GUIDELINES
for the
DONKIN EXPORT COKING COAL PROJECT**

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Prepared by:

Canadian Environmental Assessment Agency

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List of Acronyms

Acronym	Meaning
AAND	Aboriginal Affairs and Northern Development
ACCDC	Atlantic Canada Conservation Data Centre
ARD	Acid Rock Drainage
Agency	Canadian Environmental Assessment Agency
CACs	criteria air contaminants
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EC	Environment Canada
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
GHG	Greenhouse Gas
HADD	Harmful Alteration Disruption or Destruction
HC	Health Canada
KMK	Kwilmu'kw Maw-klusuaqn /Mi'kmaq Rights Initiative
MBCA	<i>Migratory Birds Convention Act</i>
MEKS	Mi'kmaq Ecological Knowledge Study
ML	Metal Leaching
Mtpa	million tones per annum
NAFO	Northwest Atlantic Fisheries Organization
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Department of Environment
NPAG	Non-Potentially Acid Generating
NRCan	Natural Resources Canada
NWPA	<i>Navigable Waters Protection Act</i>
Proponent	Xstrata Coal Donkin Management Limited
Provincial Act	<i>Environment Act (Nova Scotia)</i>
SARA	<i>Species at Risk Act</i>
TC	Transport Canada
The Act	<i>Canadian Environmental Assessment Act</i>
VEC	Valued Ecosystem Component
XCDM	Xstrata Coal Donkin Management Limited

1.0 INTRODUCTION

Xstrata Coal Donkin Management Limited (the proponent) proposes to construct and operate an underground coal mine facility on Donkin Peninsula within the Cape Breton Regional Municipality, Nova Scotia (the Project). The Project would produce approximately 3.6 million tonnes per annum (Mtpa) of raw coal that would subsequently be processed and washed to provide approximately 2.75 Mtpa of product coal. It would be capable of producing coal primarily suitable for coking coal markets, but may also supply thermal coal markets. Coal for coking markets would be transported to customers via a marine-based option (barge load-out with transshipment).

The Project includes all activities and physical works associated with the construction, operation and decommissioning of the proposed Donkin Export Coking Coal Project as described in the proponent's Project Description dated August 8, 2011. The Project Description was accepted as complete by the Canadian Environmental Assessment Agency (the Agency) on August 10, 2011.

The Project shall be subject to environmental assessment (EA) under both the Nova Scotia *Environment Act* and the *Canadian Environmental Assessment Act* (the Act). The Project is subject to a Class I Registration under the *Environment Act* and *Environmental Assessment Regulations*, and a comprehensive study under the Act.

1.1 Purpose of the Environmental Impact Statement Guidelines

These guidelines will guide the proponent in the preparation of the environmental impact statement (EIS) and identify the minimum information requirements. This document includes a description of the scope of the Project, the factors to be considered in the comprehensive study and the scope of those factors. The draft guidelines have been developed with input from the federal responsible authorities, the federal expert authority, the Province of Nova Scotia and the proponent. These guidelines also include provincial requirements in order for the EIS to satisfy both governments' information needs for their respective environmental assessment processes.

These guidelines shall not be regarded as either restrictive or exhaustive, as concerns other than those identified in the document could arise during the investigations associated with the EIS. The Agency is prepared to provide advice and assistance throughout the preparation of the EIS with regard to the identification of environmental concerns and the appropriate assessment methodology.

1.2 Guiding Principles

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 and to encourage decision makers to take actions that promote sustainable development and 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;
- document consultation activities;
- identify the Project's environmental effects;
- propose measures to mitigate adverse effects; and
- predict whether there shall be likely significant adverse environmental effects after mitigation measures are implemented.

Traditional and Local Knowledge

Traditional and local knowledge refers to the broad base of knowledge held by individuals and collectively by communities that may be based on spiritual teachings, personal observation and experience or passed on from one generation to another through oral and/or written traditions.

Traditional and local knowledge, in combination with other information sources is valuable in achieving a better understanding of potential effects of projects. Traditional and local knowledge may, for example, contribute to the description of the existing physical, biological and human environments, natural cycles, resource distribution and abundance, long and short-term trends, and the use of lands and water resources. It may also contribute to project siting and design, identification of issues, the evaluation of potential effects and their significance, the effectiveness of proposed mitigation, cumulative effects and the consideration of follow-up and monitoring programs.

Traditional knowledge, which is rooted in the traditional life of Aboriginal people, has an important contribution to make to an EA. Certain issues relevant to the review process are firmly grounded in traditional knowledge such as harvesting, use of lands and resources for traditional purposes, cultural well-being, land use and heritage resources. Although the basis for traditional and local knowledge and science-based knowledge can differ, they may on their own or together, contribute to the understanding of these issues.

The proponent shall incorporate into the EIS the traditional and local knowledge to which it has access or that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without

breaching obligations of confidentiality.

Sustainable Development

Sustainable development, as defined in the Act, 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 contributes to sustainable development.

Environmental assessment 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. Environmental assessment provides an effective means of integrating 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.

A project that is supportive of sustainable development shall strive to integrate the objective of net ecological, economic and social benefits to society in the planning and decision-making process and shall incorporate citizen participation. The Project, including its alternative means, shall take into account the relations and interactions among the various components of the ecosystems, including the extent to which biological diversity may be affected by the Project, and how it meets the needs of the present as well as future populations.

Precautionary Approach

Under the Act, one of the purposes of federal EA is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, to ensure that such projects do not cause significant adverse environmental effects.

The Government of Canada document, *A Framework for the Application of Precaution in Science-based Decision Making About Risk* (GOC 2003), sets out guiding principles for the application of precaution to science-based decision making in areas of federal regulatory activity for the protection of health and safety, the environment and the conservation of natural resources.

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 in order to ensure that they would not cause 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;
- take a conservative approach to mitigation (i.e. rather over-compensate than under-compensate) where uncertainty exists with regard to the likely extent or impact of negative effects of the project on the environment;
- develop contingency plans that explicitly address accidents and malfunctions;
- 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 Federal Environmental Assessment

Information on the federal EA may be obtained from:

Micheline Savard, Project Manager
 Canadian Environmental Assessment Agency – Atlantic Office
 1801 Hollis Street, Suite 200
 Halifax, NS B3J 3N4
 Tel: 902-426-0564 Fax: 902-426-6550
 E-mail: XstrataCoalDonkin@ceaa-acee.gc.ca

2.2 Requirement for Environmental Assessment under the *Canadian Environmental Assessment Act*

The Project is an undertaking in relation to a physical work and, as such, is defined as a project under subsection 2(1) of the Act.

Fisheries and Oceans Canada (DFO) may issue one or more authorizations under section 32 and subsection 35(2) of the *Fisheries Act* with respect to the Project, specifically the marine infrastructure associated with the construction of the barge load-out facility and transshipment mooring.

Transport Canada (TC) may issue an authorization under subsection 5(2) of the *Navigable Waters Protection Act* (NWPA) with respect to the Project, specifically the marine structures at barge load-out facility and transshipment mooring.

Natural Resources Canada (NRCan) may issue authorizations under paragraph 7(1)(a) of the *Explosives Act* with the respect to the Project, if explosives are stored on site.

Environment Canada (EC) may issue a Disposal at Sea authorization under subsections 127(1) and 129(3) of the *Canadian Environmental Protection Act* if construction of the barge load-out facility requires dredging and ocean disposal of the dredged material.

These authorizations are described in the *Law List Regulations* of the Act. Therefore, DFO, TC, NRCan and EC are or may be responsible authorities under the Act and must ensure that an EA of the Project is carried out before any permits or authorizations are issued. Health Canada (HC) has identified itself as an expert federal authority, and shall provide advice in relation to the EA.

The Project is subject to a comprehensive study under the Act, pursuant to paragraph 16(d) of the *Comprehensive Study List Regulations* given that it is a coal mine with a coal production capacity of 3,000 tonnes/day or more. Because the Project shall be assessed as a comprehensive study under the Act, the Agency shall exercise the powers and perform the duties and functions of the responsible authority until the Agency publishes a notice for public consultation on the comprehensive study report (CSR). After this point, DFO shall take on the role of lead responsible authority in relation to the Project.

Pursuant to subsection 17(1) of the Act, the Agency delegates the preparation of the EIS to the proponent. The EIS should be prepared according to these guidelines. Once completed, the proponent shall submit five hard copies and one electronic copy of the EIS to the Agency and electronic and paper copies to the federal authorities and province of Nova Scotia in the quantities detailed below. In addition, the proponent shall make hard copies of the EIS and of the French and English versions of the Plain Language Summary (PLS) of the EIS available at designated public viewing centers in the project vicinity. Specific numbers of copies of the EIS are as follows:

Organization	Electronic copy	No. of paper copies
Agency	1 English PLS, 1 French PLS, and 1 English EIS	5 – English EIS 1 – English PLS
DFO	1 English PLS, 1 French PLS, and 1 English EIS	2 – English EIS
TC	1 English PLS, 1 French PLS, and 1 English EIS	Nil
NRCan	1 English PLS, 1 French PLS, and 1 English EIS	2 – English EIS
EC	1 English PLS, 1 French PLS, and 1 English EIS	2 – English EIS
HC	1 English PLS, 1 French PLS, and 1 English EIS	1 – English EIS
NSE	For the purpose of the provincial review, an electronic copy in a format as directed by NSE	For the purpose of the provincial review, copies are to be provided as directed by NSE
Public Viewing Locations	None required	1 French and 1 English copy of the PLS and 1 English copy of the EIS at each location

2.3 Federal and Provincial Cooperation in the Environmental Assessment

The Government of Nova Scotia requires a Class I Registration under the *Nova Scotia Environmental Assessment Regulations* for the Project. The Government of Canada and the Province of Nova Scotia will be signing a harmonization agreement to coordinate their respective EA processes to reduce duplication. The proponent's EIS shall be used to satisfy both processes and there will be a joint federal and provincial comment period. For further information on the Nova Scotia EA process contact:

Steve Sanford, Environmental Assessment Officer
Nova Scotia Environment
5151 Terminal Road, 5th fl.
Halifax, NS B3J 2T8
Tel: (902) 424-7630
E-mail: sanforsl@gov.ns.ca

2.4 Public Consultation by the Agency during the Environmental Assessment Process

The comprehensive study process for the Project will include the following three opportunities for the public to participate in the EA. Specifically, the public will be invited to provide their comments on:

- these draft EIS guidelines, the Project, and the conduct of the comprehensive study (current comment period);
- the Plain Language Summary of the EIS (this comment period will be jointly administered by the Agency and the Province of Nova Scotia); and
- the Comprehensive Study Report (CSR).

As required by the Act, once the Notice of Commencement is issued, the Project will be listed on the Canadian Environmental Assessment Registry Internet Site. Key EA documents will be available on this internet site.

To facilitate and encourage public participation in the EA, the Agency will make \$30,000 available under its Participant Funding Program. The application deadline for this funding is December 29, 2011. For further information, please refer to <http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=E33AE9FB-1>.

The Agency shall e-mail individuals or organizations who would like to be notified of public comment periods, if a written request is sent to: XstrataCoalDonkin@ceaa-acee.gc.ca.

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

3.1 Scope of Project

Pursuant to section 15 of the Act, the scope of the Project for the purpose of the federal EA shall include all activities and physical works associated with the construction, operation and decommissioning of the proposed Project as described in the proponent's project description dated August 8, 2011, including, but not limited to, the following activities and components:

- site clearing and preparation;
- underground mining activities, including blasting;
- explosives, manufacturing, handling and storage;
- short- and long-term waste management;
- management of solid and hazardous wastes;
- coal washing;
- a Coal Handling Preparation Plant with a dry disposal reject handling system;
- coal and mineral rock waste disposal and water treatment infrastructure;
- water supply for domestic, process and fire suppression usage;
- ancillary services to support the underground mine and Coal Handling Preparation Plant (administration/office buildings, workshop, coal weighing and sampling facilities, dust suppression systems, conveyors, stackers, reclaimers and stockpiles, water treatment infrastructure, truck loading facilities, mobile equipment etc., a 138kV power line from Victoria Junction to the Project site);
- trucking to domestic customers and to the Port of Sydney, should marine transportation to these destinations prove impractical at any time;
- a barge load-out facility on the Donkin Peninsula to transport product coal to a transshipment mooring located southwest of Cape Morien;
- disposal of dredged material at sea;
- ancillary services to support the marine transportation component (e.g., tugboat and barge operation), dust suppression systems, conveyors, access road, power from the Project site);

- marine transportation from the barge landing facility to the transshipment mooring;
- mine decommissioning and site reclamation, including long-term management needs; and
- all physical works and undertakings associated with any required fish habitat compensation plan.

The EIS shall include a description of all components of the Project and any associated physical works and activities.

3.2 Factors to be Considered

In accordance with subsections 16(1) and (2) of the Act, the EIS shall include a consideration of the following factors:

- the environmental effects of the project, including the environmental effects of malfunctions 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 shall be carried out;
- the significance of the environmental effects referenced above;
- comments from the public that are received in accordance with the Act and the regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- any other matter relevant to the comprehensive study, including the need for the project and alternatives to the project, that the responsible authority or the Minister after consulting with the responsible authority may require to be considered;
- the purpose of the project;
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- the need for, and the requirements of, any follow-up program in respect of the project; and
- the capacity of renewable resources that is likely to be significantly affected by the project to meet the needs of the present and those of the future.

As stated in the Act: "environment" means the components of the Earth, and includes:

- (a) land, water and air, including all layers of the atmosphere,
- (b) all organic and inorganic matter and living organisms, and
- (c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

As stated in the Act, "environmental effect" means, with respect to a project:

- (a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act* (SARA),
- (b) any effect of any change referred to in paragraph (a) on
 - (i) health and socio-economic conditions,
 - (ii) physical and cultural heritage,
 - (iii) the current use of lands and resources for traditional purposes by aboriginal persons, or
 - (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or
- (c) any change to the project that may be caused by the environment.

3.3 Scope of the Factors to be Considered

Further to subsection 16(1) and (2) of the Act, the EIS shall consider the factors listed above. In addition, the EIS shall document any additional issues or concerns that may be identified through regulatory, stakeholder, Aboriginal and public consultation.

The assessment of environmental effects shall focus on valued ecosystem components (VECs). For this EA, the term VEC refers to components or attributes that are particularly important for ecological, legal, scientific, social, cultural, economic or aesthetic values. VECs for the project should be selected based on defined criteria and their selection should be justified. The assessment shall consider potential environmental effects that the project may have on these VECs.

The consideration of the environmental effects in the EA needs to be conceptually bound in both time and space. This is more commonly known as defining the study areas and time frames, or spatial and temporal boundaries of the EA. It is expected that the spatial and temporal boundaries shall vary between VECs, depending on the nature of the predicted effects. The spatial boundaries must reflect the geographic range over which the project's environmental effects may occur, recognizing that some effects will extend beyond the project area. Specific spatial and temporal boundaries must be defined in the EIS.

Impacts with respect to spatial and temporal boundaries may vary depending on the VEC, and the assessment of these impacts shall consider:

- timing/scheduling of project activities;
- natural variations of each VEC;
- the time required for recovery from an impact; and
- cumulative effects.

The following VECs were selected based on information gathered from:

- the Donkin Exploratory Phase EA (XCDM 2008) and ongoing environmental monitoring during the current care and maintenance phase of mine operations;
- previous and ongoing public engagement and issues identification;
- input from the Agency, federal responsible authorities, the federal expert authority, and the Province of Nova Scotia along with associated written government guidance; and
- input from the proponent and their environmental consultant.

VECs to be considered in the EIS shall include:

- Atmospheric Resources
 - Ambient air quality
 - Acoustic environment
- Water Resources
 - Quality and quantity of groundwater and surface water resources potentially affected by the Project
- Birds and Wildlife
 - Birds, including those species protected under the *Migratory Birds Convention Act* and associated regulations, and those species under provincial responsibility, with particular, but not exclusive, consideration to birds or habitat that meet one of the following criteria:
 - species listed under the *Species at Risk Act* (SARA), designated or under review by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or provincial species at risk and species of conservation concern listings;

- areas of concentration of migratory birds, such as breeding areas, colonies, spring and fall staging areas, flight corridors, and wintering areas;
- breeding and nesting areas of species low in number and high in the food chain;
- interior and mature forest habitat;
- species that are identified by priority ranking systems (Partners-In-Flight); or
- habitats in or near areas that have been or are in the process of being identified by land managers as particularly important to the survival of the species globally, regionally, or locally, or habitats valued by local users of the resource. These include, but are not limited to, areas with the following existing, proposed, or potential designations:
 - Migratory Bird Sanctuaries,
 - Important Bird Areas, or
 - other types of protected or designated areas that have been established, in part, to protect migratory birds and their habitat.
- Mammals and fur bearers and their habitat, including rare or sensitive species
- Amphibian and reptile populations and their habitat, including rare or sensitive species
- All SARA and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) - listed species
- All species listed in the Nova Scotia *Species at Risk Regulations* made under sections 10 and 12 of the *Endangered Species Act* and those ranked extremely rare (S1) or rare (S2) in the Atlantic Canada Conservation Data Centre (ACCDC)
- Areas of concentration for other wildlife species (e.g. deer wintering areas).
- Wetlands
 - Wetlands (defined as land commonly referred to as marshes, swamps, fens, bogs, and shallow water areas that are saturated with water long enough to promote wetland or aquatic processes)
 - Coastal wetlands (e.g. salt marshes and eelgrass beds)
- Rare Plants
 - Rare vascular plants and uncommon species assemblages

- Freshwater Fish and Fish Habitat
 - Effects on habitat quality and species in freshwater bodies, including SARA - listed species and fish habitat, including spawning, nursery, rearing, feeding and migratory habitat
- Marine Environment
 - Pelagic and demersal marine finfish, and shellfish, and marine benthos, including SARA- listed species and fish habitat including spawning, nursery, rearing, feeding and migratory habitat
 - Marine and coastal mammals, and marine turtles with a focus on SARA-listed species and species of conservation concern
 - Flora and fauna, including SARA-listed species, existing on the sea floor and in sediments
 - Water quality, and quality of marine sediments and associated levels of contamination, as components of habitat quality (*i.e.*, as they potentially affect biological receptors)
 - Ecologically sensitive, protected areas or candidate protected areas (*e.g.*, St. Anne's Bank)
- Archaeological and Heritage Resources
 - Marine and terrestrial archaeological and heritage resources and sites providing evidence of past use and occupation
- Current Use of Land and Resources by Aboriginal Persons for Traditional Purposes
 - Lands and resources of specific social, cultural or spiritual value to the Mi'kmaq of Nova Scotia with focus on current use of land and resources (including terrestrial, freshwater and marine) by the Mi'kmaq for traditional purposes
- Commercial and Recreational Fisheries
 - Commercial fisheries, including but not limited to lobster, scallop, snow crab and herring.
- Land Use
 - Existing land development (industrial, commercial, institutional, residential), settlement areas, recreation, tourism and areas of special community or social value. Includes discussion of land ownership.
 - Includes lands along power transmission lines and truck routes as well as lands required for water lots

- Sensitive coastal habitats (e.g. dunes, beaches)
- Includes consideration of land use post decommissioning.

Rationale for VEC selection based on ecological, legal, scientific, social, cultural, economic or aesthetic values is provided in Section 4 as well as a proposed study approach. Detailed study methods and analytic methods, including incorporation of information gathered through consultation and traditional knowledge studies shall be included in the EIS.

4.0 PREPARATION OF THE EIS

The EIS is a statement of the proponent's environmental conclusions and commitments related to the Project and, as such, must be explicitly endorsed by the proponent. It shall be made available for Aboriginal consultation and public review and to the extent possible, must be written in a manner that can be understood by non-specialists. Acronyms and a glossary of technical terms must be provided. A Plain Language Summary, described in Section 4.15 must be prepared and shall serve to facilitate Aboriginal consultation and for public review.

The following sections describe the different topics to be addressed in the EIS. Sufficient information needs to be provided for each so that informed conclusions can be reached regarding the potential for impacts on the various components of the environment. However, the greatest time and effort are to be applied to data collection and interpretation related to the most significant impacts as identified by the proponent and through these guidelines. The proponent must provide a rationale if issues identified in the guidelines are not fully addressed in the EIS and highlight key impacts that are identified for more intensive investigation.

Where external sources of information or data are used, the proponent shall reference this information within the text of the EIS in addition to providing a complete reference list at the end of the document. Where conclusions that are critical to the assessment of environmental impacts are cited from other reports, the proponent shall provide sufficient detail of the original data and analysis so as to enable a critical review of that material. Such detailed reference material could be submitted as an appendix to the EIS. The EIS shall be a stand-alone document upon which a critical review can be undertaken.

Section 4 is organized into two parts. PART I: CONTENT OF THE EIS describes the layout and required content of the EIS. PART II: DETAILED GUIDANCE ON SELECT ENVIRONMENTAL COMPONENTS provides an overview of the proposed studies and approach to be undertaken in the EIS for each VEC. Please note that the information included in this document is not intended to be exhaustive and additional detail, studies and components may require examination.

PART I: CONTENT OF THE EIS

The following section provides a description of the required structure and content for the EIS and the Plain Language Summary document.

4.1 Executive Summary

The EIS should begin with a clear and concise Executive Summary of the document. It should include a concordance table which describes where in the EIS the information requirements described in the EIS Guidelines have been addressed. The Executive Summary shall be included as a section of the EIS document.

4.2 Project Introduction

4.2.1 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, phone, fax, email);
- explain corporate and management structures, as well as insurance and liability management related to the Project;
- specify the mechanism that would be used to ensure that corporate policies shall be implemented and respected for the Project;
- summarize key elements of its environmental management system and discuss how the system would be integrated into the Project; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the EIS. The qualifications of 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.

4.2.2 Project Overview

The EIS shall briefly summarize the development proposal. If the Project is part of a larger sequence of projects, the proponent shall outline the larger context and present the relevant references. The Project location should be described in conjunction with 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 4.3.5 of this document.

4.2.3 Regulatory Framework and the Role of Government

To understand the context of the EA, the EIS should identify, for each jurisdiction, the government bodies involved in the assessment as well as the EA processes. More specifically, it shall:

- identify the environmental regulatory approvals and legislation that are applicable to the Project at the federal, provincial, and municipal levels;
- identify environmental government policies, resource management, planning or study initiatives pertinent to the Project and discuss their implications;
- identify Mi'kmaq policies and guidelines that are pertinent to the Project and discuss their implications;
- identify any relevant Land Use Plans, Land Zoning, and/or Community Plans;
- identify and delineate major components of the Project and identify those being applied for and constructed within the duration of approvals under provincial and federal 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.

4.2.4 Other Participants in the Environmental Assessment

The EIS shall clearly identify the main participants in the EA including the Mi'kmaq, community groups, and environmental organizations.

4.3 Project Description

4.3.1 Purpose of the Project

The 'purpose of' and 'need for' the Project should be established from the perspective of the proponent and provide a context for the consideration of alternatives to the Project. The Project shall be designed to achieve specific objectives and these should be described. If the objectives of the Project are related to or contribute to broader private or public sector policies, plans or programs, this information should also be included. The EIS shall consider the Agency guidance document entitled: [Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the Canadian Environmental Assessment Act \(Agency 2007\).](#)

4.3.2 Need for the Project

The EIS must clearly describe the need for the Project (i.e., the problem or opportunity the Project is intended to solve or satisfy). The 'need for' shall establish the fundamental rationale of the Project. The EIS shall consider the Agency guidance document entitled: Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act* (Agency 2007).

4.3.3 Alternatives to the Project

The EIS must include an analysis of alternatives to the Project; describing functionally different ways to meet the Project's need and purpose in accordance with the Agency guidance document entitled: Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act* (Agency 2007).

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 analysis must be done to a level of detail which is sufficient to allow the Agency, technical and regulatory agencies, the public and the Mi'kmaq to compare the project to its alternatives.

When assessing Project alternatives, the EIS shall take into account relations and interactions among various components of the ecosystem, including affected Mi'kmaq and other communities, and any adverse impacts on potential or established Aboriginal and Treaty rights. Further, the EIS shall demonstrate how the preferred alternative contributes to sustainable development.

4.3.4 Project Location

The EIS shall provide a concise description of the geographical setting in which the Project shall take place. The description shall be focused on those aspects of the environment important for understanding the potential environmental effects of the Project. This description shall include the following information:

- any habitats in or near areas that have been or are in the process of being identified by land managers as designated (e.g. Important Bird Areas) or

protected areas (Migratory Bird Sanctuaries, Provincial Parks); wetlands (both freshwater and coastal); sensitive coastal habitats; mature and interior forest habitat for migratory birds; habitats of provincially- or federally-listed species at risk, including critical habitat for species at risk; areas of concentration of migratory birds or other wildlife; flight corridors; breeding and nesting areas of species low in numbers and high in the food chain; and other sensitive areas and habitats;

- the current land use in the area and the relationship of the Project facilities and components with any existing land use including traditional, private and crown lands; and
- a description of local communities including the identification of all potentially sensitive human receptors and their locations relative to the project area. The identification of sensitive receptors may include residences, daycares, schools, hospitals, places of worship, nursing homes, and Mi'kmaq communities.

The description of the site location and transportation corridors shall include maps of appropriate scale. The location map should include the boundaries of the proposed site and transportation corridors, the major existing infrastructure, adjacent land uses and any important environmental features. In addition, site plans/sketches and photographs showing project location, site features and the intended location of project components should be included.

4.3.5 Project Description

Facilities and Components

The EIS shall describe in detail all of the Project's facilities and components. For the purposes of the EA, the project description shall focus on those elements of the Project with the most potential for environmental interactions and risk (e.g., Project "footprint" wastes and emissions and associated zones of influence). As appropriate to convey the information (i.e., environmental interactions), the EIS shall present descriptions, locations, plans, figures and/or drawings for each of the facilities.

Activities

The EIS shall include descriptions of the construction, operation, maintenance, foreseeable modifications, including the expansion and lengthening of the operation and, where relevant, closure, decommissioning and reclamation of sites and facilities associated with the Project and post-decommissioning activities. Detailed descriptions of the activities to be carried out during each phase of the Project should include the location of each activity, expected outputs, and an indication of the activity's magnitude and scale. Although a complete list of project activities is required, the emphasis should be on activities with the greatest potential to have environmental effects. Sufficient information should be included to predict environmental effects and address public concerns about them. If activities involve periods of increased

environmental disturbance or the release of materials into the environment, these should be highlighted.

Schedule

A schedule including time of year, frequency, and duration for major or significant project activities should be provided.

4.3.6 Alternative Means of Carrying out the Project

The EIS must identify and describe alternative means of carrying out the Project that are technically and economically feasible in accordance with the Agency guidance document entitled: [Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the Canadian Environmental Assessment Act \(Agency 2007\)](#).

The analysis shall:

- describe the alternative means considered, whether they are technically and economically feasible, and the rationale for rejecting alternatives;
- identify the environmental effects of the technically and economically feasible alternatives in sufficient detail to allow a comparison with the environmental effects of the Project; and
- identify the preferred means of carrying out the Project based on the relative consideration of environmental effects including the criteria and rationale for their selection.

Any potentially adverse impacts of the technically and economically feasible alternatives on potential or established Aboriginal and Treaty rights should also be identified.

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

- Mining Method (longwall/continuous miners)
- Product Coal (process(es) for preparing coal for coking and thermal markets)
- Transportation (marine, rail, road)
- Breakwater design
- Rejects Management
- Passive water treatment
- Disposal at Sea (alternative means of disposal of dredged material)

4.4 Description of the Existing Environment

The EIS shall provide a baseline description of the environment in the vicinity of the Project and all other areas that could be impacted by the Project. This description shall include the components of the existing environment, and environmental processes, their interrelations and interactions, as well as the variability in these components, processes and interactions over time scales appropriate to the effects analysis. The proponent's description of the existing environment shall be in sufficient detail to permit the identification, assessment and determination of the significance of potentially adverse environmental effects that may be caused by the Project. The level of detail shall also enable the adequate identification and characterization of the beneficial effects of the Project, and provide the data necessary to enable effective testing of impact predictions during project follow-up.

The baseline description should include results from studies conducted as part of the Donkin Exploratory Phase EA (XCDM 2008) and past and ongoing monitoring at the Donkin site. It shall also include information from other environmental baseline studies conducted in support of the EIS.

Bedrock, surficial and applied geology maps will be useful in identifying potential effects on the environment when terrain, surficial geology, bedrock or soils are disturbed or used for any phase of the project. Surficial mapping and field benchmarking will also help better define the distribution of surface earth materials, soils, wetlands and rare ecosystems. Knowledge of pre-existing bedrock faults and joints may help better model the sub-surface impact of hydrogeological changes triggered by mining activities.

The baseline description shall include characterization of environmental conditions resulting from historical and present activities in the local and regional study area. In describing the physical and biological environment, the proponent must take an ecosystem approach that considers both scientific and traditional knowledge and perspectives regarding ecosystem health. It is assumed that traditional First Nations and Aboriginal knowledge shall be available through the Mi'kmaq Ecological Knowledge Studies (MEKS) commissioned by the proponent for this Project. The EIS must 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 impacts to the biological environment, the EIS shall consider the resilience of species populations, communities and their habitats. It shall summarize all pertinent historical information on the size and geographic extent of 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 further information on species populations and densities that could be adversely

affected by the Project. Habitat at regional and local scales should be defined in mapping of aquatic and terrestrial vegetation types and/or communities.

Habitat use should be characterized by type of use (e.g., spawning, breeding, migration, feeding, nursery, rearing, wintering), frequency and duration. Emphasis must be on those species, communities and processes most sensitive to project impacts. However, the interrelations of these components to the greater ecosystem and communities of which they are a part must be indicated. The EIS must address issues such as habitat, 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 must also be considered.

A description of the rural and urban human communities likely to be affected by the Project should be included in the EIS as well as the proximity of the Project to sensitive features.

If the baseline data used to describe environmental conditions in the study area have been extrapolated or otherwise manipulated, the assumptions and/or extrapolations used must be described.

4.5 Effects Assessment

The EIS shall describe the Project's effects on the environment, including but not limited to the effect of any environmental change on health, socio-economic conditions, and heritage values and on the current use of land and resources by the Mi'kmaq. Potential effects from all components of the Project at the site and within local and regional study areas 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, post-decommissioning), and describe these effects using appropriate criteria. The EIS shall also describe the cumulative effects of various project activities.

In undertaking the environmental effects assessment, the EIS shall be based on best available information and methods. All conclusions must be substantiated. Predictions shall be based on clearly stated assumptions. With respect to quantitative models and predictions, the EIS shall discuss the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained. Modelling methods and equations presented must include information on margins of error and other relevant statistical information (e.g., confidence intervals, possible sources of error).

The assessment of the project impacts shall be based on a comparison of the environment between the predicted future conditions with the Project and the predicted future conditions without the Project.

Views of the public and the Mi'kmaq relative to the EA, including any perceived changes in the environment from the Project, must be recognized and addressed as part of the impact analysis. The Proponent shall demonstrate how relevant issues raised by the public or the Mi'kmaq were addressed in the EA.

4.5.1 Accidents and Malfunctions

The EIS should identify and describe the accidents and malfunctions that may occur as a result of project activities during all project phases (e.g., construction, operation, decommissioning, post-decommissioning) and assess the significance of associated environmental effects on VECs. It 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 and the probabilities and hazards associated with them; the safeguards that have been established to protect against such occurrences such as security measures for the mine site; and the contingency/emergency response procedures in place if an accident/malfunction were to occur. Factors which contribute to the uncertainty of detecting and mitigating impacts associated with accidents and malfunctions should be assessed.

It is also recommended as part of the evaluation of the likelihood of accidents and malfunctions associated with hazardous substances and petroleum based products, that worst probable case scenarios are used. Please note that both the [Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 - Environmental Emergency Plans](#) and the [Risk Management Guide for Major Industrial Accidents \(CRAIM\)](#) utilize the premise that potential consequences arising from an environmental emergency should be identified using the worst probable case, as well as alternative scenarios.

Monitoring key geological indicators (e.g, coastal slope stability, groundwater levels and quality, surface water levels and quality, coal bed methane, acid rock drainage, seismic activity) prior to, during operations and following decommissioning will provide useful information for describing cumulative environmental effects and developing contingency plans, mitigation measures and response options for accidents, malfunctions and damage to infrastructure (e.g., rejects piles, containment ponds, dykes, underground works, roads, powerlines, and marine shipping facilities).

4.5.2 Capacity of Renewable Resources

As required by the Act subsection 16(2), the EIS shall describe the effects of the Project on the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of the future. The EIS shall identify any VECs predicted to have significant adverse residual environmental effects and describe how the Project could affect their sustainable use. The EIS shall identify and describe criteria used in considering sustainable use.

4.6 Mitigation Measures

Under the Act, mitigation is defined as the elimination, reduction or control of the adverse environmental effects of the Project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Every comprehensive study conducted must consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project.

As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the Project or relocation of project components.

The EIS shall describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. The EIS shall then describe its environmental protection plan and its environmental management system, through which it will deliver this plan. The plan shall provide an overall perspective on how potentially adverse effects would be minimized and managed over time. As well, the proponent shall describe its commitments, policies and arrangements directed at promoting beneficial or mitigating adverse socioeconomic effects. The EIS shall discuss the mechanisms it would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS shall specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the Project's various phases (construction, operation, modification, decommissioning, abandonment or other undertaking related to the Project) to eliminate or reduce the significance of adverse effects. The EIS shall also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures.

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

The EIS must indicate what other technically and economically feasible mitigation measures were considered and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation must be justified. The proponent must identify who is responsible for the implementation of these measures and the system of accountability.

For species at risk defined by the federal *Species at Risk Act* (SARA), pursuant to subsection 79(1) of that Act, RAs under the Act must notify the appropriate federal

Minister if any listed wildlife species, its critical habitat or the residences of individuals of that species may be adversely impacted by the Project. Pursuant to subsection 79(2) of the SARA, if the Project is carried out, RAs must also ensure that measures are taken to avoid or lessen those effects and to monitor them; these measures must be taken in a way that is consistent with any applicable recovery strategy and action plans. Therefore, the proponent must include information in the EIS that will allow the Agency, (performing the duties of the RA) to meet this requirement.

A fish habitat compensation plan to offset the impact of the Project on fish and fish habitat shall be provided in the EIS.

4.7 Cumulative Impact Assessment

Cumulative effects are residual effects of a project on the environment (i.e., impacts that occur after mitigation measures have been put in place) combined with the environmental effects of past, present, and future projects and/or activities. Cumulative effects can also result from the combination of different individual environmental effects of the project acting on the same environmental component. Environmental components that would not be affected by the Project can, therefore, be omitted from the cumulative effects assessment. However, a cumulative effect on an environmental component may be important even if the assessment of the Project's effects on this component reveals that the effects of the Project are minor.

The EIS must assess the effects of the Project in tandem with the effects of other projects and activities that have been or shall be carried out, and for which the effects are expected to overlap with those of the Project. It must consider different types of effects (e.g., synergistic, additive, induced, spatial or temporal) and identify impact pathways and trends. Generally speaking, the information available to assess the environmental effects from other projects and activities can be expected to be more conceptual and less detailed as those effects become more remote in distance and time to the Project, or where information about another project or activity is not available. It is important to note that the objective is *not* to identify two classes of environmental effects (project-specific and cumulative). Instead, the EIS should identify a *single* set of environmental effects that take into account the aggregate effect of the Project in the context of other foreseeable developments and activities acting upon the environment. It should determine the significance of the residual cumulative environmental effects that remain after mitigation has been implemented.

The Agency guidance documents, [Operational Policy Statement - Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act \(Agency 2007\)](#) and [Cumulative Effects Assessment Practitioners Guide \(Agency 1999\)](#) should also be consulted regarding the assessment of cumulative impacts in the EIS.

Past and present projects and ongoing activities shall be reviewed under the description of existing conditions for each VEC.

Agency guidance states that only those future projects and activities that have a reasonable certainty of proceeding (e.g., have received regulatory approvals or are currently in the approval process) should be considered for the cumulative effects assessment. There may be a cumulative effect of the Project on commercial fishers in the area since Fisheries and Oceans Canada has selected [St Anns Bank](#), an area east of Cape Breton on the Eastern Scotian Shelf, as an Area of Interest for establishment as a Marine Protected Area under the *Oceans Act*.

4.8 Effects of the Environment on the Project

The definition of an “environmental effect” under the Act includes any change to the project that may be caused by the environment. The EIS must project how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g., flooding, ice jams, rock slides, landslides, fire, outflow conditions, seismic events and tsunamis) could adversely affect the project and how this in turn could result in impacts to the environment (e.g., extreme environmental conditions result in malfunctions and accidental events). Potential impacts should be mitigated and monitored, as appropriate and/or feasible, over time for precautionary reasons.

Physical oceanographic conditions (waves, ice, currents) in the assessment area shall be summarized based on existing information sources such as MSC-50 Marine Hindcast data (MSC50 Wind and Wave Hindcast Dataset), and other existing information. Any available wave measurements, including those in the Integrated Science Data Monitoring (ISDM) archive (e.g. Gabarus Inner and Outer Bay wave buoys), should be utilized. As the MSC50 Hindcast resolution is not sufficient for very near shore areas, there should be consideration of wave transformation processes into shallow water.

4.9 Environmental Management

Planning

The EIS shall describe the proposed Environmental Management Plans (EMPs) for all stages of the Project and include a commitment by the proponent to implement the EMPs should the Project proceed. The finalization of detailed EMPs shall occur through consultation with federal and provincial government agencies, the Mi'kmaq, the public and other stakeholders. This may occur after the EA but must be consistent with the information presented in the EIS.

Pertinent legislation, regulations, industry standards, documents and legislative guides shall be used in the development of the EMPs.

Draft Solid Waste Materials Management Plan

The EIS shall provide a draft solid waste materials management plan which will be reviewed by the appropriate government departments. The plan will ensure municipal solid waste and construction and demolition debris generated during construction,

operation, and/or remediation, are sorted, collected and delivered to the appropriate recycling, composting or solid waste management facilities.

Draft Decommissioning and Reclamation Plan

The EIS shall provide the preliminary outline of a draft decommissioning and reclamation plan for any components associated with the Project. This shall include ownership, transfer and control of the different project components as well as the responsibility for monitoring and maintaining the integrity of some of the structures. The full preparation and submission of the plan to appropriate authorities, and their subsequent approvals, will occur prior to the decommissioning of the temporary components of the Project. A timeline for submission of the decommissioning plan for the temporary components should be identified as well as a timeline for submission of the complete decommissioning/reclamation plan.

The plan would serve to provide guidance on specific actions and activities to be implemented to decrease the potential for environmental degradation in the long-term during decommissioning and abandonment activities for temporary facilities, and to clearly define the proponent's ongoing environmental commitments.

For permanent facilities, a conceptual discussion on how decommissioning may occur shall be provided. The decommissioning plan for permanent components should include consideration of components necessary for implementation of the decommissioning activities (e.g. site security, wastewater treatment, offices) to ensure that required operations are not prematurely terminated). A figure should be included to portray the reclaimed site. Ongoing monitoring and adaptive management should also be part of any reclamation activity.

Draft Fish and Fish Habitat Compensation Plan

A draft Habitat Compensation Plan should be provided in the EIS for review.

Follow-Up Program

The EIS must include a framework upon which follow-up, including effects monitoring, including compliance monitoring, would be based throughout the life of the Project should it proceed, including the post-closure phase. A follow-up program must be designed to verify the accuracy of the EA and to determine the effectiveness of the measures implemented to mitigate the adverse environmental effects of the Project.

The follow-up program must be designed to incorporate pre-project baseline information 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). Environmental assessment effects predictions, assumptions and mitigation actions that are to be tested as part of the follow-up program must be converted into 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 establish a firmer project baseline.

A schedule for follow-up frequency and duration is to be developed 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 (Type 1 and Type 2 errors).

The description of the follow-up program should include;

- a discussion on the need for and requirements of a follow-up program and its objectives;
- a description of the main components of the program and each monitoring activity under that component;
- a discussion of the objectives the monitoring activity is fulfilling (i.e., confirmation of mitigation, confirmation of assumptions, and verification of predicted effects);
- the structure of the program;
- a schedule for the finalization and implementation of the follow-up program;
- a description of the roles and responsibilities for the program and its review process, by government, Aboriginal groups and the public;
- a discussion of possible involvement of independent researchers;
- the sources of funding for the program; and
- information management and reporting.

Environmental compliance monitoring is conducted to ensure compliance with appropriate legislation and to ensure commitments made in the EIS are fulfilled.

The description of the follow-up program must include any contingency procedures/plans or other adaptive management provisions as a means of addressing unforeseen effects or for correcting exceedances as required to comply with or to conform to commitments in the EA and with benchmarks, regulatory standards or guidelines.

The follow-up program plan must be described in the EIS in sufficient detail to allow for independent judgment as to the likelihood that it shall deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence thereof), confirm EA assumptions, and confirm the effectiveness of mitigation.

The SARA also establishes obligations to ensure that measures are taken to monitor the adverse effects of a project on listed wildlife species and their critical habitat. If potential adverse effects on a listed wildlife species or its critical habitat are identified, a monitoring plan should be developed, which identifies 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 listed species at risk would be engaged in reviewing proposed adaptive management measures, in the event that mitigation measures are not effective.

4.10 Significance of Residual Adverse Environmental Effects

After having established the technically and economically feasible mitigation measures, the EIS should present any residual (post-mitigation) effects of the Project on the biophysical and human environments after these mitigation measures have been taken into account. The residual effects, even if very small or deemed insignificant should be described.

The EIS shall include a summary of the Project's residual effects so that the reader clearly understands the real consequences of the Project, the degree to which effects can be mitigated and which effects cannot be mitigated or compensated.

The criteria for evaluating and describing the significance of the residual effects (including cumulative effects) may include: magnitude; duration and frequency; ecological context; geographic extent; and degree of reversibility. In some cases, existing federal and provincial regulatory and industry standards and guidelines shall be relevant in identifying points of reference for evaluating significance. Professional expertise and judgment may also be applied in evaluating the significance of an environmental effect. The EIS must contain clear and sufficient information to enable the Agency, technical and regulatory agencies, the Mi'kmaq and the public to understand and review the proponent's judgment of the significance of effects.

To satisfy the Act's requirements, the EIS must include conclusions specifically on whether the Project is likely to cause significant adverse effects on each VEC. Residual effects significance criteria shall be presented for each VEC in the EIS along with the analysis to support the conclusion of significance.

4.11 Consultation

Aboriginal Consultation

When the Government of Canada contemplates conduct that may potentially adversely affect established or potential Aboriginal and treaty rights, it has a legal duty to consult Aboriginal peoples before making a decision to proceed with the proposed conduct. The Supreme Court of Canada has held in several decisions that the Crown has a duty to consult with, and if applicable, accommodate Aboriginal peoples if the Crown has knowledge of real or asserted Aboriginal or treaty rights and it exercises a power, duty or function that may adversely affect such rights. The Government of Canada's policy and procedures with respect to this obligation are set forth in its publication entitled "[Aboriginal Consultation and Accommodation - Updated Guidelines for Federal Officials to Fulfill the Duty to Consult, March 2011](#)" (INAC 2011). These guidelines form the basis for the Government's actions in the evaluation

of the existence of asserted rights, current traditional use, and the strength of any claim in relation to the Project.

In addition to the Crown's broader obligations, the Act requires that all federal EAs consider the effect of any change in the environment caused by the Project, as well the effect of that change on current use of land and resources for traditional purposes by Aboriginal persons. The Act also requires consideration of the effect of any Project-induced change in the environment on physical and cultural heritage, as well as any structure, site or thing that is of historical or archaeological significance, such as sites historically occupied by Aboriginal peoples.

To assist the federal and provincial governments in their consultation processes, the EIS must describe the concerns raised by the Mi'kmaq in respect of the Project, and where applicable, how they have been or will be considered and where appropriate addressed. That description should include a summary of discussions, the issues or concerns raised, and should identify any asserted or established Aboriginal and treaty rights as conveyed to the proponent by the Mi'kmaq or the Crown. Where applicable, the EIS must document any significant adverse environmental effects of the Project on the current use of land and resources for traditional purposes by the Mi'kmaq as well as any measures taken or recommended that would prevent, mitigate, or otherwise accommodate such environmental effects, as applicable. This information will be then used by governments towards fulfilling any duty to consult the Mi'kmaq regarding the Project.

In addition to proponent-involved Aboriginal engagement, the provincial and federal governments will undertake additional engagement activities directly with the Mi'kmaq regarding the Project.

The Agency administers the Aboriginal Funding Envelope under the Participant Funding Program that supports Aboriginal groups engaged in consultation activities on projects that are undergoing a federal environmental assessment under the Act.

Public Consultation by the Proponent

The EIS should describe public consultation activities undertaken by the proponent prior to the commencement of the EA and those conducted/planned during the course of the EA. It should include key stakeholder groups, summarize comments made, identify key issues of concern raised by the public, and describe how the proponent intends to address these issues.

4.12 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 the Agency and technical and regulatory agencies in assessing the justifiability of any significant adverse environmental effects, if necessary. Consideration of discount rates, substitutability of different capitals and inter-generational equity issues should be addressed in the economic analysis.

The EIS should include an evaluation of the Project impacts on current and future tourism in the area. This should be supported by an analysis of vehicular traffic in the areas surrounding the Project at different times of the year.

4.13 Benefits to Canadians

The proponent should describe how the EA process for the proposed project is expected to provide a benefit to Canadians. Factors to be considered include:

- Maximized environmental benefits: What expected environmental benefits will be created as a result of the project going through the EA process (e.g., will the project reduce habitat fragmentation of a species-at-risk)?
- Contribution of the EA to support 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: How is public participation in the EA expected to influence the project design and the environmental effects analysis?
- Technological innovations: Are new technologies expected to be developed to address environmental impacts that could be used for other projects?
- Increases in scientific knowledge: Is any new scientific information expected to be collected through the EA that could benefit the assessment of other projects?
- Community and social benefits: Describe any expected changes in project design that shall result in indirect benefits to communities and/or social benefits (e.g., enhanced access to wilderness areas for recreation).

4.14 Assessment Summary and Conclusions

The EIS must summarize the overall findings of the EA with emphasis on the main environmental issues identified. It should make predictions on the likely significance of adverse environmental effects from the Project.

For all key VECs that were assessed, the EIS should contain a table summarizing the following key information:

- a concise summary of potential adverse environmental effects;
- a summary of proposed mitigation and compensation measures;
- a brief description of potential residual effects;
- a brief description of potential cumulative effects;

- any applicable standards or guidelines;
- comments from the public and responses; and
- comments from the Mi'kmaq and individuals and responses;
- the relationship of the VEC to the Mi'kmaq's potential or established Aboriginal and Treaty right;
- a summary of proposed follow-up; and
- a list of proposed commitments, summarizing the timing and responsibility of each of the actions for which a commitment (including special management practices or design features) has been made by the proponent.

4.15 Plain Language Summary

In order to enhance understanding of the EIS and facilitate consultation activities, a Plain Language Summary of the EIS, which summarizes the Project and major findings and conclusions of the associated EA process must be prepared. The Plain Language Summary (maximum 50 pages, excluding annexes) should be a separate document from the EIS. It should briefly describe the proponent, the Project (including decommissioning and reclamation activities), and the environmental impacts of the Project. Maps indicating project location and project components should be included. The report should be organized as follows:

Introduction

- Project Overview
- Environmental Assessment Process
 - Purpose of the CSR
 - Federal EA process
 - Cooperative EA Process

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 Technically and Economically Feasible Alternative Means
 - Selection of a Preferred Alternative Means

Consultation

- Public Consultation Activities
 - Cooperative and Provincial Consultation Activities
 - Public Participation in the Comprehensive Study Process
 - Public Participation Activities by the Proponent
- Aboriginal Consultation Activities
 - Cooperative and Provincial Consultation Activities
 - Aboriginal Consultation in the Comprehensive Study Process
 - Aboriginal Consultation/Engagement Activities by the Proponent

Existing Environment

Environmental Effects Assessment

- Approach
- Valued Ecosystem Components (impact matrix should be provided)
 - Potential Environmental Effects
 - Mitigation Measures
 - Residual Environmental Effects
 - Government, Public and Aboriginal Comments and Proponent's Response
- Effects of the Environment on the Project
 - Approach
 - Potential Effects
 - Mitigation
 - Residual Effects
 - Government, Public and Aboriginal Comments and Proponent's Response
- Effects of Possible Accidents or Malfunctions
 - Approach
 - Potential Effects
 - Mitigation
 - Residual Effects
 - Government, Public and Aboriginal 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 and Aboriginal Comments and Proponent's Response

Follow-Up Program

Benefits to Canadians

Overall Conclusions of the Proponent

PART II: DETAILED GUIDANCE ON SELECT ENVIRONMENTAL COMPONENTS

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

4.16 Atmospheric Resources

4.16.1 VEC Definition and Rationale for Selection

Atmospheric Resources for the EIS include the quality of ambient air and the acoustic environment. Greenhouse gas issues will also be considered within Atmospheric Resources.

Atmospheric Resources has been selected as a VEC due to:

- sensitivity of human health to air quality;
- sensitivity of the environment to air contaminants;
- aesthetics connected to the contamination of the atmosphere by air pollutants and noise;
- regulatory provisions of the federal *Canadian Environmental Protection Act* and Air Quality Regulations under the Nova Scotia *Environment Act*;
- Health Canada policy and guidelines for noise impact through annoyance on community health;
- Cape Breton Regional Municipality Noise By-law; and
- national and provincial concerns with greenhouse gas emissions as promulgated in the requisite reporting inventories of emissions.

For air pollutants and noise emissions, the spatial boundaries extend to a distance where the effects of the Project are a minor fraction of the respective standards, and generally difficult to distinguish from the variability of background levels. The proponent should ensure that the spatial boundaries include the nearest significant receptors (i.e. houses, off-site work places), noting that if analyses indicate a greater zone of influence, that the boundaries could change. Greenhouse gases are considered to present a cumulative challenge to the climate. Given the global nature of this issue, the proponent is only expected to discuss GHG emissions from the project and techniques being used to minimize them.

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation and decommissioning. Time periods of enhanced receptor sensitivity shall also be considered.

4.16.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- effects on ambient air quality from dust and construction vehicle/vessel emissions;
- odours from processes and fugitive emissions;
- cumulative greenhouse gas emissions to the atmosphere;
- process commissioning testing emissions;
- effects of underwater noise associated with marine construction; and
- effects of noise in the terrestrial environment.

Potential Project-VEC interactions during operation and maintenance activities may result in criteria air contaminants (CACs) and greenhouse gases.

The potential for malfunctions and accidental events may also have interactions with atmospheric resources throughout all phases of the project.

4.16.3 Existing Environment

Climate

The EIS shall include a discussion of climate conditions in the Donkin region including wind, precipitation, and fog. This section shall include both climate normals and extreme conditions. It shall be based upon available data from Environment Canada's nearest principal weather station at J. A. Douglas McCurdy airport at Sydney and supplemented with onsite weather monitoring conducted by the proponent. The data sources should also include climatology from ship reports, in the International Comprehensive Ocean Atmosphere Dataset (ICOADS) archive, and climatology from nearby coastal stations, available from EC. Information about the sources of data, such as instrument type and location/elevation, should be described.

The discussion shall include extremes of temperature, precipitation, wind speeds as well as pertinent oceanographic data. In addition, the discussion shall include:

- winds over open water;
- freezing spray and precipitation with resultant icing of marine structures/ships;
- fog/low visibility conditions;
- storm surge, extreme water levels (both positive and negative), and sea level rise (using latest published projections);
- tropical cyclones and transitioning or post tropical cyclones in mid-latitudes; and
- climate variability and trends.

Air Quality

The EIS shall include information on air quality monitoring conducted for the Exploration Phase EA completed in 2008. It shall also include a description of desktop ambient air quality information based on local or regional air quality stations as available. It shall include a qualitative discussion of large air emission sources in the region with quantitative information provided, where available.

Noise

The EIS shall include information on ambient sound testing conducted for the Exploration Phase EA completed in 2008, updated as required.

A qualitative description of likely noise sources on site (e.g., equipment and vehicles) and in the surrounding communities shall be provided. Discussion of marine noise shall be provided as part of the discussion of impacts to the Marine Environment (Section 4.22.4). The proponent shall refer to the Health Canada guidance document: [Useful Information for Environmental Assessments \(Health Canada 2010\)](#), for information needs with respect to evaluating noise and human health effects associated with noise.

4.16.4 Effects Assessment and Mitigation

The EIS shall include:

- an inventory of emissions of criteria air contaminants (CACs) and greenhouse gases due to operations within the Project boundary, including emissions from any storage (i.e. coal piles), loading activities and transportation routes;

- a quantitative assessment of particulate emissions from the Project within the spatial boundaries as described in 4.16.1; and
- an assessment of impacts on ambient air quality (including air pollutants and greenhouse gases) and ambient sound due to mining operations and transportation of coal from the site (to the transshipment location) and along potential terrestrial transportation routes.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to Atmospheric Resources. The EIS shall provide a description of measures to mitigate effects to Atmospheric Resources, and predict potential residual effects and their significance.

Climate and Greenhouse Gas Emissions

This EIS section shall include discussion of flaring of methane in early years of the Project and capture and reuse of methane in later years.

With respect to greenhouse gas emissions (GHGs) the EIS should:

- list and predict the direct and indirect GHG emissions and the potential impact on carbon sinks (e.g. clearing of forest areas) for activities associated with the construction, operations, and decommissioning phases of the project. Predicted GHG emissions should be compared to provincial and national totals. Greenhouse gas emissions that should be considered as applicable include, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). GHG emissions should be calculated and reported using a lifecycle GHG analysis;
- discuss the analytic techniques and relevant policies considered in the assessment. Both the International Organization for Standardization and the World Resources Institute/World Business Council for Sustainable Development have developed standard practices for quantifying GHG emissions;
- discuss mitigation measures considered to control project GHG emissions;
- consider and discuss options for measuring and monitoring baseline and going forward GHG emissions;
- discuss the GHG intensity of the proposed coal mine in comparison to regional and international standards; and
- consider and discuss the implications and risks of predicted GHG emissions under the current provincial and federal regulatory regime.

In conducting the analysis, the EIS shall consider the Agency guidance document entitled [*Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners \(Agency 2003\)*](#). The proponent should also look to the following sources:

- *Guide to Considering Climate Change in Environmental Assessments in Nova Scotia*. Available at:
http://climatechange.gov.ns.ca/files/02/65/EA_CC_Guide1.pdf
- *Guide to Considering Climate Change in Project Development in Nova Scotia*. Available at:
http://climatechange.gov.ns.ca/files/02/66/Development_CC_Guide1.pdf

Air Quality

Assessment of potential Project related effects on air quality shall include modeling for dust dispersion and discussion of dust mitigation and monitoring. The analysis should be informed by a full accounting of emissions from all project phases and activities including those from point and mobile sources. Emissions and air pollutants that should be considered as applicable include, but should not necessarily be limited to:

- Total Suspended Particulate, PM 2.5 and PM 10;
- criteria air contaminants - sulphur oxides (SO_x), nitrogen oxides (NO_x), particulate matter (PM) including total PM, PM₁₀, and PM_{2.5}, volatile organic compounds (VOCs), carbon monoxide (CO), ammonia (NH₃); ground-level ozone (O₃), secondary particulate matter (secondary PM)];
- air pollutants on the *List of Toxic Substances in Schedule 1* of the *Canadian Environmental Protection Act* (CEPA Registry 1999);
- heavy metals (e.g., mercury); and
- other toxics (e.g., benzene).

The emissions inventory should be used to identify emissions of concern from the proposed project to determine whether further analysis, discussion and/or modelling is required, commensurate with potential effects. The proponent may contact Environment Canada for guidance on recommended analysis based on inventory results.

Estimated Project related air emissions shall be compared with relevant provincial regulations and federal guidelines.

The EIS shall provide a description of measures to reduce emissions and predict potential residual effects and their significance. The analysis should include consideration of the impacts of emissions on biological receptors (e.g., vegetation, fish, wildlife, human health).

Noise

The EIS should assess the potential for noise impacts at the site and within local and regional study areas. Daytime and nighttime noise exposure and resulting effects on nearest sensitive receptors shall be predicted and noise modeling with respect to the nearest sensitive receptors is required.

The EIS should also:

- identify and quantify potential noise sources during construction and operational phases including increased road traffic;
- identify potential receptors and describe the proximity of identified receptors to the project area including identifying and describing whether particular receptors may have a heightened sensitivity to noise exposure or expectation of peace and quiet (e.g., quiet rural areas, worker camps);
- include a map illustrating estimated noise levels from the Project at key receptors; and
- describe mitigation and noise management measures including the conditions for mitigation, and evaluate project compliance with appropriate noise guidelines.

Calculation of sound pressure levels shall be used for comparison with Health Canada criteria at receptors.

4.17 Water Resources

4.17.1 VEC Definition and Rationale for Selection

Water Resources include quality and quantity of groundwater and surface water resources potentially affected by the Project.

Spatial boundaries shall include the Project property boundary and relevant watershed boundaries. Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning and post-decommissioning. Temporal boundaries shall also address natural variation in the quantity and quality of water resources.

4.17.2 Potential Project-VEC Interactions

The potential environmental effects of the Project shall be minimized by Project design and mitigation measures, including consideration of water conservation, diversion and recycling techniques. Groundwater flowing into and pumped from the mine workings during the operation phase shall be used in the coal production process, along with collected surface water runoff on the Project site. Any water collected in excess of the Project needs shall be treated as necessary and discharged, to meet permit requirements.

Potential Project-VEC interactions during construction activities include:

- effects related to erosion and sedimentation associated with on-site construction and modification of the current surface hydrologic regime; and
- vehicle maintenance and fueling, which is anticipated to occur on the site and could result in spills affecting water resources.

Potential Project-VEC interactions during operation and maintenance activities include:

- vehicle maintenance and fueling is anticipated to occur on the site and could result in spills affecting water resources;
- extraction of groundwater from the coal seams and surrounding rock, import and redistribution of freshwater on the site has the potential to affect the site water balance, water table conditions, and influence wetlands and surface water flows in fish-bearing streams and in ephemeral and perennial streams tributary to fish-bearing streams;
- contamination associated with mine and process water management;
- acid rock drainage from the project area including waste rock, coal stockpiles, mine workings and other exposed or disturbed areas that may result in the formation of acid rock drainage; and
- release of hazardous materials on-site.

Potential Project-VEC interactions during decommissioning activities include:

- release of hazardous materials on-site; and
- decommissioning filling of or flooding of mines with water that could result in impacts to groundwater or surface waters (e.g. overflows from the mine).

The potential for malfunctions and accidental events may also have interactions with Water Resources throughout all phases of the project.

4.17.3 Existing Environment

The baseline characterization of Water Resources for the Project has been ongoing during the current care and maintenance phase of the mine, and includes:

- results obtained from ongoing water monitoring programs at the site (both surface water and groundwater, and toxicity testing);
- results of surface water and groundwater assessments completed for the Donkin Exploratory Phase EA (XCDM 2008) and Industrial Approval Application, and the previous development of conceptual groundwater and surface water models for the Project area; and
- preliminary work completed to assess potential for acid rock drainage from the Project area (Dillon Consulting Limited 2005).

Using this, and additional information if necessary, the EIS shall describe the baseline environment for surface and ground water, including:

- a description of surface water quality, and hydrology at the site within local and regional study areas, including any water courses along the transmission line route. It should provide details of surface water quality monitoring programs conducted by the proponent, and achieve the following:

- characterize the range and measure of water quality and aquatic ecology characteristics;
 - provide the basis for the prediction, modeling and assessment of potential effects prior to the potential project proceeding;
 - form the basis for monitoring and assessing change during construction, operation, closure and post-closure;
 - provide the basis for the formulation of site-specific water quality objectives (if any) for the aquatic environment;
 - provide the basis for the determination of allowable maximum waste water discharge based on specific water quality objectives;
 - provide a graphical presentation of key variables and stream flows over time for key sites to illustrate patterns and variability; and
 - provide power and confidence calculations, where applicable, for key variables at key sites once the impacts have been predicted, to guide and support future monitoring. Key variables are those that the impact assessment indicates may contribute to degraded water quality, and key sites are those sites where the discharge of key variables might take place.
- the delineation of drainage basins at the appropriate scales.
 - a description of hydrological data such as water levels and flow rates.
 - a description of hydrological regimes, including monthly, seasonal and year-to-year variability of all surface waters and assess normal flow, flooding, and drought properties of water bodies.
 - the interactions between surface water and groundwater flow systems.
 - whether any nearby surface water is used for recreational purposes, such as swimming, boating or recreational fishing.
 - a review of the physical geography and geology of the area as it pertains to local and regional groundwater flow.
 - the hydrogeologic maps and cross sections for the mine area in order to outline the extent of aquifers, bedrock fracture zones, location of wells, springs, potentiometric contours and flow direction.
 - the physical and geochemical properties of hydrogeological units such as aquitards and aquifers.
 - the groundwater flow patterns including recharge and discharge areas.
 - a description of local and regional potable water resources in the area, including current and known future uses. Include location and proximity of any nearby private or municipal drinking water wells, and a description of the type(s) of wells (if known) i.e. dug or drilled and their depths.

The EIS will also include an investigation for Acid Rock Drainage/Metal Leaching (ARD/ML) potential. The investigation shall include:

- a description of the chronology of ARD/ML investigations and the design of an ARD/ML characterization program, including a description of all the static and kinetic test work conducted to date. The rationale, advantages and disadvantages of, detailed description, sample selections and methodology for all test work; and
- predictions of the ARD/ML potential of all materials to be disturbed or created during all phases (construction, operation, decommissioning,) of the proposed project.

The manual produced by the Mine Environment Neutral Drainage (MEND) Program, entitled, *MEND Report 1.20.1, "Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials", Version 0 - December 2009* is a recommended reference for use in ARD/ML prediction.

4.17.4 Effects Assessment and Mitigation

To predict the potential environmental effects of the Project on Water Resources, consideration shall be given to the effects on water quality and quantity in relation to the following items during the construction, operation, maintenance, decommissioning and post-decommissioning phases of the project:

- collection, treatment and discharge of mine water and surface runoff (including the possibility for salt-water intrusion into groundwater or surface water);
- water management (e.g., inputs, outputs, reuse);
- contaminant loading and dispersion (including surface runoff and airborne contaminants);
- acid rock drainage risk associated with mine workings, coal storage areas, waste rock, process wastes and other rock exposed by the Project including approaches to mitigation of potential impacts on receiving water resources and monitoring;
- changes to the site water balance and water flow including impacts from extreme climatic events;
- release of contaminants, including from coal and waste rock, that could adversely affect surface and groundwater quality;
- changes to site physical hydrogeology, and potential effects on domestic well users and municipal supply and relevant mitigation and monitoring;
- changes to surface water and groundwater quality and quantity compared with baseline conditions and applicable water quality standards/objectives arising out of the various phases of the Project; and
- proposed changes to existing site water treatment system.

The EIS shall indicate where day-to-day operational problems might occur, particularly regarding runoff control and treatment, and predict the effects of a worst-case scenario in which there is an uncontrolled release of contaminants, including, for example, hydrocarbons or hazardous substances as a result of spills.

A water balance for the site shall be developed for all phases of the Project, and shall show predicted water balance on an annual and monthly basis to account for precipitation and snowmelt, for each year or stage of the mine life and all inflows and outflows. Appropriate return periods shall be defined and methods for the evaluation of monthly average precipitation, wet, dry and expected scenarios shall be discussed. The possible effects of each different precipitation sequence on the site water balance/mine water management activities shall be assessed and presented in a probabilistic framework.

The EIS shall describe waste rock management to avoid adverse effects to wetlands, watercourses and groundwater. A management plan shall be developed to manage runoff from the site, including an assessment of former and any future waste rock piles or disposal areas to ensure potential for adverse effects are avoided, minimized and/or mitigated. Mine water management (discharge) shall be described including use of existing water management facilities such as the serpentine canal and Devco settling pond. In addition, management of the coal processing plant rejects disposal area (wash plant tailings) should be described.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to Water Resources. The EIS shall provide a description of measures to mitigate effects to Water Resources, and predict potential residual effects and their significance.

4.18 Birds and Wildlife

4.18.1 VEC Definition and Rationale for Selection

The Birds and Wildlife VEC is defined as:

- migratory and non-migratory birds, including seabirds, shorebirds and raptors, with a focus on rare or sensitive species and their habitat, potentially feeding, breeding, migrating through the Project area;
- mammals and fur bearers and their habitat, including rare or sensitive species;
- amphibians and reptile populations and their habitat, including rare or sensitive species;
- all SARA and Committee on the Status of Endangered Wildlife in Canada -listed species;
- all species listed in the Nova Scotia *Species at Risk Regulations* made under sections 10 and 12 of the *Endangered Species Act* and those ranked extremely rare (S1) or rare (S2) in the Atlantic Canada Conservation Data Centre (ACCDC); and
- areas of concentration for other wildlife species (e.g. deer wintering areas).

The spatial boundaries include the footprint of the Project, including its marine facilities and potential land transportation and transmission routes, as well as surrounding areas potentially affected by the Project (e.g., as a result of noise and

visual stimulus and in consideration of buffers around sensitive areas such as seabird colonies).

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning and post-decommissioning, as applicable. Temporal boundaries shall also consider periods of enhanced biological sensitivity.

Birds and Wildlife has been considered as a VEC due to:

- concern with protection of species biodiversity and critical habitat;
- *Migratory Birds Convention Act*;
- SARA;
- *Nova Scotia Endangered Species Act*; and
- recreational wildlife viewing.

4.18.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- habitat loss or alteration and direct mortality associated with facility construction (e.g., clearing and grubbing) including construction of power transmission line;
- disruption of feeding, breeding and migratory patterns due to noise and presence of construction activity and fencing;
- habitat fragmentation;
- effects on bird behaviour due to site lighting;
- effects associated with malfunctions and accidental events; and
- wildlife attraction due to improper waste handling.

Potential Project-VEC interactions during operation and maintenance activities include:

- loss of habitat due to waste rock disposal;
- disruption of feeding, breeding or migratory patterns due to presence of facility (e.g. lights, noise) and barge loading and transport;
- disruption to seabird colonies due to activities associated with barge load-out facility;
- habitat fragmentation;
- effects on bird behaviour due to site lighting;
- wildlife mortality and disturbance associated with coal trucking (if required) and presence of power transmission line; and
- wildlife attraction due to improper waste handling.

The potential for malfunctions and accidental events may also have interactions with Birds and Wildlife throughout all phases of the project.

4.18.3 Existing Environment

The EIS should characterize bird and wildlife habitat on and adjacent to the Project. The description shall include data from the Donkin Exploratory Phase EA (XCDM 2008), recent onsite bird surveys (including seabird colonies) and ACCDC habitat modeling. Methodology and results of bird surveys should be clearly presented, and include maps (to scale) showing areas where surveys were undertaken in relation to the proposed project infrastructure. Maps showing any SAR and species of conservation concern, designated or protected areas, areas of concentrations of birds or other wildlife, flight corridors, wetlands, interior and mature forest habitat, flight corridors, etc, should be shown in relation to project infrastructure on appropriately scaled maps.

In addition, the EIS shall include:

- a description of terrestrial fauna (e.g., ungulates, furbearers, amphibians and raptors) and their habitat potentially at the Project site, along the transmission line and potential transportation corridors and within local and regional study areas, including the results of any surveys conducted; and
- a description of any wildlife corridors and physical barriers to movement that exist within the Project area, including along the transmission line and potential transportation corridors.

Migratory Birds

Migratory birds are protected under the *Migratory Birds Convention Act* (MBCA) and associated regulations. Migratory birds protected by the MBCA generally include all seabirds except cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles). Most of these birds are specifically named in the Environment Canada publication, *Birds Protected in Canada under the Migratory Birds Convention Act* (Environment Canada 1991).

Preliminary data from existing sources should first be gathered on migratory bird use of the area for all four seasons (e.g., winter, spring migration, breeding season, fall migration). In addition to information obtained from the ACCDC and naturalists, other datasets should also be consulted (see below). Datasets are downloadable through Bird Studies Canada's web portal, Nature Counts, at: <http://www.birdscanada.org/birdmon/default/datasets.jsp> .

In particular, data from the Maritime Breeding Bird Atlas (1st and 2nd atlas) should be considered. Data from the 2nd atlas is not yet fully available through the ACCDC. Special requests for species at risk information from the MBBA can be made directly via the Nature Counts website but will require special approval before the data are released. In addition to the Maritime Breeding Bird Atlas, other datasets of relevance to this project include: Bird Studies Canada's High Elevation Landbird Survey (contact

Greg Campbell, gcampbell@bsc-eoc.org), Atlantic Canada Nocturnal Owl Survey, Christmas Bird Count, and the Breeding Bird Survey.

This data should then be supplemented by surveys. In designing required surveys, the proponent should refer 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 this Framework provides examples of project types and recommended techniques for assessing impacts on migratory birds.

The EIS should give particular, but not exclusive, consideration to birds or habitat that meets one of the following criteria:

- species listed under the *Species at Risk Act* (SARA), designated or under review by the Committee on the Status of Endangered Wildlife in Canada, or provincial species at risk and species of conservation concern listings;
- areas of concentration of migratory birds, such as breeding areas, colonies, spring and fall staging areas, flight corridors, and wintering areas;
- breeding and nesting areas of species low in number and high in the food chain;
- interior and mature forest habitat;
- species that are identified by priority ranking systems (Partners-In-Flight); or
- habitats in or near areas that have been or are in the process of being identified by land managers as particularly important to the survival of the species globally, regionally, or locally, or habitats valued by local users of the resource. These include, but are not limited to, areas with the following existing, proposed, or potential designations:
 - Migratory Bird Sanctuaries,
 - Important Bird Areas, or
 - other types of protected or designated areas that have been established, in part, to protect migratory birds and their habitat.

4.18.4 Effects Assessment and Mitigation

Potential direct and indirect Project effects on birds and wildlife and their habitat shall be described. In addition, the EIS shall describe mitigation and monitoring to reduce the potential for adverse effects to birds and wildlife and their habitat. Management tools (i.e., federal and provincial acts and policies, guidance, and provincial or regional strategies and plans) relevant to the protection of wildlife and/or wildlife habitat should be considered in the EIS. The EIS shall predict potential residual effects and their significance.

As a starting point, the analysis in the EIS shall include:

- a quantitative and qualitative determination of overall loss or alteration of terrestrial habitat that could result from the Project and the impact of this on key species.
- an assessment of possible physical hazards and attractants for wildlife (e.g., assessment of the potential impacts of roads, pits, and other structural features on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, nesting and chick-rearing, and direct mortality);
- an assessment of possible chemical hazards and attractants for wildlife (e.g., assessment of the potential impacts of identified contaminants of potential concern on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, and direct mortality);
- an assessment of possible sensory disturbance causing wildlife attraction or deterrence (e.g., assessment of the potential impacts of noise, light, odours, and human presence on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, and direct mortality);
- an assessment of the potential effects on species known to be important to the Mi'kmaq; and
- an assessment of the potential for local population level impacts to VEC species resulting from the impacts of:
 - habitat loss or alteration;
 - physical hazards;
 - chemical hazards;
 - sensory disturbances and/or other impacts.

The assessment of the potential effects on birds shall include nesting and chick-rearing, staging, and wintering life-stages (if applicable) in addition to other appropriate life stages;

The EIS shall describe measures to mitigate effects to wildlife and wildlife habitat and list potential residual effects and their significance.

4.19 Wetlands

4.19.1 VEC Definition and Rationale for Selection

The Wetlands VEC is defined as marshes, swamps, fens, bogs, and shallow water areas that are saturated with water long enough to promote wetland or aquatic processes. This VEC also includes coastal wetlands (e.g. salt marshes and eelgrass beds). The EIS should apply the US Army Corps of Engineers Wetland Delineation Method (1987) to formally define wetland habitat; and the Canadian Wetland Classification System (NWWG 1997) to classify and characterize wetland habitat.

Spatial boundaries include footprint of the facility and wetland areas that could reasonably be affected by the Project, including transmission lines and transportation routes (e.g., through direct effects or through changes to hydrology).

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning and post-decommissioning, as applicable. Temporal boundaries shall also consider periods of enhanced biological sensitivity and fluctuations in water levels.

Wetlands have been considered a VEC because:

- the “Federal Policy on Wetland Conservation” sets a conservation goal of no net loss of wetland function.
- globally, wetlands are recognized as unique and valued ecosystems, providing valuable functions on a local (e.g., water quality improvement), regional (e.g., groundwater recharge) and global (e.g., carbon storage) scale (Ramsar Convention Secretariat 2006).

4.19.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction include:

- site grading and filling, which can result in the direct loss or alteration of wetlands and their associated functions;
- the potential for new corridors to increase access to wetlands (e.g. by ATVs);
- changes to site hydrology (e.g., drainage, infiltration, runoff), which can result in the indirect loss or alteration of wetlands and their associated functions;
- accidental release of sediment nutrients, or contaminants as well as acid rock drainage, which can result in the indirect alteration of wetlands and their associated functions; and
- the potential for introduction of invasive species (e.g. invasive plants) from other areas.

Potential Project-VEC interactions during operation and maintenance include:

- disturbance or vegetation maintenance along permanent access roads, which can result in the direct alteration of wetlands and their associated functions;
- disposal of waste rock, which can result in the direct loss or alteration of wetlands and their associated function;
- disposal of the coal processing plant rejects, which can result in the direct loss or alteration of wetlands and their associated function; and
- accidental release of sediment, nutrients, acid rock drainage or contaminants to wetlands, which can result in the indirect alteration of wetlands and their associated functions.

Potential Project-VEC interactions during decommissioning and post-decommissioning include:

- mine water discharge from the flooded workings and

- runoff from the coal processing plant rejects disposal area.

The potential for malfunctions and accidental events may also have interactions with wetlands throughout all phases of the project.

4.19.3 Existing Environment

The Donkin Exploratory Phase EA (XCDM 2008) characterized the prominent wetland at the mine site (Bailey's Wetland) as well as wetlands associated with the former DEVCO settling pond on site. Wetland delineation and functional analysis should be conducted for wetlands potentially affected by the Project. A scaled approach to characterizing the existing wetlands on site shall be undertaken to focus efforts in the areas where project interactions are most likely to occur, while providing sufficient baseline data to support long term wetland protection in the region.

Desktop identification of areas of likely wetland habitat on the Donkin Peninsula shall be identified through use of provincial databases (NSDNR Wetland Inventory Database and Wet Areas Mapping) and air photo interpretation. Surface expressions of faults, joints and fracture systems should be captured during geological mapping to better delineate potential groundwater recharge and discharge zones.

Formal in-field delineation, classification, characterization (including function assessment) of wetlands >100 m² in area located within the footprint of the proposed Project components and preferred areas for waste rock disposal shall be assessed.

4.19.4 Effects Assessment and Mitigation

The EIS shall assess direct and indirect impacts on wetlands and describe how proposed mitigation measures will adhere to the "Federal Policy on Wetland Conservation" and related implementation guidance. Measures to ensure the no net loss of wetland function should be detailed. In the event that avoidance of wetlands is not possible, the reasons why elimination of adverse effects on wetland function was not possible should be clearly demonstrated in the EIS. Additional guidance related to the assessment of impacts to wetlands can be found in the Environment Canada publication [Wetland Ecological Functions Assessment: An Overview of Approaches \(Hanson et al., 2008\)](#).

Detailed site plans (including placement of waste rock piles) shall be evaluated for potential direct and indirect effects on identified wetlands and their associated functions. The Project interactions to be evaluated shall include all physical (e.g., infilling), hydrological (e.g., draining) and chemical (e.g., acid drainage) effects. If the Project has the potential to create new corridors which increases access to wetlands (e.g. by ATVs), mitigation and monitoring measures to address this effect should be proposed in the EIS.

Where wetland avoidance is not possible, mitigation plans shall be presented for minimizing the affected area of wetland (e.g., water management, erosion prevention and sediment control). The potential Project effects to wetlands shall be quantified in terms of area affected and described qualitatively in terms of the expected functional change. The mitigation measures and monitoring plan, as well as a proposed compensation plan, should be consistent with those proposed for other projects in Atlantic Canada.

Opportunities to offset the loss of wetland area and function through wetland compensation shall be presented conceptually to Nova Scotia Environment, EC and DFO.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to Wetlands. The EIS shall provide a description of measures to mitigate effects to Wetlands and predict potential residual effects and their significance. Since wetlands are possible indicators of change in groundwater regimes within the project area, their extent and characteristics should be monitored.

4.20 Rare Plants

4.20.1 VEC Definition and Rationale for Selection

The rare plants VEC is defined as rare vascular plants and uncommon species assemblages. Spatial boundaries include footprint of the facility and areas that could reasonably be affected by the Project (e.g., due to changes in hydrology).

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation and decommissioning. Temporal boundaries shall also consider periods of enhanced biological sensitivity.

Rare plants have been considered a VEC due to:

- protection of species biodiversity and critical habitat;
- SARA; and
- Nova Scotia *Endangered Species Act*.

4.20.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- habitat loss or alteration and direct mortality associated with facility construction (e.g., clearing and grubbing) including clearing for the power transmission line;
- site grading and filling and/or alteration of hydrology can cause the loss of rare plants and/or uncommon species assemblages;

- introduction of invasive plant species; and
- erosion and siltation or contaminants in surface runoff could affect rare plant communities.

Potential Project-VEC interactions during operation and maintenance include:

- changes in local hydrology could affect rare plant communities;
- vegetation management at the mine site and power transmission corridor; and
- erosion and siltation, acid mine drainage and other contaminants in surface runoff could affect rare plant communities.

The potential for malfunctions and accidental events may also have interactions with rare plants throughout all phases of the project.

4.20.3 Existing Environment

The EIS should characterize the baseline vegetation species/communities within the area potentially affected by the Project. Existing information on rare plants shall be derived from the Donkin Exploratory Phase EA (XCDM 2008), rare species database and habitat modeling. A description of plant communities at the site should be provided, including species lists and dominant species.

Habitat mapping and classification shall be prepared for the study area based on forest inventory mapping and field derived habitat descriptions. A desktop review of vegetative communities along the transportation corridor and the power transmission corridor shall be undertaken, and complemented by field studies if appropriate.

4.20.4 Effects Assessment and Mitigation

The EIS should describe potential direct and indirect Project effects on rare plants. Potential shall be evaluated based on detailed site layout including location of waste rock piles and potential changes to hydrology. In conducting the analysis, pertinent acts, policies, guidelines and directives relating to vegetation/ecological communities should be considered. The EIS shall provide a description of measures to mitigate and monitor effects to rare plants, including opportunities for avoidance and erosion and sediment control, maintenance of local hydrology, vegetation management and management of invasive plant species. Potential residual effects and their significance should be described in the EIS.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to rare plants. The EIS shall provide a description of measures to mitigate effects to rare plants and predict potential residual effects and their significance.

4.21 Freshwater Fish and Fish Habitat

4.21.1 VEC Definition and Rationale for Selection

Freshwater Fish and Fish Habitat is considered a VEC due to potential interactions with the Project (primarily Baileys Wetland/Schooner Pond) and regulatory protection of fish and fish habitat. This VEC also includes any freshwater fish species at risk, if applicable. For the purpose of the EIS the following definitions shall apply.

Freshwater fish shall refer to fish (as defined in section 2 of the *Fisheries Act*) that live in freshwater during at least part of their life cycle. Fish habitat as defined in subsection 34(1) of the *Fisheries Act* includes spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Spatial boundaries for the assessment of the freshwater fish and fish habitat VEC shall include potentially affected fish bearing water courses on the Donkin Peninsula and along the transmission line route between the Project site and Victoria Junction. Ecologically sensitive, protected areas and critical habitat features of the aquatic environment shall also be included in the assessment should they be present.

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning and post-decommissioning, as applicable. Temporal boundaries shall also consider periods of enhanced biological sensitivity (e.g., fish life-cycle).

Should alteration of the freshwater aquatic habitat be necessary, authorizations under subsection 35(2) of the *Fisheries Act* will be required for a Harmful Alteration Disruption or Destruction (HADD) of the productive capacity of fish habitat (e.g., if water quality and water quantity is affected). DFO policy requires no net loss in the productive capacity of fish habitat.

4.21.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- direct habitat alteration and direct mortality associated with construction of site works including drainage/dewatering;
- indirect habitat alteration due to changes in habitats or water quality caused by erosion or localized changes to hydrology; and
- potential reduction in riparian vegetation.

Potential Project-VEC interactions during operation and maintenance include:

- potential changes to water quality and quantity from mine water and process water discharges into Bailey's Wetland/Schooner Pond;

- potential changes to water quality due to turbidity, siltation and contamination from surface runoff including concerns related to acid mine drainage from stockpiles and waste rock piles;
- impacts of releases of mine water into the marine environment (the deposit of a deleterious substance into waters frequented by fish is prohibited under the *Fisheries Act*); and
- indirect habitat alteration from localized changes to hydrology and the thermal regime.

Potential Project-VEC interactions during decommissioning and post-decommissioning include:

- direct or indirect habitat alteration due to changes in habitats or water quality caused by erosion or localized changes to hydrology;
- potential changes to water quality due to the drainage of acidic waters from the Project site; and
- potential impact on freshwater fish and fish habitat from mine water discharge from the flooded workings.

The potential for malfunctions and accidental events may also have interactions with Freshwater Fish and Fish Habitat throughout all phases of the project.

4.21.3 Existing Environment

Watercourses which are likely to be directly affected by the Project include Bailey's Wetland/Schooner Pond and the associated tributaries.

Assessments of the existing Freshwater Fish and Fish Habitat have been completed for the Donkin Exploratory Phase EA (XCDM 2008). Freshwater Fish habitat was identified within the DEVCO settling pond and Bailey's Wetland/Schooner Pond. Additional assessments were performed within the tributaries to Bailey's Wetland and the DEVCO settling pond and were determined to not provide suitable fish habitat. These assessments shall be substantially relied upon for the current assessment of Freshwater Fish and Fish Habitat.

Any additional watercourses identified in the Project area which have the potential to be affected by the Project and that were not covered in the Donkin Exploratory Phase EA (XCDM 2008), shall be visited by aquatic biologists and characterized for potential as fish habitat. This would include any watercourses that may be present along the proposed transmission line route.

4.21.4 Effects Assessment and Mitigation

Freshwater Fish and Fish Habitat shall be evaluated with respect to potential loss of the productive capacity of the habitat as regulated under the *Fisheries Act* and in accordance with DFO policy. Any potential Project-related HADD shall be described

as well as application of the mitigative hierarchy of avoidance, mitigation and compensation as applicable for the Project.

The Donkin Exploratory Phase EA (XCDM 2008) shall be referenced for the Freshwater Fish and Fish Habitat including the mitigation currently in place and ongoing water quality monitoring, toxicity testing and standard mitigation and controls (i.e., during the current care and maintenance phase of the mine) as applicable to the proposed Project and assessment.

Any predicted changes to water quality and quantity discharged into water control systems (including potential acid rock drainage) shall be discussed, compared with relevant guidelines and standards such as Canadian Council of Ministers of the Environment guidelines for protection of freshwater aquatic life as well as existing provincial permit limits. Based on the quantification of any potential HADD, conceptual habitat compensation options shall be identified.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to Freshwater Fish and Fish Habitat. The EIS shall provide a description of measures to mitigate effects to Freshwater Fish and Fish Habitat and predict potential residual effects and their significance.

4.22 Marine Environment

4.22.1 VEC Definition and Rationale for Selection

The Marine Environment is considered a VEC due to interactions with the Project, regulatory protection of fish and fish habitat and intrinsic connection to the local commercial fishery. The Marine Environment VEC shall focus on marine fish and fish habitat (as defined under the *Fisheries Act*) including benthic habitats and sediment and water quality. Consideration of potential interactions with marine mammals and turtles shall also be considered in this section of the EIS. Special consideration shall be given to the potential for marine species at risk including species that have been identified by federal or provincial agencies as being of special concern. Ecologically sensitive, protected areas or candidate protected areas (e.g., St. Anne's Bank) and critical habitat features of the marine environment shall also be included in the assessment.

Authorization under subsection 35(2) of the federal *Fisheries Act* shall be required for a HADD of the productive capacity of fish habitat. In addition, DFO policy requires no net loss in the productive capacity of fish habitat. Habitat compensation shall be discussed based on the characterization and quantification of marine habitat to be affected by the Project. It is expected that an Authorization under section 32 of the *Fisheries Act* shall also be required to permit Project related mortality of fish by means other than fishing. Section 36 of the *Fisheries Act* prohibits the introduction of deleterious substances into waters frequented by fish.

The EIS will consider impacts to marine sediment and water quality due to potential mobilization of contaminants contained within the surficial sediments during construction operations. Water and sediment quality are general terms that provides a means to compare physio-chemical parameters against guidelines or standards. Marine sediment quality is strongly associated with demersal fish habitat through direct contact and food sources.

Potential effects on the local commercial and recreational fishery shall be discussed in Section 4.25.4: Commercial and Recreational Fishery.

The spatial boundaries of the Marine Environment include the footprints of the transshipment and barge load-out facility sites (may need to expand beyond the physical footprint to include the zone of natural longshore sediment transport, and nearshore currents and shore cliff stability adjacent to the site); the footprints of the dredge (if necessary) and infill areas; the transportation route between the barge load-out facility and the transshipment mooring location; zones of influence related to potential deposition of contaminated sediments; and the transshipment mooring location. Consideration shall be given to potential interactions with more far ranging and migratory marine species and to the footprint associated with potential generation of underwater noise and interactions with sensitive species.

Environmental effects of the project on navigation are taken into consideration as part of the EA only when the effects are indirect, i.e. resulting from a change in the environment affecting navigation. Direct effects on navigation are not considered in the EA, but any measures necessary to mitigate direct effects will be included as conditions of the *Navigable Waters Protection Act* approval.

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning, and post-decommissioning, as applicable. Temporal boundaries shall also consider periods of enhanced biological sensitivity. The temporal boundaries of the environmental impacts of the barge load out facility should include impacts on longshore sediment transport during the existence of the facility, and the impacts on sediment transport resumption and dispersal following facility decommission and removal.

4.22.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- direct habitat alteration and fish mortality associated with construction of barge load-out facility and transshipment locations - infilling, dredging and subsea structures may be required in fish habitat;
- possible habitat loss associated with disposal of dredged material (if required);
- underwater noise from construction (e.g., pile driving, dredging);
- marine mammal and vessel collisions.

Potential Project-VEC interactions during operation and maintenance include:

- turbidity, siltation and contamination from surface runoff, propeller wash and ship releases, including ballast water;
- introduction of invasive marine species;
- impacts of noise on marine species;
- impacts of releases of mine water into the marine environment (the deposit of a deleterious substance into waters frequented by fish is prohibited under the *Fisheries Act*); and
- impacts of subsea tunnelling on seafloor stability.

Potential Project-VEC interactions during decommissioning or post-decommissioning include:

- potential impacts from any acid drainage from the Project site; and
- potential impacts from the release of other contaminants from the decommissioned mine site.

The potential for malfunctions and accidental events including releases from vessels, vessel accidents and marine mammal and vessel collisions may also have interactions with the Marine Environment throughout all phases of the project.

4.22.3 Existing Environment

The description of the existing marine environment shall reference aspects of the marine environment addressed by the Donkin Exploratory Phase EA (XCDM 2008). The current Project shall have a broader marine footprint and shall thus require consideration of a larger assessment area encompassing additional habitats in the marine environment. The potentially affected marine habitats shall be identified and characterized. Data for the following areas, described below, have been or shall be collected for the EIS.

A review of databases for species of conservation concern shall be undertaken to determine the potential for marine species of conservation concern to be present within the Assessment Area.

The biological aspects of commercially valuable species (e.g., lobster and crab) shall be highlighted and further discussed in the Commercial and Recreational Fisheries VEC. This information shall be supplemented with discussion with resource experts and DFO officials.

Site-specific field surveys at the barge load-out facility, transshipment location and the ocean disposal location (if required for dredge spoil disposal) shall be undertaken. This shall include marine biologists performing benthic habitat surveys of the marine environment using a subsea remotely operated vehicle. Surveys shall be performed according to DFO's Underwater Survey Guidelines.

A sediment sampling program shall be designed for the load-out facility (including an assessment of seabed sediment mobility), transshipment location and the disposal at sea location (if required for dredge spoil disposal) according to Environment Canada's *Users Guide to the Application Form for Ocean Disposal* (EC 1995) by a marine biologist. Sediment sampling shall be performed according to Environment Canada's *Guidance Document on the Collection and Preparation of Sediments for Physiochemical Characterization and Biological Testing* (EC 1994). Sediment shall be analyzed for sediment quality and infaunal organisms. Characterization of the material that may be dredged, in accordance with EC requirements, shall be presented in the EIS. The effects assessment related to the DAS activity shall meet the requirements of the Act as well as CEPA Disposal at Sea requirements.

Characterization of the water column at the load-out facility, transshipment location and potentially the ocean disposal site shall be undertaken for currents and oceanographic parameters such as salinity and temperature.

During all field surveys, observations of marine mammals shall be noted, including species, number, life stage, and orientation of travel.

The oceanographic parameters and physical oceanographic conditions shall be analyzed along with the sediment quality results to qualitatively assess risk of dispersion of potential resuspended sediments during the infilling, dredging and construction of the barge load-out facility. Direct observations shall be made of physical coastal processes near the barge load-out facility (i.e., scour/erosion and deposition) and include a historical review of shoreline changes using repetitive air photos where available.

Multi-beam and seismic sea floor surveys were conducted by the Geological Survey of Canada Atlantic Division in 1995 in the vicinity of the proposed development. Water column imaging in the vicinity of the proposed tunnelling detected methane seeps from seafloor fractures and could be used in future surveys to detect seeps near the proposed tunnelling.

4.22.4 Effects Assessment and Mitigation

The effects assessment for the Marine Environment shall be completed based on the results of the field and desktop studies to determine potential adverse environmental effects and mitigation. In particular, areas to be directly affected by marine aspects of the Project (i.e., HADD) shall be characterized and quantified as well as application of the mitigative hierarchy of avoidance, mitigation and compensation as applicable for the Project.

The EIS shall provide an assessment of the possible fish habitat loss or disruption associated impacts of the barge load out facility on longshore sediment transport, erosion and deposition.

The Donkin Exploratory Phase EA (XCDM 2008) shall be referenced for the predicted effects on the marine environment (mainly Schooner Cove) including the mitigation currently in place and ongoing water quality monitoring, toxicity testing (undertaken during the current care and maintenance phase of the mine) and standard mitigation and controls as applicable to the Project and assessment.

Any predicted changes to marine water quality and quantity discharged into water control systems (including potential acid rock drainage) shall be discussed, compared with relevant guidelines and standards as well as existing provincial permit limits. Based on the quantification of any potential HADD, potential conceptual compensation habitat options shall be identified.

Environmental management measures to be developed and implemented as part of the Project, including: vessel ballast water discharge plans (e.g., to minimize risk of introduction of invasive species), environmental protection, contingency and emergency response plans, shall be outlined in the EIS and further details shall be developed and included in the EMP as the Project design evolves.

Repetitive seafloor multibeam surveys would be useful in detecting seafloor subsidence resulting from the proposed mining activity. (Repetitive multibeam surveys of the seafloor completed at the nearby Port Aconi mine site mapped seafloor subsidence along subsea mine tunnels and provided knowledge about the competence of the overlying bedrock. Results from the Point Aconi surveys showed subsidence occurred within 1-2 yrs after initial coal extraction in the tunnels.)

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to the marine environment. The EIS shall provide a description of measures to mitigate effects to marine environment and predict potential residual effects and their significance.

4.23 Archaeological and Heritage Resources

4.23.1 VEC Definition and Rationale for Selection

According to the Agency Reference Guide: *Assessing Environmental Effects on Physical and Cultural Heritage Resources* (Agency 1996), a cultural heritage resource is a human work or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has historic value. Cultural heritage resources are distinguished from other resources by virtue of the historic value placed on them through their association with an aspect(s) of human history. This interpretation of cultural resources can be applied to a wide range of resources, including cultural landscapes and landscape features, archaeological sites, structures, engineering works, artifacts and associated records.

Spatial boundaries are limited to the footprint of area to be disturbed by Project activities. Temporal boundaries shall be developed in consideration of potential

permanent alteration of archaeological and heritage resources during Project construction and operation.

Archaeological and heritage resources have been considered a VEC due to:

- concern with effective management of archaeological and heritage resources;
- Nova Scotia *Special Places Protection Act*; and
- Nova Scotia *Environment Act*.

4.23.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- Disturbance to and loss of archaeological and heritage sites from site clearing, grubbing and grading, and marine construction.

Potential Project-VEC interactions during operation and maintenance include:

- Project related activities during the operation phase could include areas of waste rock disposal and associated grading and infilling activities.

The potential for malfunctions and accidental events may also have interactions with Archaeological and Heritage Resources throughout all phases of the project.

4.23.3 Existing Environment

Baseline information for the terrestrial aspects (i.e., mine site) of this VEC shall substantially reference the archaeological report prepared for the Donkin Exploratory Phase EA (XCDM 2008). This information shall be reviewed and updated as necessary including checking the Nova Scotia museum shipwreck database for recorded shipwrecks near the barge load-out facility and transshipment locations. Benthic video records shall also be reviewed for evidence of shipwrecks or other cultural features. This information shall also address historic use of the area by the Mi'kmaq inhabitants.

4.23.4 Effects Assessment and Mitigation

The EIS shall assess the potential effects of any change in the environment as a result of the Project on physical and cultural heritage resources and on structures, sites or things of historical, archaeological, or paleontological significance. Potential Project interactions with documented archaeological and historic features (terrestrial and marine) shall be assessed with mitigation and monitoring proposals provided.

An archaeological potential model shall also be provided including proposals for monitoring and contingency planning in the event that previously undocumented resources are discovered.

Provisions for notification and involvement of relevant regulators and the Mi'kmaq shall also be included as applicable.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to Archaeological and Heritage Resources. The EIS shall provide a description of measures to mitigate effects to Archaeological and Heritage Resources and predict potential residual effects and their significance.

4.24 Current Use of Land and Resource Use for Traditional Purposes by First Nation and Aboriginal People

4.24.1 VEC Definition and Rationale for Selection

The Current Use of Land and Resources for Traditional Purposes by First Nations and Aboriginal People VEC is defined as lands and resources of specific social, cultural or spiritual value to the Mi'kmaq of Nova Scotia with focus on current use of land and resources by the Mi'kmaq for traditional purposes. Spatial boundaries for the assessment of Traditional Purposes by First Nations and Aboriginal People VEC shall be defined in the MEKS and in consideration of areas and resources potentially affected by Project activities (e.g., fishing, hunting and gathering).

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation and decommissioning. Temporal boundaries shall also consider periods of enhanced biological sensitivity for resource species and times used for resource harvesting.

Current Use of Land and Resources for Traditional Purposes by First Nations and Aboriginal People is considered as a VEC due to:

- concerns for Mi'kmaq interests (*i.e.*, current use of lands for traditional purposes);
- the Act; and
- *Nova Scotia Environment Act*.

4.24.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- Effects on land and resource use from construction activities. For example, restricted access to the site (mine site and marine construction) could restrict First Nations fishing, hunting and harvesting opportunities. Change in habitats (terrestrial and marine) could also affect traditional land use (e.g., harvesting) by the Mi'kmaq.

Potential Project-VEC interactions during operation and maintenance include:

- Effects on land and resource use due to the presence of the mine facility (terrestrial and marine) and ongoing activities could restrict Mi'kmaq fishing, hunting and

harvesting opportunities. Change in habitats (terrestrial and marine) could also affect traditional land use (e.g., harvesting) by the Mi'kmaq.

The potential for malfunctions and accidental events may also have interactions with the Current Use of Land and Resource Use for Traditional Purposes by the Mi'kmaq throughout all phases of the project.

4.24.3 Existing Environment

Baseline information on the traditional use of lands and resources shall rely substantially on the MEKS associated with the Donkin Exploratory Phase EA (XCDM 2008). The MEKS shall be updated to reflect the requirements of the current project. This information shall be supplemented with consultation with federal and provincial government departments. The EIS shall describe fishing for food and ceremonial purposes (not related to commercial fisheries). Information shall also be cross referenced to the archaeological and heritage resource section.

With respect to vegetation, the EIS shall describe flora that is harvested for subsistence, social, cultural, ceremonial or medicinal purposes including, for example:

- plant tissues e.g., roots, barks, leaves and seeds that are traditionally harvested for social, cultural (e.g., black ash) or ceremonial (e.g., white cedar) purposes;
- produce harvested from naturally occurring sources (e.g., berries, seeds, leaves, roots and lichen);
- plant tissues that are ingested for medicinal use (e.g., roots, bark, leaves and seeds); and
- any of the above foods from the Project area that are offered for sale, barter or trade and that are not captured under (traditional) systems of licensing and/or inspection (e.g., through market gardeners).

4.24.4 Effects Assessment and Mitigation

The EIS will assess the impact of the Project's environmental effects on the current use of lands and resources for traditional purposes by the Mi'kmaq. This includes impacts on traditional hunting, fishing, gathering or ceremonial activities. The analysis should focus on the identification of potential adverse effects of the Project on the ability of future generations of Aboriginal people to pursue traditional activities.

Traditional activities carried out by the Mi'kmaq must be described. Based on information provided by the Mi'kmaq or, if the Mi'kmaq do not provide this information, on available information from other sources, the EIS will identify:

- potential social and/or economic effects to the Mi'kmaq that may arise as a result of any change in the environment due to the Project;

- effects of any change in the environment due to the Project on current and proposed uses of land and resources by the Mi'kmaq for traditional purposes;
- effects of any change in the environment due to the Project on hunting, fishing, trapping and cultural uses of the land (e.g., collection of medicinal plants, use of sacred sites), as well as related effects on lifestyle, culture and quality of life of the Mi'kmaq;
- effects on the Mi'kmaq of area access, including deactivation or reclamation of access roads; and
- effects of any change in the environment as a result of the Project on heritage and archaeological resources in the Project area that are of importance or concern to the Mi'kmaq.

The EIS shall include measures to avoid, mitigate, compensate or accommodate these effects. Effects assessment and mitigation with respect to the traditional use of lands and resources shall rely substantially on the original MEKS and the planned updated MEKS.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to the Current Use of Land and Resource Use for Traditional Purposes by First Nation and Aboriginal People. The EIS shall provide a description of measures to mitigate effects to the Current Use of Land and Resource Use for Traditional Purposes by the Mi'kmaq and predict potential residual effects and their significance.

4.25 Commercial and Recreational Fisheries

4.25.1 VEC Definition and Rationale for Selection

Commercial and Recreational Fisheries is considered a VEC due to interactions with the Project, regulatory protection of fish and fish habitat and the importance of the fishery to the local and regional economy and traditions. In particular, this VEC shall address potential Project interactions with inshore commercial fisheries including, but not limited to, lobster (Lobster Fishing Area (LFA) 27), snow crab, rock crab, herring and scallop. Consideration shall also be given to the presence of any nearby aquaculture leases that could potentially be affected by the Project.

The marine environment within the assessment area is located within Northwest Atlantic Fisheries Organization (NAFO) Division 4Vn which is further divided into LFA 27. The annual lobster fishery runs from May 15 to July 15 and contributes greatly to the economic base of the region. It is anticipated that Schooner Pond Cove and Morien Bay provide rearing habitat for finfish and invertebrate commercial fish species.

This VEC is closely linked to the Marine Environment VEC with respect to potential changes to marine habitat used by commercially fished species.

Spatial boundaries for this VEC are limited to areas that could be affected by Project-related construction and operation activities of barge load-out facility and transshipment location. For example fishing activities could be directly affected by construction of the barge load-out facility and the transshipment location by limiting access to fishing grounds and/or navigation routes.

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation and decommissioning. Temporal boundaries shall also consider periods of enhanced biological sensitivity for commercially fished species as well as fishing seasons.

4.25.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- loss of commercial and/or recreational fish habitat and/or loss of access to fishing grounds due to the barge load-out and transshipment facility construction, dredging and/or the ocean disposal site (if required);
- interference with fishing gear, navigation restrictions and constricted vessel movements associated with additional marine construction traffic;
- destruction of commercial and/or recreational fish due to the barge load-out facility construction dredging and/or the ocean disposal site (if required); and
- dispersion of fish stocks based on construction noise and vibration.

Potential Project-VEC interactions during operation and maintenance include:

- loss of commercial and/or recreational fish habitat within the barge load-out and transshipment facility footprint; and
- interference with fishing gear, navigation restrictions and constricted vessel movements associated with the barge load-out facility and routine vessel movements.

The potential for malfunctions and accidental events may also have interactions with Commercial Fisheries throughout all phases of the project.

4.25.3 Existing Environment

As part of the EIS, Commercial and Recreational Fisheries potentially affected by the Project shall be identified and characterized. Information to support the assessment of this VEC shall include the following:

- Commercially valuable species shall be characterized through a desktop study. Information sources used to characterize the commercial fisheries shall include: DFO catch data; DFO trawl survey publications; DFO stock assessments; and NAFO publications. This information shall be supplemented with discussion with resource experts and DFO officials.

- The results of the marine benthic habitat surveys conducted for the assessment area as part of the Marine Environment VEC shall also be reviewed for habitat suitability for commercial species.
- Results of lobster trap surveys conducted by the proponent shall be reviewed to help characterize the distribution of fishing activity.
- Information gathered during fisheries consultation shall be reviewed as relevant to characterize the local fishery and its activity.

4.25.4 Effects Assessment and Mitigation

The EIS shall assess the potential effects of the Project on Commercial and Recreational Fish species as well as any change in the environment as a result of the Project on the Commercial and Recreational Fishery. The effects assessment for the Commercial and Recreational Fisheries VEC shall be completed based on the results of the desktop and benthic studies and consultation with DFO representatives, resource experts and input from the fisheries consultation. It is assumed that habitat compensation shall be provided to achieve no net loss of productive capacity of fish habitat in consideration of the importance of commercial species. Fish and fish habitat mitigation including HADD compensation shall be addressed in the Marine Environment VEC. Other types of issues and mitigation (e.g., avoidance of marine construction during key fishing seasons) shall also be discussed. It is likely that any specific fishing mitigation and habitat compensation plans shall be reviewed for input by local fishing industry representatives.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to the Commercial Fisheries. The EIS shall provide a description of measures to mitigate effects to Commercial and Recreational Fisheries and predict potential residual effects and their significance.

4.26 Land Use

4.26.1 VEC Definition and Rationale for Selection

The Land Use VEC shall include consideration of: existing land development (industrial, commercial, institutional, residential); settlement areas; recreation, areas of special community or social value; land ownership; and post closure land use.

Spatial boundaries limited to within the footprint of the facility (including mine site, marine facilities and power transmission line) and areas that could reasonably be affected by the Project (e.g., sensory disturbance, truck routes, demand for housing and community infrastructure/services).

Temporal boundaries for assessment shall include those applicable to the regulatory criteria and guidelines, and include Project construction, operation, decommissioning and post-decommissioning, as applicable. Temporal boundaries shall also consider periods of seasonal land use activities and potential sensitivity to Project effects.

Land use has been considered a VEC due to:

- importance as socio-economic component supporting a wide range of human activities and interests;
- municipal land use plans; and
- Nova Scotia *Environment Act*.

4.26.2 Potential Project-VEC Interactions

Potential Project-VEC interactions during construction activities include:

- exclusion/promotion of development (industrial, commercial, residential);
- exclusion of recreation sites (e.g., recreational fishing, hiking, ATV use, recreational boating, and collection of terrestrial country foods, such as wild game and vegetation) or elimination of areas of special community or social value;
- additional housing and community infrastructure and services (e.g., increased health and emergency services may be required to accommodate Project activities and worker requirements); and
- land use effects associated with establishment of the power transmission corridor.

Potential Project-VEC interactions during operation and maintenance include:

- exclusion of recreation activities (e.g., hiking, ATV areas);
- additional housing and community infrastructure (e.g., health and emergency services may be required to accommodate Project activities and worker requirements);
- improvements to lands designated for industrial uses and ongoing economic activity;
- Project facilities and presence of waste material (e.g., waste piles and water treatment systems) could affect future development of site post closure;
- land use effects associated with establishment of the power transmission corridor; and
- potential disturbance associated with trucking of coal (if necessary) along transportation routes.

The potential for malfunctions and accidental events may also have interactions with land use throughout all phases of the project.

4.26.3 Existing Environment

A description of existing land uses shall rely on sources including:

- Donkin Exploratory Phase EA (XCDM 2008) including transportation study;
- Cape Breton Regional Municipality Municipal Planning Strategy;
- land use and ownership in the Project area;

- identification of informal land and water uses in discussion with municipal planners, stakeholders and experts;
- information gathered through implementation of the stakeholder consultation component of the Project shall be reviewed as relevant to characterize local land uses;
- review of Statistics Canada information for community characteristics; and
- review of the capacity of local housing stock, temporary housing and community infrastructure and services (emergency services, health care, school) to support increased work force and project requirements.

4.26.4 Effects Assessment and Mitigation

The EIS shall assess the potential effects of any change in the environment as a result of the Project on Land Use. This assessment shall include indirect and direct impacts to satisfy the requirements of the Agency and the province. The EIS shall describe:

- project related changes to existing and planned land uses, including water lot acquisition and lands along power transmission corridor and trucking routes;
- project related changes to informal land uses;
- evaluation of the capacity of local housing and community services to support the Project; and
- qualitative assessment of improvements to industrial land use and development.

Types of mitigation shall include controls on dust, noise, lighting and other potential disturbances associated with Project activities. Mitigation could also include an information program to notify local residents and, businesses and planners of upcoming Project activities and requirements.

In conducting the analysis, the proponent shall consider pertinent acts, policies, guidelines and directives relating to land use. The EIS shall provide a description of measures to mitigate effects to land use and predict potential residual effects and their significance.

Appendix A: Data and Information Sources

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