



**NORTH COAST WIND ENERGY CORP**

**BANKS ISLAND NORTH WIND  
ENERGY PROJECT**

**APPLICATION FOR AN  
ENVIRONMENTAL ASSESSMENT  
CERTIFICATE**

**DRAFT TERMS OF REFERENCE  
VERSION 2**

**Submitted to:  
British Columbia Environmental Assessment Office  
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## PREFACE

North Coast Wind Energy Corp. (NCWE) is proposing to construct, operate and maintain, and possibly decommission a wind energy project located on Banks Island, British Columbia. This **Draft Terms of Reference** (TOR) has been prepared as a basis for defining the scope, assessment methods and consultation processes for an environmental assessment (EA) of the proposed Banks Island North Wind Energy Project (the Project). This EA will be conducted to meet the requirements for an Application for an Environmental Assessment Certificate (the Application) pursuant to the British Columbia *Environmental Assessment Act* (BCEAA), and concurrently, to meet the requirements of the *Canadian Environmental Assessment Act* (CEAA).

The Project is proposed to consist of approximately 250 to 350, 2.0 to 3.0 MW wind turbines, interconnecting access roads and buried and overhead cables and substations on Banks Island, and a transmission line to connect the wind turbine area to an existing British Columbia Transmission Corporation (BCTC) transmission line. The preferred transmission line is primarily overhead transmission line and will include an underwater section (Figure 1). The total nameplate capacity of the Project is planned to be approximately 700 megawatts (MW).

The Application will be organized and structured consistent with this **Draft TOR** to facilitate a harmonized regulatory, public and First Nations review of the Project under BCEAA and CEAA. The Application will include figures, maps and tables to clarify text and present data and information.

This **Draft TOR** will be circulated to the British Columbia Environmental Assessment Office (BCEAO), identified federal Responsible Authorities (RAs) and Federal Authorities, the Canadian Environmental Assessment Agency (CEA Agency), interested First Nations and provincial and federal regulatory agencies for review, comment and input to attempt to achieve consensus on the proposed scope and methods to be used in preparing the Application.

Once this **Draft TOR** has been approved, it will be posted on the BCEAO Project Information Centre website.

The contents and structure of the Application are outlined in the following sections.

## **ACKNOWLEDGEMENTS**

The Application will acknowledge the Project Team, key regulatory agencies and First Nations that contributed to the preparation of this document.

## **EXECUTIVE SUMMARY**

An Executive Summary will provide a concise and complete overview of the Application. It will include, but not be limited to, the following information:

- A concise description of the Project.
- A summary of information distribution and First Nations and public consultation activities undertaken.
- An outline of potential Project-related and cumulative effects and proposed mitigation and compensation measures within various technical disciplines.
- A conclusion of whether the proposed Project will result in a significant impact.

## **TABLE OF CONCORDANCE**

A table of concordance will correlate each section of the Final TOR and with the corresponding section of the Application.

## **TABLE OF COMMITMENTS AND ASSURANCES**

The Application will contain a summary table of commitments and assurances made by NCWE to be met during the construction, operation and maintenance and decommissioning of the proposed Project. It is anticipated that this table of commitments and assurances will be further refined in response to the comments provided by First Nations, regulatory agencies and the public during formal review of the Application.

## LIST OF ABBREVIATIONS

The Application will contain a list of all acronyms, abbreviations, and units of measure used in the document. It will be based on the following list, and expanded as necessary during the preparation of the Application.

Application	Application for an Environmental Approval Certificate
AOA	Archaeological Overview Assessment
AIA	Archaeological Impact Assessment
ARD	Acid Rock Drainage
BCCDC	British Columbia Conservation Data Centre
BCEAA	British Columbia <i>Environmental Assessment Act</i>
BCEAO	British Columbia Environmental Assessment Office
BCTC	British Columbia Transmission Corporation
CCME	Canadian Council of Ministers of Environment
CEA	Cumulative Effects Assessment
CEAA	<i>Canadian Environmental Assessment Act</i>
CEA Agency	Canadian Environmental Assessment Agency
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dGPS	Differential Global Positioning System
DEM	Digital Elevation Model
DFO	Fisheries and Oceans Canada
ecoEnergy RP	ecoEnergy for Renewable Power Program
EA	Environmental Assessment
EMF	Electromagnetic Field
EMP	Environmental Management Plan
GPS	Global Positioning System
the Guide	Cumulative Effects Assessment Practitioners Guide
HADD	Harmful Alteration, Destruction or Disturbance of Fish Habitat
HCA	Heritage Conservation Act
ILMB	Integrated Land Management Bureau
LSA	Local Study Area
m	Meters
ML	Metal Leaching
MW	Megawatt
NCWE	North Coast Wind Energy Corp.
NRCan	Natural Resources Canada
the Project	Banks Island North Wind Energy Project
RA	Responsible Authority
ROW	Right-of-Way

RSA	Regional Study Area
SARA	<i>Species at Risk Act</i>
TEK	Traditional Ecological Knowledge
TEM	Terrain Ecosystem Mapping
TOR	Terms of Reference
VEC	Valued Ecosystem Component
VLI	Visual Landscape Inventory
RISC	Resource Inventory Standards Committee

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## ATTACHMENTS

Figure 1 Project Site Plan

# **1 INTRODUCTION**

## **1.1 OVERVIEW**

### **1.1.1 Project Overview**

- Provide an overview of the Project that includes:
  - An overview description of the Project.
  - The Project’s location, size, and phases.
  - A clear identification and listing of Project Works and Activities included in the Project Scope, including reference to the BCEAA Section 11 Order defining the scope of the Project for the purposes of the Environmental Assessment (EA).
  - Confirmation of whether the Project requires use of Crown land and/or private land.
  - Figure or maps showing regional context and site-specific setting.
  - Whether the Project requires use of lands within the proposed or designated parks, conservancies or other protected areas.
  - An estimation of the total labour force required (direct labour) during construction and operation and maintenance.
  - An estimation of capital costs for the Project.

### **1.1.2 Proponent Identification**

- Describe corporate overview, roles, responsibility and contact information.

### **1.1.3 Project Team**

- Provide a list of project team members and roles and responsibilities.

### **1.1.4 Structure of the Application**

- Describe the structure of the Application.
- The proposed structure of the Application is:

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    - 8.4.3 Valued Ecosystem Components

- 8.4.4 Project-environment Interactions
- 8.4.5 Assessment of Likely Effects
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- 8.5 MARINE MAMMALS
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11.3 CONCLUSIONS

- Provide a Table of Concordance with the requirements.
- Identify and discuss reporting conventions (e.g., acronyms, table and figure numbering).

### 1.1.5 Terms of Reference

- Describe information sources used to prepare the TOR and to scope the EA studies.
- Summarize input received from regulatory agencies, First Nations and the public during preparation of the TOR.

## 1.2 REGULATORY FRAMEWORK

### 1.2.1 British Columbia *Environmental Assessment Act*

- Identify and discuss BCEAA trigger.
- Indicate whether or not a concurrent review of permit applications is being requested under Section 23 of BCEAA.
- Provide additional information and/or applications associated with requested concurrent permits.

### 1.2.2 *Canadian Environmental Assessment Act*

- Identify likely CEAA regulatory triggers, which are preliminarily identified as:
  - NCWE intends to secure a federal loan guarantee under the proposed ecoEnergy for Renewable Power (ecoEnergy RP) Program, which is administered by NRCan. Due to the anticipated federal funding of the Project, CEAA is expected to be triggered pursuant to Section 5(1)(b).
  - The proposed Project may also trigger a determination under Section 5(1)(d) of CEAA due to the requirement of a federal authorization or permit, which may include but not be limited to:
    - *Fisheries Act* Section 35(2) Authorization for harmful alteration, destruction or disturbance (HADD) of fish habitat.
    - *Navigable Waters Protection Act* Part 1 Section 5(1) approval for works to be constructed in navigable waters.
- Identify and discuss type of assessment under CEAA (i.e., Screening or Comprehensive Study).
- Identify and discuss federal roles and responsibilities.

- Identify and discuss delegation of EA to NCWE.
- Identify and discuss Public Registry for the Project.

### 1.2.3 Other Permits, Approvals and Authorizations

- List statutory licenses, permits and other authorizations likely required for Project construction and operation. These may include, but not be limited to:

Agency	Legislative Mandate	Potential Authorization, Permits, Licenses and Notifications	Potential Project Trigger
<b>Provincial</b>			
Ministry of Tourism, Sports and the Arts, Archaeology Branch	<i>Heritage Conservation Act</i>	Site Inspection Permit	Identification of archaeological sites.
Ministry of Environment	<i>Environment Management Act</i> <i>Sewage Disposal Regulation</i> <i>Water Discharge Regulation</i>	Permit or authorization to introduce waste into the environment	Authorization to operate a sewage disposal system for a camp under 100 people during construction of the wind turbine Project. Authorization for discharge to the air during operation of a portable concrete batch plant.
Ministry of Environment	<i>Parks Act</i> , amended <i>Parks Act</i> and <i>Protected Areas Act</i>	Permit to construct the proposed Project or application for legislative amendment under the Provincial Park Boundary Adjustment Policy	Construction of the wind turbine in a Conservancy and/or construction of the transmission line in a Conservancy.
Ministry of Environment	<i>Water Act</i>	Notification and/or approval	Notification for the installation of access road culverts. Approval for water withdrawal to be used for concrete mixing.
Ministry of Forests and Range	<i>Forest and Range Practices Act</i>	License to Cut	Clearing required for turbine areas, access roads and transmission line right-of-way (ROW).
<b>Federal</b>			
Fisheries and Oceans Canada	<i>Fisheries Act</i>  <i>Species at Risk Act (SARA)</i>	<i>Fisheries Act</i> Section 35(2) Authorization	Potential HADD for the installation of the underwater transmission line across Principe Channel, direct and indirect effects associated with construction of the overhead transmission line and access roads across watercourses (aquatic and marine) and water withdrawal.
Transport Canada	<i>Navigable Waters Protection Act</i>  <i>Canadian Aviation Regulations, Standard 621.19 Standards Obstruction Markings.</i>	Section 5(1) Approval  Notification	Installation of overhead and underwater transmission line and access roads in or over designated navigable waters.  Operation of wind turbines.

- Identify additional acts and regulations that may apply to the Project but not require an approval, notification or authorization. These may include, but not be limited to:
  - Provincial:
    - *Environmental Management Act – Spill Reporting Regulation.*
    - *Wildlife Act.*
    - *Fish Protection Act.*
    - *Land Act.*
    - *Transportation of Dangerous Goods Act.*
    - *Pesticide Control Act.*
    - *Weed Control Act.*
    - *Wildfire Act.*
    - *Energy Act.*
    - *Health Act – Industrial Camps Health Regulation.*
    - *Workers Compensation Act.*
    - *BC Fire Code.*
    - *Occupational Health and Safety Regulation.*
  - Federal:
    - *Species at Risk Act (SARA).*
    - *Migratory Birds Convention Act.*
    - *Canadian Environmental Protection Act.*
    - *Canada Shipping Act.*
    - *Canada Transportation Act.*
    - *Transportation of Dangerous Goods Act.*
    - *Pest Control Products Act.*
    - *Canada Wildlife Act.*
    - *Canadian Council of Ministers of Environment (CCME) – Environmental Code of Practice for Aboveground/Underground Storage Tank System Containing Petroleum Products (CCME 1993).*

### **1.3 LAND AND RESOURCE MANAGEMENT PLANS**

- Identify and discuss applicable local and regional government planning bodies and land and resource management plans.
- Identify and discuss applicable First Nation land use plans.

- Identify applicable First Nations/Provincial land use agreements.

## **1.4 FIRST NATIONS INDIAN RESERVES AND TRADITIONAL USE BOUNDARIES**

- Identify First Nations that have a potential interest in the Project.
- Identify and map locations of First Nations Indian Reserves in respect to Project component locations.

## **1.5 NEED FOR AND PURPOSE OF THE PROJECT**

### **1.5.1 Project Principles**

- Identify and discuss the principles that provide for the context of the Project and the EA, including:
  - Sustainability.
  - Recognition of First Nations land claims and treaties.
  - Recognition of parks, protected areas and conservancies.
  - Recognition and discussion of asserted and proven Aboriginal Rights and title relevant to the Project area.
  - The Precautionary Approach.

### **1.5.2 Need for and Purpose of the Project**

- Describe the need for and purpose of the Project. The need for the Project is defined as the problem or opportunity that the Project is intending to solve or satisfy from the perspective of the Proponent.

## **1.6 PROJECT ALTERNATIVES**

### **1.6.1 Alternatives to the Project**

- Section 16(1) (e) of CEAA allows for the Responsible Authority (RA) or the federal Minister of Environment to EA to consider “alternatives to” the project.
- NCWE will provide an “alternatives to” analysis of the proposed Project. This will include an analysis on other forms of energy generation to fulfil the 700 MW proposed Project energy capacity. The other types of projects that may be included in this analysis could include, but not necessarily be limited to:
  - Hydroelectric.

- Thermal using natural gas or coal.
- Biomass or cogeneration.

## **1.6.2 Alternative Means of Carrying out the Project**

- Section 16(2)(b) of CEAA allows for the requirement of “alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means”.
- For this Application, NCWE will provide an analysis of the following alternative means:
  - Transmission line corridor options from Banks Island to interconnect to existing BCTC grid.
  - Proposed transmission line route within the preferred corridor.
  - Overhead and underwater transmission line installation techniques.
- Describe the tiered approach for evaluating the alternative means of carrying out the Project, as follows:
  - Prepare an evaluation matrix of the range of possible alternative means.
  - Evaluate the alternatives using criteria including, but not limited to: wind resource, engineering, cost, geotechnical stability, environmental and archaeological resources, public and First Nations considerations, and land use.
  - Prepare a brief rationale of why certain alternatives are not considered technically and/or economically viable, and why they are not being considered further.
  - From the remaining alternatives, describe the rationale for selecting the preferred alternative upon which the detailed EA of potential effects will be undertaken.

## 2 PROJECT DESCRIPTION

- Describe major Project Works and Activities for the design, construction, operation and maintenance and decommissioning stages of the Project. These are preliminarily identified below.

Stage	Project Works <sup>(a)</sup>	Project Activity
Design	<ul style="list-style-type: none"> <li>• Anemometers.</li> </ul>	<ul style="list-style-type: none"> <li>• Project component siting surveys.</li> <li>• Anemometer installation and maintenance.</li> </ul>
Construction	<ul style="list-style-type: none"> <li>• Worker camps.</li> <li>• Mobile concrete batch plant.</li> <li>• Laydown areas.</li> <li>• Borrow pits.</li> <li>• Temporary work spaces.</li> <li>• Main and interconnecting access roads and bridges.</li> <li>• Marine bulkhead.</li> <li>• Wind turbines.</li> <li>• Substations.</li> <li>• Interconnect lines.</li> <li>• Transmission line (overhead and underwater).</li> <li>• Series compensation facility.</li> </ul>	<ul style="list-style-type: none"> <li>• Site and route surveys.</li> <li>• Site preparation (clearing, grubbing, soil stripping) for all Project Works.</li> <li>• Excavation of borrow pits.</li> <li>• Construction of access roads.</li> <li>• Installation of power collector system among turbines.</li> <li>• Installation of transmission lines.</li> <li>• Preparation of concrete foundations.</li> <li>• Wind turbine installation.</li> <li>• Construction of substation(s).</li> <li>• Construction of marine bulkhead, including pile driving.</li> <li>• Installation and operation of concrete batch plant.</li> <li>• Transportation of materials and equipment.</li> <li>• Vehicle/equipment refueling and maintenance.</li> <li>• Reclamation and/or revegetation of temporary sites.</li> </ul>
Operation and Maintenance	<ul style="list-style-type: none"> <li>• Wind turbines.</li> <li>• Roads and bridges.</li> <li>• Marine bulkhead.</li> <li>• Interconnect cables.</li> <li>• Substations.</li> <li>• Transmission line.</li> <li>• Series compensation facility.</li> </ul>	<ul style="list-style-type: none"> <li>• Operation and maintenance of Project Works (as listed).</li> </ul>
Decommissioning	<ul style="list-style-type: none"> <li>• Wind turbines.</li> <li>• Roads and bridges.</li> <li>• Marine bulkhead.</li> <li>• Borrow pits.</li> <li>• Interconnect cables.</li> <li>• Substations.</li> <li>• Transmission line.</li> </ul>	<ul style="list-style-type: none"> <li>• Dismantling and removal of Project Works (as listed).</li> <li>• Transportation of salvaged materials and equipment.</li> <li>• Reclamation of sites.</li> </ul>

Stage	Project Works <sup>(a)</sup>	Project Activity
	<ul style="list-style-type: none"> <li>• Series compensation facility.</li> </ul>	

- Provide sufficient detail to reasonably identify and understand the selection of Valued Ecosystem Components (VEC <sup>1</sup>), potential Project-environment interactions and potential environmental effects that may be caused by the Project.
- Provide plans, diagrams, photos, maps, preliminary designs and/or design codes, as appropriate, to support the project description. The scale and detail of maps will facilitate the identification of the location of Project Works and Activities in relation to features of the physical, biological and human environments.

## 2.1 MAJOR PROJECT WORKS

- Describe the major Project Works of the Project, including:
  - Anemometers.
  - Wind turbines turbines (actual number and type is still being determined by NCWE).
  - Primary access road between the marine bulkead facility and the turbine area on Banks Island.
  - Interconnecting access roads and transmission lines between turbines and to the substations.
  - Overhead and underwater transmission line.
  - Laydown areas.
  - Portable concrete batch plant.
  - Substations.
  - Worker camps.
- Identify onsite vs. offsite Project Works.

### 2.1.1 Land Requirements and Right-of-Way Dimensions

- Identify and describe:
  - Dimensions of the major Project Work and any right-of-ways (ROWs).
  - Amount of land will be disturbed during construction and permanently used during operation within a proposed or identified conservancy.
  - Ownership of lands needed for permanent or temporary use.

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<sup>1</sup> Throughout this document, “Valued Components” (VEC) refer to valued ecological and socio-economic components.

- Zoning and/or other planning designations.

## **2.2 MAJOR PROJECT ACTIVITIES**

- Identify and describe Project Activities for each of the design, construction, operation and maintenance and decommissioning phases, taking into consideration construction timing windows for aquatic and wildlife species.

### **2.2.1 Construction Phase**

- Discuss construction methodologies and sequencing for the Project.
- Describe proposed schedules, activities and milestones related to construction of the Project.
- Provide a construction schedule diagram or flow chart identifying major tasks and timelines.

### **2.2.2 Operation and Maintenance Phase**

- Identify and describe all Project Works and Activities during the operation and maintenance phases including:
  - Wind turbine, substation and overhead and underwater transmission line operations and procedures.
  - Schedule and methods for maintenance and repair.
  - Methods and frequency for facility inspection, monitoring and surveillance.

### **2.2.3 Decommissioning Phase**

#### **2.2.3.1 Temporary Project Works**

- Identify applicable regulatory frameworks for the decommissioning of temporary Project Works, and the restoration of areas affected by construction activities and facilities.
- Describe clean-up and restoration of areas affected by temporary Project Works, including activities, timing and final condition for the following:
  - Work camps.
  - Access infrastructure.
  - Fuel storage areas.
  - Borrow pits and quarries.
  - Waste disposal.
  - Equipment staging or storage areas.
  - Temporary watercourse crossings (e.g., for vehicles and equipment).

### **2.2.3.2 Permanent Project Works**

- Describe the types of activities likely to be undertaken as part of decommissioning the Project (e.g., removal of surface facilities).
- Describe the conceptual reclamation and land use objectives for the Project decommissioning.

## **2.3 PROJECT SCHEDULE**

- Identify the scheduling and relative timing and duration of major Project Activities.

## **2.4 CAPITAL COSTS**

- Provide a total capital estimate of Project costs broken down by phase.

## **2.5 LABOUR FORCE**

- Describe the labour force required for the Project including:
  - Estimate construction workforce requirements (direct jobs only) by numbers and occupation or skill.
  - Estimate operation/maintenance workforce requirements (direct jobs only) by numbers and occupation or skill.
  - Provide a schedule of workforce requirements.
  - Indicate from where the construction workforce would originate.
  - Indicate from where the operation/maintenance workforce would originate.

## **2.6 ENVIRONMENTAL MANAGEMENT PROGRAM**

### **2.6.1 Environmental Management Plan**

The Application is to include an outline of a Construction Environmental Management Plan and an Operation and Maintenance Environmental Management Plan for the Project, to be finalized in discussions with the relevant permitting agencies and First Nations prior to construction of the Project.

Environmental Management Plans (EMPs) are general documents that identify and describe the applicable best management practices and procedures to be applied during the construction and operation/maintenance of the Project. The EMPs will outline the Proponent's approach to project planning and the development of protection measures to mitigate potential environmental effects.

The Application will outline the frameworks for the Construction and Operation and Maintenance EMP component plans, which in turn, will be developed by the contractors and reviewed by regulatory agencies having jurisdiction prior to construction. The commitments in the EMPs will be provided in the Table of Commitments and Assurances and will be implemented by the Proponent's contractors.

## 2.6.2 Environmental Monitoring

- Provide a framework for environmental monitoring programs to be undertaken during each of the Project Phases.
- The proposed monitoring programs will be identified and described in terms of:
  - **Compliance Inspection:** the activities, procedures and programs undertaken to confirm the implementation of approved design standards, mitigation, conditions of approval and company commitments.
  - **Monitoring:** monitoring to track conditions or issues during the Project lifespan.
- The need for a follow-up program as defined under CEAA will be determined in consultation with the identified RAs and CEA Agency.

### **3 INFORMATION DISTRIBUTION AND CONSULTATION**

Information distribution and consultation is an important component of the Application process and a means by which concerns and interests of the public, regulatory agencies and First Nations are taken into account.

- The goals of the consultation and communications program are to ensure that the Project:
  - Meets development timelines.
  - Meets requirements for consultation and communications: Public Consultation Policy Regulation (BC Reg. 373/2002) under BCEAA; requirements imposed by the RAs under Section 18 of CEAA; and, British Columbia First Nations Consultation Policy (2002).
  - Provides for an open and accountable review process which considers all interested parties.
  - Fosters community support for the Project.
  - Strengthens ongoing relations with local interests.
- There are three phases proposed for the consultation and communications program:
  - Phase I: Project Introduction.
  - Phase II: Terms of Reference.
  - Phase III: Application Review.
- Phase timelines will be finalized pending further discussion with the BCEAO and CEA Agency.
- Outline the engagement activities undertaken, and identify and report on issues raised.

#### **3.1 PRE-APPLICATION NOTIFICATION AND CONSULTATION INITIATIVES UNDERTAKEN**

- Describe the pre-Application consultation process undertaken by the Proponent including the following.

##### **3.1.1 Public Consultation**

- Identify key stakeholders and individuals that may have an interest in the proposed Project.
- Describe and summarize the consultation and communications plan for the proposed Project pertaining to public consultation.
- Describe the efforts undertaken to distribute Project materials to the public (including key stakeholder groups) during preparation of the TOR and the Application.

- Summarize direct consultation activities undertaken during the preparation of the Application.
- Prepare a tabulated summary/record to document issues and concerns raised during the preparation of the TOR and the Application, organized by discipline.

### **3.1.2 First Nations Consultation**

- Identify First Nations that will have an interest in the proposed Project.
- Describe and summarize the consultation and communications plan for the proposed Project pertaining to First Nations consultation and how this plan was prepared.
- Describe the efforts undertaken to distribute Project materials to First Nations during preparation of the TOR and the Application.
- Summarize direct consultation activities undertaken during the preparation of the TOR and the Application to formally notify and consult with First Nations representatives.
- Document relevant communication and consultation agreements/protocols between First Nations and NCWE.
- Prepare a tabulated summary/record to document issues and concerns raised during the preparation of the TOR and the Application, organized by discipline.

### **3.1.3 Consultations with Federal, Provincial and Local Government Agencies**

- Identify key regulatory agencies, Crown corporations and local governments that will likely be involved in the EA review of the proposed Project. These have preliminarily been identified as:
  - Provincial:
    - BCEAO.
    - Ministry of Environment.
    - Integrated Land Management Bureau (ILMB).
    - Ministry of Forests and Range.
    - Ministry of Energy, Mines and Petroleum Resources.
    - Ministry of Tourism, Sport and the Arts.
    - Ministry of Agriculture and Lands.
    - BC Parks.
    - British Columbia Transmission Corporation.
    - BC Hydro and Power Authority.
  - Federal:
    - CEA Agency.

- Fisheries and Oceans Canada (DFO).
- Environment Canada; Environmental Protection Operations.
- Environment Canada, Canadian Wildlife Service.
- Natural Resources Canada.
- Transport Canada.
- Health Canada.
- Local Governments:
  - Regional District of Skeena-Queen Charlotte.
  - City of Prince Rupert.
  - District of Port Edward.
- Describe the efforts undertaken to distribute Project materials to regulatory agencies during preparation of the TOR and the Application.
- Summarize direct consultation activities undertaken during the preparation of the TOR and the Application, including public meetings, open houses and meetings with key government agencies and stakeholders.
- Prepare a tabulated record to document issues and concerns raised during the preparation of the TOR and the Application, organized by discipline.

## **3.2 PLANNED NOTIFICATION AND CONSULTATION ACTIVITIES**

### **3.2.1 Public Consultation**

- Outline the Proponent's proposed public information dissemination and consultation programs to be undertaken during the formal public comment period following submission of the Application.

### **3.2.2 First Nations Consultation**

- Outline the Proponent's proposed First Nations information dissemination and consultation programs to be undertaken during the formal public comment period following submission of the Application.

## **4 ASSESSMENT METHODOLOGY**

### **4.1 SCOPE OF ASSESSMENT AND STUDY AREAS**

- Describe the issues scoping process, including the influence of consultations on the identification of potential environmental, social, economic, heritage, and health effects on First Nations interests, including Aboriginal rights.
- Itemize the issues identified during pre-Application issues scoping. The scope of the assessment will consider the potential effects of the Project on the following environmental components:
  - Human Environment:
    - First Nations Traditional Use and Traditional Ecological Knowledge.
    - Land and Resource Use.
    - Archeological Resources (Terrestrial and Marine).
    - Socio-economic Resources.
    - Visual Landscape.
    - Public Health.
    - Navigable Waters.
    - Aviation Safety.
    - Telecommunications and Radar Systems.
  - Atmospheric Environment:
    - Climate and Air Quality.
    - Noise Environment.
  - Aquatic Environment:
    - Surface Water Hydrology.
    - Surface Water Quality and Aquatic Health.
    - Aquatic Fish and Fish Habitat, including provincially and federally listed rare and endangered species.
  - Marine Environment:
    - Marine Geology.
    - Marine Invertebrates, including provincially and federally listed rare and endangered species.
    - Marine Vegetation and Epifauna, including provincially and federally listed rare and endangered species.

- Marine Fish and Fish Habitat, including provincially and federally listed rare and endangered species.
- Marine Mammals, including provincially and federally listed rare and endangered species.
- Terrestrial Environment:
  - Soils, Geology and Terrain Stability.
  - Vegetation, Wetlands and Forestry, including provincially and federally listed rare and endangered species and communities.
  - Wildlife and Wildlife Habitat, including marine birds and provincially and federally listed rare and endangered species.

## **4.2 ENVIRONMENTAL ASSESSMENT METHOD**

### **4.2.1 Overview of Assessment Method**

- Provide an overview of the assessment methods used to determine the potential effects of the Project on the environment including:
  - Temporal and spatial boundaries adopted for the assessment.
  - Environmental components used in the assessment.
  - Consideration of community, regulatory agency and First Nations issues and interests.
  - Methods used for assessing measurable effects of the Project on the environment.
  - VECs used in the assessment.
  - Evaluation of the significance of residual effects.

### **4.2.2 Spatial Boundaries**

- Identify spatial boundaries used for the EA and the rationale for their selection. Spatial boundaries will be identified for the following two study areas:
  - Local Study Area (LSA) – the immediate area that includes the turbines and associated facilities and structures as well as the route for the transmission line.
  - Regional Study Area (RSA) – the area within which there is the potential for cumulative effects and the area used to assess potential effects for regional VECs as applicable (e.g., plant communities, wildlife habitats).
- The application of these two study areas will vary by VEC to allow the full extent of reasonably likely effects to be considered.

### **4.2.3 Temporal Boundaries**

- Define the temporal boundaries for the assessment. The temporal boundaries will define the time periods for which likely environmental effects will be considered over the lifespan of the Project, (i.e., construction, operation and maintenance and decommissioning phases).

### **4.3 CONSIDERATION OF PUBLIC, REGULATORY AGENCY, AND FIRST NATIONS**

- List issues identified by regulatory agencies, public and First Nations, and describe how these issues have been incorporated into the Project design.
- Describe how identified issues have been addressed in the Application.

### **4.4 ASSESSMENT OF LIKELY EFFECTS OF THE PROJECT**

- Describe the methods used to predict likely effects of the Project on VECs, which will include the following steps:
  - Step 1: Characterize the existing environment in terms of the VEC selected to represent the environmental component.
  - Step 2: Identify and rationalize the choice of VECs that are used to focus the assessment.
  - Step 3: Identify Project-environment interactions using matrix tables that may result in a measurable change in the environment that leads to a potential effect on a VEC. As such, matrix tables generally reflect the source-pathway-receptor concept.
  - Step 4: Determine the effects that are likely to occur as a result of implementing the Project (the likely effects), considering opportunities to mitigate and/or compensate any adverse effects.
  - Step 5: Identify and evaluate the Project specific residual effects. Residual effects for the purposes of this assessment are those effects that remain after implementation of reasonable mitigation and/or compensation. Only those residual effects that are considered to be adverse and are likely to occur will be advanced for an assessment of significance. Those effects determined to be positive (e.g., employment and income) will not be carried forward into the assessment of significance.
  - Step 6: Conduct a cumulative effects assessment of Project-specific residual effects. The cumulative effects assessment will include the identification of projects beyond the Project Footprint.
  - Step 7: Determine the significance of residual adverse Project-specific and cumulative environmental effects. Each residual effect will be allocated to one of the following significance values:
    - No Significant Adverse Effect: The residual adverse effect is not significant.

- Significant Adverse Effect: The residual adverse effect is significant. Additional or more effective mitigation to reduce the impact of the effect is not considered possible.

## 4.5 VALUED ECOSYSTEM COMPONENTS

- VECs are features selected to be the focus of the EA study because they can provide information that responds to issues that have been identified for consideration in the EA.
- Criteria for selecting VECs will include, but not be limited to:
  - Abundance in the LSA and RSA.
  - Ecological importance.
  - Baseline data availability – sufficient information should be available to allow a reasonable evaluation of effects.
  - Native flora and fauna species and communities.
  - Exposure – the VEC should have some exposure to the “stressors” produced by the Project.
  - Sensitivity – the VEC should be sensitive to the “stressors” produced by the Project.
  - Socio-economic importance - value as commercial, recreational or subsistence resource. inherent aesthetic value.
  - Conservation status – specifically protected by law, designated as rare, threatened, or endangered.
  - Traditional and current importance to Aboriginal people.
  - Regional and local importance.
  - Cultural and heritage importance to society.
- Provide a tabulated summary of identified VECs and rationale for their selection by component.

## **5 HUMAN ENVIRONMENT**

### **5.1 FIRST NATIONS TRADITIONAL USE AND TRADITIONAL ECOLOGICAL KNOWLEDGE STUDY**

#### **5.1.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing mapping, databases and published and unpublished literature of historic and current traditional land use and ecological knowledge where available.
- Make reasonable efforts to collaborate with interested First Nations to collect traditional use and traditional ecological knowledge (TEK) information and data.
- Collate historical and current traditional land use and ecological knowledge collected during the study and First Nations consultations.
- Confidential First Nations information will not be included in the Application. First Nations may request that any information considered to be confidential be compiled in a document separate from the Application for use by appropriate review agencies and will not become part of a public document.
- Acknowledge, recognize and respect First Nations protocols in relation to Traditional Use and TEK documented through the study. NCWE will work towards agreements with the interested First Nations regarding use of information by NCWE for purposes of the environmental assessment and other approvals and for the duration of the Project.
- Original maps and audio recordings produced through the TUS/TEK process will be returned to the originating communities upon Project completion and receipt of written request by the First Nation.

#### **5.1.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

#### **5.1.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate potential effects of the Project on historical and current traditional land use.
- Where confidentiality identified by First Nations permits, provide TEK information and data to component specific studies (e.g., aquatic fish, wildlife and wildlife habitat) for assessment of potential effects.

### **5.1.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate identified likely effects.

### **5.1.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.2 LAND AND RESOURCE USE**

### **5.2.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing mapping, databases and published and unpublished literature of current and proposed land and resource users, including permitted and tenured users.
- Collate resource use information collected in the regulatory agency and public consultation program.
- Identify and contact pertinent resource users, including hunting outfitters, fishing charters, aggregate managers, forestry representatives and tourism and recreation organizations.
- Map and discuss existing land and resource users, including but not limited to parks and protected areas, forestry, trapping and hunting, fishing, minerals and aggregation and non-consumptive recreation.
- Map and discuss existing and proposed land use designations in applicable Land and Resource Management Plans.
- Identify First Nations/Provincial land use agreements.

### **5.2.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.2.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate potential indirect (noise and light) and direct (land disturbance) effects to resource users.
- Evaluate the proposed Project land use in the context of the BC *Park Act* and applicable land use designations and land and resource management objectives.

## 5.2.4 Identified Mitigation Measures

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## 5.2.5 Residual Effects

- Identify any residual effects that remain after implementation of mitigation.

## 5.3 TERRESTRIAL ARCHAEOLOGY RESOURCES

### 5.3.1 Existing Environment

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Conduct an Archaeological Overview Assessment (AOA) that will consist of a review of existing information.
- Based on the AOA, and in collaboration with affected First Nations, conduct an Archaeological Impact Assessment (AIA) in accordance with the British Columbia Archaeological Impact Assessment Guidelines (BC AIA Guidelines), and under the terms of a Heritage Inspection Permit, issued by the Archaeology Branch under Section 14 of the *Heritage Conservation Act* (HCA).
- The AIA will be conducted in such a manner to recognize applicable First Nations policies and protocols that are consistent with the *Heritage Conservation Act* or other provincial policies that govern the conduct of archaeological work under permit.
- Conduct a site survey inventory under the HCA permit by qualified archaeologists and First Nations representatives to locate, record and evaluate archaeological sites. Detailed assessments will be carried out by qualified archaeologists and First Nations representatives in locations selected for AIA, based on the AOA results and discussions with affected First Nations.
- Map, record, photograph and discuss assess identified archaeological sites and provide to the provincial Archaeology Branch and affected First Nations. The Application will not include maps illustrating the location of archaeological sites.
- Locations of identified archaeological sites will not be illustrated in the Application or other documents made available to the general public as part of the Application process.
- Prepare and submit an AIA report to the provincial Archaeology Branch. Site-specific information must be provided for this report, and the Archaeology Branch retains the right to use and distribute such information in accordance with provincial archaeological data management policies.

### **5.3.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.3.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Conduct an evaluation of potential effects as per the requirements of the AIA and include:
  - Impact Evaluation – Identify potential direct and indirect effects to archaeological sites.
  - Significance Evaluation – For sites recorded during the AIA that could be affected by the proposed Project, assess scientific, public, and, where applicable, historic and economic significance, using the criteria established in the BC AIA Guidelines. Request an assessment of “ethnic” (cultural) significance from First Nations.

### **5.3.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### **5.3.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.4 MARINE ARCHAEOLOGICAL RESOURCES**

### **5.4.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Conduct a review of various map themes including contours, surficial geology, bathymetry and scientific literature.
- Conduct a review of pertinent shipwreck literature, as well as contacting groups or institutions that may have information about shipwrecks in the project area (e.g., Underwater Archaeology Society of BC, the BC Maritime Museum, Vancouver Maritime Museum, Vancouver Archives, BC Archives and the Prince Rupert Museum).
- Consult experts to attempt to reconstruct a sea level curve for the project area, based on existing information.
- Map, identify and discuss marine archaeological resources.
- Categorize and map the marine survey areas into zones of differing archaeological potential (e.g., low, moderate, or high).

## **5.4.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

## **5.4.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential physical loss, damage or destruction of marine archaeological resources.
- Evaluate the potential indirect effects from decreased marine water quality.

## **5.4.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## **5.4.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.5 SOCIO-ECONOMIC RESOURCES**

### **5.5.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Summarize the following Project socioeconomic related data:
  - Labour requirements: by skill level, occupation and number of positions for Project construction and operations/maintenance. These may be based on the National Occupational Codes in the Application.
  - Contractors and goods and services: required throughout the life of the Project. These may be based on the North American Classification System Codes in the Application.
  - Predicted expenditures: associated with project construction and operations/maintenance.
- Summarize the following socio-economic baseline conditions for non-Aboriginal communities based on existing information, which is to include the following parameters: where relevant to communities:
  - Demography: population, population growth, gender distribution, migration patterns.

- Housing: Current housing and availability of accommodation for project construction/operations (will be assessed at the local level if work crews are not staying in construction camps).
- Infrastructure and services: community access to, and existing capacity of health and education services and facilities, water and sanitation, and emergency services.
- Employment and unemployment rates.
- Income: levels and sources.
- Labour force: size, education, skill level and distribution within industry.
- Economic sector profiles: for regional and local area economies. Economic trends and projections will be analyzed. This will include a description of prominent industries in the study area such as forestry, tourism, mining and recreation.
- Business and occupation profiles: This will include local and regional suppliers of goods and services.
- Summarize the socio-economic baseline conditions based on existing information and interviews with First Nations, which include the following parameters, where relevant to communities:
  - Demography: population, population growth, gender distribution, migration patterns.
  - Housing: Current housing and availability of accommodation for project construction/operations.
  - Infrastructure and services: community health and education services and facilities, and emergency services.
  - Employment and unemployment rates.
  - Income: levels and sources.
  - Labour force: size, education, skill level and distribution within industry.
  - Economic activities.
  - General community health and well-being characteristics.
  - First Nations businesses that could supply goods and services to the Project.
- Identify VECs and the rationale for their selection.
- Based on the interviews and First Nations consultation effort, identify issues and concerns raised by the First Nations with respect to the Project's adverse or positive socio-economic effects on the communities.

## 5.5.2 Assessment of Likely Effects

- Use matrix tables to illustrate likely interaction of Project Works and Activities on identified VECs.

- Assess potential socio-economic effects on Non-Aboriginal communities:
  - Potential Social Effects:
    - Changes in demand and supply of infrastructure and social services, where applicable.
    - Housing availability focusing on the availability of construction crew housing (if Project workforce will not be staying in construction camps).
    - Public safety as a result of the influx of workers into the Project area.
  - Potential Economic Effects:
    - The development of the Project as part of overall industrial development locally and regionally.
    - Anticipated market for products produced by the Project.
    - Geographic distribution of expected economic and employment impacts.
    - Estimated annual revenues to local, provincial and federal governments.
    - Potential local sourcing of workers for the Project.
    - The potential for the project to create opportunities for local suppliers.
    - Indirect economic effects to existing industries as a result of the Project including employment effects and business production outputs.
- Assess potential socio-economic effects on First Nations communities:
  - Potential Social Effects:
    - Housing availability.
    - Public safety as a result of the influx of workers into the Project area.
    - The effects associated with a large migrant work force.
    - Effects associated with new income resulting from Project employment.
  - Potential Economic Effects:
    - Potential revenues for First Nations.
    - Potential sourcing of First Nations workers for the Project.
    - The potential for the project to create direct and indirect opportunities for First Nations suppliers.
    - Other issues pertaining to community well-being, as per interviews with First Nations.
- To address CEAA socioeconomic effects requirement, a separate subsection of indirect socioeconomic effects will be included in the Application.

### **5.5.3 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.6 VISUAL LANDSCAPE**

### **5.6.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Map and discuss current visual landscape classifications based on existing LRMPs.
- Characterize existing visual environment based on the Recreation Visual Landscape Inventory (VLI) data created by the BC Ministry of Forest and Range and supplied by the ILMB.
- Map and discuss VLI classifications.
- Map and discuss Visual Sensitivity Unit polygons.

### **5.6.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.6.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of Project Works based on the Visual Impact Assessment Guidebook and incorporating viewshed models, site visits and perspective renderings.
- Create viewshed models based on a TRIM Digital Elevation Model (DEM) and wind turbine tower locations and heights. Where available, Forest stand heights will be added to the viewshed DEM. The viewshed will be modelled using an assumed viewer height of 1.6 m.
- Create perspective renderings of the Project from a 3D landscape model created from available data for the study area.
- From the key viewpoints, including key recreational and cultural locations, measure the scale and contrast of the Project. Scale will be measured by the relative size of the disturbance in the view and the contrast of the disturbance with the surrounding landscape.
- The visual assessment will be evaluated in relation to applicable regional management objectives and classifications.

## **5.6.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## **5.6.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.7 PUBLIC HEALTH**

### **5.7.1 Existing Environment**

- Identify and map local and/or regional study area boundaries and the rationale for their selection.
- Address the following public health issues:
  - Electro and magnetic field (EMF).
  - Air quality.
  - Noise.

### **5.7.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.7.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Identify and map proposed Project Works and Activities in relation to existing communities and fish, logging and other field camps.
- Investigate the potential effects due to increased EMF as a result of the transmission line will be assessed based on existing literature and the location of human settlements, including First Nations traditional use areas, in relation to the proposed transmission line route.
- Public health effects related to air quality and noise will be assessed by comparison of estimated increases in ambient noise and air quality as a result of construction, operation and decommissioning of the project with existing air quality and noise criteria to protect public health and the distance to nearest human settlements and First Nations traditional use areas. Changes to the ambient air quality and noise environment due to the Project are addressed in Chapter 6.0.

- Assessment of potential effects and mitigation measures related to Project security will be focused on the turbine area and include ice falls or throws from the turbine, blade failure and site access.

## **5.8 NAVIGABLE WATERS**

### **5.8.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Identify and map waters deemed navigable through existing literature and consultation with Transport Canada.
- Identify major components of the Project and that are of interest to Transport Canada during their review process:
  - Overhead and underwater transmission line crossings on or over navigable waters.
  - Access roads and crossings over navigable waters as well as traffic patterns.
  - Construction of the marine bulkhead facility.
  - Proposed marker lighting on the wind turbines and towers.
- Characterize current and foreseeable seasonal use and traffic patterns (number and type, both current and foreseeable) of vessels in navigable waters crossed by the Project.

### **5.8.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.8.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interactions of Project Works and Activities.
- Evaluate the potential direct and indirect effects of the Project to navigable waters including:
  - Obstruction of the use of identified navigable waters during construction, operation and decommissioning of the Project.
  - Potential for marine vessel traffic collision with Project works located in navigable waters.
  - Potential for marine vessel collision during construction of the Project.

### **5.8.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

- All minor works on or over Navigable Waters not requiring formal NWPA Approval will conform to Canadian Standards Association standards, the procedures for minor crossings and minor works described by Transport Canada can be found at <http://www.tc.gc.ca/MarineSafety/TP/menu.htm> will be used and will be reference during the identification of mitigation measures.
- Identification of appropriate Canadian and International Standards that will be followed for those specialized vessels potentially used during Project construction activities.

### **5.8.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.9 AVIATION SAFETY**

### **5.9.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Identify and map known aviation routes.
- Identify and map major components of the Project and that may have the potential to affect aviation safety.
- Characterize current and foreseeable aviation traffic in areas that may be affected by the Project.

### **5.9.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.9.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interactions of Project Works and Activities.
- Evaluate the potential direct and indirect effects of the Project to aviation safety in areas that may be affected by the Project.

### **5.9.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.
- Identify appropriate marking and lighting for Project components that meets applicable standards.

### **5.9.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.10 TELECOMMUNICATION AND RADAR SYSTEMS**

### **5.10.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Identify and map known telecommunication and radar locations.
- Identify and map likely frequency pathways of known telecommunication and radar systems.
- If required, consult with operators of telecommunication and radar systems that may be affected by the Project.

### **5.10.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **5.10.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interactions of Project Works and Activities.
- Evaluate the potential effects of the Project to the operation of telecommunication and radar systems.

### **5.10.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### **5.10.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **5.11 LIST OF REFERENCES AND SUPPORTING DOCUMENTATION**

- Provide a list of references and personal communications cited in this Chapter.

## 5.12 APPENDICES

- Provide Chapter specific appendices.

## **6 ATMOSPHERIC ENVIRONMENT**

### **6.1 CLIMATE AND AIR QUALITY**

#### **6.1.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Summarize baseline air quality conditions based on existing information.
- Provide a description of baseline meteorological conditions including temperature, wind and precipitation.
- Summarize the long-term climatological information, including 30-year trends for temperature, wind and precipitation.

#### **6.1.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

#### **6.1.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Characterize likely emissions and emission sources during Project construction and operation and maintenance phases including a detailed emissions inventory for the construction phase of the Project.
- Identify regional, provincial and national emissions criteria that are used to evaluate potential air quality effects.
- Identify any potential for changes to local and regional air quality from Project emissions. Modelling will not be conducted.

#### **6.1.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

#### **6.1.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **6.2 NOISE ENVIRONMENT**

### **6.2.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Characterize the existing ambient atmospheric noise environment based on existing data and information.
- Characterize the existing underwater noise environment based on existing data and information and or other similar environments.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Identify and map noise sensitive receptors in the study areas.

### **6.2.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **6.2.3 Effects Assessment**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Identify Project Works and Activities that could affect noise and determine noise emissions of major sources for each Project stage (construction, operations, decommissioning).
- Conduct a high level model of a worst-case scenario for both construction and operation to identify acoustic zones of influence; including zones of acoustic influences around the Project related marine activities susceptible to acoustic emissions.
- Conduct an underwater noise model for construction of the marine bulkhead facility (i.e., pile driving), including zones of acoustic influence around this facility. Results of the model will be forwarded to Marine Fish and Fish Habitat and Marine Mammals components.
- Identify applicable noise criteria through consultation with regulatory agencies, such as Health Canada.
- Assess the model results compared to the existing environment and applicable noise criteria and identified First Nations traditional use areas.

### **6.2.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### **6.2.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

### **6.3 LIST OF REFERENCES AND SUPPORTING DOCUMENTATION**

- Provide a list of references and personal communications cited in this Chapter.

### **6.4 APPENDICES**

- Provide Chapter specific appendices.

## **7 AQUATIC ENVIRONMENT**

### **7.1 SURFACE WATER HYDROLOGY**

#### **7.1.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Describe surface water hydrology at representative locations within various watersheds in the turbine area and along the transmission line route based on available published information, including typical annual hydrographs, base flows, extreme high and low flows, and the groundwater hydraulic regimes.
- Identify existing water licences, user and usage, including surface water points of diversion and registered groundwater wells.
- Identify all surface watercourses and waterbodies that could potentially be affected by the proposed Project.
- The transmission line will be mapped using a stratified approach, with 1:20 000 scale mapping in potentially sensitive areas and at a scale of 1:50 000 for the remaining portion of the transmission line.
- Describe peak flow, mean flow and low flow conditions in the study area based on available existing information and databases. The requirement to address high flow and low flow regimes will be based on regional hydrologic analysis of available data in the same hydrologic region as defined by the BC Streamflow Inventory.
- Conduct a field program on Banks Island to supplement the existing information and confirm and map drainage area boundaries. Baseline stream physical parameters such as width, depth and gradient will be collected as part of this field program.

#### **7.1.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

#### **7.1.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate potential effects of any alteration in direction and flows, including all temporary and permanent stream crossings or other disturbances, their extent and duration.
- Evaluate the potential effects of the increase in impervious area on local and regional surface drainage patterns.

### **7.1.4 Identified Mitigation and Compensation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### **7.1.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **7.2 SURFACE WATER QUALITY AND AQUATIC HEALTH**

### **7.2.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Collect available surface water quality information in the LSA.
- Conduct a seasonal field program to collect water quality data on Banks Island for appropriate water quality parameters such as turbidity, temperature, dissolved oxygen, conductivity and total dissolved solids.
- The requirement to address and collect metals data for surface water quality will be based on a risk approach with respect to the potential quarry sites and acid rock drainage (ARD) potential. If there is a risk identified, metal analysis will be conducted prior to, during or after construction.
- Using existing and field program water quality data, characterize the water quality in the study areas, including seasonal variations.
- Identify and compare existing water quality with provincial and federal water quality guidelines for the protection of aquatic health.

### **7.2.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

### **7.2.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Compare predicted water quality with provincial and federal water quality guidelines for the protection of aquatic health.
- Evaluate the potential effects to water quality and to aquatic fish VEC species that may be caused by the accidental introduction of deleterious substances during all Project phases, and
- Evaluate potential effects to health of aquatic fish and wildlife VECs.

## 7.2.4 Identified Mitigation Measures

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## 7.2.5 Residual Effects

- Identify any residual effects that remain after implementation of mitigation.

## 7.3 AQUATIC FISH AND FISH HABITAT

### 7.3.1 Existing Environment

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Identify and map fish-bearing watercourses and waterbodies that could potentially be affected by the proposed Project.
- Collect historical data and information on fish and fish habitat in the study areas based on existing literature and consultation with applicable regulatory agencies, First Nations and stakeholder groups.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Conduct field programs in the study areas as follows:
  - Banks Island Spawning Survey:
    - Conduct spring and fall surveys to evaluate salmonid spawning habitat in the study area. Data will be collected on RISC site cards and fish collection forms, which will also provide information on rearing and overwintering habitat, as well as fish species assemblage.
  - Banks Island Detailed Habitat Survey:
    - Conduct surveys to characterize fish habitat and use of the streams within the proposed wind turbine area on Banks Island. Habitat surveys will generally be conducted according to BC Resource Inventory Standards Committee (RISC) methodology.
    - Conduct fish sampling to determine fish species and life-stages presence and will use a variety of methods (e.g., backpack electrofishing, angling, beach seines, pole seines, minnow traps) depending on habitat conditions. Fish sampling information will be recorded on RISC Fish Forms.
    - Use fish sampling strategy outlined in the provincial Overview Fish and Fish Habitat Inventory Methodology. Sampling sites will focus on streams potentially directly

affected by the project (i.e., stream road crossings, construction footprint areas within 30 m of a watercourse).

- Transmission Line Fish Habitat Surveys:
  - Conduct fish habitat assessments at select streams and rivers crossed by the transmission line ROW, based on presence of existing information and potential effects of the project on fish and fish habitat.
  - Sample 3<sup>rd</sup> order and large watercourses that will be crossed by the transmission line that do not have existing site-specific information. Sample a sub-set of 1<sup>st</sup> and 2<sup>nd</sup> order smaller watercourses. Characterize remaining 1<sup>st</sup> order and 2<sup>nd</sup> order watercourses based these results of sampled streams.
  - Conduct fish and fish habitat assessments at streams with gradients of less than 20% (i.e., streams that would likely support fish).
  - Record fish habitat information on RISC Site Cards.
  - Detailed fish habitat surveys will be conducted during summer low water periods between July and September.
- Based on existing data and information, consultation with regulatory agencies, stakeholder groups and First Nations and the results of the field program, identify fish species composition, seasonal distribution, relative abundance and general life cycle requirements for aquatic fish VECs in the study areas.
- Map and discuss key life cycle habitats in the study areas that could be directly and indirectly affected by the proposed Project and seasonal requirements for all aquatic VEC species.

### 7.3.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. VECs preliminarily identified for aquatic fish and fish habitat include, but not limited to, the following species:
  - Aquatic commercially, recreationally and aboriginally important fish species known to occur in the area include chum salmon, coho salmon, pink salmon, sockeye salmon, chinook salmon, winter and summer run steelhead trout, cutthroat trout, and Dolly Varden char.
  - A preliminary review of these databases has identified the following British Columbia Conservation Data Centre (BCCDC) blue-listed in the North Coast Forest District that could occur in the project area are cutthroat trout, Dolly Varden, char and eulachon.
  - At this time, no SARA Schedule 1 Listed aquatic fish species are known to occur in the Project area.
  - Critical life cycle habitats including spawning, rearing and migration.

### **7.3.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of the proposed Project on aquatic fish and fish habitat VECs, including, but not limited to:
  - Habitat Alteration, Disruption or Destruction (HADD) of fish habitat from potential for disruption to fish passage, alteration of stream banks and channels, and loss of instream fish habitat that may result from the Project.
  - Indirect effects to fish and fish habitat from alterations in surface water quality and or surface water hydrology.
  - Fish mortality.
- Provide a preliminary determination of a *Fisheries Act* HADD for consideration by DFO.

### **7.3.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.
- Identify construction windows timing and locations.
- Through consultation with regulatory agencies (i.e., DFO and MOE), First Nations and key stakeholders and professional judgment, provide opinions and preferred options for aquatic fish habitat compensation, if required, to achieve “no net loss” of fish and marine habitats, consistent with DFO Policy for the Management of Fish Habitat.

### **7.3.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **7.4 LIST OF REFERENCES AND SUPPORTING DOCUMENTATION**

- Provide a list of references and personal communications cited in this Chapter.

## **7.5 APPENDICES**

- Provide Chapter specific appendices.

## **8 MARINE ENVIRONMENT**

### **8.1 MARINE GEOLOGY**

#### **8.1.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Characterize the existing marine geology conditions along the proposed underwater transmission line route.

#### **8.1.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection.

#### **8.1.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of the Project on marine geology.
- Evaluate the potential effects of seismicity on the Project.
- Evaluate potential marine geology effects on the Project to satisfy in part the requirements of CEAA “Effects of the Environment on the Project”.

#### **8.1.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

#### **8.1.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

### **8.2 MARINE INVERTEBRATES**

#### **8.2.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.

- Collect benthic invertebrate samples according to RISC procedures for sediment and biological sampling.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Identify and enumerate marine invertebrate species and species groups from samples collected during the field program.
- Archive samples for future reference.
- Characterize the existing marine benthic invertebrate community, including:
  - Total Abundance.
  - Taxonomic Richness.
  - Simpson's Diversity Index.
  - Swartz Dominance Index.
- Provide summary statistics including means, standard deviations and minimum and maximum values by station, as well as overall statistics for the LSA.
- Map sample stations locations.

## 8.2.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. The preliminary VECs identified for this assessment include:
  - Federal SARA Schedule 1 listed species and commercially and cultural important species such as sea urchin, sea cucumber and geoduck.
  - Other species important to the food chain such as:
    - Polychaetes.
    - Molluscs.
    - Echinoderms (other than Holothurians).
    - Holothurians.
    - Crustaceans.

## 8.2.3 Assessment of Likely Effects

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of the proposed Project on abundance, distribution and composition of marine benthic invertebrates through direct mortality during construction.

- Quantify the loss of marine benthic invertebrate habitat.
- Evaluate potential indirect effects to marine benthic invertebrates from decreased surface water quality.

## **8.2.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## **8.2.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **8.3 MARINE VEGETATION AND EPIFAUNA**

### **8.3.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing published and unpublished documents, reports, databases and maps.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Conduct site investigations according to existing standards, such as DFO: “Marine Foreshore Environmental Assessment Procedure”.
- Characterize intertidal habitat:
  - Characterize intertidal habitat at low tide by foot using photodocumentation during daylight low tides. Intertidal transects will be established from the HHWL to the Lower Low Water Level (LLWL) to provide a representative data set of physical and biological features that occur in the intertidal zone.
  - Identify intertidal floral and faunal species that are present, and provide an estimate of distribution and abundance (abundance will be the format for quantifying marine vegetative and epifaunal species). Percent cover will be used to quantify species that are sessile; for those species that are mobile only identification of species will be made. Photograph key features including upper, middle and lower intertidal zones.

- Characterize marine riparian habitat:
  - Transects will be established from the HHWL inland to approximately 30 m (generally the setback designated as the riparian assessment area) to provide a representative data set of physical and biological features that occur in the riparian zone. Adjacent riparian areas will be surveyed for comparative purposes. The DFO Marine Foreshore Environmental Assessment Procedure (MFEAP) suggests 25 m spacing of transects, unless features are fairly homogenous. Based on desktop review investigations of the foreshore environment the number and location of transects will be determined.
  - The survey will identify floral species that are present, and provide an estimate of distribution and abundance, and will relate these to physical habitat features. Photographs will be taken of key features. Generally the transect lines will follow the same bearing as the subtidal and intertidal survey transect lines discussed in the above sections. GPS coordinates will be recorded for the transect start and end points and generated as figures for inclusion in the Application.
- Characterize subtidal environment using dive team and underwater camera images, where possible. Focus will be placed on key or sensitive habitats such as eelgrass and/or kelps beds.
- At each cable termini, conduct towed underwater video to depths of approximately 80 m. Towed underwater video transect lines will include the underwater cable route from landing site to landing site, to a depth which is feasible and acceptable to the requirements by DFO. The video documentation will be recorded to DVD, analysed and the observations will be included in the Application. The towed video transect lines will be placed on a base map using differential global positioning system (dGPS) or hand held GPS coordinates and generated as figures.
- Conduct site investigations during the summer months when marine vegetation is at its peak biomass.
- Identification of deep water geological features and potential deep water habitat features will be conducted by single beam sonar and deep water drop video along the entire length of the underwater cable.
- Map all sampling locations.
- Provide summary of marine vegetation and faunal composition, distribution and abundance within the LSA.

### 8.3.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. The preliminary VECs identified for this assessment include:
  - Eelgrass.
  - Kelp beds.
  - Macroalgae beds.

- As of December 2007, there are no marine vegetation species that are SARA Schedule 1 Listed or red and blue-listed in BCCDC and are therefore not included as VECs.

### **8.3.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of the proposed Project on abundance, distribution and composition of marine vegetation and epifauna species including:
  - Direct mortality to marine epifauna and vegetation during construction.
  - Indirect effects to marine vegetation and epifauna from decreased marine water quality.
  - Potential effects to marine vegetation in the context of marine fish habitat.

### **8.3.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.
- Identify construction windows timing and locations.

### **8.3.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **8.4 MARINE FISH AND FISH HABITAT**

### **8.4.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing published and unpublished documents, reports, databases and maps.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Identify, discuss and map critical and sensitive habitats for spawning, rearing and migration for VEC species.
- Identify sensitive times of the year which are critical for certain life cycle stages of marine VEC species.
- Review and summarize existing commercial, recreational and First Nations catch data.
- Identify, discuss and map cultured finfish and shellfish areas.

## 8.4.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. The preliminary VECs identified for this assessment include:
  - Species of Special Interest to First Nations, including eulachon, salmon and smelt.
  - DFO special interest – rockfish.
  - Commercial, recreational and aboriginal fisheries species.
  - Commercial and recreational marine fish species of cultural importance to First Nations.
  - Critical life cycle habitat, including spawning, rearing and migration.
  - Shellfish and finfish culture areas.
- As of December 2007, there are no marine fish species that are SARA Schedule 1 Listed and red and blue-listed in BCCDC and therefore not included as VECs.

## 8.4.3 Assessment of Likely Effects

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs:
- Evaluate the potential effects of the proposed Project on marine fish and fish habitat VECs, including:
  - HADD based on information and data provided by Marine Vegetation and Epifauna and Marine Invertebrates Components.
  - Direct and indirect effects to marine fish and fish habitat from construction activities and/or alterations in marine water quality.
  - Direct marine fish mortality.
  - Indirect effects to fish from underwater noise generated during construction of the marine bulkhead facility.
  - Provide a preliminary determination of a *Fisheries Act* HADD for consideration by DFO.

## 8.4.4 Identified Mitigation Measures

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.
- Identify construction windows timing and locations.
- Through consultation with regulatory agencies (i.e., DFO and MOE), First Nations and key stakeholders and professional judgment, provide opinions and preferred options for aquatic fish habitat compensation, if required, to achieve “no net loss” of fish and marine habitats, consistent with DFO Policy for the Management of Fish Habitat.

## **8.4.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **8.5 MARINE MAMMALS**

### **8.5.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing published and unpublished documents, reports, databases and maps.
- Consult with DFO and knowledgeable biologists and naturalists who have personal experience or knowledge in the study areas.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Map and discuss migratory patterns and timing of marine mammal VECs.
- Map and discuss seal and sea lion rookeries and haul-out areas.
- Map and discuss other marine mammal sensitive habitats.
- Discuss marine mammal VEC population levels and trends.
- Identify sensitive times of the year which are critical for certain life cycle stages of marine mammal VEC species.
- No field studies will be conducted.

### **8.5.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection. The VECs proposed below are based on SARA Schedule 1 Listed, COSEWIC Listed and BCCDC red and blue-lists databases.

Proposed VECs	Rationale for Inclusion
<ul style="list-style-type: none"> <li>• Humpback whales (<i>Megaptera novaeangliae</i>) (North Pacific population).</li> <li>• Killer whales (<i>Orcinus orca</i>) (Northeast Pacific offshore population), (West Coast transient population) and (Northeast Pacific Northern resident population).</li> <li>• Grey whales (<i>Eschrichtius robustus</i>) (Eastern North Pacific population).</li> <li>• Harbour porpoise (<i>Phocoena phocoena</i>) (Pacific Ocean population).</li> <li>• Steller sea lions (<i>Eumetopias jubatus</i>).</li> </ul>	<ul style="list-style-type: none"> <li>• Humpback whales (North Pacific population) are SARA Schedule 1 listed Threatened and BC blue-listed species.</li> <li>• Killer whales (Northeast Pacific offshore population) are SARA Schedule 1 listed Special Concern and BC blue-listed species; (West Coast transient population) are SARA Schedule 1 listed Threatened and BC red-listed species; (Northeast Pacific Northern resident population) is SARA Schedule 1 Threatened and BC blue-listed species.</li> <li>• Grey whales (Eastern North Pacific population) are SARA Schedule 1 listed Special Concern and BC blue-listed species.</li> <li>• Harbour porpoise are SARA Schedule 1 listed Special Concern.</li> <li>• Steller sea lions are SARA Schedule 1 Special Concern listed and BC blue-listed species.</li> </ul>
<ul style="list-style-type: none"> <li>• Seal and sea lion haul out areas and rookeries.</li> <li>• Migratory routes of marine mammals.</li> <li>• Seasonal use and distribution of marine mammals within the Project area.</li> <li>• Life history.</li> </ul>	<ul style="list-style-type: none"> <li>• Haulouts and rookeries are critical life cycle habitat requirements.</li> <li>• Migratory routes are necessary to the life cycle of many of the marine mammal species.</li> <li>• Marine mammal seasonal feeding or breeding ground areas are critical habitat requirements.</li> </ul>

### 8.5.3 Assessment of Likely Effects

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of electro and magnetic field of the underwater cable(s) and helicopter flights on marine mammals.
- Evaluate indirect effects to marine mammals from underwater noise generated during construction of the marine bulkhead facility.

### 8.5.4 Identified Mitigation Measures

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### 8.5.5 Residual Effects

- Identify any residual effects that remain after implementation of mitigation.

## **8.6 LIST OF REFERENCES AND SUPPORTING DOCUMENTATION**

- Provide a list of references and personal communications cited in this Chapter.

## **8.7 APPENDICES**

- Provide Chapter specific appendices.

## **9 TERRESTRIAL ENVIRONMENT**

### **9.1 SOILS, GEOLOGY AND TERRAIN STABILITY**

#### **9.1.1 Existing Environment**

- Identify and map LSA and RSA boundaries and the rationale for their selection.
- Provide a description of physiography, surficial and bedrock geology and terrain based on existing data information.
- Conduct a terrain hazards evaluation (including field mapping and assessment) of the proposed wind turbine area and terrestrial transmission line route.
- Conduct preliminary seismic evaluation including assessment of ground accelerations and provision of earthquake design parameters adequate to assess seismic-related risks.
- Conduct preliminary evaluation of ARD and metal leaching (ML) preliminary evaluation for assessing potential risks associated with water quality impacts from rock cuts and excavation.
- Map approximate locations of relevant terrain features and hazards.
- Map seismicity and snow avalanche potential (if available) ratings in the study areas.

#### **9.1.2 Valued Ecosystem Components**

- Identify VECs and the rationale for their selection. The preliminary VECs identified include:
  - Terrain Stability.
  - Snow Avalanches.
  - Seismicity.
  - ARD/ML.

#### **9.1.3 Assessment of Likely Effects**

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Evaluate the potential effects of the proposed Project on terrain stability and the potential for increase of snow avalanche.
- Evaluate the potential of seismicity and snow avalanche and terrain stability on the propose Project. This will meet the requirements of CEAA “Effects of the Environment on the Project”.
- Evaluate the potential for ARD/ML and its potential effect to surface water quality.

### **9.1.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

### **9.1.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **9.2 VEGETATION, WETLANDS AND FORESTRY**

### **9.2.1 Existing Environment**

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Review existing mapping and databases for the purpose of preliminary vegetation delineation and determination of general ecosystem types.
- Consult with applicable regulatory agencies and individuals/groups with knowledge of the local area.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Conduct the following field programs:
  - Conduct vegetation field surveys according to the following RISC standards: Field Manual for Describing Terrestrial Ecosystems; Field Description of Wetlands and Related Ecosystems in British Columbia; and Voucher Specimen Collection, Preparation, Identification and Storage Protocol: Plants & Fungi. Provincial field forms will be used to record the site, vegetation and soil data.
  - Conduct surveys for VEC SARA Schedule 1 Listed and BCCDC red and blue-listed plant species in the spring and summer focusing on the Project footprint areas.
  - Conduct a modified method of Terrain Ecosystem Mapping (TEM) in consultation with the provincial domain specialist. Mapping for Banks Island will be at a 1:20,000 scale. The transmission route will be mapped using a stratified approach, with 1:20,000 scale mapping in areas of interest and 1:50,000 elsewhere. Methods of data collection to support the TEM will follow those as outlined in the Field Manual for Describing Terrestrial Ecosystems.
- Map and discuss ecosystem types, including dominant vegetation.
- Map and discuss SARA Schedule 1 Listed and BCCDC red and blue-listed plant species and communities.

- Map and discuss other identified VECs, including old growth forest and wetland and riparian areas.

## 9.2.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. The VECs proposed below are based on SARA Schedule 1 Listed, COSEWIC Listed and BCCDC red and blue-lists databases and species and habitats identified in applicable LRMPs.

Proposed VECs	Rationale for Inclusion
Plant species and communities of conservation concern designated as endangered, threatened or extirpated	SARA Schedule 1 Listed, BC CDC red and blue-listed species and communities, and species listed under the NCLRMP.
Wetland and Riparian ecosystems	Rich and productive sites contribute significantly to habitat structural diversity and are integral to hydroriparian ecosystem function. Identified during LRMP process as an important component to multiple stakeholders.
Old Growth Forest	Globally significant centers of biological diversity. Important habitat to a variety of listed plant and animal species. Identified during LRMP process as an important component to multiple stakeholders. Listed under the NCLRMP.
Traditional Use Plants Plants utilized for food, medicinal and cultural purposes	Traditional use plants identified by First Nations and plants listed under the NCLRMP.
Old Forest Analysis Unit Targets	The Old Forest Analysis Unit Targets are a component of the North Coast LRMP proposed land use objectives.
Active Fluvial Units	Active Fluvial Units are a component of the North Coast LRMP proposed land use objectives.
Forested Swamps	Forested Swamps are a component of the North Coast LRMP proposed land use objective.

## 9.2.3 Assessment of Likely Effects

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Quantify vegetation, wetlands and riparian areas and old growth loss in the LSA and place this loss in the context of the RSA.
- Identify and quantify (for plant communities) loss of SARA Schedule 1 Listed and BCCDC red and blue-listed plant species and communities in the LSA and place this loss in the context of the RSA.
- Evaluate the potential indirect effects to VECs from decreased air and water quality.
- Evaluate the potential effects for the accidental introduction of non-native plant species and weeds.

## 9.2.4 Identified Mitigation Measures

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.

## 9.2.5 Residual Effects

- Identify any residual effects that remain after implementation of mitigation.

## 9.3 WILDLIFE AND WILDLIFE HABITAT

### 9.3.1 Existing Environment

- Identify and map LSA and/or RSA boundaries and the rationale for their selection.
- Consult with applicable regulatory agencies and individuals/groups with knowledge of the local area.
- Consult with Royal BC Museum, Canadian Wildlife Service, Ministry of Environment and knowledgeable biologists and naturalists who have personal experience or knowledge in the study areas.
- Where confidentiality permits, collate information collected by the First Nations TUS and TEK study, subject to information sharing agreements and First Nations approval to use the information.
- Conduct the following field programs:
  - Radar Surveys:
    - Radar surveys for birds and bats will provide flight behaviour data over Banks Island. This information will be used to assess potential collision effects to birds from wind turbines, regardless of behaviour between the life cycle habitats identified. The key issue to be addressed is not behaviour between life cycle habitats, but collision potential with wind turbines between these habitats. This is sufficiently addressed in the radar studies and standwatches.
    - Conduct high-frequency vertical and horizontal radar surveys on Banks Island. Conduct four surveys (two radar surveys each in the spring/summer and in the fall) in 2007 and in 2008 at a minimum of four stations within the wind turbine farm area. The radar unit will operate in the evenings and mornings to document:
      - Marbled murrelets.
      - Other bird species.
      - Bats.

- Other Marbled Murrelet Surveys:
  - Conduct low-level aerial habitat suitability surveys using the latest accepted methodology, and air photo interpretation to identify and rank marbled murrelet nesting habitat in select polygons identified through modified TEM and VRI.
  - Conduct detailed (audio/visual) surveys at representative habitat units in old-growth forest before dawn. Special attention will be given to pair exchanges, sightings over forest canopy, flight into trees, 'keer' calls, and jet sounds made by diving murrelets.
- Aerial Reconnaissance Surveys for Large Birds:
  - Aerial surveys will be conducted for stick nests of bald eagle, osprey and great blue heron according to accepted survey protocols. Aerial surveys for sandhill crane will be conducted for nests.
  - Aerial surveys will be conducted in accordance with RISC standards.
- Stand watches for Raptors, Waterbirds, Shorebirds and Sandhill Cranes:
  - Conduct area counts (one-hour stand-watches of 800 m radius plots) in spring, summer and fall to document bird flight patterns.
  - If required, conduct colony counts by helicopter.
- Bat Surveys:
  - Use anabat detectors to identify bat use in the wind turbine area.
  - Conduct field surveys to identify key bat habitat features in the wind turbine area.
- Seasonal Aerial Survey:
  - Conduct winter survey on Banks Island to characterize the distribution pattern and relative abundance of over-wintering bald eagles, and to document the foraging concentrations and staging areas of over-wintering waterbirds.
  - Conduct spring survey on Banks Island and along the transmission line route to characterize the distribution of large birds and mammals (including mountain goats and grizzly bears).
  - Conduct summer survey on Banks Island and along the transmission line route to determine the presence of stick nests for large breeding birds (including bald eagles, osprey, great blue herons sandhill cranes, great blue herons, and peregrine falcons) and large mammals.
  - Aerial surveys for sandhill crane will be conducted in summer 2007 and 2008 to located nests and family groups.
  - Conduct aerial survey methodology according to RISC standards.
- Raptor Breeding Surveys:
  - Conduct call playbacks at dusk for western screech-owls and northern saw-whet owls, and during the day for northern goshawks.
  - Conduct 60-minute stand-watches for migrating raptors in the spring and fall.

- Breeding Bird Surveys:
  - Conduct point counts to document songbirds in representative habitats (e.g., lowlands, shrubby meadows and forests) on Banks Island according to RISC standards for songbirds.
- Amphibian Surveys:
  - Conduct amphibian surveys (time-constrained searches) in the wind turbine area to document presence/absence of western toad and other potential amphibian species. Surveys will focus on shallow margins of temporary and permanent wetlands (including slow watercourse reaches, lake shores, bog pools).
- General Ground-based Encounter Surveys:
  - Conduct opportunistic visual encounter surveys during the field programs identified above to maximize bird detection, particularly for species that do not call with any regularity (e.g., hawks, herons, shorebirds) and other wildlife (namely mammals).
  - Conduct the visual encounter surveys in a variety of habitat types (e.g., knolls, beaches, riparian forest, ecotones) to supplement other survey methods most effectively.
  - Conduct reconnaissance surveys on Banks Island and along the transmission line route at selected habitat zones or complexes to focus on habitats of likely high value to wildlife.
- Map and discuss density and flight patterns, including direction, height and timing, of waterfowl, raptors marbled murrelet, and other marine bird species at risk.
- Map and discuss and identify potential marbled murrelet nesting sites.
- Map and discuss locations, composition and geographical and seasonal distributions of raptors and marine bird species at risk.
- Map and discuss critical and sensitive habitats for marine bird species at risk.
- Identify times of the year which are critical for certain life cycle stages of raptors and marine bird species at risk.
- Develop and conduct Habitat Suitability Index modelling for select VEC species.
- Map and discuss habitat types focusing on VEC species.
- Map and discuss VEC species locations and geographical and seasonal distributions.
- Identify and discuss sensitive times of the year which are critical for certain life cycle stages of VEC species.

### 9.3.2 Valued Ecosystem Components

- Identify VECs and the rationale for their selection. The VECs proposed below are based on SARA Schedule 1 Listed, COSEWIC Listed, and BCCDC red and blue-lists databases, and

species and habitats identified in the NCLRMP and Integrated Wildlife Management Strategy.

Proposed VEC	Rationale for Inclusion
Species at risk	Federal SARA Registry; Provincial Red or Blue List.
Over-wintering birds Migratory birds Migratory bats	Large concentrations of wildlife are at risk of local extirpation from stochastic events and other disturbances.
Breeding birds Breeding bats	Breeding individuals contribute to the reproductive success of a species, and thus to local population size.
Bird colony sites, individual nest locations, seabird feeding areas	Critical life cycle requirement for sustainability of populations.
Amphibian assemblages	Amphibians are vulnerable to desiccation and contamination due to their semi-permeable skin; associated with sensitive ecosystems.
Large mammals	Of economic and scientific value in NCLRMP.
Other wildlife of economic significance	Of value locally or provincially; listed in NCLRMP.
Large and small carnivores	Of regional significance.
Wetlands, Riparian and Estuarine ecosystems	Productive and diverse ecosystems that can be important to conservation of sensitive species. Management and conservation concerns with respect to habitat disturbance and access.
Old Growth Forest	Globally significant centers of biological diversity; important habitat for several focal species. Identified during LRMP process as an important component to multiple stakeholders; listed in NCLRMP.
Ungulate Winter Ranges	Important seasonal wildlife ranges for maintenance of ungulate populations; listed in NCLRMP.
Wildlife Habitat Areas	Critical habitat for species listed in MOF's Identified Wildlife Management Strategy.
Special Resource Management Zones	Critical habitat areas for designated wildlife (e.g., grizzly bear); listed in NCLRMP.

### 9.3.3 Assessment of Likely Effects

- Use matrix table to illustrate likely interaction of Project Works and Activities on identified VECs.
- Quantify habitat loss by type and location in the LSA and place this loss in the context of the RSA.
- Evaluate the potential effects of the proposed Project on Wildlife and Wildlife Habitat VECs, including:
  - Direct mortality to VEC species during the construction of the underwater transmission line.
  - Loss of or damage to critical and sensitive life cycle habitats of wildlife VEC species.
  - Collision risk of VEC marine and terrestrial bird species from operation of the wind turbines.

- Collision risk of VEC marine and terrestrial bird species with transmission lines.
- Indirect sensory effects (noise and light), including helicopter flights, during VEC species migration, daily movements, breeding and feeding.
- Indirect effects to VEC species from decreased air quality and surface water quality.
- Habitat fragmentation.
- Access into previously inaccessible areas, resulting in disturbance or mortality of wildlife.

### **9.3.4 Identified Mitigation Measures**

- Identify mitigation measures incorporated into Project phases to minimize or eliminate the identified likely effects.
- Identify construction windows timing and locations.

### **9.3.5 Residual Effects**

- Identify any residual effects that remain after implementation of mitigation.

## **9.4 LIST OF REFERENCES AND SUPPORTING DOCUMENTATION**

- Provide a list of references and personal communications cited in this Chapter.

## **9.5 APPENDICES**

- Provide Chapter specific appendices.

## **10 OTHER CEEA REQUIREMENTS**

### **10.1 ENVIRONMENTAL EFFECTS OF ACCIDENTS AND MALFUNCTIONS**

- During construction, operation and maintenance and decommissioning phases of the Project, malfunctions or accidents may occur and result in an interaction with the environment that would not occur during normal operations. Section 16[1] of the CEEA requires that every Screening Level EA consider the environmental effects of malfunctions or accidents during construction, operation and maintenance and decommissioning that may occur in connection with the Project.
- The Project will be conservatively designed and includes redundant safety systems to assure safe operation; quality assurance programs, operating policies and procedural controls are in place to consistently attain the required level of safety. Nonetheless, for the purposes of this Application, it was assumed that a malfunction or accident may still occur.
- Identify and discuss, for each Project Phase, the potential accidents and malfunctions that may occur as a result of the Project, including a consideration of, but not limited to:
  - Accidental spills of a hazardous material.
  - Fire.
  - Use of explosives.
  - Rockfall.
  - Transportation accidents.
  - Accidents and malfunctions as they may affect marine traffic.
  - Failure of components at a substation facility.
- Evaluate the potential effects of Project-related accidents and malfunctions on the environment.
- Where potentially significant effects could occur as a result of an accident or malfunction, assess the probability of such an occurrence.
- Identify contingency and/or response measures (i.e., mitigation) that would be in place should an accident occur.

### **10.2 ASSESSMENT OF EFFECTS OF THE ENVIRONMENT ON THE PROJECT**

#### **10.2.1 Short-Term Events**

- Describe and evaluate changes to the Project that may be caused by the environment.

- Identify those elements of the physical, biological and human environment that may cause a change to the Project during its lifespan and how they could change the Project.
- Describe how the Project will be designed to respond to the possibility of environmental events that might affect the Project.
- Specifically include a consideration of the following:
  - Extreme weather events.
  - Debris flow.
  - Snow avalanche.
  - Storm surges.
  - Seismicity.
  - Unstable slopes.
  - Forest fires.

## 10.2.2 Effects of Climate Change on the Project

- Based on climate change scenarios<sup>2</sup>, describe future climate conditions provincially and regionally, if possible.
- For any scenario provided, describe the method, resolution, validity, unknowns, assumptions and level of uncertainty with respect to its development.
- The description of future conditions should:
  - Estimate and discuss the extent to which the key weather and climate parameters are projected to be affected by climate change over the Project lifespan. Discuss trends or change in climate anticipated to occur.
  - Comment on the adaptability of the Project in the event the region's climate changes. Discuss any follow-up programs and adaptive management considerations.
  - Identify associated hazards or limitations presented to the Project.
  - Identify the climate parameters that may change and to which the Project, or Project Works, would be sensitive.
- Identify the sensitivity of the Project, or Project Works, to specific climate parameters.
- Describe how changes in these parameters may change the Project over its lifespan. Provide this description in general, by Project phase, by facility type, location, time of year, etc., as appropriate.

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<sup>2</sup> The climate change assessment will not include development and generation of a Project-specific climate change scenario and associated computer modeling.

## 10.3 CUMULATIVE EFFECTS ASSESSMENT

- The CEA Agency's Cumulative Effects Assessment Practitioners Guide (the Guide) (Cumulative Effects Assessment Working Group and AXYS Environmental 1999) and Operational Policy Statement (CEAA 1999) provide guidance in conducting an assessment of cumulative effects to meet regulatory requirements. According to the Practitioners Guide, a cumulative effects assessment is:
  - "...an assessment of those incremental effects of an action on the environment when the effects are combined with those from other past, existing and future actions" (pg. A1).
- In the case of the Project, the cumulative effects would be those incremental residual effects caused by the proposed Project when added to, or combined with, the effects that are caused by other projects or activities at the site as well as offsite within a designated Cumulative Effects Assessment study area.
- As noted in the Guide, the identification of residual project effects allows for cumulative effects to be assessed. The Guide suggests three outcomes of a cumulative effects assessment for a single project under regulatory review:
  - Determine if the project will have an effect on a VEC.
  - If such an effect can be demonstrated, determine if the incremental effect acts cumulatively with effects of other actions, either past, existing or future.
  - Determine if the effect of the project, in combination with the other effects, may cause a significant change now or in the future in the characteristics of the VEC after the application of mitigation for that project." (pg. 10).
- There are three steps to the cumulative effects assessment:
  - Identifying projects or activities that could potentially interact with residual effects from the proposed Project.
  - Considering the likelihood for an interaction in terms of:
    - Similar effects from other projects and activities that might contribute to those caused by the proposed Project.
    - Other potential past and reasonably foreseeable future project preliminarily identified for this CEA including, but not limited to:
      - Past Projects
        - Previous and current logging activities.
      - Reasonably Foreseeable Future Project
        - Wind power generation expansion on Banks Island.
        - Nai Kun Wind Power Project.
        - Mount Hays Wind Farm Project.
        - Kitimat Liquefied Natural Gas Project.

## **11 CONCLUSIONS**

### **11.1 SUMMARY OF LIKELY EFFECTS, MITIGATION MEASURES AND RESIDUAL EFFECTS (PROJECT-RELATED AND CUMULATIVE)**

- Provide a table that summarizes likely effects (Project-related and cumulative), mitigation measures, residual effects.

### **11.2 DETERMINATION OF SIGNIFICANCE**

- The CEAA requires an assessment of the significance of residual effects. Only those residual effects which are considered to be adverse and are likely to occur have been advanced for an assessment of significance. Those effects determined through the preceding assessment sections to be positive have not been carried forward into this assessment of significance. Residual adverse effects from the proposed project have been assessed using the following criteria:
  - Magnitude: the size or degree of the impact compared against baseline conditions or thresholds.
  - Geographic Extent: The area over or throughout which the effects will be measurable.
  - Duration: The time period over which the effect will last.
  - Frequency: The rate of recurrence of the effect (or conditions causing the effect).
  - Probability: The likelihood the effect will occur.
- Identify and evaluate the significance of Project-related and cumulative residual effects. For this EA, residual effects are defined as environmental changes that result from the Project after mitigation measures have been incorporated.
- It is recognized that the final determination of significance rests with the federal RAs under CEAA and with the provincial Minister of Environment.
- Provide a table that summarizes residual Project-related and cumulative effects, significance criteria and determination of significance.

### **11.3 CONCLUSION**

- Provide a clear conclusion of potential adverse environmental effects predicted to occur during the lifespan of the Project.
- Clearly indicate whether the Project is predicted to result in a likely significant adverse environmental effect.

**ATTACHMENT**

**FIGURES**

