**Pacific Booker Minerals Inc.**

**Morrison Copper-Gold Project**

# Draft Terms of Reference for an Application for an Environmental Assessment Certificate under the British Columbia Environmental Assessment Act SBC 2002, Chapter 43.

Submitted to:

British Columbia Environmental Assessment Office
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## PROJECT BACKGROUND TO THE DRAFT APPLICATION TERMS OF REFERENCE

The Morrison Copper/Gold Mining Project (Project) proposed by Pacific Booker Minerals Inc. (PBM or the Proponent) is subject to review under the British Columbia Environmental Assessment Act, S.B.C. 2002, c.43 (BCEAA). Project review under the Canadian Environmental Assessment Act, SC 1992, c.37 (CEAA) has yet to be determined. The Canada/British Columbia Agreement on Environmental Assessment Cooperation, signed in March 2004, provides for harmonized reviews when Environmental Assessments (EA)s are required under both Acts. The Agreement also provides for the Environmental Assessment Office (EAO) to lead harmonized reviews of proposed projects.

To ensure reviews are harmonized, the EAO and Canadian Environmental Assessment Agency (CEA Agency) develop a work plan to agree on the overall timelines for the EA review. Federal and provincial agencies are involved in developing the Terms of Reference (TOR) to ensure the requirements of both the CEAA and the BCEAA are met and addressed in a proponent's application for an environmental assessment certificate (Application). The TOR have been prepared as if the Project is subject to a comprehensive study as part of the federal environmental assessment.

The contents of this document constitute the draft TOR for PBM's Application. The draft TOR identifies the issues to be addressed and the information that must be provided by PBM in its Application. The final TOR once reviewed and approved by the EAO, will incorporate comments from federal, provincial and local government agencies, First Nations and the public. The process and procedures for conducting the environmental assessment will be formalized in an order to be issued by the EAO pursuant to Section 11 of the BCEAA. The Section 11 order will stipulate the scope of the Project, the scope of the assessment and the procedures and methods for assessing the Project.

The Application will include a table of concordance, which cross-references the information presented in the Application with the information requirements in the TOR.

## PREFACE

This section of the Application will identify the purpose of the Application and state the following:

- the Project is subject to the BCEAA, pursuant to an order issued under Section 10 of the BCEAA; and
- the Project is/is not subject to review under the CEAA. Triggers that may apply to the Project are *Navigable Waters Protection Act, Fisheries Act* and/or *Explosives Act*. The CEAA may require a comprehensive study depending on whether federal Responsible Authorities scope the mine into the federal scope of assessment.

A list of federal, provincial and municipal agencies, First Nations, community and other key stakeholders involved in the Project will be provided.

## PRESENTATION

### Conformity

The Application will include a Table of Concordance that cross-references the approved TOR with the Application (including appendices and technical reports) so that points raised in the TOR are easily located in the Application.

### Format

The Application will generally be presented in an order similar to the approved TOR.

### Data Presentation

Information will be presented in the Application in the clearest language possible. Where technical language is used a glossary defining technical words and acronyms will be included. The Application will contain charts, diagrams and maps whenever useful to clarify the text. Where possible, maps will be of common scale and orientation to allow for comparison and overlap of mapped features.

## EXECUTIVE SUMMARY

The Executive Summary will provide an overview of the Application including a brief description of the major Project components and activities, key issues considered during the EA, related mitigation measures and the overall conclusion of the EA. The Executive Summary will contain a succinct description of the proponent's consultation efforts and information sharing with the First Nations, public, stakeholder, local government, and government agencies over the duration of project development, and a summary of issues raised and solutions suggested.

# TABLE OF CONTENTS

## ABBREVIATIONS

A list of Abbreviations will be provided in the Application. It will be based on the following list developed for the Term of Reference document.

| | |
|---|---|
| ARD | Acid Rock Drainage |
| BCEAA | BC Environmental Assessment Act |
| BCEAO | BC Environmental Assessment Office |
| BCRISC | BC Research Information Standards Committee |
| CEA | Cumulative Effects Assessment |
| CEAA | Canadian Environmental Assessment Act |
| CEA Agency | Canadian Environmental Assessment Agency |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| DFO | Federal Department of Fisheries and Oceans |
| EA | Environmental Impact Assessment |
| EC | Environment Canada |
| EMPs | Environmental Protection Plans |
| EMPR | BC Ministry of Energy, Mines and Petroleum Resources |
| EMS | Environmental Management System |
| GPS | Global Positioning System |
| HADD | Harmful Alteration, Disruption or Destruction (of fish habitat) |
| LBN | Lake Babine Nation |
| MEMPR | Ministry of Energy, Mines and Petroleum Resources |
| MLRMP | Morice Land and Resource Management Plan |
| MOF | Ministry of Forests |
| MAL | Ministry of Agriculture and Lands |
| ILMB | Integrated Land Management Bureau |
| MOE | Ministry of Environment |
| NHA | Northern Health Authority |
| NRCan | Natural Resources Canada |
| PEM | Predictive Ecosystem Mapping |
| SARA | Species at Risk Act |
| TEM | Terrestrial Ecosystem Mapping |
| TOR | Terms of Reference |
| VECs | Valued Ecosystem Components |
| VSECs | Valued Socio-Ecosystem Components |

## GLOSSARY

A Glossary of terms will be provided in the Application. It will include the commonly used terms in the Application to ensure their meanings are consistently applied.

# 1.0 INTRODUCTION

The Application will include an Introduction to orient the reader to the Application by introducing the geographic setting, the Project, the underlying rationale for the Project, the Proponent, and the content and format of the Application.

## *1.1 Project Setting*

The Application will describe the geographic setting in which the Project is proposed to take place and include maps at appropriate scales to illustrate the regional setting and clearly locate the Project within that setting. Site plans, sketches and photographs will be used as necessary to indicate Project components, site features and activities.

## *1.2 The Project*

The Application will summarize the Project, location, scale, components, activities, scheduling and costs. Maps at appropriate scales to indicate both the regional setting and the layout of Project components and activities will be included. The Application will identify labour force requirements (direct jobs only) broken down by construction and operation, the benefits of the Project, and estimated capital cost of the Project.

## *1.3 The Proponent*

The Application will describe the Proponent, including information on the history of the Proponent and contact information. The Application will provide information on the nature of the Proponent's management structure and organizational accountability for:

- the design, construction, operation, modification and decommissioning of the Project;
- the implementation of mitigation measures and monitoring; and
- the management of potential adverse effects.

## *1.4 Need For and Purpose of the Project*

The Application will identify the need for and the purpose of the Project. In this context, the Application will present the rationale for proceeding with the development at this time within the context of regional, provincial and federal economies, as well as global implications of supply and demand on metal mines and markets.

The Application will include a summary of the economic feasibility of mining the Morrison deposit. This analysis will identify key commercial assumptions used in the analysis such as metal prices and concentrate shipping and refining charges.

## *1.5 Project History*

The Application will provide a summary of the history of exploration activity on and around the Morrison property since its initial discovery. It will summarize the Project planning and Project review history to date, as well as any legal orders or agreements applying to the review of the Project.

### *1.6 Proponent Ownership and Tenure*

The Application will provide a description of the ownership status and development rights held for the Morrison property, including a listing of existing mineral tenures and their status, and other mineral tenures, if any, held in the vicinity of the Project.

### *1.7 Regulatory Context*

The Application will identify government polices, regulations, and land use plans that have a bearing on the Project as well as the need for the EA under the CEAA and BCEAA. The Application will briefly explain the EA processes and describe the role of the Application in the overall EA process. The Application will summarize any legal orders issued pursuant to the BCEAA relating to the review of the Project. The Application will identify provincial and federal legislation, and international treaties, agreements and conventions applicable to the Project. The Application will identify statutory licenses, permits and other authorizations that may be required for the Project, and which of these, if any, will be requested for concurrent review with the Application.

### *1.8 Land Use*

The Application will describe the current land use context and address how proposed Project activities will interact with the objectives and strategies established in the Morice Land and Resource Management Plan. The EA will describe the land uses in the Project area, including resource development, recreational use, fishing and registered hunting, trapping and guiding. The EA will describe third party tenures adjacent to the Project.

The EA will also identify the claimed traditional territories of First Nations in the vicinity of the proposed Project, and briefly summarize available information on the First Nations interests in, and use of, the area potentially affected by Project development.

## 2.0 INFORMATION DISTRIBUTION AND CONSULTATION

Project information distribution, and public and First Nation participation in EAs are important aspects of Project reviews. Public consultation measures must comply with the "Public Consultation Policy Regulation", BC Reg. 373/2002 and the requirements set out in the Section 11 order issued pursuant to the BCEAA.

The residents of Granisle, Topley, Houston, Burns Lake, Smithers, Fort Babine, Old Fort, Woyenne, Tachet and Smithers Landing will be consulted about the Project. Consultation may also be undertaken with industrial, recreational, environmental, and other individuals, groups and organizations who are interested in the proposed Project. Consultations with LBN may require translation support to ensure all residents have an opportunity to be involved.

This section of the Application will summarize the Proponent's past and proposed notification and consultation activities in accordance with the consultation provisions of BC Regulations, the Section 11 order and all applicable government policies regarding consultation with First Nations.

This section will include an issues-tracking table that states Project comments and questions and how they were addressed.

A list of all agencies, First Nations, communities, individuals and others who received copies of the Application for review and the form in which it was provided will be appended to the Application.

### *2.1 First Nations Consultation*

The Application will describe consultations undertaken with the Lake Babine Nation and the details of any jointly developed consultation plan. The Application will describe the objectives of the First Nations' consultations, the methods used, issues raised during these consultations and the ways in which PBM has addressed these issues, using a concordance table. Consultations will include the Lake Babine Nation elected officials and the communities of Fort Babine, Old Fort, Tachet and Woyenne.

The EA will describe any consultation agreements reached with First Nations that are likely to be affected by the Project, especially those with claimed traditional territory in the vicinity of the Project. This description will include a summary of the history of the Proponent's relationship with First Nations with respect to the pre-application stage of the Project.

The approach generally described for Lake Babine Nation should be similarily described for any other First Nations identified as requiring consultation needs.

This section will include an issues-tracking table that states Project comments and questions and how they were addressed.

### *2.2 Government Agency Consultation and Local Government Consultation*

The Application will describe consultations undertaken with government agencies and local governments. The Application will describe the objectives of these consultations, the methods used, issues raised during these consultations and the ways in which PBM has addressed these issues, using a concordance table.

### *2.3 Other Stakeholder Consultation*

The Application will describe consultations undertaken with other stakeholders (e.g., guide outfitters, trappers, resort owners, mineral tenure holders and other tenure holders and area users). The Application will describe the objectives of these consultations, the methods used, issues raised during these consultations and the ways in which PBM has addressed these issues, using a concordance table.

### *2.4 Public Consultation*

The Application will describe public consultation undertaken by PBM prior to submitting the Application. This description will identify the objectives of the consultations, outline the methods used, and summarize the issues raised by the public, and the ways in which PBM has addressed these issues, using a concordance table.

### *2.5 Proposed Consultation Activities*

The Application will describe consultation activities with government agencies, local governments, First Nations, other stakeholders and the public during the review of the Application. The Application will also propose a process for resolving issues during the Application review.

## 3.0 PROJECT DESCRIPTION AND SCOPE OF PROJECT

The Application will describe the Project facilities and the activities associated with them for all relevant stages of the Project development, construction, operations/maintenance, and decommissioning/reclamation and post-closure in sufficient detail to allow a meaningful assessment of the Project effects.

If the Project is subject to a review under CEAA, the federal agencies will determine the scope of the Project from their agency mandate perspective. Although the scopes may differ between the federal and provincial EA processes, a joint EA review will be conducted and the approved TOR will identify both federal and provincial information requirements. It should however be noted that the draft TOR has been finalized prior to a determination by federal departments as to what project components may be subject to review under CEAA. In the interim, federal information requirements have been identified in the TOR. Nothing in this document should be taken to indicate that a decision has been made on the federal project scope or the appropriate process to take to complete a federal environmental assessment.

Appendix 1 identifies CEAA information requirements.

### *3.1 Project Description and Rationale*

This section of the Application will provide a detailed project description:

- provide a history of the Project planning and development;
- present the rationale for the Project and describe the Project's objectives;
- describe any sustainability principles that have guided the Project planning;
- provide a summary of site selection studies and alternative locations assessments for the mine-site, load-out access and other major facilities;
- Describe the major phases and scheduling of project development; and
- If applicable provide a federal scope statement on the project where this is determined through the harmonized process to differ from the provincial scope of project.

### *3.2 Location of Project and Mapping*

The Application will:

- show the location of the Project and the latitude and longitude of the site;
- include maps at appropriate scales that indicate both the regional setting and the site layout of the Project components and activities;
- include site plans/sketches/photographs with Project location, site features and activities identified on maps; and

- describe the proximity to designated environmentally sensitive areas or cultural sites, such as national/provincial/regional parks, ecological reserves, heritage sites and other sensitive areas.

- Describe any agreements supporting acquisition of First Nations cultural information.

### *3.3 Geology and Mineralization*

The Application will describe the regional geology and property geology, including a description of the deposit geology, as well as mineralization, alteration and structural controls.

### *3.4 Mineral Resources*

The Application will provide a detailed accounting of the defined mineral resource, including measured, indicated and inferred categories for each zone and the property as a whole. A clear indication of mineral reserves will be presented in the Application and will also include a review of geo-statistical evaluations of the drill hole database and block models at various cut-off grades.

### *3.5 Mine Development*

The Application will contain sufficient detail to be able to identify major mine components or structures that are likely to have a high failure consequence during operation and closure and where monitoring efforts will be required for the purposes of risk analysis. Mine development components include:

- open pit development plan including location, design and production scheduling;
- waste rock development plan*;
- identification and management of ML/ARD rock;
- marginal ore stockpile;
- concentrate stockpile;
- overburden storage*;
- organic material storage for reclamation;
- mine dewatering, treatment and storage;
- crushing and conveying ore;
- mine roads and drainage control;
- explosives use, manufacturing and storage facilities;
- heavy equipment fuel, lubrication and maintenance facility;

- waste rock and tailings storage facility plans which will identify the location, preliminary designs, preliminary data on geo-technical properties and foundation conditions, seepage and surface water control*;
- dangerous goods and hazardous material handling, storage and/or distribution;
- borrow sources for dam construction*;
- condemnation drilling plan in areas of proposed permanent mine structures;
- construction materials for roads and impoundments.

*All of these geotechnical components will include a risk assessment covering the most likely mode to the most severe impact of failure.

### 3.5.1 Maintenance , Administration and On-Site Support Facilities

- heavy mobile equipment shops;
- mill maintenance shop;
- electrical and instrumentation shop;
- carpenter, paint and sheet metal shops;
- tire shops; and
- small vehicle maintenance shop.

### 3.5.2 Administration Facilities

- main administration facility;
- safety, first aid and training facility;
- fire prevention system and control facility;
- geology and engineering facility; and
- environmental and community relations facility.

### 3.5.3 On-site Support Facilities

- sewage treatment plant facility;
- potable water treatment;
- electrical distribution system;
- ancillary power plant;
- fuel storage facility;

- communications system;
- incinerator operations and putrescibles handling;
- non-hazardous waste landfill; and
- dangerous goods and hazardous materials storage and disposal.

### 3.5.4 Off-Site Support Infrastructure for Mine Development and Operations

Support infrastructure for mine development and operations associated with the Project include the access road and the transport of concentrate to Stewart BC, or an alternate transhipment terminus. The Application will provide information on the siting of any construction camps and/or transmission line routing in the area. The Application will also contain sufficient detail to describe offsite infrastructure to identify where effects monitoring will be required for the purpose of risk analysis and response plans and to provide details on potential environmental effects.

### 3.5.5 Permanent Access to the Mine-site

The Application will describe the preferred access route and all relevant design criteria. Terrain mapping, hazard mapping, road design parameters, use requirements, construction scheduling, engineering design deliverables, stream crossing structures and design will be evaluated. The Application will also identify proposed borrow sources for road construction, the use by First Nations and others of any pre-exisiting roads, the owner of the road, and any use agreements, and a summary of any potential design upgrade requirements.

### 3.5.6 Power Access to the Mine-site

The Application will identify the options considered to provide power to the mine-site and will describe the preferred option, including a description of power transmission line right-of-way(s) and their environmental and archaeological values and potential for environmental effects.

### 3.5.7 Transport of Concentrate to Port

The Application will describe the transport of the concentrate from the mine-site to a load-out facility (railhead or the Port of Stewart). The Application will identify the anticipated average number of truck trips per day (both to the port and returning from the port) and anticipated load and fuel capacity of the trucks used to transport the concentrate. The Application will also provide a review of background dust levels along the proposed transportation corridor.

### 3.5.8 Stewart Port Facilities

The Application will evaluate the capacity of the Port to accommodate concentrate from the Project if the concentrate is to be shipped from this terminus. The Application will not be required to conduct a cumulative effects analysis of all future proposed mining shipments of concentrate from other mining projects through the Port of Stewart during

the life of the Morrison mine.

### *3.6 Project Development Schedule*

The Application will provide a timetable and schedule for each phase of the Project with an estimate of timing to reach commercial production.

#### 3.6.1 Project Permits and Development Commitments

The Application will provide a summary list of the relevant permits required, the purpose, and authorizing agency, along with the possible timing of their application or need. Opportunities for concurrent permitting will be identified and a plan proposed. The Application will also provide a summary of commitments including those which manage for environmental effects during the construction phase.

### *3.7 Related Considerations*

#### 3.7.1 Hazardous Materials

The Application will describe the handling, storing, using and disposing of hazardous materials forming part of the proposed development. The Application will describe the transport of petroleum products, and other hazardous materials to and from the mine-site.

### *3.8 Decommissioning Activities*

The Application will provide the expected lifetime of the Project and of any temporary Project components. It will also describe the conceptual decommissioning or reclamation plans, removal of structures and ancillary equipment, site remediation etc., and include plans for the long-term maintenance of permanent facilities.

### *3.9 Assessment of Alternative Options*

The Application will include a description and rationale of the main development, production, technical and location alternatives, in particular, those associated with the following:

- access;
- mining methods;
- target extraction volumes;
- waste rock and tailings management;
- mine water management;
- energy production (i.e. hydropower grid, diesel generation);
- decommissioning, closure and reclamation;
- mine production rates;

- employee work schedules and transportation to/from site; and
- mine development scheduling.

Where alternatives that would mitigate impacts on the environment and/or enhance the socio-economics of the Project are deemed not economically or technically feasible, the economic, environmental and technical analysis to determine feasibility will be summarized in the Application.

The Application will reference the CEAA document Addressing "Need for", "Purpose of" "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act* (October, 1998).

# 4.0 ENVIRONMENTAL ASSESSMENT METHODOLOGY

## *4.1 Description of the Existing Environment*

The Application will describe the methods used to conduct the EA. The Application will contain a sufficient level of baseline information to predict positive and negative impacts and will demonstrate the extent to which negative impacts may be mitigated and positive effects augmented by mine design and construction, operational and reclamation practices, and environmental management plans.

Explicit documentation of the assumptions, models, and information sources used, as well as information limitations and associated levels of uncertainty will support all steps of the Application. Where professional or traditional knowledge expertise is applied, a description of the methodology used to arrive at those views will be given.

The analysis will be quantitative where necessary to evaluate the effects of the project. Where third party data is identified but either not located or deemed inappropriate, the reasons for such will be described and any impacts on the resulting analysis will be assessed. However, where data or models are lacking, best professional judgment and/or traditional knowledge may be used. The approach and methodologies used to identify and assess cumulative environmental effects will be explained.

## *4.2 Spatial Boundaries*

The Application will identify and present the spatial boundaries used for the EA. Spatial boundaries will be identified using the following criteria:

- the physical extent (terrestrial and aquatic) of the Project, including any off-site facilities or activities;
- the extent of aquatic and terrestrial ecosystems potentially affected by the Project;
- the extent of potential socio-economic and other biophysical effects arising from the Project; and
- input from government, First Nations, and stakeholders.

## *4.3 Temporal Boundaries*

The Application will identify and present the rationale for the temporal boundaries used for the EA, informed by input from government, First Nations, and stakeholders. The Application will include an assessment of the effects for all phases of the Project including construction, operations, closure and post-closure.

## *4.4 Valued Ecosystem Components (VECs)*

The Application will describe the general criteria used to identify VECs that may be affected by the Project. The Application will identify the methods used to predict and assess the effects of the Project on VECs, and will explain the criteria used to assign

significance ratings to any predicted adverse effects. The Application will include sufficient detail to address the relevant impact issues on VECs over the entire temporal scope of the development and distinguish between biological, physical, social, cultural and economic parameters.

## 5.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

The Application will describe the existing biophysical environment, human environment and health setting of the Project. The existing environment includes the resources being extracted over the predicted life of the mine, affected components of the existing environment and related ecological processes, and contemporary and/or past land use and occupancy in the region, whether industrial or aboriginal. The description of the existing Project setting will be presented in sufficient detail to permit the identification, assessment and determination of the significance of potentially adverse effects that may be caused by the Project and to adequately identify and characterize the positive effects of the Project.

Baseline studies will be conducted and reported on using accepted provincial or national standards of data acquisition and generally accepted procedures of good scientific practice. All existing reports and documents will be appropriately referenced. The Application will clearly and succinctly describe the following components as they relate to the proposed development.

### *5.1 Climate and Meteorology*

The Application will describe the climate and meteorology including annual climatic conditions in the Project area and how factors such as air temperature, relative humidity, precipitation, wind speed and direction, solar radiation and extreme weather events may be expected to change with the seasons.

### *5.2 Air Quality*

The Application will describe the air quality including ambient air quality with emphasis on emissions from the mine including emissions from mining, operating equipment, vehicles, ventilation, heating, road, crusher and other facilities.

### *5.3 Surface Water and Groundwater Quality*

The Application will describe the surface water and groundwater quality including physical characteristics for all potentially affected waters in the Project area (e.g., Morrison Creek), as well as potential reference areas for environmental effects monitoring.

Clearly describe the objectives of water sampling and the QA/QC program and results.

Compare current and historic water quality data where possible and include in the interpretation reference to improvements in detection limits and sampling quality assurance.

Provide comment on the quality and reliability of data and the applicability for the

intended purpose of the EA; identifying any gaps, uncertainties and insufficiencies.

Provide a detailed tabular and/or graphical representation and summary of key statistical parameters (mean, minimum, maximum, 95 percentile, standard deviation) of water quality data from each of the main receiving environment monitoring locations. Provide reference to exceedances and conformity with British Columbia Water Quality and Aquatic Life Guidelines and the Canadian Council of Ministers of the Environment (CCME) guidelines.

For key receiving environments discuss the relationship and partitioning of trace elements between water and sediment media.

### *5.4 Surface Water and Groundwater Quantity*

The Application will describe the surface water and groundwater quantity that has the potential to be changed during all Project phases and affect Project design. This includes information from hydro-geological studies of groundwater regimes in the Project area, aquifers, groundwater levels, flow and hydraulic gradients, properties of the surficial and bedrock geologic units and hydrology of affected watersheds.

### *5.5 Aquatic Biota and Habitat*

The Application will describe the aquatic organisms and habitat and fish populations. This will generally include:

- documentation of all waterbodies in the vicinity of the project components;
- description of fish (species and life stage) use and habitat characteristics of all watercourses that could be affected by project components;
- determination of seasonal fish use and migration patterns;
- description of any listed fish species in the project area potentially affected by the project components;
- measures /estimates of the productivity of fish habitat where impacts or losses to fish habitat are anticipated;
- information on flow/habitat relationships for fish habitat where flow alterations are a likely outcome of project impacts;
- information that can be used to develop habitat compensation options if habitat losses are anticipated;
- photographic records of fish habitat; and
- description of methods used.

### *5.6 Wetlands*

The Application will identify, characterize and quantify wetland habitat in a manner

similar to aquatic biota habitat as described in 5.5. Wetlands will be described by type, and include water and sediment analysis and water level monitoring.

### *5.7 Wildlife Identified as At Risk*

The Application will describe wildlife identified as at risk (including species on Schedule 1 of SARA, COSEWIC-listed endangered, extirpated or species of special concern, and provincial red- and blue-listed species), of concern, or of economic value, as well as limiting habitats, specifically for identified ungulates and grizzly bear.

### *5.8 Vegetation and Plant Communities*

The Application will describe the vegetation and plant communities that may be affected by the Project, including a description of Terrestrial Ecosystem Mapping (TEM), Predictive Ecosystem Mapping (PEM), biogeoclimatic zones, rare plants and species of potential concern.

### *5.9 Geological Conditions*

The Application will describe the geological conditions including terrain, soils, sediments, surficial geology, bedrock and structural geology, seismicity, glaciation, gossans, geological hazards such as slope stability, regional seismic hazard, landslides, and natural hazards such as avalanches. This description will include the ground conditions at the mine site and, ancillary facilities including a description of surface soils and geology. A condemnation drilling report acceptable to the MEMPR will be included.

### *5.10 Mineralogy and Geochemistry*

The Application will describe the mineralogy and geochemistry of the principal units of the deposit which will be disturbed or mined, results of mineralogical analyses, and of static and kinetic geochemical testing[1].

### *5.11 Water Bodies and Navigable Waters*

The Application will describe the water bodies and navigable waters including data on location (latitude and longitude), depth, width, area and any navigation uses.

### *5.12 Heritage and Cultural Resources*

The Application will describe the heritage and cultural resources including archaeological sites.

1 For guidance see “Policy for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia” and “Guidelines for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia”.

### *5.13 Land Use*

The Application will describe the land use including traditional, historic and current uses

of lands and resources in areas potentially affected by the Project.

### *5.14 Social, Economic, Community and Cultural Profiles*

The Application will describe the social, economic, community and cultural profiles of the communities potentially affected by the Project, including associated infrastructure and transport routes.

The Application will describe the means to acquire First Nations social, economic, community and cultural information.

### *5.15 Human Health*

The Application will describe human health in relation to workers and potentially affected communities, including consideration of the health consequences of environmental effects.

In providing baseline information on the environment, the Application will include data collected over a sufficient period of time to establish norms, trends, and extremes, to the extent that predictions can be made. The Application will comment on the quality and reliability of these data and their applicability for the purpose used, and identify gaps, insufficiencies, and uncertainties, especially those that should be remedied for monitoring purposes.

Elements of potential concern identified by First Nations (eg mercury and arsenic) will be described for the project area environment and in relation to the project development.

## 6.0 ASSESSMENT OF PROJECT EFFECTS, MITIGATION MEASURES AND SIGNIFICANCE OF RESIDUAL PROJECT EFFECTS

The Application will analyze potential environmental, economic, health, social and heritage effects of the Project, including cumulative environmental effects, the potential for accidents and malfunctions, which could affect the natural environment, and the effects of the environment on the Project.

For the purposes of meeting the environmental effects assessment of CEAA agencies, "environmental effects" means, in respect of the project,

1) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*.

2) any effect of any change referred to in (a) on

   a) health and socio-economic conditions,

   b) physical and cultural heritage,

   c) the current use of lands and resources for traditional purposes by aboriginal persons, or

   d) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance,

3) any change to the project that may be caused by the environment.

The Application will report on the effects resulting from the Project on the physical, chemical and biological components of the environment following proposed mitigation. The Application will identify monitoring programs during all phases for all environmental components included in this section subject to requirements of regulatory agencies during operational and post-closure phases.

The Application will contain all pertinent data and assessment methodologies. Information gaps will be identified along with reasonable suggestions on how to remedy them.

The proposed end land use of the mine site once operations have ceased will be described.

### Mitigation

The Application will identify technically and economically feasible measures to mitigate potentially adverse effects of the Project and to enhance the beneficial effects. The Application will describe proposed mitigation measures and identify equipment needs and procedures (including monitoring requirements) and policies associated with the proposed measures. The Application will evaluate the effectiveness of the proposed

measures and assess the risk of mitigation failure and the potential severity of its consequences. The Application will propose impact mitigation measures such as compensation where effects cannot be mitigated on-site. Where there is significant uncertainty or a residual risk, the Application will outline contingency planning.

**Significance of the Residual Adverse Environmental Effects**

The Application will assess residual effects, which include beneficial effects and those adverse environmental effects which cannot be avoided or mitigated through the application of environmental control technologies or other acceptable means, including emergency response and contingency plans. The Application will assess the significance of predicted effects according to the following criteria:

- magnitude;
- geographic extent;
- timing;
- duration;
- frequency;
- irreversibility of impacts;
- ecological resilience and anticipated resiliency timeframe; and
- probability of occurrence and confidence level.

It will be important to distinguish between ecological parameters and social-cultural parameters.

The Applicatio will follow the “Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects” (CEA Agency 1994).

### *6.1 Climate and Meteorology*

The Application will identify potential effects on local climate and meteorology. The analysis will document greenhouse gas emissions in a manner consistent with guidance from “Incorporating Climate Change Considerations in Environmental Assessment General Guidance for Practitioners”(CEA Agency, 2003). Climate will include not only the average or mean values but also the extremes that can be expected and the full range of weather conditions will be investigated.

- greenhouse gas assessment including expected greenhouse gas emissions over all phases of the Project,
- the Projects’ marginal contribution to total national and provincial emissions on an annual basis,
- the intensity of greenhouse gas emissions per unit of energy produced and how it

compares with industry and technology performance.

- describe and quantify direct effects on large scale carbon sinks (i.e., vegetation loss due to the mine-site and the road), if any, including best practices for greenhouse gas emissions or emissions intensity and specific approaches towards managing emissions over the lifetime of the Project; and

- identify the Project's sensitivity to changes in specific climate and related environmental parameters, including total annual rainfall, total annual snowfall frequency and/or severity of precipitation extremes and streamflows.

The Application will follow the guidance in "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (CEA Agency 2003).

### *6.2 Air Quality*

The Application will identify potential effects on air quality associated with all phases of the Project, including point and mobile sources such as vehicle exhaust and particulates and potential effects from blasting and ore concentrate transport. The analysis will include:

- discussion of measures considered to minimize the release of air contaminants (dust - both emissions and fugitive, particulate exhaust fumes, greenhouses gases and other air contaminants);

- atmospheric dispersion of emissions with emphasis on PM2.5 and PM10 on a local and regional scale;

- acid deposition and impact of the acidic precipitation resulting from release of gasses such as NOX and SOX;

- impact on biological receptors such as vegetation, fish, wildlife and human health; and

- demonstrate compliance with applicable federal and provincial air quality standards.

### *6.3 Geology, Terrain and Soils*

The Application will provide a detailed description of the ground conditions at the mine site, and ancillary facilities, including a description of the terrain, surface soils and geology.

The Application will analyze the impacts on the environment when surficial geology, bedrock or soils are disturbed or used for construction purposes. The analysis will include:

- the proposed Project's impact including:

  - impact of erosion in relation to altered drainage;
  - impact of ground freezing occurrences and effects on containment structures;
  - impact of frost heave on the mine site and access roads; and
  - impact of the water content contained in waste rock dumps and the potential for pore-water drainage during melt periods.
- impacts of borrow pits and aggregate use with resulting terrain disturbance;
- rock types, including mineralogy and geochemistry, plus ML/ARD and selenium potential;
- ML/ARD and seepage potential associated with movement of material and use for foundations, dikes, dams and road building;
- seismicity and natural erosion potential;
- impact of remedial actions at the mine site (waste dumps, tailings); and
- volume and characteristics of material stockpiled for reclamation and changes to stockpiled material over time.

As the waste dumps could be the location for the disposal of a variety of materials, including solid inert waste, sewage sludge, mine rock and mill clean-up residue, the Application will identify the potential impacts on the environment of the interaction of these materials, including long term monitoring and management plans for ensuring the stability of the material.

### *6.4 Vegetation and Plant Communities*

The Application will identify potential effects on:

- local plant communities (classified as vegetation cover types);
- rare or highly valued plant species;
- COSEWIC and SARA-listed plant species;
- long-term, direct and indirect, habitat loss or alteration;
- vegetation productivity and ethnobotany; and
- potential for invasive, noxious plants, as defined in the province's *Integrated Pest Management Act*.

### *6.5 Wildlife and Wildlife Habitat*

The Application will provide an analysis of the proposed development's impacts, both direct and indirect, on wildlife and wildlife habitats, including migratory birds, giving

consideration to, and demonstrating linkages between, predicted physical and biological changes resulting from the proposed development. The assessment will consider effects at multiple ecological levels with population impacts being the focus of primary concern. The assessment will be based on best available knowledge of species behaviour, presence and distribution, and population biology and ecology. British Columbia Wildlife Habitat Rating Standards Version 2 (MoE, 1999) will be used.

A Valued Ecosystem Component (VEC) approach will be taken that focuses assessment on species that either have conservation status provincially (i.e., red and blue-listed species) or under COSEWIC or SARA *(i.e.,* are listed as "endangered", "threatened", "extirpated", or of "special concern") or are regionally occurring species that have particular cultural, economic or ecological importance to First Nations, the province or other Canadians. The analysis will include:

- A quantitative and qualitative determination of overall loss or alteration of terrestrial and wetland habitat that will result from Project development. This will include a ranking of habitat quality for each VEC species so that the relative loss of high quality versus low quality habitat can be assessed in relation to the regional availability of habitat. Describe the methodology. Regional boundaries for assessment of relative habitat loss will be based on major watershed boundaries and ecosections;

- A qualitative assessment of the anticipated changes in local hunting pressures. Describe potential thresholds that may be cause for consideration of amendments to hunting regulations for conservation purposes;

- A qualitative assessment of possible physical hazards and attractants for wildlife *(i.e.,* assessment of the potential impacts of roads, transmission lines, pits, pipelines, and other structural features on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, and direct mortality);

- A qualitative assessment of possible chemical hazards and attractants for wildlife *(i.e.,* assessment of the potential impacts of identified contaminants of potential concern on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, and direct mortality);

- A qualitative assessment of possible sensory disturbance causing wildlife attraction or deterrence *(i.e.,* assessment of the potential impacts of noise, light, odours, and human presence on wildlife feeding, migration and movement, denning and refuge, reproductive behaviour and success, and direct mortality); and

- A qualitative assessment of the potential for population level impacts to VEC species resulting from the combined impacts of

    - habitat loss or alteration;

    - physical hazards;

- chemical hazards; and
- sensory disturbances.

- Propose mitigation, monitoring, and compensation programs for avoiding, minimizing, tracking, and compensating Project related impacts on wildlife.

### *6.6 Surface Water and Groundwater Quality and Quantity*

The Application will identify potential effects on surface and groundwater quantity and quality. Effect conclusions will be based on predicted and modeled water quality of all waste streams and containment ponds throughout the Project, including mine water, seepage, surface runoff and collection ponds, process plant discharges, the open pit dewatering settling pond, the sewage treatment facility. This analysis will include the impacts on water quality and quantity and catchment areas in relation to:

- effects of blasting and its associated residues, in particular, nitrogen, nitrate, nitrite and ammonia on fish and non-fish bearing water sources, including possible trophic status changes in the receiving environment and, if necessary, ways to reduce or eliminate nutrient input;
- water from open pits, land clearing and other mine workings and site runoff;
  - a detailed characterization of geochemical influence on inflowing groundwater from all potential sources, including: mine rock exposed on pit walls, materials temporarily stored (e.g., waste rock); and water released or leached from tailings dam and other structures; and
  - a description of the predicted mine inflows and hydrogeology, water handling procedures, water balance predictions and contingencies for potential higher than expected inflows, impacts of discharges on the hydrology of the area and water balances for waste water containment facilities including contingencies and excess holding capacities and will adhere to specific design criteria identified by the permitting agency. Groundwater modeling will include baseline, operational and post-closure scenarios.
- effects on surface water quantity, including changes in timing, volume and deviation of peak and minimum flows resulting from the Project and dewatering of open pit and resulting impacts on the sedimentation pond water balance, water level, outflow rates, etc;
- effects on water quality including:
  - a detailed description of how any effluent is predicted to mix in the receiving environment in Morrison Lake and Creek and any aquatic receiving environment for any effluents discharged from the Project. The Application will provide an assessment of water quality (metals, nutrients, major ions, process chemicals, physical characteristics) through concepts such as plume delineation.;

  - a description of the predicted impacts of releases of any concentrate slurry, any effluents, surface runoff and seepages that may be directed to land (including consideration of surface ponding), with particular attention to impact linkages on vegetation, soil and wildlife; and effects to aquatic organisms, including acute and sub-lethal bioassays; and
  - treated sewage flows to associated wetlands and downstream waters.

- siltation and water chemistry effects (e.g., runoff along mine site roadways, proposed access routes, transmission lines and drainage ditches);
- effect of the Project on the watershed, including ;
  - a detailed description of the hydrology of the Morrison Creek watershed; and
  - water chemistry impacts of surface runoff.
- impacts of tailings water overflow on the water chemistry of the receiving environment;
- impacts of waste rock;
- contaminant loading and dispersion (including surface runoff and airborne contaminants);
- ML/ARD and geochemistry;
- tailings toxicity and implications for aquatic wildlife, birds and amphibians; and
- waste rock chemistry and toxicity, runoff characteristics and the implications for wildlife and downstream water quality.

All parameter estimates (e.g., water balance), reported in the Application will include sources of information (either estimates or empirical), assumptions built into the data, and data reporting that includes ranges and confidence estimate for parameters.

### *6.7 Water Balance*

A water balance will be prepared that incorporates all components of the Project throughout all of the Project's development phases and under a range of climatic conditions, from full-sun dry summer periods to peak snowmelt and spring rain storm events. All parameter estimates (e.g. precipitation, evaporation, stream flows, groundwater flows, soil permeability, hydraulic roughness) reported will include the source of information (either estimates or empirical) and make reference to measurement standards or collection protocols used, assumptions built into the data, and data reporting that includes ranges and confidence estimates for parameters.

### *6.8 Navigable Waters*

The Application will identify potential effects on navigability of water bodies that may be

affected by the Project, the nature of the effect, and in consultation with a Navigable Waters Protection Officer any mitigation measures to be implemented. Where works are proposed in, under, over, through or across a potentially navigable water body, the Application will provide data on location (latitude and longitude), width, depth, and any navigation use or issues. Provide conceptual level information on any proposed single span bridges. The Application will also describe potential effects on navigation with respect to the identified waste rock and tailings disposal areas, and road or transmission access corridor.

For the mine access road and the new transmission route provide information on existing bridges to be upgraded (current and future owner/ maintainer of the bridge, location of watercourse crossings, including width and depth and knowledge of any navigational use or issues.

### *6.9 Aquatic Environment*

The Application will identify potential effects on aquatic life, fish and fish habitat during all phases of the Project and explain how these will be avoided or minimized or addressed through appropriate mitigation measures. Aquatic life includes: benthic invertebrates, periphyton, aquatic macrophytes and plankton. In the event that there is an unavoidable harmful alteration, disruption or destruction (HADD) of fish habitat, describe the "HADD" with regard to magnitude and significance, and provide rationale to justify why the HADD is not avoidable and propose a fish compensation plan to offset the HADD such that no net loss of productive fish capacity is achieved. Adequate information will be described to demonstrate that the fish habitat compensation measures will be technically feasible and biologically effective. Include descriptions of:

- footprint of development;
- infrastructure development;
- dewatering activities;
- flow changes from water management and diversions; and
- impacts from compensation activities.

The analysis of potential effects will consider:

- productive capacity of aquatic systems during all Project phases;
- all creeks and rivers that may experience changes to fisheries resources2 including, but not limited to the Morrison Valley, and streams associated with the road access, any linear corridors for pipelines or conveyors, transmission line;

2 Note that impacts should be assessed on all water bodies likely to be impacted by the Project, not just lakes and water bodies with fishery resources. It is important to note that the *Fisheries Act* applies to all waters of Canada where fish or fish habitat are present, the latter which is defined as *"spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes"*.

- habitat loss or alteration, including aquatic vegetation and sensitive areas such as spawning grounds (including shoreline spawning assessment of Morrison Lake), nursery areas, winter refuges and migration corridors, and riparian (streamside) vegetation;
- any rare and/or sensitive species (including fish and amphibians) and habitat and COSEWIC/SARA-listed species;
- mortality (includes fishing);
- long-range blasting effects through tremor effects on fish and fish habitat in local aquatic systems;
- .aquatic organisms and habitat, including downstream Morrison River fisheries and fish populations extending into Babine Lake;
- all creeks and rivers and associated food webs and water use potential that may be impacted by changes in water chemistry (suspended solids, nutrients, major ions, metals) due to runoff or discharges from the Project;
- mitigation and/or compensation requirements;
- physical and chemical changes to sediment quality; and
- potential changes to water temperature and depth in aquatic environments affected by the project.

### *6.10 Traditional Ecological Knowledge (TEK)*

The Application will describe where and how TEK is incorporated into the assessment, including its effects on predicting impacts and determining mitigation measures. Where traditional knowledge is not available or not provided to PBM in a timely manner despite reasonable diligence, the Application will describe efforts taken to obtain it.

The Application will present both the scientific and traditional perspectives on predicted impacts wherever both types of information are available.

### *6.11 Archaeological Resources*

The Application will identify potential effects on archaeological resources and consider all other requirements of the *Heritage Conservation Act,* R.S.B.C. 1996, c. 187. The Application will describe the assessment of heritage significance value of any cultural deposits identified and identify mitigation measures for any sites identified during the archaeological impact assessment where impacts from land altering development activities cannot be avoided.

### *6.12 Land and Resource Use*

The Application will analyze and describe the Project's potential impacts on land and resource uses, taking into account the overall management objectives and strategies of

the Morice Land and Resource Management Plan (MLRMP).

The Application will reference the MLRMP resource management zones in the Project area for monitoring impacts at a regional scale. Maps and/or descriptions of existing and past land and resources uses in relation to the proposed development will be included. The Application will assess the projects possible impacts on the following existing land and resource uses:

- important areas traditionally-used by First Nations;
- seasonal camp areas;
- permanent camp areas;
- hunting, trapping, outfitting, recreational, tourism, commercial and sport fishing areas;
- Parks and protected areas adjacent to the proposed Project; and
- Other resource tenures (egs. forestry, mining).

### *6.13 Economy*

The Application will describe the potential economic effects associated with the Project, including the following considerations:

- changes in job opportunities, employment levels and average wages and salaries over the life of the proposed development, including estimates of local and First Nations participation and details on the required skill levels necessary to obtain employment directly at the mine;
- the availability of local skilled workers to meet prerequisites for employment, the transferability of skills between industries and the barriers to employment, advancement, and retention of local workers, including the training or retraining necessary for sections of the local workforce to meet PBM's employment policies;
- probability and any effects of employee migration into or out of north western British Columbia with respect to the structure of the local community workforce, overall consumer demand and business development opportunities;
- opportunities for local and regional businesses to supply goods and services both directly to the proposed development and to meet the demand created by the expenditure of contractors and new employees receiving income from the Project-related employment;
- impacts on the subsistence economy of First Nations;
- federal, provincial and municipal tax revenues;

- economic diversification and sustainable economic development;
- impacts on provincial Gross Domestic Product (GDP);
- predicted inflation and the cost of living impacts.

The Application will reanalyze the identified potential project effects with mitigation once determined.

### *6.14 Social*

The Application will analyse the Project's potential effects on the following:

- First Nations;
- Residents within the Project study area, including the communities of Granisle, Fort Babine, Old Fort, Tachet, Woyenne, Burns Lake, Smithers, Topley, Telkwa and Houston.
- Potentially affected businesses within the Project study areas; and
- Other users those are currently active in the study area including trappers, guide outfitters, recreational users and other tenure holders.

The Application will analyse potential effects of the Project on the following:

- Current and future socio-community environment, including:
  - Population and demographic indicators, including migration patterns;
  - Projected population changes, and associated changes to demands for services;
  - Social and community issues and the potential adverse and positive effects related to Project development;
  - Social and community services, their ability to meet current demand and ability to meet projected and changing needs in relation to Project development;
  - Housing, including values, costs, availability, taxes and vacancy rates;
  - Residential and business proximity to the Project and its infrastructure and the potential effects; and
  - Cultural well being of communities, including effects of changes on cultural and heritage activities, including language use.
- Current environmental setting related to the socio-community environment, including:

  - Noise;
  - Visual quality; and
  - Regional and local air quality.
- Road safety
  - Road use of potential haul routes including volume and type of traffic; and
  - Road hazards, infrastructure and seasonal changes for the potential haul routes.

The potential social affects upon the Lake Babine Nation (LBN) at the local level will be given particular consideration in the context of the commitment that the Proponent has to engage the participation of the LBN. The potential social impacts and benefits of the Project are being addressed with the LBN and will continue to be throughout the lifespan of the Project.

### *6.15 Infrastructure*

The Application will identify potential effects on existing social, institutional and community services, transportation facilities, infrastructure (e.g., transportation safety), and permanent changes to the infrastructure and services arising from the Project.

### *6.16 Noise*

The Application will identify potential effects due to increased noise levels from blasting, crushing, equipment operation and trucking on wildlife, and mine workers. The assessment of noise effects will include the construction and operation phases of the Project, point and mobile sources of noise, and tonal and impulsive noise. The Application will also identify measures to mitigate noise effects, as appropriate.

### *6.17 Visual and Aesthetic Resources*

The Application will include an assessment of the visual and aesthetic impact of the proposed development. The Application will describe design components that mitigate visual and aesthetic impacts. The effects on local and traditional users will be documented and assessed through consultations.

### *6.18 Health*

The Application will assess potential effects of all phases of the Project on public health and safety with consideration of relevant physical environment and social health determinants. The Application will assess potential effects of the Project on the health and safety of employees, their families and local communities (including First Nation communities), and describe mitigation measures for any possible effects to human health and safety. The Application will outline a program for wildlife encounter and avoidance information and training of employees. Information considered in other areas of the Application (e.g., air quality, noise, water quality, socioeconomic

assessments etc.) will be used to assess the Project's impacts on human health such as potential effects on human health.

### *6.19 Transportation*

The Application will assess potential effects on wildlife, fish and water quality of transporting the concentrate along existing highways, and if relevant, to the Port of Stewart and identify any proposed mitigation measures.

### *6.20 Accidents and Malfunctions*

The Application will identify the probability and potential magnitude of accidents and/or malfunctions associated with the Project, including the likelihood of a failure of water treatment at the filter plant, tailings dam, sedimentation dam, pit wall slope and waste rock slope, and concentrate spills. The Application will also assess the probability and potential for hazardous substance releases/spills and fuel spills outside of secondary containment areas. This assessment will link and describe the outcome of accidents and/or malfunctions with a probability analysis of consequential impacts to the environment. The Application will identify any contingency plans and response options for probable accidents and/or malfunctions. All assumptions, model data sources and model outputs will be included in the Application.

### *6.21 Sustainability*

The Application will consider the potential adverse environmental effects on the capacity of renewable resources that are likely to be significantly affected by the Project, to meet the needs of the present and those of the future, including the post-closure period. The Application will identify the renewable resources that may be affected by the Project and the criteria used in determining whether their sustainable use will be affected. Sustainable use may be based on ecological considerations such as integrity, productivity, and carrying capacity.

To the extent that information is available from First Nations on their sustainability objectives within the zone of influence of the Project, these objectives will be discussed.

### *6.22 Residual Adverse Effects Summary*

The Application will summarize the findings of residual effects assessments for each VEC.

## 7.0 EFFECT(S) OF THE ENVIRONMENT ON THE PROJECT

The Application will assess the effect(s) of the environment on the Project and activities forming part of the proposed development. The full range of climate conditions (including extreme weather events, wet, dry and normal precipitation and extreme temperature spells, freeze-thaw cycles) will be considered. The Application will describe and assess how extremes in current climate, seismic activity and other extreme events such as fires and floods, landslides and avalanches could affect and impact the integrity of the proposed development infrastructure, particularly the tailings containment facility, water retention dikes, road operation, waste rock dumps, access road and transmission line. Measures to mitigate these effects will be identified.

## 8.0 CUMULATIVE EFFECTS

The Application will include an evaluation of cumulative environmental effects of residual impacts that are likely to result from the proposed development and how they may combine cumulatively with environmental effects from other past, present and reasonably foreseeable projects and activities.

The Application will consider existing forecasting models of cumulative infrastructure development, where such models are available, and can be calibrated to the regional ecosystem encompassing the proposed development. The models considered will be reported in the Application. At minimum, other identified existing developments including tourism operations in the region would be considered in the cumulative effects assessment.

The Application will also report and describe developments considered. Other developments should be excluded from the cumulative effects assessment only when the environmental effects of the other projects are not likely to accumulate or interact with the residual environmental effects of the Project in question. The Application will include a rationale for excluding any development from the cumulative effects assessment.

The Application will consider the likelihood of the proposed development expanding and any areas of medium to high development potential within the area. The Application will provide confirmation that all existing facilities and infrastructure can adequately handle the demands generated by the proposed development and will assess cumulative effects in relation to:

- visual and aesthetic resources;
- the bio-physical environment;
- inflow to Babine Lake;
- social environment;
- economic environment;
- cultural environment; and
- archaeological, cultural and heritage resources.

A preliminary list of developments and activities will include:

- access roads, both forestry and mining;
- vegetation removal, both forestry and mining;
- rural / recreational development;
- other anticipated mining activity; and

- recreational and traditional hunting and fishing.

Explicit documentation of the assumptions, models, and information sources used as well as information limitations and associated levels of uncertainty will support all steps of the cumulative effects assessment in the Application. The analysis will present data and analyses that are verifiable in nature and quantitative, where data are available. In the absence of verifiable knowledge, best professional judgment or expert opinion should be used, whether that is from traditional or scientific sources. Any mitigation measures identified for cumulative effects and follow-up programs will be included in the discussion of cumulative effects.

The approach and methodologies used to identify and assess cumulative effects will be explained. All methodologies used for the cumulative effects assessment will follow the framework as set out by the CEA Agency in the documents "*Reference Guide: Addressing Cumulative Environmental Effects*" (November, 1994) and "*Cumulative Effects Assessment Practitioners Guide*" (February 1999), and refer to the operational policy statement "*Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act*" (CEAA Agency 1999).

## 9.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The Application will include an Environmental Management System (EMS) for the Project, to be finalized in discussions with relevant permitting agencies before the start of construction. The objective of the EMS is to provide a consistent approach to environmental management through resource allocation, the assignment of responsibilities and ongoing evaluation of environmental practices, procedures and processes. The EMS is part of the overall corporate management system which includes organizational structure, planning activities, staff responsibilities, practices, procedures and resources for developing, implementing, reviewing and maintaining environmental policies associated with the Project. The Lake Babine Nation role will be described.

Environmental Management Plans (EMPs) are essential components of the EMS. EMPs will identify PBM's approach to project planning and the development of protection measures to mitigate potential environmental effects and other impacts during construction and operation phases. EMPs will describe the environmental practices and procedures to be applied during planning, construction and operation of the Project. The Application will describe how PBM will ensure that commitments in EMPs will be binding on those acting for PBM including contractors and sub-contractors.

### *9.1 Construction and Operational EMPs*

The Application will describe general approaches to individual EMPs and include preliminary outlines of EMPs required during construction and operation. Preliminary outlines for EMPs will be developed in the following areas:

- agency reporting procedures and plans for environmental supervision;
- mine, mill and filter plant operations, tailings impoundment plus other containments and maintenance facilities, power line and slurry pipeline;
- hydrocarbon containment;
- dangerous goods and hazardous materials and waste, construction and operational waste, explosives manufacture, storage and handling;
- maximum, most-likely spill incident and response plan(s) options for short-term and permanent access routes;
- surface water quality and sediment control;
- ML/ARD;
- freshet and storm water runoff and erosion control;
- aquatic life and fisheries;

- air quality and dust control;
- landscape design and restoration/reclamation;
- archaeological;
- noise attenuation measures;
- vegetation;
- wildlife/adaptive management;
- access; and
- landscape design and restoration/reclamation.

First Nations role in EMP implementation will be described.

### *9.2 Habitat Mitigation and Compensation Plan*

The Application will include habitat impact mitigation and compensation plans such as a fish habitat compensation plan (FHCP) if such are required. Describe the implications to the environment and other species (e.g. a fisheries compensation plan altering migratory bird habitat). A wildlife and fisheries/aquatic assessment will be completed which identifies impacts and prescribes preliminary impact mitigation and compensation measures. For fish a detailed FHCP with design drawings will be required if necessary to satisfy Section 35(2) of the *Fisheries Act.*

### *9.3 Closure, Decommissioning and Reclamation*

The Application will describe the regulatory framework and requirements, industry standards, and government agreements that are needed with respect to the closure phase of the proposed development, including plans for mitigating the social and economic impacts of mine closure. Where regulatory requirements, industry standards or government agreements exist, their minimum standards, criteria etc., will be reported.

The Application will provide a clear visual and textual description of the proposed development site at closure, and after reclamation. Closure, decommissioning and reclamation, components and activities will be listed. An estimate of decommissioning, closure and reclamation costs will be provided. The Application will provide an overview of the key site reclamation options considered and explain the rationale for selecting some and rejecting others, e.g., the removal of all material from site versus partial or total burial, including costs and associated environmental issues. The Application will describe methods and location of materials disposal, both on and offsite, including the structural foundations, tailings storage facility, waste dumps and sedimentation ponds.

The Application will describe the plan for the re-introduction and monitoring of native plants used in reclamation to a state where vegetation is self-sustaining.

Provide a description of any post-closure environmental management plans.

### *9.4 Monitoring*

The Application will provide an overview of the proposed monitoring programs to be incorporated into each phase of the Project. Final details of these phased and long-term monitoring programs will be developed during the permitting stage.

Clearly describe how the Metal Mining Effluent Guidelines would apply.

Describe whether commitments and assurances have been provided for involvement of public and First Nations in long-term monitoring.

## 10.0 SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Summarize impact assessment findings, including:

- the potential environmental, socio-economic, human health and heritage impacts;
- the potential impacts on First Nations;
- measures proposed to reduce these effects to acceptable levels;
- the potential for residual effects, taking into account proposed mitigation measures; and
- the significance of those residual effects.

Include the results of the cumulative effects assessment conducted on any residual effects.

Estimate the significance levels of residual impacts after impact management measures have been applied.

**Summary of Commitments and Assurances**

Include a summary table or listing of proposed impact management commitments which have been made at different points in the EA Application, including timing of the actions, execution plans, and who will address each commitment.

Include all of the significant impact management commitments in the EA Application, including commitments to any standard as well as special management practices and design features, and organize them by impact topic.

## 11.0 FOLLOW-UP PROGRAMS

The Application will outline feedback procedures including proposed monitoring programs. The intent is to ensure that remedial actions are taken if the results of a monitoring program deviate from any established operational standards on environmental performance, or predictions on environmental impacts. The Application will describe the approach, objectives and proposed methodologies that will be used in proposed monitoring programs. Follow-up programs will include the following:

- environmental effects monitoring, including sediment quality, ground water and surface water quality, aquatic life (including metal levels if required), and effluent quality and lethal and sub-lethal toxicity;
- vegetation and metal levels;
- air quality;
- hydrology;
- archaeological;
- wildlife monitoring, including tissue metal levels, if required;
- geotechnical stability of waste and water management facilities;
- geochemical stability of waste rock, tailings and pit walls (ML/ARD monitoring);
- overall success in meeting objectives of fish habitat compensation and reclamation programs;
- post construction requirements; and
- post-closure environmental management and monitoring programs.

## 12.0 CONCLUSION

The Application will summarize the effects of the Project, mitigation measures and commitments. The Application will propose a conclusion from the assessment of effects, cross referencing the findings from section 6 of this document.

## 13.0 CORPORATE COMPLIANCE

The Application will describe the operating arrangements proposed to develop the Project, including management structure, business history and contact information. The Application will describe the relevant experience of the company, its key directors and management members, and/or its primary contractors, advisors and consultants in Canada and in other countries with similar environmental regulatory and social policy regimes concerning the following:

- record of compliance with government agencies and regulations pertaining to environmental protection and socio-economic issues, including details of any corrective measures or penalties imposed by government as a result of significant non-compliance;
- prior experience in the design, construction, operation and closure of mining facilities, processing facilities, waste rock and tailings impoundments in areas with similar terrain, natural features and of a similar size and scale including details of safety statistics and any significant penalties or corrective measures imposed by government as a result of improper design and/or infractions during operation and closure; and
- record in honouring commitments on environmental and socio-economic matters during exploration, construction, operation and particularly in the event of mine closure or cessation.

The Application will include copies or factual summaries of all corporate policies related to construction and operations management, the safety of its workforce, environmental protection and socio-economic activities which relate to the proposed development including summaries of any agreements related to preferential hiring in local community groups.

APPENDICES

## Appendix 1: CEAA Information Requirements

| Project Factor | BCEAO Application | Description |
|---|---|---|
| **Environmental effects arising from the Project** | Section 6 | • Describe any change the Project may cause in the environment including: land, water, air, organic and inorganic matter, living organisms, and the interaction of natural systems. |
| **Species at Risk** | Section 6.1 | • Describe any effects that the Project may cause to a listed wildlife species, its critical habitat or residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*. |
| **Indirect social and economic effects** | Section 6.2 | • Describe the effects of a project-related environmental change on: health and socio-economic conditions; physical and cultural heritage; the current use of lands and resources for traditional purposes by aboriginal persons; and any structure, site or thing that is of historical, archeological, palaeontological or architectural significance. |
| **Mitigation** | Section 7 | • Describe any measures that are technically and economically feasible to be taken that would mitigate identified environmental effects. |
| **Significance of effects** | Section 6 | • Describe the significance of any residual environmental effects arising from the Project after mitigation. |
| **Public comments** | Section 2 | • Address any issues raised by the public during review of the Project. |
| **Cumulative effects** | Section 6.5 | • Describe the cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out. |
| **Effects of the environment on the Project** | Section 6.7 | • Evaluate the effects of the environment on the Project or Project components such as avalanche, storm events, earthquakes etc. |
| **All phases of the development** | Section 6 | • Describe the environmental effects that may result from all phases of the Project (construction, operation, modification, abandonment and decommissioning). |
| **Accidents and malfunctions** | Sections 6 | • Describe the environmental effects of accidents and malfunctions that may occur in connection with the Project. |

| | | |
|---|---|---|
| **Any other matter** | **Addendum** | • Provide information on any other matter that the responsible authority deems to be relevant such as the need for the Project, alternatives to the Project, community knowledge and aboriginal traditional knowledge. |
| **Additional Requirements for a Comprehensive Study** | | |
| **Purpose** | Section 1.4 | • Describe the purpose of the Project. |
| **Alternative means of carrying out the Project** | **Addendum** | • Describe the various means of carrying out the proposed Project that are technically and economically feasible, including the various components as appropriate, and the environmental effects of any such alternative means. |
| **Follow -up program** | **Addendum** | • Describe the requirements of a follow-up program which would be used to determine the accuracy of environmental assessment conclusions and the efficacy of required mitigation measures. |
| **Capacity of renewable resources** | **Addendum** | • Describe the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of the future. |

## Appendix 2: LIST OF REFERENCES AND SUPPORTING DOCUMENTATION

This section will itemize reference documents cited in the Application.

### Consultations, Public, First Nations and Government Agencies

The EA will provide documentation with respect to consultations with the public, First Nations and government agencies.

### Records, Meetings and Discussion Topics and Relevant Agreements

The EA will provide records of meetings, discussion topics and relevant agreements, with government review agencies prior to filing the Application.

### List of Enclosures

The EA will provide a list of all enclosures included with the Application.