
# *Draft* GUIDELINES

## FOR THE PREPARATION OF AN

# ENVIRONMENTAL IMPACT STATEMENT

For

BAFFINLAND IRON MINES CORPORATION'S

## MARY RIVER PROJECT

(NIRB File No. 08MN053)

Nunavut Impact Review Board

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## GLOSSARY

This glossary is provided for the Proponent's greater certainty; the onus is on the Proponent to request clarification from the NIRB on any term it feels has not been made clear. Please note that, where possible, a reference has been provided for each of the terms below.

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| *Archaeology* | The scientific study of prehistoric people and their cultures. |
| *Bioaccumulation* | The process in which certain pollutants gather in living tissue (Theodore *et. al*, 1997). |
| *Biodiversity* | The diversity of plant and animal life in a particular habitat or ecosystem. |
| *Borrow pit* | Excavated areas used to provide low quality fill for construction activities such as roadbed building and landscaping. Fill of this type is usually removed from a nearby borrow pit and then compacted on the site as a base for other construction (DIAND, 1999). |
| *Climate Change* | Any long-term change in statistics of weather over periods of time that range from decades to millions of years. It can express itself as a change in the mean weather conditions, the probability of extreme conditions, or in any other part of the statistical distribution of weather. Climate change may occur in a specific region, or across the whole Earth. Climate change includes global warming. |
| *COSEWIC* | Committee on the Status of Endangered Wildlife in Canada is a committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada. |
| *Cumulative impacts* | The impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. |
| *Demography* | The statistical study of populations, with particular reference to births, deaths, migratory movements, age and sex. |
| *Ecosystemic* | Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature. |
| *Ecosystem* | A functional unit consisting of all living organisms (plants, animals and microbes) in a given area, and all the nonliving physical and chemical factors of their environment linked together through nutrient cycling and energy flow. An ecosystem can include humans and be of any size, but it always functions as an integrated unit. Ecosystems are commonly described according to the major type of vegetation, e.g. forest ecosystems or grassland ecosystems (Tilleman, 2005). |

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| *Esker* | A ridge of sand and gravel deposited by a receding glacier. |
| *Faulting* | Cracks or breaks within a body of rock, causing one part of the body of rock to slip or slide relative to the other. |
| *Fines* | The portion of a powder composed of particles [of rock, mineral or sediment] which are smaller than a specified size (Theodore *et. al*, 1997). |
| *Fish* | Includes (a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals (*Fisheries Act*, 2009). |
| *Fish habitat* | 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 (*Fisheries Act*, 2009). |
| *General circulation model* | A mathematical or statistical model describing atmospheric movements over the Earth. Among other things, such models are used to predict how the climate of the Earth may evolve over the years to come as a result of, for example, changes in atmospheric pollution. |
| *Geochemistry* | The study of the chemical composition of the earth and the physical and chemical processes responsible for it. |
| *Geology* | The study of Earth in terms of its development as a planet, commonly thought of as the study of rocks. |
| *Geomorphology* | The scientific discipline that studies the surface features of the Earth, including land forms. |
| *Geotechnical* | Relating to the application of engineering to geology. |
| *Greenhouse Gases (GHGs)* | Greenhouse gases (GHGs) are gases in the atmosphere that trap energy from the sun. Naturally occurring GHGs include water vapour, ozone, carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) (EC, 2008). By United Nations Framework Convention on Climate Change (UNFCCC), GHGs of interest may include: carbon dioxide ($CO_2$) methane ($CH_4$), nitrous oxide ($N_2O$), sulphur hexafluoride ($SF_6$), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs). |
| *Harvest* | The reduction of wildlife into possession, and includes hunting, trapping, fishing, as defined in the *Fisheries Act*, netting, egging, picking, collecting, gathering, spearing, killing, capturing or taking by any means (GC and TFN, 1993). |
| *Hydrocarbons* | Any organic chemical compounds that consist entirely of carbon and hydrogen (e.g., gasoline and oil). |
| *Hydrogeology* | The science that deals with the occurrence, circulation, distribution, and movement of water below the surface of the earth (groundwater), with emphasis on geological aspects. |

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| *Hydrology* | The science that deals with water, its properties, distribution and circulation on or below the earth's surface. |
| *Inuit* | Aboriginal peoples of northern Canada and Greenland. In the context of Nunavut, for the purpose of these Guidelines, meaning those people to whom NLCA Beneficiary status is ascribed. |
| *Inuit Owned Lands* | Means (a) those lands that vest in the DIO [Designated Inuit Organization] as Inuit Owned Lands pursuant to Section 19.3.1 [of the NLCA], and (b) any lands that are vested in, acquired by or re-acquired by the DIO as Inuit Owned Lands from time to time pursuant to the [NLCA], so long as they maintain such status pursuant to the [NLCA] (GC and TFN, 1993). |
| *Inuit Qaujimajatuqangit* | Means traditional, current and evolving body of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including land, water, wildlife and people, to the extent that people are part of the environment (QIA, 2009). |
| *Inuit Qaujimaningit* | Means (a) Inuit Traditional Knowledge and variations of Inuit Traditional Knowledge; (b) Inuit epistemology relating to: Inuit Societal values (including the legal obligations set out in the NLCA regarding Inuit Participation, Inuit employment and training, etc.); and Inuit knowledge (both contemporary and traditional) (QIA, 2009). |
| *Leaching* | The process by which a liquid (e.g., water) passes through a substance, picking up some of the material and carrying it to other places. Leaching can occur underground in soil and rock, or above ground through piles of material. |
| *Limnology* | Limnology is the study of the structural and functional interrelationships of organisms of inland waters as they are affected by their dynamic physical, chemical, and biotic environments" (Wetzel, 2001). |
| *Lithology* | The description of rocks on the basis of their physical and chemical characteristics (Tilleman, 2005). This often includes colour, structure, mineral components, and grain size. |
| *Local Study Area* | That area where there exists the reasonable potential for immediate impacts due to project activities, ongoing normal activities, or to possible abnormal operating conditions. |
| *Mitigation* | Actions taken for the purpose of reducing the negative impacts on the environment of a particular land use or activity (Tilleman, 2005). Actions may include considerations in design, construction, schedule, and restorative measures. Mitigation may also include restitution for any damage to the environment caused by a land use or activity through replacement, restoration, compensation, or any other means. |
| *Nunavummiut* | Residents of Nunavut. |
| *Nunavut Land Claims* | The "Agreement Between the Inuit of the Settlement Area and |

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| *Agreement (NLCA)* | her Majesty the Queen in Right of Canada", including its preamble and schedules, and any amendments to that agreement made pursuant to it (Tilleman, 2005). |
| *Ore* | A mineral or aggregate containing a precious or useful substance in a quantity and form that makes its extraction/mining profitable. |
| *Overburden* | Material that must be removed to allow access to an ore body, particularly in a surface mining operation. |
| *Permafrost* | A permanently frozen layer of soil or subsoil, or even bedrock (INAC, 2007), |
| *Palaeontology* | The study of life in the past as recorded by fossil remains. |
| *Periphyton* | Very small plants that live attached to a surface in freshwater but do not move around. |
| *Phenology* | The study of periodic phenomena in plants, such as the time of flowering in relation to climate. |
| *Phytoplankton* | Very small plants that float or drift in lakes (Tilleman, 2005). |
| *Plume* | A visible or measurable discharge of a substance from a given point of origin. Plumes may occur in water or air. |
| *Post-closure* | The period of time following the shut-down of a mine or other facility, during which monitoring of its effects should be continued. |
| *Post-project audit* | An evaluation occurring after a development which assesses the environmental and social impacts of a project and the mitigation measures applied to them. |
| *Potentially affected communities* | A community or communities with the potential to be impacted, either positively or negatively, by a proposed project or development. Such communities may be defined physical entities or comprised of dispersed populations in the area of influence of a development or project. |
| *Precautionary principle* | Where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UN, 1972). |
| *Proponent* | The organization, company, or department planning to undertake a proposal (Tilleman, 2005). |
| *Quarries* | Are any sites used for the extraction of building products or construction material from bedrock, such as limestone, shale, sandstone, or granite. Quarries may also be used as to manufacture crushed rock or other specific types of aggregate (DIAND, 1999). |
| *Raptor* | A bird that hunts by snatching its prey. |
| *Reasonably foreseeable future development* | Projects or activities that are currently under regulatory review those or that will be submitted for regulatory review in the near future, as determined by the existence of a proposed project |

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| | description, letter of intent, or any regulatory application filed with an authorizing agency (NIRB, 2007). |
| *Regional Study Area* | The area within which there is the potential for indirect or cumulative biophysical and socio-economic effects. |
| *Rock heave* | The movement of rock as a result of freezing and thawing. |
| *Run of mine* | This term applies to mined ore prior to it undergoing crushing or any other form of processing and treatment. |
| *Sacred site* | A place on the land created or used by Inuit spiritual leaders in the past for religious ceremonies, such as: a platform or formation leading to an "altar"; a hill, mountain, stone, boulder, river, lake, or Inukshuk designated as a sacred site; an offering place where people might plead for good fortune and well-being, often found along the coast, but also inland; a place where an unusual event might have happened, or an event that led to a death or a story of survival; a place known to Elders in legend where a significant story occurred (Ittarnisalirijiit Katimajiit, 1996). |
| *Scoping* | A process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and for which there is public concern (NIRB, 2008). |
| *Seismicity* | The phenomenon of earth movements, in extreme cases in the form of earthquakes, and their geographic distribution. |
| *Significant* | Significance is a consideration of the context of the project and the intensity of adverse effects, by giving particular regard to the following:<br><br>a) the environmental sensitivity of the geographic area likely to be affected by the project; b) the historical, cultural and archaeological significance of the geographic area likely to be affected by the project; c) the extent of the effects of the project, including the geographical area that will be affected, the size of the affected human populations, and the size of the affected wildlife populations and related habitat; d) the extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit Harvesting activities; e) the magnitude and complexity of adverse effects; f) the probability of adverse effects occurring; g) the frequency and duration of adverse effects; h) the reversibility or irreversibility of adverse effects; i) the potential for cumulative adverse effects given past, present and future relevant events; and j) any other factors NIRB considers relevant to assessing significance (NIRB, 2007). |
| *Species at Risk* | In this document, Species at Risk includes a): those species listed on Schedule 1 of the Species at Risk Act (SARA), b): species assessed as "at risk" by the Committee on the Status of |

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| | Endangered Wildlife in Canada (COSEWIC), and c): species with territorial, regional, or local "at risk" status. |
| *Sustainable s development* | Development that meets the needs of the present generation without compromising the ability of future generations to meet their needs. |
| *Talik* | Permanently unfrozen ground in regions of permafrost. Usually applies to a layer that lies above the permafrost but below the active layer, often occurs below waterbodies. |
| *Thermal stability* | The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time. |
| *Toxic substance* | A poisonous substance. |
| *Transboundary impacts* | Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party (UN, 1991). |
| *Transportation corridor* | The general routing for an area containing a road (winter or permanent), a pipeline, transmission line or any combination of the three, within Nunavut but outside community boundaries (NPC, 2000). In the current context, routings or tracts utilized for regular marine shipping activities are also considered to be transportation corridors. |
| *Valued Ecosystem Components (VECs)* | Those aspects of the environment considered to be of vital importance to a particular region or community, including: a) resources that are either legally, politically, publically, or professionally recognized as important, such as parks, land selections, and historical sites; b) resources that have ecological importance; and c) resources that have social importance (NIRB, 2007). |
| *Valued Socio-Economic Components (VSECs)* | Those aspects of the socio-economic environment considered to be of vital importance to a particular region or community, including components relating to the local economy, health, demographics, traditional way of life, cultural well-being, social life, archaeological resources, existing services and infrastructure, and community and local government organizations (NIRB, 2007). |
| *Waste rock* | All rock materials, except ore and tailings that are produced as a result of mining operations. |
| *Water crossing* | An area used for the purpose of crossing a water body. Water crossings may consist of naturally occurring areas, or installed structures such as pipelines, bridges, culverts, or roads, etc. |
| *Zooplankton* | Very small animals that float or drift in lakes. |

## LIST OF ACRONYMS

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| ANFO | - Ammonium Nitrate and Fuel Oil |
| ARD | - Acid Rock Drainage |
| ATV | -All Terrain Vehicle |
| CEA | - Cumulative Effects Assessment |
| DPA | - Development Partnership Agreement |
| EIS | - Environmental Impact Statement |
| EMP | - Environmental Management Plan |
| GHG | - Greenhouse Gases |
| GN | - Government of Nunavut |
| IIBA | - Inuit Impact Benefit Agreement |
| INAC | - Indian and Northern Affairs Canada |
| IOL | - Inuit Owned Land |
| IPG | - Institutions of Public Government |
| IR | - Information Request |
| LSA | - Local Study Area |
| ML | - Metal Leaching |
| MSDS | - Material Safety Data Sheets |
| NBRLUP | - North Baffin Regional Land Use Plan |
| NIRB | - Nunavut Impact Review Board |
| NLCA | - Nunavut Land Claims Agreement |
| NPC | - Nunavut Planning Commission |
| NSA | - Nunavut Settlement Area |
| NWB | - Nunavut Water Board |
| OHF | - Oil Handling Facility |
| QIA | - Qikiqtani Inuit Association |
| ROM | - Run-Of-Mine |
| RSA | - Regional Study Area |
| SEMC | - Socio-Economic Monitoring Committee |
| TSP | - Total Suspended Particulate |
| TSS | - Total Suspended Solids |
| VEC | - Valued Ecosystem Component |
| VSEC | - Valued Socio-Economic Component |

# PART I – THE ASSESSMENT

## 1.0 INTRODUCTION

### 1.1 OBJECTIVE OF NIRB GUIDELINES

The present Guidelines are issued for the preparation of a draft Environmental Impact Statement (EIS) for the Mary River Project (the Project) by Baffinland Iron Mines Corporation (the Proponent). An EIS is a tool used by Nunavut Impact Review Board (NIRB or Board) to evaluate the potential environmental and socioeconomic impacts of a project proposal and to ensure the integrated planning of development proposals (NIRB, 2006). It includes the identification and development of mitigation measures, which are measures designed to control, reduce or eliminate potentially adverse impacts of an activity or project and enhance positive impacts. It also contains monitoring and reporting methods to verify the accuracy of impact predictions.

### 1.2 EIS GUIDELINE DEVELOPMENT

The Mary River Project is subject to the environmental review and related licensing and permitting processes established by the *Nunavut Land Claims Agreement* (NLCA) (GC and TFN, 1993). In correspondence dated February 11, 2009, the Minister of Indian and Northern Affairs Canada (the Minister) referred the Project to the NIRB for a Review under Part 5 of Article 12 of the NLCA. The EIS developed in accordance with these Guidelines will serve as the basis for the Board's review of the Project and will enable the Board and any interested parties to understand and assess the potential adverse and beneficial biophysical environmental and socio-economic effects associated with development of the Project.

The NIRB has developed these EIS Guidelines based on the information contained within the *Mary River Project Proposal* (Baffinland, 2008a) submitted by the Proponent and on NIRB's Public Scoping process. During the scoping period, NIRB solicited and received oral and written comments from the Mary River project distribution list which included the Hunters' and Trappers' Organizations (HTO) and Hamlet offices of 11 communities in Nunavut, relevant Federal and Territorial Agencies, Inuit Organizations and interested parties regarding the issues to be included in the environmental review. Also, this distribution list included organizations in the Nunavik Region of Northern Quebec (Makivik Corporation, Kativik Environmental Quality Commission, etc.) and Labrador. This is in accordance with the Minister's direction to include groups in adjacent jurisdictions which might potentially be affected by the Proposal, as referenced below:

> *Pursuant to section 12.5.1 of the Agreement, I would like to identify a particular issue of concern for the Board to consider. Year-round shipping involving seasonal ice breaking at the rate proposed by the proponent is unprecedented in the North. As a result, I will be looking to the Board to carry out a very thorough assessment of the impacts related to this component of the Proposal, which as a starting point, will involve obtaining a clear description of the location of the shipping route for the project within the Nunavut Settlement Area. Since the parties in adjacent jurisdictions might potentially be affected by the Proposal, I request the Board to encourage the participation of these groups in the review* (Minister, 2009).

NIRB staff have also conducted public scoping sessions in the following potentially-affected communities: Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River and Iqaluit. The objective of these meetings was to allow NIRB staff to effectively engage the public and interested parties on the proposed scope of the

assessment, while soliciting their advice on Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent in its EIS. A *Public Scoping Meeting Summary Report* (NIRB, 2009) was developed following these community visits in the Nunavut Settlement Area, taking into account all comments received from community members. Additional community consultation by NIRB in Northern Quebec is planned to occur in late 2009.

## 1.3 PREPARATION AND REVIEW OF THE EIS

Upon receipt of NIRB's EIS Guidelines, the Proponent is required to prepare and submit to NIRB a draft EIS that meets or exceeds the requirements specified herein. It is the sole responsibility of the Proponent to prepare a complete EIS that includes sufficient basic data and analysis for a complete assessment of the anticipated impacts of the Project. The EIS should be concise and should focus on the assessment of significant ecosystemic and socio-economic impacts. In particular, the Proponent cannot invoke omissions in these Guidelines to justify inadequacies in its EIS. The EIS must be a stand-alone document that allows the reader to understand the Project and its likelihood to cause significant environmental effects.

The NIRB shall conduct an internal review of the material presented in the Proponent's submission of an EIS to determine whether the document conforms to these Guidelines (conformity review). The guideline conformity review is focused on identifying whether any information requested in the Guidelines or in the NIRB's Minimum EIS Requirements (Appendix A) has been omitted from the EIS. Guideline conformity review is a presence or absence analysis rather than an evaluation of the quality of the information presented, although the NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information and may be required to revise and resubmit the draft EIS.

Following a positive conformity determination by the NIRB and acceptance of the EIS submission, the NIRB will distribute the EIS to Inuit organizations, community stakeholders, Federal and Territorial regulatory agencies, technical advisors, and other interested parties for review. The technical review period involves a more detailed review of the EIS than the guideline conformity review, and is intended to analyze the quality of the information presented by the Proponent. A technical review of an EIS comprises the following:

- Determination of whether Parties agree/disagree with the conclusions in the EIS regarding the alternatives assessment, environmental impacts, proposed mitigation, significance of impacts, and monitoring measures – and reasons to support the determination;
- Determination of whether or not conclusions in the EIS are supported by the analysis – and reasons to support the determination;
- Determination of whether appropriate methodology was utilised in the EIS to develop conclusions – and reasons to support the determination, along with any proposed alternative methodologies which may be more appropriate (if applicable);
- Assessment of the quality and presentation of the information in the EIS; and
- Any comments regarding additional information which would be useful in assessing impacts – and reasons to support any comments made.

## 1.4 COOPERATION IN THE NIRB REVIEW OF THE MARY RIVER PROJECT

The Nunavut Planning Commission (NPC), the NIRB and the Nunavut Water Board (NWB) are Institutions of Public Governments (IPGs), established under the NLCA with mandates for land use planning, impact assessment, and licensing and managing of water use, respectively, within

the Nunavut Settlement Area. Section 13.6.1 of the NLCA directs the IPGs to cooperate as follows:

> *The NPC, NIRB and the NWB shall co-operate and co-ordinate their efforts in the review, screening and processing of water applications to ensure they are dealt with in a timely fashion.*

Given this direction from the NLCA, the nature of the project proposal, and a request from the Proponent (Baffinland, 2008b), NPC, NIRB and NWB have made significant efforts to cooperate and coordinate their efforts in the NIRB's Part 5 Review for the Mary River Project.

### 1.4.1 Joint Review of Transportation Corridor

Upon referral of the Project to NIRB for a Part 5 Review, the Minister recommended the following:

> *In order to limit the delays to the overall review of the Proposal, I would encourage the Board and the Commission to develop an arrangement that will satisfy the outstanding requirements of the land use planning process, while not unduly encumbering the Board's Part 5 review process. Once finalized, I would encourage the Commission and Board to communicate the agreed upon processes to all parties involved in the review* (Minister, 2009).

Also, Appendix C of the North Baffin Regional Land Use Plan (NBRLUP) states:

3.5.11:

> *All parties wishing to develop a transportation corridor and/or communication corridor shall submit to the NPC a detailed application for an amendment. This application must include an assessment of alternative routes, plus the cumulative effects of the preferred route. It shall provide reasonable options for other identifiable transportation and utility facilities.*

3.5.12:

> *The NPC, and either NIRB or a panel acting under section 12.4.7 of the NLCA, shall publicly review the proposed corridor to determine whether the proposal adequately meets the guidelines set out in Appendices J and K. Once it is determined that a proposal does meet the guidelines, the NPC may request the ministers to amend the plan to include the new transportation corridor.*

In keeping with the Minister's direction and the provisions of the NBRLUP noted above, NIRB and the NPC have developed an arrangement to jointly review the transportation corridor (railway) proposed by the Project. The Proponent is required to include the project-specific information stipulated in Appendices J and K of the NBRLUP (see Appendix B), within its EIS. Given that much of the required information pertains directly to the impact assessment of the Project, the Proponent should cross reference where the required information can be found within the body of the EIS. It is recommended that an appendix be included in the EIS, with references to all the information required by Appendix B, which will then serve as the Proponent's formal application for an amendment to the NBRLUP.

### 1.4.2 NIRB and NWB Coordination

Section 13.5.2 of the NLCA speaks to coordination between the NIRB and the NWB as follows:

> *Where the water application is referred for review under Article 12, the NWB and the review body shall coordinate their efforts to avoid unnecessary duplication in the review and processing of the application. Legislation may provide for joint hearings or authorize the NWB to forego public hearings on any water application where it has participated in a public review of the relevant water application pursuant to Article 12.*

In order to facilitate this coordination between NIRB and NWB, the Proponent shall submit an EIS with an appendix containing the *Draft* water licence application for the Project. Information requirements of the NWB for the *Draft* water licence have been included within Appendix C of these Guidelines. Where possible, the Proponent is encouraged to cross reference relevant sections of the EIS with this *Draft* water licence application, where items are required by both NIRB's environmental impact assessment and the NWB's water licensing process (e.g. Abandonment and Reclamation Plan, Waste Management Plan, Spill Contingency Plan, etc.). The *Draft* water licence application will be reviewed in accordance with the coordination framework developed by NIRB and NWB for this review.

### 1.5 REASSESSMENT OF THE GUIDELINES

The NIRB reserves the right at any time, having given reasonable notice to the Proponent, to reassess these Guidelines and to update and amend them accordingly to allow for consideration to changes in the Project description, baseline information, relevant technological advances, or changes in the regulatory and/or regional environments.

## 2.0 GUIDING PRINCIPLES

The following general principles should guide the creation of the Proponent's EIS and NIRB's assessment of the Project's impacts.

### 2.1 NIRB'S IMPACT REVIEW PRINCIPLES

In accordance with NIRB's primary objectives found in the NLCA, Section 12.2.5, the following principles should be followed in the review process, and precautionary approaches should be adopted in the preparation of the EIS:

- **An ecosystem-based approach must be adopted for the review** - In order to gain an adequate understanding of the effects of the Project, an ecosystem-based approach must be adopted to ensure that the review addresses both the direct impacts that the Project will have on the various ecosystem components, as well as the interactions that will occur between components.
- **Socio-economic issues, such as the Project's potential to affect economic development within the region, must be included in the review** - Members of the community constitute a critical part of the environment, and their concerns relating to the Project need to be to be assessed by the NIRB. As such, adverse and beneficial effects of the Project on members of the community with respect to health, recreation, and other aspects of social well-being need to be addressed in the EIS, in order to ensure a culturally holistic understanding of the Project's effects.
- **An understanding of past and potential future environmental, economic, and social trends in the Baffin Region of Nunavut, and how the Project will influence these trends is required** - The inclusion of a time perspective, from the early planning of the Project through to its operation and possible closure over the next two decades (20 years), is important in order to provide the NIRB with a full understanding of the cumulative environmental effects of the Project in combination with other past, present and reasonably foreseeable projects.
- **The well-being of residents of Canada outside the Nunavut Settlement Area must be taken into account** – Significant transboundary bio-physical and socio-economic effects directly related to this Project must be included in the EIS in order to ensure the NIRB's assessment of the well-being of Canadians outside of the Nunavut Settlement Area.

## 2.2 PUBLIC PARTICIPATION AND ENGAGEMENT

Public participation is a central objective of the NIRB review process. Meaningful public participation requires the Review to address concerns of the general public regarding the anticipated or potential environmental effects of the project. In preparing its EIS, the Proponent is required to engage residents and organizations in all potentially-affected communities, including where relevant, adjacent jurisdictions outside of the Nunavut Settlement Area.

Another objective of the NIRB review process is to involve potentially affected Nunavummiut to address concerns regarding any changes that the Project may cause in the environment and the resulting effects of any such changes on the traditional and current use of lands/ices and resources. The Proponent must ensure that Nunavummiut have the information that they require in respect of the Project and of how the Project may impact them.

Meaningful involvement in the environmental impact assessment process takes place when all parties involved have a clear understanding of the proposed project as early as possible. The NIRB Part 5 Review process requires the development of a public participation and an awareness program to initiate engagement of the public during the initial stages of the review, to facilitate meaningful consultation with those communities potentially affected by a proposed project. To this end, NIRB staff has conducted public scoping sessions in the following potentially affected communities: Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River and Iqaluit (NIRB, 2009). The objective of these meetings was to allow NIRB staff to effectively engage the public and interested parties on the proposed scope of the assessment, while soliciting their advice on VECs and VSECs that should be addressed by the Proponent in its EIS. Throughout the community visits, concerns were voiced about the necessity for meaningful consultation about this proposed project. Therefore, the Proponent is required to:

- Continue to provide up-to-date information describing the project to the public, particularly residents of communities likely to be most affected by the project;
- Involve the public in determining how best to deliver that information, *i.e.* the types of information required, translation and interpreting needs, different formats, the possible need for community meetings; and
- Explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

The Proponent must provide the highlights of this engagement within the EIS, including the methods used, the results, and the ways in which the Proponent intends to address the concerns identified.

## 2.3 PRECAUTIONARY PRINCIPLE

One of the purposes of environmental assessment is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, in order to ensure that such projects do not cause significant adverse environmental effects. Principle 15 of the 1992 Rio Declaration on Environment and Development states that *"Where there are threats of serious or irreversible damage; lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation"* (UNCED, 1992). This precautionary principle has since been incorporated into several pieces of Canadian legislation, including the *Canadian Environmental Protection Act* (CEPA, 1999), the *Oceans Act* (Oceans Act, 1996), and the *Canada National Marine Areas Conservation Act* (CNMAC, 2002). In applying a precautionary approach to its planned undertakings, the Proponent must:

- Demonstrate that the proposed actions are examined in a precautionary manner in order to ensure that they do not cause serious or irreversible damage to the environment;
- Outline the assumptions made about the effects of the proposed actions and the approaches to minimize these effects;
- Identify any follow-up and monitoring activities planned, particularly in areas where scientific uncertainty exists in the prediction of effects; and
- Present public views on the acceptability of these effects.

## 2.4 SUSTAINABLE DEVELOPMENT

Sustainable development is defined as "meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1987). The central task of environmental impact assessment is to contribute to sustainable development by safeguarding the sustainability of VECs in the face of development that might compromise that sustainability (Duinker and Greig, 2006). Promotion of the principle of sustainable development is fundamental to the NIRB's primary objectives laid out in Section 12.2.5 of the NLCA:

> *In carrying out its functions, the primary objectives of NIRB shall be at all times to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. NIRB shall take into account the well-being of residents of Canada outside the Nunavut Settlement Area.*

The EIS Guidelines are based upon three factors that the NIRB considers directly associated with sustainable development. These factors are:

1) The extent to which biological diversity is affected by the Project;
2) The capacity of renewable and non-renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of future generations; and
3) The "precautionary principle", defined as follows: if there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UNCED, 1992).

The NIRB interprets progress towards sustainable development as meeting the following goals:

- Preservation of ecosystem integrity, including the capability of natural systems (local and regional) to maintain their structure and functions and to support biological diversity;
- Respect for intergenerational equity. That is, the right of future generations to the sustainable use of renewable and non-renewable resources depends on our commitment to those resources today; and
- The attainment of durable social and economic benefits, particularly in Nunavut.

The NIRB requires the Proponent to demonstrate how the Project meets these three goals as noted above.

## 2.5 TRADITIONAL KNOWLEDGE

The phrase "Traditional Knowledge" refers to Inuit Qaujimajatuqangit (*i.e.* Inuit Traditional Knowledge) restrictively, while Inuit Qaujimaningit refers to Inuit knowledge without reference to temporality. Inuit Qaujimaningit encompasses Inuit Traditional Knowledge (and variations thereof) as well as Inuit epistemology as it relates to Inuit Societal Values and Inuit Qaujimaningit (or Inuit Knowledge-both contemporary and traditional) (QIA, 2009). In this

document, Traditional Knowledge broadly refers to Inuit Qaujimaningit and is meant to encompass local and community based knowledge, ecological knowledge (both traditional and contemporary), which is rooted in the daily life of Inuit people, and has an important contribution to make to an environmental assessment (Stevenson, 1996). This knowledge represents experience acquired over thousands of years of direct human contact with the environment (Berkes, 1993) and is rooted in personal observation, collective experience and oral transmission over many generations. Traditional Knowledge relates to factual information on such matters as ecosystem function, social and economic well-being, and explanations of these facts and casual relations among them. It plays a significant role in the EIS development in term of acquisition of adequate baseline information, identification of key issues, prediction of the effects, and assessment of their significance, all of which are essential to the EIS and its review.

Traditional Knowledge can be obtained with the cooperation of other concerned parties. Peer-referenced, systematic identification of local Traditional Knowledge experts assures that those considered most knowledgeable within either the local community, social group, or livelihood fraternity will be revealed and potentially included in work dedicated to documenting the local ecological knowledge system (Davis and Wagner, 2003). The Proponent must incorporate into the EIS the Traditional Knowledge to which it has access or that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality.

## 2.6 STUDY STRATEGY AND METHODOLOGY

The Proponent is expected to observe the intent of these Guidelines and to identify all environmental effects that are likely to arise from the project (including situations not explicitly identified in these Guidelines), the mitigation measures that would be applied, and the significance of any residual effects. It is possible that the EIS Guidelines include matters that, in the judgement of the Proponent, are not relevant or significant to the project. If such matters are omitted from the EIS, they must be clearly indicated so that the public and other interested parties have an opportunity to comment on this judgement. Where the NIRB disagrees with the Proponent's decision, it may require the Proponent to provide the additional information. The Proponent is advised to consult with the NIRB on any issues within these Guidelines on which it plans significant deviation.

The Proponent should explain and justify methods used to predict impacts of the project on each VEC and VSEC, the interactions among these components and the relations of these components within the environment. The information presented must be substantiated. In particular, the Proponent must describe how the VECs were selected and what methods were used to predict and assess the adverse environmental effects of the project on these components. The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans. The culture and way of life of the people using, or with a cultural connection to, the area affected by the project may themselves be considered VSECs.

In describing methods, the Proponent must document how it used scientific, engineering, traditional and other knowledge to reach its conclusions. Assumptions must be clearly identified and justified. All data, models and studies must be documented such that the analyses are transparent and reproducible. All data collection methods must be specified. The uncertainty, reliability and sensitivity of models used to reach conclusions must be indicated.

The Proponent must identify all significant gaps of knowledge and understanding where they are relevant to key conclusions presented in the EIS. The steps to be taken by the Proponent to address these gaps must also be identified. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from Traditional Knowledge,

the EIS must contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

### 2.7 USE OF EXISTING INFORMATION

In preparing the EIS, the NIRB expects the Proponent will rely heavily on the use of existing information and available results of scientific surveys and studies completed in the project regions by the government agencies, institutions and individual researchers, which are related to the project and the environment. When using existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent should either include the quoted information directly in the EIS with clear reference indicating the source of information (*i.e.* document, section, and page numbers), or clearly direct the NIRB (through cross-referencing, indicting the document, section and page number) to where it may obtain the information if referred information is contained in the EIS (including supporting documents of the EIS). This is to ensure that the referenced materials can be obtained and confirmed by reviewers. The Proponent must also clarify how representative the data are, clearly separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from them.

The EIS must clearly document any information or knowledge gaps encountered in the existing literature or other information sources, and discuss how these gaps might affect the ability to draw conclusions and the reliability of those conclusions drawn in the assessment.

## 3.0 SCOPE OF THE NIRB ASSESSMENT

Based on the information contained within the Project Description and the NIRB's requirements for the Proponent's development of an EIS, the following subsections comprise the focus and scope of the NIRB review. In preparing the draft EIS, the Proponent must follow these Guidelines closely, while paying specific attention to the requirements of the NLCA, the NIRB's Minimum EIS Requirements (Appendix A), and the General EIS Principles as listed below. In addition, the Proponent should note that directions regarding the EIS Format are a further submission requirement of the NIRB. A detailed discussion of EIS format requirements may be found in Subsection 4.4.

### 3.1 NLCA – SECTIONS 12.5.2 AND 12.5.5

Where appropriate, the EIS shall contain information with respect to the following:

- Project description, including the purpose and need for the project;
- Anticipated ecosystemic and socio-economic impacts of the project;
- Anticipated effects of the environment on the project;
- Steps which the Proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts;
- Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional preferences as to benefits;
- Steps which the Proponent proposes to take to compensate interests adversely affected by the Project;
- The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- The interests in land and waters which the Proponent has secured, or seeks to secure;

- Options for implementing the proposal; and
- Any other matters that NIRB considers relevant.

Furthermore, when reviewing any project proposal, Section 12.5.5 of the NLCA directs the NIRB to take into account all matters that are relevant to its mandate, including the following:

- Whether the project would enhance and protect the existing and future well-being of the residents and communities of the Nunavut Settlement Area, taking into account the interests of other Canadians;
- Whether the project would unduly prejudice the ecosystemic integrity of the Nunavut Settlement Area;
- Whether the proposal reflects the priorities and values of the residents of the Nunavut Settlement Area;
- Steps which the Proponent proposes to take, or that should be taken, to compensate interests adversely affected by the project;
- Posting of performance bonds;
- The monitoring program that the Proponent proposes to establish, or that should be established for ecosystemic and socio-economic impacts; and
- Steps which the Proponent proposes to take, or that should be taken, to restore ecosystemic integrity following project abandonment.

## 3.2 SCOPING LIST

The following is the scoping list of the Mary River Project subject to a review of ecosystemic and socio-economic impacts under Part 5 of the NLCA.

### 3.2.1 Mary River Project Components

The scope of the project includes all works or undertakings, required for the construction, operation, modification, maintenance, decommissioning, abandonment or other undertakings of the listed project components:

- Milne Inlet and Tote Road
- Mary River Mine Site
- Railway
- Steensby Inlet sea port
- Marine Shipping
- Air Traffic
- Ongoing Geotechnical Exploration

### 3.2.2 Environmental Factors

The scope of the project includes the following environment elements, associated baseline information, and related impacts assessment from construction, operation, modification, maintenance, decommissioning, abandonment or other undertakings of the listed project components above:

#### 3.2.2.1 Biophysical Components

- Meteorology and climate (including climate change)
- Air quality
- Noise and vibration

- Geology and geomorphology
- Hydrology and hydrogeology
- Surface and groundwater quality
- Freshwater biota (including fish) and habitat
- Landforms, soil and permafrost
- Vegetation
- Terrestrial wildlife and wildlife habitat
- Birds
- Marine environment, marine water and sediment quality
- Marine wildlife and marine habitat

#### 3.2.2.2 Socio-Economic Components

- Population Demographics
- Education and Training
- Livelihood and Employment
- Economic Development and Self-Reliance
- Human Health and Well-being
- Community Infrastructure and Public Services
- Contracting and Business Opportunities
- Cultural, Archaeology/Palaeontology Resources
- Benefits, Royalty and Taxation
- Governance and Leadership

# PART II – THE ENVIRONMENTAL IMPACT STATEMENT

## 4.0 OVERVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT

### 4.1 PRESENTATION

The Proponent shall provide an EIS that is complete, including scientific works, subject-specific studies and all other sources of information covering all aspects of the Project in regards to ecosystemic and socio-economic perspectives. For clarity and ease of reference, the EIS should be presented in the same order as the EIS Guidelines. However, in certain sections of the EIS, the Proponent may decide that the information is better presented following a different sequence. The EIS must include a guide that cross-references the Guidelines with the EIS such that requirements of the EIS Guidelines are easily located within the EIS. In the interest of brevity, the EIS should make reference to, rather than repeat, information that has already been presented in other sections of the document. A key subject index would also be useful and should reference locations in the text by volume, section and sub-section.

The EIS shall be made available to NIRB electronically on searchable CD-ROM, and also in hard copy. The Proponent shall be responsible, where requested, for the delivery of the EIS to regulators and relevant authorities, in addition to those recipients listed in Appendix D *<to be included in the Final version of these Guidelines>*.

## 4.2 CONFORMITY

The Proponent is expected to observe the intent of the Guidelines, which will then lead to the preparation of an EIS. Specific issues or directions described in the Guidelines must be easily identifiable in the EIS. In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB, 2006), the EIS shall contain a concordance table directing reviewers to the location (document, section, and page number) where specific information addressing the Guidelines and the NIRB's Minimum EIS Requirements may be found. The Proponent is cautioned that any significant deviation from these Guidelines could result in a negative conformity decision and subsequent requirements for revision. Where any differences in direction are encountered between the NIRB's *Guide 7* and these EIS Guidelines issued under NLCA Section 12.5.2, these Guidelines shall prevail.

In its concordance table, the Proponent shall also clearly indicate the locations of information required by Appendices B and C of these Guidelines, so that they may be completely accessible to the NPC and NWB, respectively.

## 4.3 LENGTH

In accordance with the NIRB's *Guide 7* (NIRB, 2006), the Proponent's EIS Main Document (*i.e.* Volume I) shall be concise and not exceed 150 pages without permission from the NIRB. The 150 page limit shall not include: the Title Page, Executive Summary, Popular Summary (in English, French and Inuktitut); Glossary (in English, French and Inuktitut); Table of Contents; Concordance Table; Consultants and Organizations; and References. To ensure the main document within the EIS report remains manageable for reviewers, communities, and the general public, any data of a detailed nature shall be contained in separate volumes as appendices and technical reports submitted in supporting documents of the main document.

## 4.4 FORMAT

The EIS shall be double-spaced**,** and its sections numbered. Subject to any other instructions given by the NIRB, the following format shall be adopted, based on the NIRB's *Guide 7* (NIRB 2006) and adapted as much as possible to the specific circumstances of the Project:

- Cover sheet with project description;
- Plain language summary (in English, French and Inuktitut);
- Executive summary (in English, French and Inuktitut);
- Table of Contents;
- Concordance table which lists each of the Guideline requirement and location within the EIS;
- Purpose of and need for the Project;
- Detailed Project description including potential future development;
- Alternatives considered in the development of the Project proposal;
- Discussion of the public consultation initiatives with the communities potentially affected by the Project. Provide the results of the public consultation, as well as, evidence that community concerns where addressed in the planning of the Project activities;
- Baseline of the existing environmental and socioeconomic information, based upon proper studies, given the environment in the region;
- Anticipated ecosystemic and socio-economic impacts of the Project proposal, including its impacts on the valued ecosystem components (VECs) and valued socio-economic

components (VSECs) potentially affected by the Project (and as identified by public consultation process);

- Anticipated accidents and malfunctions, effects on the environment, contingency plans and mitigation measures;
- Anticipated effects of the environment on the Project;
- Anticipated cumulative effect of the Project on the region/regions;
- Anticipated transboundary effects;
- Steps which the Proponent proposes to take to avoid and mitigate adverse impacts, including any Contingency Plans (spills, fires, floods, etc.) and adaptive management;
- Statement of residual impacts and significance;
- Steps which the Proponent intends to undertake in order to restore the area affected by the Project activities during operation and upon project closure and abandonment; including Abandonment and Reclamation Plan;
- Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional interests;
- The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- The interests in lands and waters which the Proponent has secured, or seeks to secure;
- List of permits, licenses and authorizations required to undertake the Project proposal;
- List of consultants or individuals who assisted in preparation of the EIS;
- List of agencies, organizations, and persons to whom copies of the EIS will be sent;
- Index; and
- Supporting documentation and appendices.

## 4.5 DATA PRESENTATION

The Proponent shall provide charts, diagrams, aerial and other photographs and maps wherever appropriate and useful to clarify the text. Specifically, the Proponent shall include maps or diagrams showing all project related infrastructure and/or activities (e.g., camp sites, drilling activities, port site, mine site, transportation routes including the railway, marine shipping and air transport). Where feasible, maps shall be of a common scale and projection to facilitate comparisons. All charts, diagrams, photographs, and maps must be clearly referenced in the text of the EIS, especially where these charts, diagrams, photographs and maps are included in a separate volume to the main EIS document.

## 4.6 SUMMARIES

### 4.6.1 Executive Summary (in English, French and Inuktitut)

The Proponent shall prepare an Executive Summary that describes the key Project elements and key findings of the EIS, with particular reference to the overall conclusions of the assessment and a clear rationale relating those conclusions to the predicted impacts and the measures proposed to address them. The Executive Summary shall focus on items of known or expected public concern and shall focus on the significant potential impacts of the Project and the methods proposed to address them. It shall also address outstanding issues and the strategies proposed to address them. The Executive Summary shall form part of the EIS, but it shall also be made available as a separate document.

### 4.6.2 Popular Summary (in English, French and Inuktitut)

The Popular Summary shall have the same general structure and objectives as the Executive Summary, but it shall be written in non-technical language and shall include such things as a glossary and additional explanatory text to assist non-specialists in appreciating the content of the EIS as a whole. The Proponent shall consider presenting the Popular Summary in hard copy. Maps indicating major project components including shipping routes and the potentially affected communities should be included, and presented in English, French and Inuktitut. The Popular Summary shall form part of the EIS, but it shall also be made available as a separate document.

## 4.7 TRANSLATION

In addition to the Popular Summary, Executive Summary and Glossary, being presented in English, French and Inuktitut within the EIS, the summary for each thematic volume shall also be translated into Inuktitut. Maps shall indicate common and accepted place-names usually referred to by the local populations in their own language, in addition to their official toponyms, especially where traditional Inuit place-names have been made official through the process outlined in Section 33.9 of the NLCA.

# 5.0 EIS CONTENT

## 5.1 THE PROPONENT

The Proponent shall identify itself and explain current and proposed ownership of rights and interests in the Project, operational arrangements, and corporate and management structures. It shall specify the mechanisms used to ensure that corporate policies are respected. It shall present its environmental policy and shall specify whether and how it applies to all businesses for which it has an operating responsibility, to employees, to contractors, to subcontractors and to suppliers. It shall also describe its reporting systems. Furthermore, the Proponent shall provide complete contact information, including telephone and fax numbers, postal and email addresses, and shall include, where necessary, separate addresses for corporate and operations (or other relevant) offices.

The Proponent shall describe its past experience in exploration, mining, railway and shipping operation, with particular reference to:

- Its record of compliance with governmental policies and regulations pertaining to environmental and socio-economic issues in past operations;
- Operation safety, major accidents, spills and emergencies, and corresponding responses;
- Its record in honouring commitments on environmental and socio-economic matters in the event of planned or premature mine closure, whether temporary or permanent, or due to change of ownership;
- Relations with Aboriginal peoples, including prior experience with any Impact and Benefits Agreements if appropriate;
- Operations in Arctic and Sub-arctic regions;
- Its record in incorporating environmental and socio-economic considerations into construction, operations, temporary closure, final closure, and post-closure;
- Corrective actions undertaken in the past, distinguishing between those taken voluntarily and those taken at the insistence of a third party;
- The provision of security to ensure payment of compensation in the event of accidents.

The Proponent shall identify and describe any obligations or requirements that it must meet to post a bond or other form of financial security to ensure payment of compensation in the event of accidents that directly or indirectly result in major damage by the Project to the environment, as well as to cover the cost of planned or premature closure, whether temporary or permanent**.**

If the Proponent does not have prior experience in exploration, or mining, particularly for this region, it shall explain the safeguards that it intends to put in place to compensate for that lack.

## 5.2 REGULATORY REGIME

The Proponent shall present its understanding of the regulatory regime in which it would be operating by identifying all relevant federal, territorial, and local environmental and socio-economic standards, laws, regulations, policies, and fiscal regimes relating to Project approval, construction, operations, monitoring, and closure. It shall further explain how such requirements would be met and what specific governmental permits and approvals would be required. A list of currently held permits and licences, including dates of issue and expiry, shall be appended.

The Proponent should also include a discussion of any steps it proposes to take to ensure it meets its Project related tax obligations (including fuel and payroll taxes) with the Government of Nunavut (GN). The Proponent should, if applicable, also provide any relevant non-confidential information regarding its relationship with the GN in terms of the optional fuel-rebate program.

## 5.3 REGIONAL CONTEXT

The Proponent shall describe in general terms the regional biophysical and socio-economic environments of the Baffin Region and Nunavut as a whole, including: ecological land classifications; ecological processes and relationships; the location of other basic and precious metal finds and other existing and potential developments; and current and future land use plans.

## 5.4 ASSESSMENT BOUNDARIES

### 5.4.1 Spatial Boundaries

The spatial boundaries of the assessment of the Project (and its components) shall be determined on the basis of the Project's potential impacts on the particular biophysical or social phenomenon being addressed. In accordance with the NIRB's definition of local and regional study areas, the Proponent shall consider the following criteria when establishing spatial boundaries for the assessment of the Project:

- The physical extent of project activities;
- The extent of ecosystems potentially affected by the Project;
- The extent to which traditional land use and Inuit harvesting could potentially be affected by the Project; and
- The size, nature and location of past, present, and reasonably foreseeable projects and activities which could interact with the items listed above.

The EIS shall define the spatial boundaries of the maximum area potentially affected by the Project and major alternatives being considered, based on the boundaries for each individual type of impact, and taking into account the migratory nature of wildlife, such as caribou and their cyclic nature (caribou numbers and distribution follows a cycle of 40 – 60 years, QIA, 2009). Identification of spatial boundaries should also take account the impact pathways as pollutant transport and bioaccumulation mechanisms. Furthermore, Inuit land use and occupancy (past, present, and future), should be considered in addition to other factors when determining spatial boundaries for the impact assessment of the Project.

The Proponent is not required to provide a comprehensive baseline description of the environment at each of the above scales, but must provide sufficient detail to address the relevant environmental and cumulative effects of the project. For example, the spatial boundaries for archaeological studies related to burial grounds in the Project area might reasonably be expected to differ from those for studies on migration of caribou in the area.

The boundaries for the assessment of socio-economic impacts shall be based on an analysis of the socio-economic effects directly and indirectly associated with the Project. In all cases, priority focus shall be directed to potential impacts within Nunavut, but the EIS shall also consider potential impacts outside of Nunavut, wherever there is reason to anticipate that they might occur. The EIS must contain a justification and rationale for all spatial boundaries and scales chosen.

The following general spatial boundaries are suggested:

- **Local Study Area** (LSA): the Local Study Area shall be defined as that area where there exists the reasonable potential for immediate impacts due to project activities, ongoing normal activities, or to possible abnormal operating conditions. The Local Study Area includes the Project facilities, buildings and infrastructure, and all areas proposed for Project activities, including proposed marine activities and shipping.
- **Regional Study Area** (RSA): the Regional Study Area shall be defined as the area within which there exists the potential for direct, indirect, and/or cumulative biophysical and socio-economic effects. This area includes lands, communities, and portions of Nunavut and other regions of Canada that may be relevant to the assessment of wider-spread effects of the Project. The Proponent is advised to duly consider the transboundary implications of impacts to identified VECs/VSECs as results of marine shipping for the Project.

The LSAs and RSAs may vary between disciplines and between VECs/VSECs, as they represent the likely distribution of Project effects on individual VECs/VSECs.

### 5.4.2 Temporal Boundaries

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact being considered and with seasonal changes. The establishment of temporal boundaries has two aspects: the time-horizon that will be used in predicting change; and the temporal variability and periodicity that characterize the predicted impacts (Whitney and Maclaren, 1985). The time-horizon used for predicting change must be a function of the anticipated duration of the Project, including the final closure and post-closure phases, the predicted impacts, and the predictive capability of the various disciplines at play.

The EIS shall determine the temporal boundaries separately for the construction, operation, final closure, and post-closure periods, and also for planned exploration work to be undertaken in conjunction with the Project. The closure period covers decommissioning, abandonment, and reclamation; post-closure covers the period after the mine has been decommissioned and the site reclaimed and returned as much as possible to its natural state. The temporal boundaries of the post-closure period may encompass many years, depending on the site and on the methods of closure. The Proponent shall also consider where applicable, the temporal bounds of Project alternatives under assessment, noting where they differ from those for the preferred option.

The Proponent shall give due consideration to Inuit land use and occupancy (past, present, and future), in addition to other factors to be considered in its determination of spatial boundaries for the Project.

The description of the existing baseline and the environmental trends should include a consideration of past projects and activities carried out by the Proponent and/or others within the

RSA. As is the case for the determination of spatial boundaries, the temporal boundaries must indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented.

For all temporal boundaries, the EIS shall give a rationale and justification for the boundaries chosen, including a description of any consultation with members of the public or technical experts. In doing so, the Proponent shall recognize increased global warming rates which might influence the some of the impact assessment, for example, there may be no immediate danger of permafrost degradation, but the Proponent must incorporate that possibility into the design of Project components where applicable.

### 5.5 LAND TENURE

The Proponent shall delineate on a map of suitable scale the legal boundaries of any areas to which it will acquire rights through lease or other tenure arrangements, to include Crown land, Inuit Owned Land, and Commissioner's land. It shall further describe those areas by providing such information as file numbers, start and end dates, fees, name of right holder, renewals, etc.

### 5.6 ANALYSIS OF NEED AND PURPOSE

The following points must be addressed in discussing the need for and purpose of the Project:

- General feasibility from an economic perspective, including how this Project will benefit communities in Nunavut, either directly or indirectly;
- An assessment of the longer term strategic implications of the Project, and how it may affect or lend to transportation networks (existing and proposed) in Nunavut;
- Identification of past, current and potential future users of the LSA, RSA, and project infrastructure, including commercial, government, public, and private;
- Analysis of community support for and opposition to the Project, with particular emphasis on the proposed Steensby Inlet shipping route, with a description of how the Proponent has sought input from a broad range of socio-economic groups and members of the public, and any efforts undertaken to relieve public concern;
- An analysis of the overall net benefit of the Project in terms of Nunavut and of Canada as a whole, which includes considerations that are not related to economics; and
- Describe the current status of Project financing, and the Proponent's financial preparedness to meet the requirement for reclamation and security shall the project proceed.

Discussions addressing the above points shall be supported by an analysis of the positive and negative social and economic effects on existing industries, markets, and communities over the life of the Project. This analysis should also indicate the distribution and magnitude of benefits and/or losses to specific socio-economic groups in the relevant study area.

## 6.0 PROJECT COMPONENTS AND ACTIVITIES

The description of the Project components and activities shall address all phases of the Project in sufficient detail to allow the Proponent to predict potential adverse environmental effects and address public concerns about the Project. The Proponent shall describe the Project as it is planned to proceed through the site preparation, construction, operation and maintenance, and any potential modifications, closure, reclamation and post closure monitoring. The description must include a timeline for all phases of the Project. This section must include a discussion of the

planned uses of the railway sea port as related to the project and any potential use other than for the project.

This section contains explicit requirements for the Project components and all activities associated with each project component through the life of the project.

## 6.1 ALTERNATIVES

The EIS shall include an explicit analysis of all alternative means of carrying out the project components, including a "no-go" alternative, the identification and application of criteria used to determine the technical feasibility and economic viability of the alternatives to the Project (e.g. transportation, natural, social, economic and cultural environment). This analysis must be done to a level of detail which is sufficient to allow NIRB and the public to compare the Project with the alternatives in terms of the economic costs and the environmental, social and economic impacts and benefits. The Proponent must include reasons for selection of the Project as the preferred alternative, and the reasons for rejection of other alternatives.

The EIS shall present alternatives for the following project elements:

- Alternatives of railway routing and the location of the sea port, including:
  - Routing the rail line from the Mary River mine site to a seaport at Milne Inlet.
  - Using/updating existing shipping facilities at Nanisivik and routing the railway from the Mary River mine site to Nanisivik across the lower portion of Borden Peninsula.
  - Routing the rail line from the Mary River mine site to a seaport on the east coast of Baffin Island.
  - Locations of docks at preferred seaport site with consideration of bathymetric studies, minimizing underwater blasting and dredging and other factors.
- Alternatives to year round shipping (including ice breaking) from Steensby Inlet, including:
  - Open water shipping only in Foxe Basin and Hudson Strait.
  - Decreasing the shipping frequency by extending mine life and decreasing the production rate.
- Alternative iron ore mining methods rather than conventional drilling and blasting;
- Alternatives to diesel power generation, including solar energy, wind energy, hydro and geothermal energy, etc;
- Alternative closure and reclamation options;
- Options of ballast water treatment and discharge;
- Alternatives to antifouling coatings of ore ships; and
- Any other alternatives to project components.

When the Proponent assesses the economic viability for each alternative option, due considerations must be given to the vulnerability of the arctic ecosystem, the potential for extension of the mine life and/or increased iron ore production rates, and associated cumulative effects of each option, in accordance with the requirements indicated in the Cumulative Effects Assessment (CEA) section (Subsection 7.8, appropriate cross referencing can be used in the EIS for CEA), particularly the potential for cumulative impacts on the marine ecosystem and Inuit harvesting activities. In addition to CEA, alternative assessment shall also include the following aspects: VECs and VSECs, assessment boundaries, and baseline data if applicable.

Furthermore, as indicated in public consultation (Subsection 7.4), the public opinions and preferences shall also be taken into consideration as a criterion in the assessment all the alternative options. Therefore, the alternative analyses shall include a discussion on how public consultations by the Proponent have influenced the Project planning, and how public preferences have been considered by the Proponent in determining the preferred project alternatives.

## 6.2 PROJECT DESIGN

General Project design issues discussed in the EIS shall include:

- An explanation of how the environment has influenced the design of the Project. This should include, but is not limited to, geographical, geological, meteorological, hydrological and oceanographic conditions;
- Global climate change. The discussion must describe and assess, on the basis of current knowledge, how the potential of climate change could affect permafrost and soils with high ice content, the hydrological regime, as well as marine ice flow regimes, and the long-term impacts of such changes on the Project; in addition, the Proponent shall identify the Project sensitivity to changes in specific climate-related parameters (CEAA, 2003)
- The Proponent should design and apply multiple scenarios on impacts assessments, where these scenarios span the range of possible future climates, rather than designing and applying a single "best guess" scenario (EC, 2007)
- A discussion of how design, engineering, and management plans are consistent with the maintenance of eco-systemic integrity focusing on various wildlife habitats, including freshwater habitat, marine habitat and terrestrial habitat;
- A demonstration of how the Proponent has applied the precautionary principle in its Project design and management;
- How potential impacts to wildlife (e.g. caribou and peregrine falcons) have influenced the design of the Project, including the geographical location of project components, special attention should be paid to the influence of peregrine falcon habitat on the selection of land farms, borrow pits and quarry sites, etc.;
- How socio-economic conditions have influenced the Project design. For example, how local preferences and labour capacity, etc., have influenced the design of work rotations, pace of construction, employment policy, etc.;
- How project design, particularly site preparation, has been influenced by the distribution of archaeological resources;
- How public consultation and Traditional Knowledge have influenced the planning and design of the Project; and
- The considerations for future development.

All assumptions underlying design features should be explicitly stated.

## 6.3 PROJECT PHASES

The Proponent is required to present the overall development plan including the Project development phases, relating timeframe in each phase, and involved works and undertakings in each phase. The Proponent should also clarify all associated monitoring and/or mitigation plans to be implemented in each phase to eliminate or minimize adverse effects that might occur at various project stages for each project element.

## 6.4 FUTURE DEVELOPMENT

The Proponent shall evaluate any foreseeable expansions of the current Project, the needs of required infrastructure, and associated eco-systematic and socio-economic impacts. The Proponent shall also evaluate the potential for development of additional ore deposits in the Project area (*i.e.*, Deposit #2, #3 and # 4) in accordance with previous and current exploration activities. Such an evaluation should be based on the Proponent's business strategic plan, other predictions and the development realized by projects of a similar nature.

In addition, the Proponent shall discuss how any foreseeable future development scenarios have been taken into consideration when designing the infrastructure and ancillary utilities for the Project. The Proponent's assessment of cumulative impacts of the Project shall also include the future development scenarios as outlined above.

## 6.5 DETAILED PROJECT PROPOSAL DESCRIPTION

The Proponent shall describe the Project components and all activities associated with each in a systematic way. The description shall encompass all stages of development, from site preparation through to construction, operation and maintenance (including any potential modifications and/or expansions that may be required during the operations phase based on exploration results), as well as closure and reclamation. The description must include an approximate timeline for all phases of the Project, including closure, reclamation and post closure monitoring if applicable. Where specific codes of practice, guidelines and policies apply to items to be addressed, in particular if involving thresholds and quantitative limits to be applied, those documents must be cited and may be included as appendices to the EIS.

For a better understanding of detailed description of the project components and activities, whenever appropriate, the Proponent shall present required information in reference to the impact assessment section (Section 8), and environmental management section (Section 9) by applying appropriate cross links.

The description shall include the following project components and associated activities, which intends to cover all the aspects of the Project, and might not be exhaustive; therefore the Proponent is expected to incorporate other necessary information by its discretion.

### 6.5.1 Milne Inlet

The Proponent shall describe the followings aspects of facilities or activities at Milne Inlet:

- Barge Handling facilities:
  - All possible use.
  - Design and construction, including how precautionary principles have been incorporated into the port design.
  - Operational details including but not limited to: listing of equipment and materials to be brought into port; unloading and transport of materials and equipment.
  - Security and safety management.
- Laydown areas;
- Oil Handling Facility (OHF), bulk fuel storage facilities and management;
- Camp facilities operation;
- Water supply and associated water intake sources and facilities;
- Waste (including shipping waste generated on board and hazardous waste) management facilities:

    - Including but not limited to industrial waste segregation, recycling and management facility.
    - inert waste landfills, camp incinerator, and sewage treatment facilities.
- Communication systems; and
- Power generation unit.

### 6.5.2 Tote Road

The Proponent shall describe the followings aspects of facilities or activities related to the Tote Road:

- Milne Inlet Tote Road upgrades:
    - Quarrying borrow sites.
    - Modifications to sea container crossings.
    - Watercourse crossing installations.
    - Earthworks (grading, roadbed, re-alignments).
- Milne Inlet Tote Road operation and maintenance:
    - Traffic volume.
    - Road and water crossings maintenance.
    - Dust suppression.
    - Snow and surface runoff management, including total suspended solids (TSS) control and consideration of acid rock drainage (ARD) potential of sediment.
    - Wildlife management.

### 6.5.3 Mary River Mine Site

#### 6.5.3.1 Geology/Mineralogy of the Ore Deposit

The Proponent shall describe the iron ore resources from the Mary River site, including where appropriate:

- Deposit locations, including detailed maps of the mine site area;
- The lithology and mineralogy in the Project area;
- The types of the deposits (hematite and magnetite) and associated bedrocks;
- The nature, depth, and thickness of the ore deposit to be mined;
- The estimated volumes and characteristics of the waste rock to be removed;
- ARD and metal leaching (ML) characteristics of ore and bed rock;
- Ore body delineation;
- The permeability of the open pit; and
- Anticipated salinity and general characterization of pit water.

#### 6.5.3.2 Ore Mining, Transport and Processing

The Proponent shall describe the ore mining, transport and processing associated with the Project, using maps and diagrams whenever applicable:

- A mining plan indicating the sequence of development for the proposed open pit;
- Characteristics of the open pit mine design and operation;
- The daily and yearly average extraction rate(s);
- The permeability of the impoundment structure(s) and the effectiveness of seepage containment, including the needs for control or retention structures if applicable;

- Means of drilling, blasting, extraction, loading and transport of ore;
- Design, location, capacity of iron ore and processed ore product stockpiling facilities, and related surface disturbance;
- The locations of the run-of-mine (ROM) stockpiles, and plans to control snow deposition, spring freshet, pooling, water run-off and storm flooding;
- The location of ore processing facilities (e.g. crushing and screening, stockpiling, conveying, loading) and the site-selection criteria, including processing equipment capacities and processing rates;
- Dust suppression technologies and dust suppressants to be used in mining, transport, crushing and other process where dusts might be generated;
- Physical characteristics of processed ore, including the size and quantities of fines and their predicted particle settling characteristics, and associated dust prevention measures;
- Chemical stability analysis of the waste rock, and relevant technical measures to prevent potential ARD and ML;
- Discussion of how geotechnical factors, and geological characteristics, including permafrost, taliks related seasonal thawing and seepage conditions; were considered in the design of ramps, high walls, slopes and other features in the open pit;
- Description of methods of controlling and monitoring groundwater seepage from ramps of the open pit, the processed ore and other containment areas, and the capacity to cope with storms, floods, and other intermittent natural events using a return period that is adequately conservative (e.g., 1/100 years);
- A review of similar operations elsewhere in similar settings, and implications and the results of research on the long-term stability of the underlying permafrost and frozen materials; and
- Measures and management plans to control natural hazards, and also mitigate their impacts on the project, such as rock falls and collapses, extreme climate events and other geological or geomorphological events (*i.e.*, storm, flooding, earthquake and other worst case scenarios).

#### 6.5.3.3 Overburden and Waste Rock Disposal

The Proponent shall present:

- Overburden and waste rock handling, including the design and location of the storage sites, describing the options for each, with references to similar operations in a comparable conditions, and results of research on the long-term thermal stability of the underlying permafrost;
- Physical and chemical stability of the types of materials to be stored and those to be used for containment construction with regard to the long-term acid-generation and metal-leaching potential of the waste rock, bearing in mind the latest monitoring results from mines in the same general region and climate condition, and present a water management plan;
- Explain the relationship between the timing of acid generation and permafrost encapsulation in cold weather condition, taking account the consideration of climate change, where possible in reference to the region in which the Project will take place;
- Describe the physical and chemical characteristics of seepage and runoff from the waste rock piles and appropriate control measures;

- Description of the water balance, and how it is considered in the design for any control measures to ensure that runoff from the pile does not result in impacts on water quality in the surrounding environment;
- Describe the potential for rock heave phenomena and implication to ground stability; and
- Describe, in qualitative and quantitative terms, the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area.

#### 6.5.3.4 Water Supply and Water Treatment Facilities

The Proponent shall present, in connection with its Site Water Management Plan (Subsection 9.5.5), the details on the water supply and water treatment facilities for the Project, including the followings:

- Identification of water supply sources and projections of the amount of water required from each water source;
- Water uses including the camp sites, open pit mine, processing facilities, dust suppression, firefighting reserves, workshops and maintenance facilities as well as drilling activities etc.;
- The water supply source(s) and mitigation measures designed to prevent the entrapment of fish at water intakes, on-site use, storage and final discharge to the environment;
- Alteration of drainage patterns, water treatment (including water containing nitrate residues from explosives if it is required), diversions, and water conservation and recycling measures;
- Estimates of mine water volumes and potential uses of the mine water and methods used to calculate the volumes;
- The facilities for washing mine trucks and other equipment, as well as any treatment of water used for such activities;
- How melt water, and other water collected from potential contaminated facilities and areas, particularly with high metal content and/or hydrocarbons will be managed; and
- The disposal method for brine water from the proposed sea water desalination plant at Steensby Inlet.

#### 6.5.3.5 Natural Drainage Diversion

The Proponent shall provide information on:

- A description of any planned diversions of natural drainage from mine site and project facilities, and estimation of the flows to be diverted;
- Potential challenges expected in constructing drainage diversions (e.g. melting ice lenses); and,
- Potential for mobilizing sediments, erosion generating and disturbance to terrain.

#### 6.5.3.6 Mine De-Watering

The Proponent shall describe:

- Information about de-watering methods, specifying the estimate of volumes to be pumped based on the meteorological baseline data, and geotechnical works, the areas that may be affected, the quantities of bottom sediment requiring disposal, and the disposal methods; and
- The contingency plan should the mine water quantity be significantly larger than estimated.

#### 6.5.3.7 Landfills or Landfarms

The Proponent shall describe the following information to the extent possible:

- Research results for effectiveness of similar landfarm operation facilities in comparable geological regions taking account the climate condition;
- Locations of any landfills and landfarms, with estimates of containment capacities, associated design basis and considerations to minimize impact on the surrounding environment;
- An inventory of materials to be land filled, taking into account the Project stages;
- Planned landfarm construction materials and specifications, engineering features and facilities layout drawings;
- How contact and noncontact water will be managed, and how the design of these components incorporates the consideration of climate change, especially when water diversions are proposed (*i.e.* increased or decreased flows).

#### 6.5.3.8 Other Facilities at Mary River Mine Site

The Proponent shall present the following information on Project infrastructure and facilities where excluded from the above descriptions.

**a) Temporary Facilities during Construction Stage**

Construction camp; Contractor offices; Temporary fuel storage (iso-containers and manufactured tanks); Explosive plant; Aggregate crusher and stockpiles; Concrete batching plants; Portable lighting plants; Construction workshops and maintenance shops; Warehouses/stores; Construction equipment and vehicles; Equipment maintenance facilities; Sewage and grey water treatment; and Solid waste disposal.

**b) Permanent Facilities during Operation Stage**

Camp facilities; Ore crushing and screening facilities; Ore stockpiling facilities; Railway loading and unloading facilities (for mine operation supplies transported from the Steensby Inlet port); Permanent worker accommodations; Communication systems (including satellite ground station); Heavy equipment fleet parking lot; Laydown areas; Bulk fuel storage and distribution facilities; Explosive manufacturing and storage; Railway terminal facility including train loading and unloading facilities; Transportation and service vehicles; Sewage and grey water treatment; and Solid waste disposal.

### 6.5.4 Airstrip Traffic

The Proponent shall provide information on:

- Description of all air traffic and types of aircraft to be used, regardless whether a airstrip is required or not (e.g. helicopter);
- Estimates of the number of passengers to be transported and the volume of goods to be shipped through the airport facilities;
- Estimates of the number of flights and types of aircraft at each airstrip on a daily or weekly basis covering all phases of the Project;
- All airport/airstrip facilities and construction methods;
- Identification of waterbodies and watercourses that may be in-filled or encroached upon by the airstrips or airport infrastructure;
- The duration, frequency, and extent of use of each airport facility/airstrip;

- The infrastructure characteristics, service roads, fuel storage, OHF, de-icing and containment systems, methods of dust suppression; and
- Accident/incident response reporting.

### 6.5.5 Ground Traffic and Access Roads (Except the Rail Transportation)

The Proponent shall describe ground traffic, and associated facilities both temporary for construction purposes and permanent for operation and maintenance. Access roads include the mine hauling roads, site service roads, various access roads, railway construction and maintenance roads, all terrain vehicle (ATV) trails, etc. The Proponent shall describe the following in connection with Road Management Plan (Subsection 9.4.18), including relevant maps and drawings where useful:

- Permitting regime and land tenure of all access roads (designations of accessibility to public);
- Locations, connectivity of roads and speed limits;
- Terrain conditions along the road alignments, design specification, construction methods, estimates and types of materials required for construction and maintenance; design features of all access roads, including laydown areas, temporary construction camps; types of water crossing, quantity and locations of each kind, and diversions of watercourses;
- Sediment control measures during construction and operation;
- The duration, frequency and extent of use for all facilities, including predictions for public or hunting access; estimates of traffic volume and type of vehicles at seasonal or annual basis;
- Roads management related to daily operation and maintenance (e.g. snow removal, de-icing, snow drifts/banks); dust suppression methods (if specific dust suppressants is planned, then material safety data sheets (MSDS) should be referred to appropriately);
- Wildlife impact mitigation procedures and structures such as caribou crossing during construction and operation;
- Management plan for public or hunting access;
- Accident/incident response procedures and reporting; and
- Site reclamation, especially temporary construction camp and quarry sites which are used for extracting construction materials; disposal of construction waste materials and options of final closure and reclamation;

### 6.5.6 Rail Traffic

#### 6.5.6.1 Railway Corridor

The Proponent shall describe the followings associated with the preferred rail corridor as results of the alternative analysis, with maps of the routing, pictures of topography, and other information if applicable:

- A description of the proposed corridor, including its use, its general routing, the possible environmental and social impacts, and any seasonal considerations that may be appropriate, which include:
    - All infrastructure and railway facilities and respective locations of the proposed railway corridor. Infrastructure should include water crossings, bridges, tunnels and other facilities.
    - General characteristics of ecosystem and terrain conditions in the corridor including (but not limited to) surficial materials (including

thermal condition, ground ice/moisture content), topography and drainage conditions and other factors influencing landscape stability.

- Identified locations and types of water crossings, waterbodies and watercourses that may be encroached upon by the railway, and associated measure to minimize the impacts on those waterbodies and watercourses.
- Wildlife resources and associated habitats uses, and significance to ecosystem health.

- A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations in connection with the alternative analysis (Subsection 6.1), including:
  - The potential impacts on ecosystem, and current and future land use in the railway corridor from proposed railroad construction and operations.
  - The presence of identified cultural and spiritual sites, archaeological and palaeontological sites, and associated impacts.
  - Advantages, in terms of environmental impact, technical feasibility and economic viability comparing to other options for the transportation corridor.
- An assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:
  - The environmental, social and terrain engineering consequences, and the cumulative impacts of the project.
  - The environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

The following planning guidelines shall be used in the assessment of a new transportation/communications corridor proposal (NPC, 2000):

- The corridor width shall be a function of:
  - The number and type of identified facilities within the corridor.
  - Physical and biophysical conditions.
  - Availability of detailed engineering data for one or more transportation modes within the corridor.
  - Safe distances between different facilities within the corridor.
  - Aesthetics.
- Corridors shall:
  - Minimize negative impacts on community lifestyles.
  - Improve access to other resources having high potential for development, while still maintaining the shortest practicable distance between the primary resource areas and the trans-shipment location.
  - Be designed in accordance with existing and prospective land use capability including topography, soil, permafrost and wildlife.
  - Be designed in accordance with the availability of granular supplies.
- In keeping with existing legal and legislative requirements, including the NLCA, corridors shall not negatively impact:
  - Community business, residential and projected expansion areas.
  - Important fish and wildlife harvesting areas.

- Key habitat for fish and wildlife species, especially areas used by endangered species.
- Areas of high scenic, historic, cultural and archaeological value.

#### 6.5.6.2 Railway and Train Operation

In the Project area, permafrost presents numerous unique engineering challenges to surface facilities construction and maintenance. Any alteration of the thermal regime at the ground surface, including even moderate disturbance of the pre-existing ground surface energy balance can induce permafrost thawing with consequent settlement and damage to roadway or railway embankments (Goering, 2003). Among these facilities, transportation routes are likely to be particularly susceptible to destructive frost action under conditions of changing climate, railway embankments are particularly susceptible to thaw settlement damage because of the need to maintain the alignment and even grade of the rails (Instanes, *et. al.*, 2005). Tremendous efforts have been made in both scientific research (Saboundjian and Georing, 2003), and engineering fields (Cheng *et. al.*, 2008) to conquer these challenges around the world. Therefore, in its EIS, the Proponent shall provide sufficient information pertaining to railway design and construction technologies addressing these issues, with emphasis on the potential impacts to the environment, and technical and operational measures to mitigate these impacts.

This information shall include:

**a) Design and Construction:**

- The characterization of both locomotives (e.g. technology and performance in arctic climate) and cars to be used for this project, and implications the design of railway;
- All facilities along the railway, including safety, signalling and communication systems, auxiliary facilities for wildlife, snow machines, sledges and ATV passes, and emergency facilities for malfunction and other similar situations;
- Consideration of how the following issues are addressed in the design and construction of the railway:
  - An assessment and forecasting of potential geo-hazards (e.g. flooding, erosion, terrain instability such as thaw settlement, frost heave, slope instability) along the route and associated countermeasures to mitigate these effects.
  - Mechanism of freeze-thaw damage, the prevention and countermeasures along the railroad corresponding to the various terrain conditions encountered along the route.
  - Anticipated interaction between climate change and variability and landscape components and processes including permafrost conditions (and potential degradation), hydrological process and stream flow and impacts related to water crossings.
  - The stability of railway embankment under dynamic loading and the engineering characteristics of underlying soils in the permafrost region.
- Thermal stabilizing technology targeting embankment and underlying permafrost;
- Design and construction technologies to enhance the thermal stability, associated thawing prevention measures and building technologies of embankment and tunnel structures; in particular the technical measures for construction of rail embankments over thaw-susceptible and ice-rich soil areas;
- Settlement prevention technology and measures to ensure slope/bank stability at bridge locations;

- Construction technology and machinery to build railway track, bridges and tunnels in arctic conditions and permafrost terrain conditions;
- Signalling and communication technology and equipment to ensure safe operations;
- Safety monitoring systems (for safe passage of wildlife), and related inspection and maintenance technology of railway equipment in harsh climate;
- Braking technology and equipment for emergency reaction;
- Vibration damping and noise reduction technology and equipment;
- Railway alert, or alarm systems and response mechanisms for natural disasters;
- Design considerations and construction methods for construction of sidings, bridges, other water crossing works, railway yards and terminals, etc.;
- Erosion control measures along the rail line for all drainage facilities, including bridges, culverts, ditches, dikes and berms, etc;
- Any lessons learned from other railway operations employed in comparable geological regions and meteorological conditions, and how those lessons have been incorporated in the proposed railway design; and
- Other issues related to railway and train operation.

**b) Operation:**

- Routing operations plan, performance monitoring plan and regular maintenance activities;
- Safety measures or management plans for dangerous goods transport;
- Measures for spill contingency plan, and security plan to minimize negative impacts on wildlife and environment from railway spill and other accidental events taking account to transport of bulk fuel and chemical;
- Operation measures planned to protect wildlife and minimize collision related mortalities;
- Mitigation measures to secure the safety of cross rail traveling, fishing, hunting/trapping activities by snow machines, sledges and ATVs; and
- Other management measures required by federal and territorial government agencies for railway operation.

Whenever appropriate, the Proponent shall present required information associated with rail/train operation in reference to the Spill Contingency Plans, (Subsection 9.4.2), the Railway Management Plan (Subsection 9.4.14) and other related plans.

### 6.5.7 Steensby Inlet

The Proponent shall provide the following information regarding Steensby Inlet site. In addition, site maps and diagrams should be provided for better understanding of the site.

#### 6.5.7.1 Steensby Site Facilities

- *Temporary Facilities during Construction Stage*: Construction Camp; Construction docks; Quarry and borrow sites, and related access roads; Concrete batch plant(s); Construction and maintenance shops; warehouses/stores; Temporary power generators; Portable lighting plants; Laydown areas/freight storage; Parking areas for construction fleet; Temporary fuel storage (iso-containers) and associated OHF; Equipment maintenance facilities; Explosives and magazines plant; Storm water and runoff water management facilities; Wastewater treatment facilities; and Land based disposal of dredged spoils.
- *Permanent Facilities during Operation Stage*: Ore management facilities including dual rotary rail car dumper, ore stockpiles and rail-mounted stacker/reclaimer system, secondary screening plant, and an ore loading dock; Ship loading and unloading facilities;

Freight and tug docks; Cargo (container) handling facilities; Permanent worker accommodation and office buildings; Corridors/utilidors (used for connecting all buildings at port sites); Railway yard and maintenance facilities; with shops and maintenance infrastructure; Communication systems; Causeway; Laydown areas/freight storage; Airstrip and related access road; Tank farm, OHF and distribution facilities; Waste management facilities (include incinerator); Power plant; Navigational aids (shipping lane and port); Potable water desalination plant and supply facilities; Ammonium nitrate storage; Storm water and runoff water management facilities; Wastewater treatment plant; Airstrip; Site roads and other ancillary facilities.

#### 6.5.7.2 Port Facilities

- Design characteristics of port facilities, based on the impact analysis, how precautionary principles have been incorporated into the port design;
- Any and all potential uses of the port;
- Description of the facilities that will be constructed at the site which are associated with the transfer and handling of any hazardous products, and the associated activities concerning the off loading of fuel;
- Operational plan including: listing of materials to be transported to and from the port, including hazardous/dangerous goods cargo;
- Description of how general sanitation in harbour area will be managed;
- Dedicated shipping waste management in accordance with the provisions of the *International Convention for the Prevention of Pollution from Ships*, as amended by the 1978 Protocol (MARPOL, 73/78).
- Port ice or snow management plan and facilities;
- Ballast water management facilities; and
- Port security management.

### 6.5.8 Marine Shipping (including Ice Breaking Shipping)

The Proponent shall describe:

- Applicable environmental legislation, including:
  - International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008).
  - Canadian legislation, such as: Canada Shipping Act, Arctic Waters Pollution Prevention Act, etc.
  - How the Proponent expects to either meet or exceed these requirements, and fulfill the obligations by the Proponent and its shipping contractors/partners.
- Description of the proposed shipping fleets (types, sizes, and numbers of ships used) as well as frequency and timing both for Milne Inlet and Steensby Inlet;
- Description of proposed shipping routes both for open water and year round operations, in addition to the inclusion of shipping facilities relating to the Milne Inlet open water shipping, the emphasis should be put on year round shipping;
- Ratification of how Traditional Knowledge has informed its choices regarding the proposed shipping routes;
- Study results of bathymetry, rock and sediment geotechnical properties, sediment thickness, tides, currents and sea ice for the proposed barge landings and anchoring sites (overwintering in Milne and Steensby);

- Bathymetric study results of the preferred shipping routes and seaport site, and chosen dock sites with consideration of bathymetric studies and minimizing underwater blasting and dredging. In particular the results of bathymetry studies at areas where shallow waters and/or strong current exist, with consideration given to the size of ore carriers, and the implications for shipping safety;
- All undertakings/works that would have to be accomplished to make port accessible for shipping, including but not limited to under water blasting/dredging, installation of land-based or sea-based navigational aids at the port site, and along the proposed shipping corridors;
- Dredging material disposal, included the proposed sites for disposal of dredged materials and the site selection considerations, means of offshore and on-shore transport;
- Disposal plans for onboard solid waste and waste water (*i.e.*, onboard sewage and grey water);
- Ballast water management plan with emphasis on the proposed ballast water exchange locations in mid-ocean (at least 200 miles from shore and in waters having a depth of 2,000 metres or more before entering waters under Canadian jurisdiction), and alternative exchange zones within waters under Canadian jurisdiction (BWCMR, 2006);
- The measures the Proponent will take to ensure the fuel conforms with Canadian regulations (*Benzene in Gasoline Regulations*, 1997; *Contaminated Fuels Regulations*, 1991; *Gasoline Regulations*, 1990; *Fuel Information Regulations, No. 1*, 1999; *Sulphur in Diesel Fuel Regulations*, 2002; *Sulphur in Gasoline Regulations*, 1999);
- Measures to eliminate or reduce the risk of harmful aquatic and non aquatic species being introduced into Canada;
- Measures to prevent smuggling and other illegal activities related to international shipping;
- Loading and offloading procedures for dangerous goods, fuel and explosives if applicable;
- Potential third parties responsible for ensuring safe shipping beyond the immediate port site;
- Safety measures, including setting of local, land-based navigational aids, in light of exist of possible shallow waters and strong currents on proposed shipping route, taking the size of iron carrier and local weather conditions into account;
- Safety measures preventing the ship from being beset in pack ice, or being carried into rocks, shoals and small islands where the proposed shipping is close to the shoreline (e.g. at Cape Dorset). And if applicable, the plan to hire personnel with local knowledge of the area and weather conditions to assist the shipping deal with urgent situations;
- Discussion of whether the shipping route or part of the proposed shipping route is a compulsory or non-compulsory pilotage area, and associated implications of regulatory compliance (APAR, 2009) if applicable; and
- Accident, malfunction and incident management and reporting.

### 6.5.9 Borrow Pits and Quarry Sites

Borrow pits and quarry sources will be developed for construction and maintenance and reclamation of various site facilities from Milne Inlet to Steensby Inlet. The Proponent shall present the following information for each borrowing pit and quarry source, and a summary of all such sites used for the Project, in combination with the Borrow Pits and Quarry Management Plan (Subsection 9.4.12):

- Maps at a scale of 1:10,000 for all sites that are to be used for borrow pits or quarries, indicating the ownerships (Inuit Owned Land [IOL] and Crown Land) of lands where borrow pits and quarries site are planned, principle geographic features (e.g. on or near eskers and other unique landscapes, the proximity to waterbodies and water courses);
- Estimates of the quantities that will be extracted from each site;
- Characterization of the materials at potential borrow site locations including the ground ice conditions and occurrences of massive ice;
- Description of how the precautionary principle is applied in the designs in terms of minimizing potential effects on environment, wildlife and wildlife habits, as well as fish habitat, if these sites are in close proximity to waterbodies and watercourses;
- Description of proposed sediment and dust control measures;
- Description of access roads to those sites, and how the surface disturbance will be minimized by proper road design and construction; and
- Other issues required to needs to be addressed in the Borrow Pits and Quarry Management Plan.

### 6.5.10 Access Roads

Access roads include the mine hauling roads, site service roads, various access roads, railway construction and maintenance roads. The Proponent shall describe the following, and include relevant maps and drawings where useful:

- Permitting regime and land tenure of access roads (designations of accessibility to public);
- Design specification, construction methods and materials, consideration for wildlife passes, and interaction with hunting and travelling routes;
- The proposed construction methods and features of all access roads, including laydown areas, temporary construction camps. The Proponent should pay particular attention to stream crossings and diversions of watercourses;
- The estimates and types of materials required for construction and maintenance;
- Types of water crossing, quantity of each kind and the locations;
- Operation and maintenance of all site roads, and dust-suppression methods;
- The types and estimated numbers of vehicles to be used, predicated traffic volume on a seasonal or annual basis, the allowable and expected speeds, and best estimates of load weights (full and empty, if applicable);
- Sediment control measures during construction and operation;
- Wildlife impact mitigation procedures and/or structures such as caribou crossing during construction and operation;
- Site reclamation, especially temporary construction camp and quarry sites which are used for extracting construction materials;
- Disposal of construction waste materials and options of final closure and reclamation; and
- Road management in reference to the Road Management Plan ( Subsection 9.4.18)

### 6.5.11 Power Generation

The Proponent shall describe, in conjunction with its Air Quality Monitoring and Management Plan (Subsection 9.4.3) the following:

- The energy balance for the proposed Project, including strategies for optimization and conservation;

- Type of power generation that will be used across the project lifespan;
- The location of the power generating plants/stations relative to prevailing winds and other infrastructure;
- Utility corridors and transmission lines;
- Description of diesel power generation facilities, including sources, volumes and transportation of fuel, transfer points, and equipment and facilities for emergency clean-up;
- The anticipated types and quantities of emissions to the atmosphere; and
- Accident/incident management and reporting.

### 6.5.12 Fuel and Explosives Facilities

The Proponent shall describe, in conjunction with its Spill Contingency (Subsection 9.4.2), Plans Hazardous Material Management Plan (Subsection 9.4.9) and Explosive Management Plan (Subsection 9.4.10) the following:

- Applicable federal and territorial legislation and regulations;
- The location and characteristics of fuel and explosives storage and/or manufacturing infrastructure and facilities (e.g. explosives and detonator magazines, fuel storage, ammonium nitrate storage, maintenance/wash area, process trucks and their parking area, any offices, warehouses, buildings). This will include distances to vulnerable features (dwellings, roads, camps, railways, bodies of water, etc.), the types and estimate of quantities of fuel, explosives, and other similar materials required for the duration of the Project;
- Operation plans (without duplication of the plans noted above) including Oil Pollution Prevention/Emergency Plans in connection with the Spill Contingency, and Oil Handling Facility Contingency Plan. This addresses fundamental requirements for the fuel transfer to ships from port and should be approved by Transport Canada;
- Methods of fuel transfer and transportation from source(s) to, and around site;
- Safe handling and spill containment prevention methods and liquid effluent disposal plans;
- Evaluation of worst case scenario (*i.e.* accidental explosion);
- Security measures to be implemented, if applicable;
- Accident/incident response reporting, spill response training; and
- The location and contents of spill kits on site.

### 6.5.13 Waste Management Facilities

The Proponent shall describe the predicted wastes generated from the construction and operation phases of the Project, in connection with related mitigation and management plans (Subsection 9.4), including:

- Waste rock:
  - An inventory of waste rock, including but not limited to overburden, waste rock, off grade iron ore, low grade mineralized material, processing wastes and excavated material generated during construction of the transport system and other infrastructure.
  - ARD and ML characterization of waste rock, the method of testing in terms of both static and kinetic tests, and number of samples and sampling protocols, the

company and personnel to carry out the tests, and implications to possible use and disposal.

- Description of implemented analysis with respect to the pile design and runoff management, including but not limited to the analysis related to the water balance of the waste rock pile and the thermal condition of the pile and surrounding ground.
- Frameworks of management plans, including stockpiles design, locations and capacities relating to the predicted volumes/tonnage of waste rock, physiochemical characteristics, waste rock stockpile methods and procedures, runoff management, progressive reclamation, and other components and activities related to the waste rock management, if applicable and practical.
- Technically achievable mitigation measures for the waste rock facilities to accommodate the projected volumes of material.
- Contingencies for the proposed control measures with a conceptual plan to monitor and audit the mine wastes.

- Sewage/grey waters treatment:
  - Sewage/grey water treatment facilities both in construction and operation stage, including the technology to be employed, the locations of the facilities, point(s) of discharge, solids (sludge) disposal methods, and the volumes and quality of the effluent, as well as the applicable discharge standards.
  - Contingency measures for the disposal of sewage/grey water in periods of sewage plant malfunction and/or disturbances, the associated disposal and treatment technologies and facilities.
  - Contaminated soil, snow, ice and surface runoff.
  - Facility, technologies and applicable standards.
  - Collection, handling, storage, treatment, and disposal.
- Hazardous waste management:
  - An inventory of the types and predicted volumes of hazardous wastes generated or produced by the Project activities, including shipping operations.
  - Storage, transport and disposal methods.
  - Destinations for each type of hazardous waste, including disposal of containers used to transport or store hazardous materials.
  - Domestic waste and incineration facilities.
  - An inventory of domestic waste, including both land-based and onboard generated waste.
  - Incineration technologies, equipment and applicable emission regulations.
  - Disposals of incineration ash.
  - Training program for operation personnel.

### 6.5.14 Exploration

The Proponent shall describe:

- The anticipated areas to be explored with emphasis on exploration/geotechnical drilling and other investigations, in different project stages, covering various project areas (e.g. mineral deposits, rail line, potential hydro power site);
- Temporary/field facilities, equipment to be used, and ground and air transport;

- Wildlife mitigation and monitoring measures associated with exploration program. This should include compliance with the minimum flight altitudes if aerial surveys are planned/conducted, timing and type of surveys, and measures of how the aerial surveys will be conducted to minimize impact to wildlife;
- Mitigation and monitoring measures to protect archaeological and cultural resources; and
- Waste management plan regarding drilling waste disposal and drilling sites reclamation to protect surface water and ecosystem integrity.

#### 6.5.15 Other Project Facilities and Infrastructure

The Proponent shall describe other project undertakings/works, and assess the potential impacts, including those resulting from interactions with wildlife, of all other site facilities and associated infrastructure not detailed in Subsection 6.5.

# 7.0 IMPACT ASSESSMENT APPROACHES

## 7.1 BASELINE INFORMATION COLLECTION

The Proponent shall present baseline data, including Traditional Knowledge about the existing biophysical and socio-economic environments including changes in baseline conditions due to exploration activities related to the Project. The EIS shall explain methodologies for baseline data collection, evaluation of the adequacy and confidence levels of the obtained baseline data, identification of significant gaps in knowledge and understanding. The associated uncertainties and the steps to be taken to fill such gaps should be discussed.

Furthermore, to the extent possible, the Proponent should consider other available information containing baseline data related to the project region, including a review of grey literature, technical scientific reports and peer-reviewed scientific literature to present a complete picture of baseline conditions. Last but not least, where technical, scientific, or Traditional Knowledge appears to be in conflict with respect to key issues, the Proponent shall provide a balanced discussion of the issues and state its position.

In order to identify natural fluctuations, trends and cyclical and other recurrent phenomena, the Proponent shall strive to give sufficient time depth to baseline data. The Proponent shall also strive to evaluate the degree that is relatively free of impacts. As well, the Proponent shall specify, where relevant, the sources of prior impacts where those can be identified with reasonable confidence, so as to assist in evaluating the thresholds of ecosystem components. Finally, the Proponent shall present the likely future conditions of baseline data in the absence of the Project.

The Proponent shall make any linkages explicit and describe the trade-offs. For example, deficiencies in baseline data increase uncertainties in the prediction of potential impacts, and consequently require an intensification of corresponding monitoring and mitigation programs (Subsection 9.3), follow up and adaptive plans (Subsection 9.7).

## 7.2 VALUED ECOSYSTEM COMPONENTS AND SOCIO-ECONOMIC COMPONENTS

This description should include, but not necessarily be limited to, those VECs and VSECs, processes, and interactions that are likely to be affected by the Project. If relevant, the location of these VECs/VSECs should be indicated on maps or charts, indicating to whom these components are valued and the reasons why, in terms of social, economic, recreational, tourism and aesthetic considerations. The Proponent should also indicate the specific geographical areas or ecosystems that are of particular concern, and their relation to the broader regional environment and economy.

The Proponent should justify the methods used to predict potential adverse and beneficial effects of the Project on the VECs and VSECs, on the interactions among these components, and on the relations of these components with the environment. In particular, the Proponent should validate the selected VECs/VSECs, especially those VECs/VSECs that will be used to assess the significance of Project component interactions, through consultation with the potentially affected communities. Any uncertainties in the validation must be documented. In this regard, the NIRB suggests that the Proponent continue to seek input from communities, government agencies, and the use of Traditional Knowledge to identify the VECs and VSECs to be discussed in the EIS. All VECs and VSECs used in the assessment should have clearly identified indicators as outlined in Subsection 7.10.

The Proponent is also expected to identify the components and works of the Project that may be anticipated to interact in adverse or beneficial ways with the VECs/VSECs. The components could be grouped into the following categories:

- Components and works related to construction, operation, temporary closure, final closure and reclamation of the Project; and
- Components related induced by the Project development, which will occur in the reasonably foreseeable future.

The following list of biophysical components and socio-economic components related to the Project, identified by NIRB's assessment with consideration of public input as a result of scoping conducted by NIRB, should be considered in the Proponent's selection of VECs and VSECs. This list is not meant to be exhaustive, but rather would give the Proponent an appropriate starting point for the identification of relevant VECs and VSECs. The Proponent shall provide a rationale for the selection of communities and relevant studies for which baseline data are provided. The Proponent shall describe the interactions between the socio-economic and bio-physical environments. If certain recommended components are not included in the EIS, the Proponent must clearly discuss its rationale for the omission.

### 7.2.1 Valued Ecosystem Components

- Air quality;
- Climate change;
- Noise and vibration;
- Landforms, soil and permafrost;
- Surface water include freshwater quality;
- Freshwater fish, fish habitat and other aquatic organisms;
- Vegetation;
- Terrestrial wildlife and habitat, including representative terrestrial mammals including: caribou (including habitat, migration and behaviour), foxes, wolverines and wolves;
- Migratory birds and habitat (nesting areas);
- Marine and coastal habitats including sea ice and seabed sediments;
- Marine fish and invertebrates; and
- Marine mammals including such representative species as polar bears, seals, bowhead whales, walrus, beluga whales, narwhals.

### 7.2.2 Valued Socio-economic Components

- Population demographics;
- Education and training;

- Livelihood and Employment;
- Economy development and self-reliance;
- Human health and well-being;
- Community infrastructure and public service
- Contracting and business opportunities;
- Cultural, archaeology/palaeontology resources;
- Benefits, taxes and royalties;
- Governance and leadership;
- Land and ice use;
- Inuit harvesting and traditional and current hunting grounds;
- Country food consumption and local food security;
- Use of Traditional Knowledge;
- Public consultation and participation (through lifespan of the Project):
- Inuit Impact Benefit Agreement (IIBA) negotiations;
- Benefits and Compensation for other jurisdictions beyond the Qikiqtani Inuit Association (QIA) administration; and
- Closure and reclamation security bonds.

## 7.3 METHODOLOGY

In describing the methodology, the Proponent shall explain how it used scientific, engineering, traditional, community, and other knowledge to reach its conclusions. Any assumptions shall be identified and justified. All data, models, and studies must be documented so that the analyses are transparent and reproducible. All data collection methods shall be specified, and the uncertainty, reliability and sensitivity of methods and models used to reach conclusions shall be indicated. All conclusions shall be substantiated.

The Proponent shall, to the extent possible, consider other available information, including knowledge on what types of data other project proponents, governments, and other researchers are collecting and have collected, in making choices with respect to the types of data it will collect for Project-specific monitoring programs as well as any regional monitoring initiatives it will participate in.

In order to support the key conclusions presented in the EIS, the Proponent shall broadly identify knowledge and understanding gaps, and identify with justification, which are significant and relevant to the conclusions. The steps taken by the Proponent to address these gaps shall also be identified. Where the conclusions drawn from scientific and technical knowledge are in conflict with the conclusions drawn from community and/or Traditional Knowledge, the EIS shall contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

### 7.3.1 Acquisition Methodology and Documentation

The Proponent shall specify and justify all sampling protocols and statistical processes employed in both the biophysical and social contexts. The reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. All data based on environmental sampling necessarily involve some variability, which shall be determined to assess the reliability and scope of the data. The Proponent shall, for all data obtained from environmental sampling, provide a dispersion or variability coefficient (variance, standard deviation, confidence interval, etc.) and indicate the size of the sample used. The sampling methods and standards should be in accordance with those prescribed by regulators in the

Territory. Similarly when using mathematical models, the Proponent shall indicate the inputs and assumptions employed, the prototype used, the accuracy, and the inherent limits of interpretation.

For the types and formats of data, the Proponent shall consider other available information, including what types of data other project proponents, governments and other researchers have collected. This recommendation applies to data collected for the General Monitoring Program, as per Article 12 of the NLCA, the Proponent's project-specific monitoring programs as well as any regional monitoring initiatives the Proponent will participate in. Every effort shall be made to synchronize the initiatives being made by Governments in respect to the General Monitoring Program.

### 7.3.2 Data Analysis and Presentation

In its EIS, the Proponent shall ensure that whenever qualitative criteria are used to describe the environment, to compare various design and development options, or to assess impacts, each of these criteria shall be defined, their relative importance stated, and the differences between the categories (e.g., desirable, acceptable, unacceptable) indicated with justification of each criterion.

The Proponent shall support all analyses, interpretations of results, and conclusions with a review of the relevant literature, providing all references required and indicating the public availability of all works consulted. Any contribution based on Traditional Knowledge shall also be specified and sources identified, subject to any concerns relating to ownership or confidentiality.

The Proponent shall also correlate its conclusions about impact significance with any thresholds referred to or adopted from relevant guidelines or regional policies.

## 7.4 PUBLIC CONSULTATION

Public consultation is required when:

- Identifying current and historical patterns of land and resource use;
- Acquiring Traditional Knowledge;
- Identifying VECs and VSECs;
- Evaluating the significance of potential impacts;
- Deciding upon mitigating measures; and
- Identifying and implementing monitoring measures, including post-project audits.

The Proponent shall describe where, how, why, when and with whom it conducted public consultation, including its efforts to inform participants how the information that they supplied was or will be used. The Proponent shall also describe how communication was facilitated with the public through accommodating regional languages/dialects; not only through translation but through live translation/interpretation at community/public meetings.

A summary of key dialogues between the Proponent, consultants, community members and organizations as indicated in Section 11 of this document should be presented in the EIS and will enable responsible agencies to:

- Assess the transparency, meaningfulness and completeness of community consultation efforts;
- Understand messages communicated within the process of dialogue;
- Obtain an increased understanding of the expectations held within communities based upon responses to specific issues raised; and
- Assess how public participation has influenced the development of the project.

## 7.5 TRADITIONAL KNOWLEDGE

The Proponent shall present and justify its definition of Traditional Knowledge and shall explain the methodology used to collect it, including:

- Format and location of meetings;
- Description of background information provided at meetings;
- Level of community participation and composition of participants;
- Design of studies on Traditional Knowledge;
- Selection process for participants in such studies; and,
- Types of Traditional Knowledge collected.

The Proponent shall summarize what kinds of Traditional Knowledge were collected and indicate whether special efforts made to collect Traditional Knowledge from Inuit Elders, women or special groups, or harvesters familiar with the Project area.

The Proponent shall discuss how it weighted and incorporated Traditional Knowledge in baseline data collection, impact prediction, and significance assessment, and the development of mitigation and monitoring programmes. It shall explain how it integrated Traditional Knowledge and popular science, including the manner in which it reconciled any apparent discrepancies between the two. Assumptions shall be justified. Furthermore, the Proponent shall describe any other past or current Traditional Knowledge studies in which it has participated or played a supporting role.

The Proponent shall outline its program to pursue the collection of Traditional Knowledge and to integrate it into ongoing baseline data collection, mitigation, and monitoring programs, and shall describe the roles and responsibilities of all concerned individuals and organizations in collecting, analyzing, interpreting, and synthesizing data, including Traditional Knowledge.

## 7.6 IMPACT ASSESSMENT APPROACH

The required impact assessment, including the significance analysis, should describe: the effect considered, the significance of the effect and justification for that determination, and if applicable, how the effect fits into a cumulative effects analysis and transboundary effects analysis. In this assessment, more emphasis should be put on those significant impacts on VECs and VSECs, and extending across all the Project phases if applicable. The biophysical elements and socio-economic elements potentially impacted by the Project components, activities and undertakings should be referred to in the categories listed in the Subsection 8.1 and Subsection 8.2. Based on the predicted potential adverse effects, the proposed mitigation measures shall be addressed in the corresponding management plans as listed in Section 9.

The impact assessment on each assessed biophysical and socio-economical element can be linked to a list of project components and activities which potentially generate impacts on the elements to be assessed. Vice versa, a project component or activity can be also linked to various environment elements, such as VECs and VSECs, on which it might potentially have impacts. A matrix or a comparable tool can be employed to identify all linkages between environments and project, and highlight those significant interactions between both, especially interactions between VECs and VSECs and major project components (e.g. railway and shipping).

## 7.7 IMPACT PREDICTION

The Proponent shall explain and justify the methods used for impact prediction, which include but are not limited to: mathematical or mechanical modeling, previous experience, statistical

modeling (e.g., variance and correlation analyses), the analysis of sequential series, expert opinion, the prediction from tendencies and Traditional Knowledge if applicable.

All studies used in the prediction of impacts must be specified, and the original authors identified, and the studies made public. All statements based on public consultation shall be justified and the sources and methodology specified. The choice of methodologies and interpretation of results shall be justified in light of current theories, knowledge and standards.

The Proponent shall assess the direct, indirect, short-term, and long-term impacts of the Project on the biophysical and socio-economic environments, and the interactions between them, focusing on the anticipated response of the VECs and VSECs. It shall also assess the degree of uncertainty associated with each predicted effect. Whenever potential cumulative effects are identified, a discussion should be provided related to the CEA as outlined in Subsection 7.8 of these Guidelines.

The Proponent shall identify potential impacts considering each Project phase, including impacts arising from accidental events and malfunctions, accepted practices shall be used to draw impact predictions. Predictions shall be presented with appropriate explanation and justification:

- Explain how scientific, engineering, community and Inuit knowledge was used;
- Document model assumptions and study methodologies;
- Document data collection methods and limitations thereof;
- Support analyses, interpretation of results and conclusions with reference to appropriate literature;
- Description of how uncertainty in impact predictions have been dealt with;
- Specify and reference sources for any contributions based on Traditional Knowledge;
- Identify which studies included the assistance of communities and individuals, who was involved (if the information can be made public), and how participants were selected;
- Identify all proposed mitigation measures and adaptive management strategies, if applicable; and
- Describe the potential residual effects.

## 7.8 CUMULATIVE EFFECTS ASSESSMENT

A cumulative impact (or effect) can be defined as the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The Proponent is expected to carry out its cumulative effects assessment (CEA) with consideration for the following factors:

- A larger spatial boundary (RSA rather than LSA): This will enable the Proponent to assess the project impacts in relations to other activities in the geographical region, this implies that spatial assessment boundary may cross jurisdictional boundaries for a better understanding of additive and interactive pathways of different types of cumulative effects (NIRB, 1997);
- A longer temporal scale: It would allow the CEA to take all factors in assessments from present time into the past and the reasonably foreseeable future for a more accurate analysis, as ecological systems and social system usually exhibit large temporal and spatial variability. Short term CEA might results in misinterpretation of real impacts due to data variability.

- Alternative analysis: CEA requires the explicit creation of alternative development scenarios and analysis of potential cumulative effects associated with each option (Greig *et. al.*, 2002). Therefore, the Proponent shall ensure its CEA clearly addresses the alternatives presented under Subsection 6.1 of these Guidelines.
- Consideration of effects on VECs and VSECs: Determining how the various project components and activities will affect or likely affect the same VECs/VSECs, then CEA can predict the impacts of the Project in combination with those of the other past, present, and reasonably foreseeable future developments in combination or interactions with other events and activities; and
- Evaluation of significance: Significance of residual impact must be taken into consideration rather than just local, direct effects. Effective CEA requires identifying and predicting the likelihood and significance of potential cumulative effects. The Proponent shall also consider and determine the significance of the cumulative effects by the criteria described in Subsection 7.11.

In terms of the Mary River project, the following areas, among others, shall be addressed in the CEA:

- The cumulative effects related to past and current project activities, including previous Nanisivik and Polaris mines, Baffinland's most recent Bulk Sampling program and ongoing Geotechnical program, as well as associated shipping activities in the project region;
- The cumulative effects related to future development of other identified deposits (#2, #3 and #4), possible new deposits to be identified from ongoing geotechnical program at or near Mary River;
- Consideration of cumulative effects from increased lifetime of use of railway and port facilities resulting from possible expansion of the currently proposed project;
- The cumulative effects associated with other ongoing or planned major project development in the region, including; the federal naval facility at Nanisivik, Roche Bay Mining project, etc;
- The cumulative impacts of the Project, that would provide for or contribute to the overall use of larger marine transportation corridors taking into account the improved accessibility for other marine traffic;
- Anticipated cumulative effects on the distribution, abundance and harvesting of both terrestrial and marine wildlife (including mammals and migratory birds) from escalated project activities, including habitat loss, changes to migration patterns and population health with a focus on cumulative impacts related to shipping with ice breaking at the proposed rate;
- The potential for cumulative effects on "Species at Risk" (EC, 2004);
- The cumulative effects related to different temporal scenarios for shipping (including an option for no ice breaking in winter and spring); and
- Cumulative effects of monitoring programs planned for identifying and mitigating effects of the Project on wildlife.

As per the objectives and methodologies for a cumulative effects assessment, the Proponent shall present in the EIS the following:

- Justify the environmental components that will constitute the focus of the CEA. The Proponent's assessment should emphasize the cumulative effects on the main VECs/VSECs that could potentially be most affected by the project;

- Present a justification for the spatial and temporal boundaries for the CEA. It should be noted that these boundaries can vary depending on the VECs or VSECs assessed;
- Discuss and justify the choice of projects components and selected activities for the cumulative effects assessment. These shall include past activities and projects, those being carried out and an reasonably foreseeable future project or activity; and
- Discuss the mitigation measures that are technically and economically feasible, determine the significance of the cumulative effects. If any impact is identified and verified beyond the Proponents sole responsibility or capacity, the Proponent shall identify the involving parties to mitigate the cumulative impact collectively.

## 7.9 TRANSBOUNDARY IMPACTS

Transboundary impacts, for the purpose of the current Guidelines, are defined as those effects which occur across provincial, territorial, or international boundaries and which may occur outside of the Nunavut Settlement Area (NSA). The Project's proposed shipping route is through the Hudson Strait located within the boundaries of the NSA; however, this shipping route may cause impacts in neighbouring jurisdictions outside of the NSA. Therefore, the Proponent shall give due consideration to the potential for transboundary impacts, including the effects of the Project outside Nunavut and the interactions between the effects of the Project and the effects of projects located outside Nunavut. In addition, any residual effects which have the potential to occur outside of the NSA shall also be included in the Proponent's evaluation of transboundary impacts.

The potential for transboundary impacts should be considered for all VECs and VSECs identified by the Proponent, with specific consideration given to the potential for transboundary impacts associated with marine shipping, marine mammals, and migratory birds. In addition, the potential for transboundary impacts related to cumulative effects associated with this Project shall be clearly defined.

## 7.10 INDICATORS AND CRITERIA

The Proponent shall identify the indicators and/or criteria selected for assessing the potential impacts of the Project, including any cumulative and transboundary impacts, and shall justify their selection. In doing so, the Proponent shall describe the role played by consultation with members of the public and technical experts. Furthermore, in its discussion of indicators, the Proponent shall emphasize the linkage between those indicators chosen and the relevant VECs or VSECs, thereby addressing any concerns identified through community consultation.

In every case where a potential impact or an area of uncertainty is identified, the Proponent must give a clear commitment, and address this uncertainty in its Adaptive Management Plan (Subsection 9.4) on the mechanism to be employed to encounter potential adverse impact.

## 7.11 SIGNIFICANCE DETERMINATION

Impact significance is based on comparing the predicted state of the environment with and without the Project and expressing a judgment as to the importance of the changes identified. Assessing the significance of potential impacts is, arguably, the single most important aspect of an environmental impact statement.

In the process of significance determination, the Proponent shall communicate with potentially-affected communities, including relevant individuals and organizations to solicit input and incorporate their views regarding the value it placed on a VEC or VSEC, as well as associated significance of impacts. Furthermore, the Proponent shall describe how it will ascertain the significance that different parties assigned to each impact, and how it will proceed if different

parties ascribe varying significance to VECs, VSECs or the associated impacts. If it is impossible to attain a consensus on the significance of certain impacts, the Proponent shall present the range of viewpoints expressed and shall present and justify its preference, if any. Finally, the Proponent shall describe the significance it ascribes to each effect, and justify how the significance of the effect was determined, taking into consideration and avoiding duplication of, the information provided above.

The dynamic change of ecosystems and their components must also be considered in determining impact significance. The Proponent shall evaluate the significance of potential impacts in the light of data on the dynamism and the current "state of health" of ecosystems and their predictable evolution, taking account global climate change. Consistent with the ecosystem approach required above, the Proponent shall strive to highlight the interactions within and between ecosystem components in an effort to increase understanding of the dynamism of the ecosystems in question and the nature and severity of the predicted impacts.

The terms used to describe the level of significance (including significance assessment for residual impact in Subsection 9.8), such as "low", "medium", "high", "adverse", "beneficial", "positive", "negative" must be clearly defined, where possible in quantitative terms. The following attributes defined by NIRB shall be taken into consideration in determining the significance of each impact:

- The environmental sensitivity of the geographic area likely to be affected by the project;
- The historical, cultural and archaeological significance of the geographic area likely to be affected by the project;
- The extent of the effects of the project, including the geographical area that will be affected, the size of the affected human populations, and the size of the affected wildlife populations and related habitat;
- The extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit Harvesting activities;
- The magnitude and complexity of adverse effects;
- The probability of adverse effects occurring;
- The frequency and duration of adverse effects;
- The reversibility or irreversibility of adverse effects; and
- The potential for cumulative adverse effects given past, present and future relevant events.

In addition, NIRB considers other relevant attributes in assessing the significance of impact:

- Direction or nature of impact (*i.e.* positive/beneficial versus negative/adverse);
- Effect on ecosystem function and integrity;
- The effect on the capacity of resources to meet present and future needs; and
- The value attached to the impacted VEC or VSEC by those who identified them.

## 7.12 CERTAINTY

The Proponent shall also assess the degree of uncertainty associated with each predicted effect. The level of certainty with predictions is related to limitations in the overall understanding of the ecosystem and limitations in accurately foreseeing future events or conditions. The Proponent shall provide a reasonable description how uncertainties have been dealt with, for example through elements of the project design, monitoring and contingency plans design, etc.

### 7.13 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Proponent shall discuss the potential impacts of the environment on the Project, considering such factors as geo-hazards (including seismicity, slope instability, ground instability related to permafrost thaw, erosion, etc.), severe weather events (extreme precipitation events, flooding, storm surges etc.), sea ice conditions, sea level trends and global climate change. The discussion must specifically describe and assess how the potential for climate change could affect permafrost and soils with high ice content and the long-term impacts of such changes on Project infrastructure, such as water diversions and impoundment structures, wastewater treatment structures, fuel and chemical storage areas, solid waste sites, waste rock and ore piles, railway embankment, etc.

In addition, the Proponent should be aware that Steensby Inlet port facility lies in an area of falling sea level. This is fast enough to outpace any potential climate induced rise in sea level and will result in decreasing under keel depths over the life of the project (NRCan, 2009). The Proponent should plan to deal with this environmental condition and provide a discussion in the EIS.

Longer-term effects of climate change must also be discussed up to the projected closure phase of the Project. The sensitivity of the Project to long-term climate variability and effects shall be identified and discussed. The Canadian Environmental Assessment Agency Procedural Guide, "*Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*" (CEAA, 2003) provides guidance for incorporating climate change considerations in an environmental assessment.

## 8.0 PROJECT ENVIRONMENT AND IMPACT ASSESSMENT

The EIS shall provide a complete analysis of the effects from the Project on the biophysical and socio-economic environments, which will serve as a basis for developing various mitigation and monitoring plans to eliminate or minimize the potential impacts from the project.

### 8.1 BIOPHYSICAL ENVIRONMENT AND IMPACT ASSESSMENT

To assess impact from the Project, the Proponent shall present the baseline information of biophysical environment to be assessed and associated processes to serve as a baseline against which the potential impacts of the Project can be measured. In describing the biophysical environment, the Proponent shall take an ecosystemic approach that takes into accounts both scientific and Traditional Knowledge perspectives regarding ecosystem health and integrity. In the impact assessment, the EIS should identify and justify the thresholds or indicators, and further relate them to Project monitoring and follow-up measures. If appropriate, for each predicted negative impact in this section, associated mitigation measures should be discussed with a level of details to extent possible, with references to project design (Subsection 6.2) and environmental management systems (Section 9.0).

#### 8.1.1 Meteorology and Climate (including Climate Change)

##### 8.1.1.1 Baseline Information

- A description of the baseline meteorological and climatic conditions at the LSA and RSA, including methods of determination (including how data from outside the project area may have been utilized) and uncertainties associated with the description of baseline conditions;

- Meteorological data including but not limited to: air temperature, precipitation, evaporation and sublimation rates, wind directions and velocity, prevailing wind directions at areas of key project components, and along proposed shipping routes;
- Annual, seasonal, monthly and daily average/mean values of above noted meteorological parameters; seasonal and yearly fluctuations and variability; and extreme climate events over the same period of time in which the data are collected in the RSA of the Project;
- Trends in key climate parameters in the Project area and their implications to the Project;
- Impacts from climate change on sensitive ecosystem features in both terrain ecosystem and marine ecosystem; and
- The predicted climate change and related changes in mean and extreme climate parameters, and meteorological phenomena including flooding, storms, etc.

#### 8.1.1.2 Impact Assessment

- Effects of climate on the Project in general, and on the design and planning of the Project elements including but not limited to: the Tote road update and water crossings; railway embankment, water crossings (bridges) and auxiliary facilities; port facilities; open pit mine; waste rock stockpile; airstrips and roads, etc.;
- Impacts on the Project design and planning from extreme meteorological events, such as temperature and precipitation events, stormy winds and waves, ice-ride up and pile-up events, extreme ocean water levels (positive and negative), severe fog or white out conditions, taking account the potential changes of the timing of ice formation; active layer thickness, and frequency of storms;
- A discussion on the likelihood of all possible climate changes based on various possible scenarios, rather than designing and applying a single "best guess" scenario, and corresponding long term implications to the Project under each scenarios;
- Discussion on the relationship between climate change and greenhouse gas emission from the Project;
- Potential effects of permafrost thawing due to climate change on stability of project components such as: railway embankment, water crossings/tunnels, waste rock stockpiles and other facilities and sensitive ecosystem features; and
- Any uncertainty related to climate change predictions, and the related effect on other predictions in the EIS, including water quantity and permafrost thawing.

### 8.1.2 Air quality

#### 8.1.2.1 Baseline Information

- Background air quality data and atmospheric conditions data collected in the RSA;
- Any current sources of emissions and seasonal variations or climatic conditions associated with variations in air quality;
- Predictions of all possible principle pollution emission sources and emission rate from the Project at various stages, including:
    - Gaseous emissions from fuel consumption from mobile equipment such as vehicles, ships, aircrafts, and stationary equipment such as diesel generators and other combustion sources;
    - Fugitive dust emissions from ore processing, handling, waste rock and ore stockpiling, quarries and other project component and works;

- Dust emissions from ground transportation and wind erosion at various project component including the Milne Inlet Tote Road, access roads and mine hauling roads.

#### 8.1.2.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Proponent will incorporate before, during and after operations to minimize and mitigate effects to air quality;
- Effects from fossil fuel combustion from project activities (including shipping) on air quality, with reference to each of the following: greenhouse gases (GHG) emission, increase of concentrations of air contaminants, such as sulphur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), other sulphur and nitrogen compounds, total suspended particulate (TSP), $PM_{10}$ and $PM_{2.5}$, etc.;
- Predictions how project emissions will disperse from the development on a local and regional scale by numeric modeling, the effects of such emissions and strategies for mitigating those impacts;
- Discussion of atmospheric photochemistry and the conversion processes for Project emissions, linkages among stratospheric ozone, GHG, climate change as well as implications in the context of the Project;
- A discussion of Project operations which may act as a source for acidic precipitation as well as an evaluation of those effects;
- Assessment of greenhouse gas contributions to Nunavut and Canada;
- Effects on air quality due to incineration of combustible domestic waste, such as food waste on various camp sites, and effects on air quality of incineration onboard the ships;
- Effects on air quality, in particular the TSP, due to ore crushing, hauling, transportation, loading and unloading of fine iron ore, airborne dusts from potential soil erosion resulting from various project disturbances, as well as fugitive dust from ground traffic and other disturbed surface areas; and
- The impacts of blasting on air quality.

### 8.1.3 Noise and Vibration

#### 8.1.3.1 Baseline Information

- Description of the area noise regime, noise data that has been collected on background conditions, the variability, if applicable, relationship with meteorological conditions and other related effecting factors;
- Available studies/research upon noise impacts on wildlife behaviours and health, both terrestrial and marine environments by railway and shipping respectively, in comparable climate and geographical regions with the Project;
- Available studies/research on noise and vibration impacts from blasting in or near freshwater and marine environments; and
- List of noise level and vibration inventory including all major equipment to be used, and activities which create noise and vibrations.

#### 8.1.3.2 Impact Assessment

- A discussion of the standards, guidelines, thresholds and regulations that the Project will comply with before, during and after operations to minimize and mitigate noise and vibration impacts;

- Assessment of the changes and impacts to atmospheric noise levels due to project activities at different project stages, including:
    - Ground transportation: such as mine hauling trucks, service tracks and railway, use of the Milne Inlet Tote Road, and other access roads.
    - Air transportation.
    - Equipment use at mine sites and construction sites, such as power generation equipment use.
    - Mine site operation: blasting, drilling, crushing, screening, transport and stockpiling.
- Assessment of the changes in marine noise levels due to activity at the port, blasting, and shipping (including ice breaking shipping), as well as noise propagation in the marine environment;
- Assessment of potential impacts of noise and vibration on the following receptors:
    - Human.
    - Terrestrial mammals, especially caribou and migratory birds.
    - Marine mammals.
    - Fish both in fresh water and marine environments.

### 8.1.4 Geology and Geomorphology

#### 8.1.4.1 Baseline Information

- A description of the bedrock, surface/subsurface geology, petrology, topography, geochemistry, hydrogeology and geomechanics of the areas that will be disturbed by principle project components;
- Structural geology, such as fractures and faults at major project infrastructure areas and where earthworks are proposed (e.g. Mary river Mine site, Steensby Inlet infrastructure, cutting and tunnelling locations along the railway route); and
- Geotechnical properties of the bedrock, soil, soil characteristics including ground ice and thermal conditions (related to slope stability and bearing capacity of facility foundations and railway line route under both static and dynamic conditions).

#### 8.1.4.2 Impact Assessment

- Assessment of potential geotechnical and geophysical hazards within the Project area, including potential seasonal subsidence, seismicity and faulting, risks associated with cut/fill slopes and constructed facilities. Where appropriate, the assessment should be supplemented by illustrations such as maps, figures, cross sections and borehole logs;
- Potential effects on foundation stability of major Project components from geological fractures and faults, and associated implications of these features on project planning and engineering design of project components. Those project components include, but are not limited to docks facilities, railway embankments, tunnels, major watercourse crossings, open pit, machine and equipment pads etc; and
- Risk management measure corresponding risk assessment and predictions.

### 8.1.5 Hydrology and Hydrogeology

#### 8.1.5.1 Baseline Information

- Hydrology of the LSA (e.g., streams, surface water flows, subsurface water movement, ice formation and melt patterns);

- Hydrological regimes, drainage basins, watershed boundaries and site water balance;
- Natural fluctuations, variability, and sources of variability in flow (including seasonal fluctuations and year-to-year variability, and the interactions between surface water and groundwater flow systems);
- Freeze/thaw timing; flood zones; ice cover (seasonal patterns and spatial variation);ice conditions and typical thicknesses, formations and melt patterns; and
- Hydrology characteristics of streams, rivers, and lakes in each watershed in the RSA. Items listed should be considered within the context of the range of climate conditions expected (*i.e.* include both climate variability, including extreme events, and changes).

#### 8.1.5.2 Impact Assessment

- Discussion of the potential impact of variable and extreme stream-flows on Project design and planning, including water crossing;
- Potential effects on the original water sheds due to surface diversions from mine site and other infrastructure (e.g. waste rock stockpiles);
- Evaluation of storm water run-off and surface waters through the Project area related to potential receiving water effects, (e.g. flow rates and flow patterns);
- Potential changes to natural drain patters due to construction and operation of mine facilities;
- Potential impacts on wildlife and aquatic habitat (fish, waterfowl, terrain mammals) resulting from the modification or redirection of natural flows; and
- Potential for ice damming and its consequent effects on other resources;
- Potential changes to navigability of watercourses due to water crossing works;
- Potential impacts of the railways on hydrology regime by draining diversion, ditching and rechanneling, as well as sediment runoff.

### 8.1.6 Groundwater/Surface waters

#### 8.1.6.1 Baseline Information

- Physical and chemical characteristics of surface, sub-surface, ground waters and seasonal variations in terms of surface water flow and quality;
- Interactions between permafrost, surface water and ground water and topography; presence of rock fractures, talik zones between different surface/ground waterbodies;
- Permafrost/talik distribution, permeability and hydraulic conductivity of the underlying materials;
- Existing groundwater forms, distribution characteristics and flow paths at Mary River area; especially the frozen groundwater within the deposits;
- Surface waters of importance to local fishing and wildlife hunting activities by surrounding communities;
- Lake bathymetry and limnology; and
- Fluvial geomorphology and stability of stream and river crossings.

#### 8.1.6.2 Impact Assessment

- Potential changes to permafrost and ground ice conditions as a result of Project activities, and the potential of groundwater inflow into the open pit;
- Potential changes to permafrost/talik distribution, groundwater distribution and flow paths;

- Potential impacts on surface/ground water quality including sediment quality in surrounding lakes and rivers from escalated potential contaminants from surface runoffs, road activities spanning construction, operation and closure stages;
- Potential changes to water quality in lakes and rivers from discharges of wastewater treatment plants from campsites (nutrients, bacteria);
- Potential impacts on surface/ground water quality from the potential ARD and ML from waste rock stockpiles, ore stockpiles, open pit dewatering, construction fills, embankment of roads and railway, and open quarry sites;
- Potential impacts on surface freshwater quality of nearby lakes and streams as a result of nutrient input from blasting activities and chemical leaching from rail sleeper coatings;
- Potential impacts from increases of suspended sediment load of waterbodies as a result of construction and maintenance of the mine facilities, Milne Inlet Tote Road, railway and associated water crossings;
- Potential impacts on surface/ground water quality, including water sources from flooding runoff of fuel storage facilities, possible accidental fuel spills and malfunctions events;
- Potential impacts on surface water quality from the deposition of particulate matter from the incomplete combustion of wastes via incineration;
- Potential effects on surface water, groundwater and sediment quality in relation to other site waste management activities, including the storage, handling, land filling of waste; landfarming of contaminated ice/snow/soil; the management of historical contaminated material (e.g. previous spills, mishaps, releases, etc.) and sewage effluent discharges;
- Potential impact on surface water and sediment quality from construction and operation of camps;
- Impacts of the railway on surface water quality due to erosion as a result of vegetation overburden stripping, cuts/fills and other surface disturbance;
- Impact of dust etc from rail cars traffic on the land and water along the rail route; and
- Potential impact of continuing exploration on surface water quality from drilling waters.

### 8.1.7 Landforms, Soils and Permafrost

#### 8.1.7.1 Baseline information

- Description of general landforms, existing unique or valuable landforms (eskers, fragile landscapes, wetlands and function in ecosystem), their distribution in the Project study areas;
- Existing or proposed protected areas, special management areas, and conservation areas;
- The geomorphologic and topographic features at areas of major project component proposed, general type, thickness, and distribution of soil over the affected lands;
- Bedrock lithology, morphology, and structures; geomorphology and soils (including sediments, the thermal and ground ice conditions) at borrow and quarry sites, and other major areas where earthworks are proposed; If eskers are a potential source of granular material then description of material properties including thermal condition and ice content should also be described;
- Evidence of the potential for ground and rock instability (e.g., slumping, landslides, and potential slippage) at major project components areas, and associated scientific studies, with emphasis on camp sites, railway alignment, port site;
- Relationship among identified permafrost, surface waterbodies, and topography, as well as permafrost processes including the active layer;

- Suitability of topsoil and overburden for establishment and maintenance of plant growth in reclamation in surface disturbed areas;
- Permafrost distribution (including areas of discontinuous permafrost, high ice-content soils, ice lenses, thaw-sensitive slopes, talik zones) in project affected areas;
- The permafrost temperatures, anticipated evolution under key project component in light of climate change, and implication for stability of infrastructures.
- Sites of paleontological or palaeobotanical significance to local communities.

#### 8.1.7.2 Impacts assessment

- Potential negative effects on planning and design of project components from baseline information, in particular the areas where permafrost and sensitive landforms (including high ice-content soils, ice lenses, thaw-sensitive slopes, talik zones) exist;
- Discussion of general impact on landform in the Project areas as results of project development, borrow resource extraction, specially the impacts on valuable landforms, wildlife habitat, etc.;
- Potential effects/changes involving abundance and distribution of unique or valuable landforms, (e.g. wetlands, eskers and fragile landscapes), as well as aesthetic values from the Project development, including continuing exploration;
- Potential effects on stability of terrain within or in the vicinity of the major Project components, in particular thermal stability, abundance and distribution of permafrost, thaw-susceptible ice-rich soils, ice lenses areas and other sensitive areas from surface disturbance due to due to construction of the project components (e.g. overburden stripping, cuts/fills), and associated implications of these features on engineering design and operation management of project components. Those project components include, but are not limited to railway embankments, tunnels, access roads, watercourse crossings, ore/waste rock piles, machine and equipment pads etc.;
- Potential effects on occurrence, frequency and distribution of terrain hazards from infrastructure construction activities (e.g. cut/fill, extraction of construction materials); occurrence, distribution of snow drift and snow banks from built and use of infrastructure and roads etc.;
- Potential effects on shoreline erosion as a result of wake effects and increased open water due to ice breaking activities along proposed shipping routes;
- Potential increases in soil erosion (including stream bank erosion) resulting from surface disturbance associated with construction, operation and maintenance of project components;
- Evaluation of materials that will be exposed by mining, stockpiled, or disposed of on the affected land relative to its potential to cause ARD and/or ML, and materials to the environment in excess of performance targets:
- Potential contamination of soils due to the deposition of air emissions and/or airborne fugitive dust fall from the Project;
- Evaluation of impacts on disposal site from dredged material (land based disposal); and
- Any other issues related to impact on landforms, soils and permafrost.

### 8.1.8 Vegetation

#### 8.1.8.1 Baseline Information

- Ecological zones, and classification system for plant associations and phenologies in the Project LSA

- Description of the vegetation types present, including estimated percentage cover and height for principal species, the importance to wildlife, and the relationship of present vegetation types to soil types;
- Indication of rare or regionally unique species or species assemblages, including species with federal, territorial designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern – as designated by the COSEWIC or other agencies), and species listed in the Draft General Status Ranking for Vascular Plants of Nunavut, or other relevant publications;
- The health status of these species/communities, and contaminant loading in representative species, for example lichen;
- Discussion on the plants that perform particularly significant ecological functions, and/or are important to wildlife;
- Species that are valuable for cultural reasons known to Inuit;
- Any other issues related to vegetation and identified through public consultation; and,
- Traditional knowledge collected regarding plants and plant use in the North Baffin.

#### 8.1.8.2 Impact Assessment

- The potential effects on abundance and diversity of vegetation due to project activities causing surface disturbance;
- The anticipated effects on specific vegetation coverage and species composition from any adverse effects due to construction, operation, and reclamation activities in project area;
- Assessment of the potential loss, disturbance, and/or changes to vegetation abundance, diversity, and forage quality as a result of Project components and activities, including potential effects from airborne fugitive dust fall, airborne contaminants from emission sources, and changes to water quality and quantity, permafrost, or snow accumulation;
- Evaluation of the potential impact on vegetation abundance and diversity due to transfer/introduction of invasive or exotic species to the LSA, by Project equipment and vehicles, including aircraft and ships;
- Effects on vegetation of cultural or practical value to Inuit;
- The anticipated direct and indirect loss of vegetation and wildlife habitat from construction of the railway;
- Impacts on vegetation quality due to dust accumulation as a results of fine iron ore transport on the railway with consideration of wind blowing, and dust accumulation in the distance of project in light of strong wind in arctic condition;
- Discussion of vegetation quality monitoring with emphasis on vegetation species directly consumed by humans (e.g. lichen) and/or indirectly by food chain take ups, if it is required as a result of impact assessment; and
- Discussion of the management measures for minimizing/mitigation of disturbance to plant associations, progressive reclamation/re-vegetation plan in the project disturbance areas, and measures to reduce the possibility of invasive species entering the area.

### 8.1.9 Freshwater Aquatic Environment Including Biota and Habitat

#### 8.1.9.1 Baseline Information

- Baseline information from studies, available published information and/or information resulting from community IQ studies on limnology, freshwater biota, fish and other fresh water species, in particular species that perform particularly significant ecological functions; associated habitats and habitat distribution in the RSA and the LSA..

- Description of the biological composition of freshwater aquatic environments in the LSA, including: strophic state, periphyton, phytoplankton, zooplankton, fish, the interactions and relative significance of each species within food chains;
- Description and population distribution of fish species in the LSA including the potential seasonal and annual trends in abundance and distribution of these species populations, in particular Arctic char, their migratory patterns and routes of these species and preferred migration corridors, and the corresponding sensitive periods when the routes include habitats affected by the Project;
- Characterization of habitat requirements for each fish species, including areas used for spawning, rearing, feeding and over-wintering, and any sensitive times for these activities;
- Description of existing freshwater habitat in waterbodies and watercourses (including littoral zones, aquatic and riparian vegetation, lake bottom characteristics, fish overwintering areas, the estimated productive capacity, etc.) within the LSA;
- Using available published and/or information from community IQ studies on the habitats and populations of any rare or regionally or locally unique species Habitats of any rare or regionally or locally unique species; species designated in Species at Risk; species listed as vulnerable, endangered, or a species of special concern by COSEWIC; species with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern), and species of the great importance for Inuit life and culture;
- The health of major fish species populations and their contaminant loadings;
- Any other issues relating to freshwater aquatic species or habitat identified through public consultation.

#### 8.1.9.2 Impact Assessment

- Potential direct and indirect impacts on fish and invertebrate biota, and habitat of both in including freshwater aquatic environment from changes of water quality and quantity, sediment quality and quantity of their habitat due to the Project development;
- Potential impact on fish and invertebrate biota and habitat of both, from changes to aquatic or riparian environments as a result of change of water and sediment quantity (e.g. water withdrawals or discharge, redirection of natural flows);
- Potential impact on fish and invertebrate biota and habitat of both, from changes to water and sediment quality (e.g. residual explosives, nutrients and toxin input, sewage and grey water effluent discharges);
- Potential direct or indirect habitat alteration, disruption, or destruction of fish and invertebrate biota habitat, including habitat of aquatic species at risk, due to project activities within and in proximate of waters, such as the noise and vibration from blasting as a result of construction of bridges and other water courses crossings;
- Potential direct or indirect impacts on aquatic life and their habitats due to containment structure (sediment control structures, fuel containment structures, etc.) and potential accidental spill;
- Evaluation of the potential impacts on critical habitat identified for spawning, rearing, nursery and feeding, and on seasonal migration areas, winter refuges and migrations corridors of fish;
- Evaluation of the ability for fish to pass at water crossings along Project roads and the railway; and
- An assessment of the changes in fishing activity, health and populations.

### 8.1.10 Terrestrial Wildlife and Habitat

#### 8.1.10.1 Baseline Information

- The local and regional presence of resources and populations of all identified wildlife VEC species, special consideration should also be given to Species at Risk and species of the greatest importance for Inuit life and culture;
- Biodiversity in the RSA, and associated food chain relations among those species;
- Wildlife habitat in the LSA which are important for forage, shelter and reproduction. This includes terrestrial and water habitats (e.g., sea ice, fresh and salt water), and areas designated as: Sirmilik National Park of Canada, Critical Wildlife Areas:
- Locations of key habitats in the RSA for wildlife VECs, which include but are not limited to Calving Grounds, eskers, calving and nursing areas, denning sites, staging areas, special locations as salt licks, insect relief habitats, and areas used by females and their young, In connection with key habitats, the baseline discussion should also include migration routes, water course crossings, travel corridors and areas important to Inuit harvesting;
- Habitats of any rare or regionally unique species or Species at Risk, with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern) or cultural status;
- A description of historic and current seasonal/annual trends in range or habitat use, movements, and distribution of all identified terrestrial wildlife VECs, with reference to scientific reports and Traditional Knowledge;
- The migratory patterns and routes of these species and the corresponding sensitive periods when the routes cross habitats affected by the Project;
- The health of VECs species populations, and contaminant loading in representative species, for example caribou. For contaminant analysis, animals already harvested in the RSA of assessment could be used, especially those are at low numbers;
- Timing and extent of presence of North Baffin caribou in the RSA and LSA (including areas of potential mine development or exploration related to the Project, and all shipping routes);
- Species that perform particularly significant ecological functions and or which play a significant role in Inuit culture;
- Available information regarding noise and vibration impacts on wildlife from studies/research and Traditional Knowledge; and
- Any other issues relating to these species identified through public consultation.

#### 8.1.10.2 Impact Assessment

- General impact on wildlife in the RSA, including but not limited to: interference with migratory routes, alienation from important habitat (*i.e.* denning sites, calving areas, nesting areas) and disturbance, interruption from increased human activities. Special consideration shall be given to Species at Risk, and Species listed as vulnerable or endangered by the COSEWIC;
- The potential effects on population size, abundance, distribution and behaviour (e.g. stress to animals) of wildlife, in terms of foraging availability and distribution from:
- Direct and indirect loss of habitat from the presence of and use of infrastructure, the conduct of project activities and their associated sensory disturbances;

- Direct and indirect impacts from potential degraded water quality and ground contamination, as well as airborne contaminants resulting from project facilities and associated activities;
- Direct and indirect impacts from ice-breaking associated with shipping and ice management at seaport (with special attention to caribou migration, if applicable);
- The potential negative impacts on wildlife from ground traffic and air traffic disturbance, especially the low level flight of aircrafts, (e.g. lower than 610 metre) during critical periods (caribou calving and post-calving). During impact assessment, a delineated Flight Impact Zone could be useful in determining the potential impact of flights on wildlife, with a particular focus on critical life cycle periods base on planned air traffic volume and routes;
- The potential effects on wildlife from injury or mortality caused by project activities, particularly the use of the Milne Inlet Tote Road, railway line, mine hauling roads and other access roads. and intentional killing of wildlife to defend human life or property by mine personnel;
- Potential effect on wildlife from increased hunting pressure resulting from increased hunting access resulting from development of the project;
- Potential impacts of noise and vibration on wildlife from drilling, blasting and other operation as a results of construction and operation activities at project sites, and mining operation at Mary River site; in particular potential impacts on caribou and other principle VEC species from frequent noise and vibration from year round railway operations, with a focus on disturbance/disruption to caribou calving and migration;
- Assessment of the potential for project activities to act as an attractant to some wildlife species and its effect/changes to behaviour and condition; and
- Any other issues related to impacts on wildlife or their habitat.

### 8.1.11 Birds

#### 8.1.11.1 Baseline Information

- The local and regional occurrence of terrestrial and marine migratory bird species, their populations and health of these species' populations; including Species at Risk, any rare or regionally unique species and other territorial, regional, or locally designated status;
- The relative seasonal/annual abundance and distribution, trends in range or habitat use, movements, and population status of these species;
- Migratory patterns and routes of these species and the corresponding sensitive periods where the routes cross habitats affected by the Project;
- The use of the established or proposed Migratory Bird Sanctuaries, Key Migratory Bird Sites, and other significant habitats (e.g. breeding and nesting sites and staging areas), or similar areas by these species in the RSA and along the proposed shipping routes;
- Habitats of Species at Risk, any rare or regionally unique species and other territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern) or cultural status;
- Critical terrestrial and marine migratory bird sites along the shipping route, including those which may be affected by marine spills as a result of current and/or wind patterns;
- Species that perform particularly significant ecological functions; and
- Any other issues relating to these species identified through public consultation.

#### 8.1.11.2 Impact Assessment

- Potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of project development; special consideration should be give to Species at Risk, rare or regionally unique species and other territorial, regional, or locally designated status;
- Potential disruption or alteration of migration routes due to the Project components and activities;
- Potential impacts on bird and habitat use due to potential escalated air contamination level, ground contaminants and degraded water quality as results of project development;
- Disturbance from noise and vibration as a result of project activity such as blasting, air traffic, and land and marine transportation;
- Potential for project facilities to attract wildlife such as foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations.
- Potential attraction of birds by domestic waste at camp sites;
- Potential for collision with aircraft;
- Potential effects of shipping and port operation on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of ship routes by shipping in NSA; and
- Any other issues related to impact on birds and habitat.

### 8.1.12 Marine environment, marine water/ice and sediment quality

#### 8.1.12.1 Baseline Data

- Marine physical processes, biological diversity and composition, and associated interactions in RSA (including entire proposed shipping routes within NSA);
- Baseline information of climate conditions at port site; coastal hydrology; marine and coastal ecology; air quality and noise levels, etc.;
- Port site bottom sediment quality and thickness, grain size, mobility, and the presence of subsea permafrost, coastal and sea bottom stability at Steensby Inlet, and Milne Inlet;
- Physical and chemical oceanographic properties including temperature, salinity, suspended solids and dissolved solutes sufficient to assess the impacts of discharges of ballast water, and any other potential discharges or effects from shipping at the proposed port site;
- Marine surface and subsurface current patterns, currents velocities, waves, storm surges, long shore drift processes and water levels from tide gauge at Steensby port site and in proximity to port and facilities areas, and along shipping routes if applicable;
- Bathymetry information of the Steensby Inlet port site, Milne Inlet and proposed shipping route through Foxe Basin and Hudson Strait;
- Ice climate in the RSA, including ice formation, thickness, ridging, break-up, and movement. Ice conditions along shipping route(s) (using scientific studies as well as Traditional Knowledge if possible) predicted climate change and its possible effect on the timing of ice formation in the future;
- Land fast ice characteristics, including extent and seasonal duration at vicinities of proposed sea port and shipping routes;
- Sensitive habitat areas for marine mammals at sea port area and along the shipping route; and,
- Traditional Knowledge collected regarding coastal areas and ice conditions.

#### 8.1.12.2 Impact Assessment

- Potential risk and impact on the marine ecosystem through the introduction of exotic species, including pathogens, to the arctic through year-round shipping with frequent voyages;
- Impact on marine resources and habitat, particularly the effects from increased turbidity due to transportation and disposal of spoils at marine terminal, and shallow areas on marine shipping routes;
- Contaminant loading in sea water and ice from dust plume settlement at the port site;
- Potential indirect effects on marine water and sediment quality due to alteration of circulation by off shore structures;
- Potential impacts to marine water quality due to changes in sediment transport regime as a result of wake effects resulting from shipping activities and other undertakings;
- The potential effects on marine water quality, in particular suspended solid concentrations and sediment quality from off shore construction and operation activities (e.g. docks and shipping infrastructure) at Steensby Inlet and Milne Inlet, including under water blasting and dredging at shipping routes;
- Evaluation of the potential effects on marine water quality as results of waste and brine discharge (from desalination plant, if applicable), sediment and contaminant input from surface runoff;
- Potential propeller wash effects to the surficial sediment and habitat of seabed;
- The potential effects on marine water quality due to ballast water discharge within Canadian waters, in particular contaminated ballast water and/or other contaminants related to ship operations and maintenance;
- Potential impact on marine water quality from near shore fuel storage facilities; or accidental spills of fuel and chemical at port areas or on shipping route, or from the accidental grounding/stranding along the shipping routes;
- the potential effects of shipping on the integrity of the landfast ice which is critical habitat for marine mammals;
- Potential impact on marine environment and bio accumulation in marine food chains, in particular on benthic organisms, from antifouling toxins (e.g. tributyltin) leaching from ships; and
- Other issues related to marine environment, marine water quality.

### 8.1.13 Marine Wildlife and Marine Habitat

#### 8.1.13.1 Baseline Data

- Marine biological communities, ranging from benthic (epifauna, infauna) and plankton communities, pelagic fish; benthic invertebrates, marine fish, coastal birds, to marine mammals in Steensby Inlet and Milne Inlet, and shipping routes at a lesser extent;
- Corresponding marine habitat including, but not limited to, fish habitat as defined by the Fisheries Act, existing and proposed areas with special designation (*i.e.*, Sirmilik National Park of Canada, National Marine Conservation Areas, and Key Marine Habitat Sites for Migratory Birds), emphasis shall be given to those identified as important to the natural life cycle of a species, and Inuit harvesting activities to be potentially impacted by port and shipping operation;
- Characterization of habitat for marine mammals, including habitat for each species used for feeding, calving, nursing, over-wintering, and any sensitive times for these habitats;

- Species and habitats of Species at Risk, rare or regionally or locally unique species, species listed as vulnerable, endangered, or a species of special concern by COSEWIC; species with territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern), and species of the great importance for Inuit culture and principle nutrient source;
- Marine mammals species (e.g. ringed seals, beard seals, bowhead whales, walrus, belugas, narwhals, killer whales), historical and current habitats distributions, seasonal migration patterns, critical areas (feeding area, calving areas, over winter areas, etc.), potential interactions with offshore facilities and shipping operation;
- Available published information and/or information resulting from community IQ studies regarding identified VECs marine mammal species, including but not limited to: the relative seasonal and annual trends in abundance and distributions, and the estimated productive capacity; migratory patterns and associated corridors/routes, critical habitats on or in proximity of shipping routes, and sensitive periods; and
- The health of those identified VECs species populations, and contaminant loading in representative species, such as seals and walrus, on which Inuit depend as food sources. For contaminant analysis, animals already harvested in the RSA of assessment should be used.

#### 8.1.13.2 Impact Assessment

The Proponent is required to present a comprehensive adverse impact analysis for its shipping activities, environmental factors could refer to *Environmental Considerations for Port and Harbour Developments*, which contains a check list of the potential adverse effects port development may generate (Davis *et. al.*, 1990), including but not limited to: water pollution, contamination of bottom sediment, loss of bottom biota, damage to fisheries, beach erosion, current pattern changes, waste discharges, waterfront drainage, oil leakage and spillage, hazardous materials, emissions of dust and gases, smoke and other air pollution, noise, odour, traffic increases, landfills, landscape, etc. This analysis should include the following:

- The potential habitat loss or deterioration of critical lifecycle stages of marine wildlife, such as feeding, calving and nursing due to ashore and offshore infrastructure related to sea port and shipping routes. Special consideration shall be given to Species at Risk, species listed as VECs or endangered on the list of the COSEWIC;
- The potential effects on coastal processes and stability from near shore dredging of sediments and bedrock blasting;
- The potential direct and indirect effects on marine fish and marine habitat, including aquatic species at risk, from project activities at Steensby Inlet, Milne Inlet, during the construction, operation, modification/maintenance and decommissioning of port facilities of the project;
- Potential impact on marine wildlife and their habitat from under water blasting and dredging, and potential disposal of spoils within Steensby Inlet;
- Risk assessment of introducing and intrusion of non-native, nuisance and exotic species due to ballast water discharge and ship wash;
- The potential effects on marine mammals as results of marine shipping, particular ice-breaking shipping and escalating noise level on the port sites and proposed shipping routes;
- The potential effects on marine wildlife and their habitats resulting from ballast water discharges in particular, contaminated ballast water;

- The potential interactions, and accidental injuries and mortality of marine mammals directly or indirectly from proposed shipping (open water and ice breaking shipping) activities, in particular those marine mammals, which congregate in North Foxe Basin and Hudson Strait where shipping routes pass through;
- The potential direct and indirect effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping, particular ice breaking shipping activities;
- The potential impacts on polar bears and polar bear habitat by year -round shipping, especially ice-breaking in winter and spring with frequent voyages and likely impacts on other wildlife and wildlife habitat (*i.e.*, polar bear prey [*i.e.* seals], walrus, narwhals and other marine species) and the environment; this includes the effects of increasing noise and repeated disturbance on wildlife;
- The potential for habitat loss (including seal dens) and its related impacts, as results of marine shipping, particularly ice-breaking and the elevated noise levels;
- The potential effects on marine wildlife and their habitats as results of incidental spills, malfunction and other accidents associated with shipping operations.
- Potential for shipping proposed by the Project to contribute to cumulative impacts on marine mammals as results of possible significant increase in ship traffic on the "established" shipping routes;
- Assessment of cumulative effects as results of escalated marine traffic from the project in a time frame as long as mining lifecycle, and potential extended mine operation period;
- Social-economic impact from shipping, taking into account the impact on marine species which local residents rely on as nutrient sources, and associated harvesting; and
- Any other issues and impact as results of shipping operation.

## 8.2 SOCIO-ECONOMIC ENVIRONMENT

The Proponent shall present baseline information on the functioning and stability of the socio-economic environment in the RSA, and predicted impacts on Socio-Economic environment from the Project spanning all the project phases. To assess and predict impacts from the Project, the Proponent shall present each potentially impacted VSEC and their interconnected processes among those VSECs without the induction from the Project development, which will serve as baseline, to evaluate the potential changes and impacts as results from development of the Project. The socio-economic impact can be measured by the designed indicators, and those indicators can also justify the selection of VSECs and measure the accuracy of the predictions, as well as the effectiveness of mitigation measures. Baseline data shall based on both available information from public releases and other available resources, and the Proponent's community consultations and engagement with local communities.

In light that it is unlikely possible to collect all required baseline information contained in the following categories completely, the Proponent should justify the specific limitations in the EIS, and consequently address corresponding measures it planned to address those limitations in its monitoring programs. Also if applicable all socioeconomic data collected should be gender and age-disaggregated in the EIS.

### 8.2.1 Population Demographics

#### 8.2.1.1 Baseline Information

- The national, regional, and local community populations, demographics structure, composition, characteristics and population trends;

- Cultural, ethnic, religious, and language characteristics and diversities;
- variations of education levels, dietary habits, religious characters and other social aspects in different demographics categories in the RSA; and
- The social life of the potentially affected communities, households, family and community stability. Problems of substance abuse, crime and violence, and other social factors.

#### 8.2.1.2 Impact Assessment

- project-induced demographics changes in population, migration, re-distribution, and the effects of those changes, including interactions between local residents and non-residents;
- Potential effects on community self-reliance, community and family stabilities, and culture integrity due to the demographic changes;
- Potential effects from various project phases, including unemployment due to temporary suspension of operations or mine closure; and
- Potential effects on lifestyle, including the effects of a major employment base away from the communities.

### 8.2.2 Education and Training

#### 8.2.2.1 Baseline Information

- Existing education (early childhood through post-secondary) system, available training programs and evolution trends;
- Local education infrastructure, capacity, funding resources and administration system;
- Education and skill levels of the residents in RSA, and experience of the local labour force in different demographic categories based on available data; and
- Requirements for education levels, skills and experiences for labour force from the Project in short, medium term and foreseeable future, taking account the vision of expansion for the Project lifespan, and regional economy development.

#### 8.2.2.2 Impact Assessment

- Assessment of local labour force sources to satisfy the needs of the Project development, and identified gap between availability and project needs;
- Discussion of potential local labour force training for the needs of the Project in specific, and for universally applicable skills that improve workers' opportunities in other sectors of the economy as a result of assessment, this assessment shall include predicted training resources, to meet the designed training programs if applicable;
- Evaluation of training programs, if necessary and proposed, associated challenges and likelihood of success to satisfy the Project needs and regional economy development with consideration of cultural and language barrier;
- Discussion the potential of the longer term community capacity building programs that will be implemented by the Project if applicable; and
- Discussion of possible solutions to fill up the gap between requirements of project needs, and education level and qualifications of local labour force, in conjunction of the minimum Inuit employment percentage in entire labour force which will be determined by IIBA.

### 8.2.3 Livelihood and Employment

#### 8.2.3.1 Baseline Information

- Description of household social structures within RSA, and where possible, the prevalent representative household social structure, including: the prevalent composition (family/kin-relations co-existing, generations in the household), the gender roles, the prevalent division of household labour based upon existing gender roles, the dominant consumption patterns, access to credit, and how resources are shared/divided within the household as well as how decisions are made in the household;
- Local household incomes, income sources, and compositions of income within RSA;
- Local and regional economy characteristics with consideration of both traditional land use activities and wage incomes;
- Description of the significance and dependence on country food as nutrients sources by local residents in the RSA;
- The employment status in terms of relative genders, ages and other demographic categories;
- Existing local employment opportunities and labour supply status; and
- Expectations and perceptions to the employment at the Project by the residents in RSA.

#### 8.2.3.2 Impact Assessment

- Assessment of the potential for development of local labour force;
- Evaluation the number of jobs to be created directly and indirectly with consideration of local business and supplying contracting;
- Discussion of the requirements for employment (e.g., education levels, criminal records, drug and alcohol policies, language abilities etc.), and the potentials of needs to be met by local recruitment;
- Assessment of the extent to which the skills of the available workers match job requirements;
- Assessment of opportunities afforded to women;
- Discussion of the commuting arrangements for local requited workers; especially those who live in the communities without proposed direct air transport to mine sites;
- Evaluation of the effect of changes in income earnings on patterns of savings, expenditure and other consumption values;
- Assessment of the barriers and incentives to healthy financial management;
- Evaluation of the effects of competition for labour between the Project and existing businesses, institutions, and traditional activities; and
- Assessment of potential effect on family values, tradition and heritage coherence as results of influence of work environment at mine sites.

### 8.2.4 Economic Development and Self-Reliance

#### 8.2.4.1 Baseline Information

- the traditional economy, current economic structure and development trends in RSA and variability in potential impacted communities;
- The economic development levels in RSA comparing to other regions in Nunavut, advantages and constraints of economy development;

- The roles of renewable resources exploit (e.g. substantial and commercial hunting and fishing) plays in economy and its significance for local economy; and
- Community and resident self-reliance;

#### 8.2.4.2 Impact Assessment

- Positive and negative impact on the local economy from regional level and community level;
- Stimulation to local businesses which developed for the Project and depend on the operation of the Project;
- Potential impact on the traditional economic activities including hunting, fishing and sport hunting /guiding, etc;
- Potential impact on the tourism from mine development which impairs the "wilderness experience" of tourism in the project region;
- Potential impacts and barriers for across rail line traveling, fishing, hunting/trapping and other activities by surround communities;
- Potential impacts on local harvesting activities both in freezing water seasons by shipping on shipping routes, and interference with offshore fisheries/boating in open water season at both Milne Inlet and Steensby Inlet, as well as on shipping routes;
- Disruption of on ice travel routes caused by shipping through land fast ice, including dangers to ice users created by both the track itself and new cracks, which is created in unpredictable places radiating from, or even distant from the track, resulting from winds and currents on the adjacent ice; and
- Potential impacts on local and regional economy due to temporary closure, final closure.

### 8.2.5 Human Health and Well-being

#### 8.2.5.1 Baseline Information

- The current status of human health, broadly including mental, psychological health and well-being in project impact regions;
- The nutrient conditions and diet habits of residents in the Project region;
- Existing infrastructure and health services available within RSA; and
- The local health statistics compared with other parts of Nunavut and Canada as appropriate.

#### 8.2.5.2 Impact Assessment

- A discussion of the standards, guidelines and regulations that the Project will incorporate during construction and operations, at various project sites to minimize the impacts and protect worker health;
- Assessment of the health, safety and security of workers at the job sites taking into account different project phases and locations(e.g. explosive manufacturing plant, drilling and blasting operation, and heavy equipment operations);
- Assessment of human health from impacts due to escalated air contamination, fugitive dusts as a results of to air and ground traffic, as well as potential impacted potable water quality;
- Impact on human health from exposure to escalated noise and extreme weather conditions on various project sites;

- Assessment potential impacts on human health as results of bioaccumulation and take-ups in country food, associated with changes to the level of contaminants loading in vegetation, freshwater, and the marine environment;
- Assessment of potential stress dealing with work place disciplines, cultural conflicts among local workers and those non local workers;
- Assessment of health and wellbeing of Nunavummiut as potentially impacted by the project, both at project sites and surrounding communities (e.g. substance abuse, family violence, sexually transmitted infections and other communicable diseases, gambling etc), as well as mental health and wellbeing;
- Assessment of community safety and security taking account the access of communities by non local personnel involved in the Project;
- Assessment of community well-being in RSA, broadly including local and regional ranges impacted by both mining operation and shipping route; and
- Evaluation of concerns of human safety due to railway accidents, malfunction, taking consideration of the worst scenarios (e.g. derail) as a result of malfunction, natural disasters (e.g. earth quakes; and hazardous weather events), etc.

### 8.2.6 Community Infrastructure and Public Services

#### 8.2.6.1 Baseline Information

- Local housing conditions and capacity in the Project RSA;
- Camps and other facilities, which facilitate hunting, boating and recreation activities in the LSA, in particular within or in proximity project sites;
- Public services and associated facilities in communities within Project RSA, including law enforcement, health care (including emergency response and emergency medical care system), dependency assistance, welfare utilities, temporary accommodation and food services, etc.;
- Community demands for new infrastructure;
- The extent and capacity of the local transportation systems and associated infrastructure; and
- Demand for community infrastructure and public services from the project directly and indirectly.

#### 8.2.6.2 Impact Assessment

- Assessment of incremental costs imposed by the Project on public infrastructure and services;
- Evaluation of the effect of the Project on public and private sector services and/or infrastructure due to the use by the Proponent directly or indirectly;
- Assessment public health and environmental health including drinking water, sewage treatment, housing inspections etc;
- An assessment of potential increased demand for health care system, including standard medical system, emergency response and emergency medical care, medivac and other emergencies, as well as challenges brought by the increased demand;
- A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities, which will likely reduce the life expenditure of local communities;
- Discussion the potential needs for establishing public service facilities to facilitate hunting activates within or in proximity of project areas; and

- Assessment of building new and updating the existing structures/shields in hunting routes/grounds to facilitate local hunting activities/traveling in project areas; and
- A discussion of community access to Project infrastructure upon closure, including the Milne Inlet tote road, railway and sea port facilities,

### 8.2.7 Contracting and Business Opportunities

#### 8.2.7.1 Baseline Information

- Most up-to-date statistics and data from socio-economic studies of communities in the Project RSA;
- Estimate of economic needs for goods supply, project-related procurement, services contracting, and other economy activities from the Project; and
- The economy structure and characteristics of local and regional economy, existing business types, scales of the different sectors of economy, potential capacities to meet the needs from the Project.

#### 8.2.7.2 Impact Assessment

- Assessment of both negative and beneficial economic effects from the Project through project lifespan;
- Opportunities for local, regional, and territorial businesses to supply goods and services both directly to the Project and to meet the demand created by the expenditure of new income by employment in the project;
- Assessment of the Project effects on other local and regional economic sectors, in particular the competition to other business needs due to limited capacity of local business;
- Assessment of the contributions made to public, communities and Inuit from the Project;
- Evaluation of the effects of increased income on the local business and economic activities;
- Assessment of the of project-related procurement, and potential the capacity to meet the Project needs;
- Discussion on barriers to local business capacity building;
- Assessment of existing country food supply sources from the Project region and Nunavut, and opportunities to supply for Inuit worker in project;
- Assessment of opportunities for local communities to diversify their economic sources and to supply new goods and services; and
- Potential impacts on local businesses which developed for the Project and depend on the operation of the Project.

### 8.2.8 Cultural, Archaeology/Palaeontology Resources

#### 8.2.8.1 Baseline Information

The Proponent shall present:

- Summary of archaeological/paleontological, burial, cultural and historic, sacred and spiritual sites in project areas by Traditional Knowledge studies and scientific survey, each site shall be described on a map at a scale allowed by laws, large scale maps should be sent to the Territorial Government Department upon request to assist its review;

- Local and Regional land/ice and resource use, including national parks and similar areas in project impact areas, and associated current and traditional activities relating to the land/ice and its resources;
- Assessment of the availability and accessibility of carving stone;
- Inuit culture and its relationship to the land/ice;
- Current and traditional hunting areas and the importance of those areas to food security; and
- Regulatory requirements for procedures for data recovery and the removal of artifacts and/or fossils that conflict with the development activities.

#### 8.2.8.2 Impact Assessment

- Discuss archaeological concerns and potential effects on archaeological and paleontological resources (e.g. burial sites, sacred sites), and other cultural sites within the Project areas from ground disturbing activities, in particular at Milne Inlet, along the tote road and railway corridor to Steensby Inlet in light of the archaeological resources which are in close proximity to the road;
- Potential adverse impacts on the archaeological resources in the area as a result of borrow pit and quarry construction and operation, built and use of access roads. Discuss how this impacts consideration has been incorporated in the road routing and design;
- Potential direct and indirect effects on paleontological/archaeological resources from increased number of human activities using the areas associated with mine, ground and marine transportations and ongoing exploration;
- Potential effects on cultural well-being, cultural and traditional values and heritage coherence in the potentially affected communities, taking account the changes to economy structure, consumption style, diet habit, and other social evolutions;
- Potential effects of the Project on current land/ice uses activities (e.g. hunting, trapping, fishing, recreation and traveling among communities); and
- Potential effects on sustainable resources use, such as food security, traditional clothing in context of general impacts to wildlife and substantive harvesting.

### 8.2.9 Benefits, Royalty and Taxation

- Evaluation the positive impacts from increasing revenues accruing through taxes to governments, royalties and benefit to potentially impacted communities as results of the Project;
- Scope, progress, and potential success of the development of an IIBA with QIA, with a discussion of considerations made for all potentially impacted communities in IIBA negotiations;
- The Proponent shall briefly discuss the negotiation of the IIBA and framework, including: with whom such agreements might be negotiated, whether these negotiations are expected to be concluded prior to the construction of the Project, and what items are included in the negotiation (e.g. employment, training and education, contracting and business opportunities, workplace conditions for Inuit employees, contracting, as well as community support);
- How the interests of Inuit outside the Baffin region, but potentially impacted by the Project and its shipping are considered in the course of IIBA negotiation;
- Description of the opportunities the project presents to Nunavut communities, as well as a thorough review of options for partnership with the Government of Nunavut, including

the two-way negotiation of a Development Partnership Agreement as a way to maximize the benefits of the Project; and

- Any Issues related to compensation by the project.

### 8.2.10 Governance and Leadership

#### 8.2.10.1 Baseline Information

- A description of current social and governmental regime in the Project region, structure and functions of the governments, Inuit organizations, other co-management organizations and interactions among those organizations;
- The role of the governments in regional socio-economic development; and
- The leadership of GN in policies making; responsibilities on contraction, operation and management of community infrastructure, community and regional development planning; mechanism, processes and structures for conflict resolution; and
- Other social and economic responsibilities of governments in the Project impacted regions.

#### 8.2.10.2 Impact Assessment

- A description of the Proponent's understanding on the roles of governments play in the process of the Project development, and associated requirements and obligations for proponents by policies and regulations;
- Discussion of how the Project planning meets the needs of regional economy development strategic plan (community wellness initiatives, Hamlet programs, housing etc) if applicable, which are managed by Federal and territorial governments agencies, and Inuit organizations;
- Assessment of how conflicts will be managed in current governance regime regarding potential interest conflicts during project development; and
- Assessment of efforts will be made by the Proponent with existing regulatory framework and government's initiatives, in terms of education and skill training, community facility development and other initiatives planned by the Proponent.

# 9.0 ENVIRONMENTAL MANAGEMENT SYSTEM

## 9.1 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) provides a systematic approach to consistently manage all environmental affairs for the Proponent, addressing concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, aiming at improving its environmental performance by continual improvement of the system. The Proponent shall present its environmental policy and its preliminary EMP and associated environmental management system through which it will deliver this plan. The EMP shall provide an overall perspective on how potentially adverse environmental effects will be managed over the course of whole project phases. The Proponent shall strive to delineate and deliver those items contained in EMP at a level of detail, which is appropriate and practical with its project planning and design, so that the NIRB is able to have a meaningful impact assessment.

The Proponent shall discuss the flexibility of the proposed EMP to respond to changes in the mining development plan, the regulatory regime, the socio-economic environments, technology, research results, and the understanding of Traditional Knowledge. It shall discuss how the results from the EMP would be used in applying adaptive environmental management throughout all

phases of the Project, and identify threshold/criteria or indicators to trigger management actions in each sub plan.

The EMP shall be comprised of individual monitoring and mitigation plans, specific to various aspects and phases of the Project, project components and activities. The Proponent shall also assess their likely effectiveness, and a rationale for the rejection of mitigation measures and justifies trade-offs between cost savings and effectiveness. It shall provide a risk assessment of those economic (e.g., the global economy and international markets), or other conditions (e.g. ownership transfer) that might impair the effectiveness of mitigation measures.

## 9.2 ENVIRONMENTAL PROTECTION PLAN

The Proponent shall, based on its impact prediction for identified VECs and VSECs, prepare an Environmental Protection Plan (EPP) in accordance with its EMP and for each main construction site prior to commencement of construction. The EPP shall be integrated into construction and operation procedure documents which target the site foreperson, the Proponent's occupational health, safety and environmental compliance staff, as well as government environmental surveillance staff. The EPP shall address construction, operation phases of the Project. If appropriate, a table of contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major construction and operational activities, permit requirements, mitigation measures and contingency planning in combination with other management plans.

## 9.3 MONITORING AND MITIGATION PLANS

In accordance with the EMP, the Proponent shall present individual monitoring and mitigation plans, specific to various aspects of the Project and the environment, to be incorporated into all applicable phases of the Project. In these plans, the Proponent is required to outline how results from monitoring will be used to refine or modify the design and implementation of mitigation measures and management plans.

These plans will also help the Proponent ensure that the Project is conducted as proposed, the predicted adverse environmental effects are promptly mitigated at the earliest possible time, and that the conditions set at the time of the project's authorization and the requirements pertaining to the relevant laws and regulations are met. The plans will also make it possible to ensure the proper operation of works, equipment and facilities connected to the Project. If necessary, the plans will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

In its monitoring and mitigation plans, the Proponent should specify criteria or thresholds to trigger the mitigation measures based on its monitoring results, the responsible person for the implementation of these mitigation measures, the system of accountability and the phase and component of the Project to which the mitigation measure would be applied (e.g. adaptive management responses).

Each of the monitoring and mitigation plans shall include:

- Objectives of the monitoring program, applicable laws, regulations and/or acts;
- The selection of the VECs and VSECs, for monitoring, and the associated parameters and indicators of each VEC and VSEC to be monitored, as well as the criteria or thresholds to assess impacts used to determine those indicators, including the role played by ecological risk monitoring in determining subjects and indicators;
- Description of the frequency, duration, and geographic extent of monitoring and the justification for these decisions; personnel to conduct the monitoring and data analysis etc;

- Proposed actions in the event that the observed results (impacts) through monitoring program differ from those predicted, and/or non-compliance with the law or regulations, performance targets or with the obligations imposed on contractors by the environmental provisions of their contracts;
- Proposed reporting scheme for the monitoring results, including format, reporting intervals, and responsible territorial and federal authorities;
- Evaluation of efficiency mitigation measures, the accuracy of the predicted impacts and compliance with authorities and licenses;
- Integration of monitoring results with other aspects of the Project including, adjustments for operating procedures and refinement of mitigation measures;
- Procedures/mechanism to assess the effectiveness of monitoring programs, mitigation measures, and adaptive programs for areas disturbed by the Project;
- The relationship between monitoring and EMP; and
- Quality assurance and quality control measures to be applied to monitoring programs.

## 9.4 BIOPHYSICAL ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present environmental management plans developed to eliminate or mitigate potential negative impacts of the Project on biophysical environment as identified in Subsection 8.1, and shall also identify any residual effects after appropriate mitigation measures are implemented. These management plans shall target identified VECs.

### 9.4.1 Risk Management and Emergency Response Plan

The Proponent shall provide an assessment of the potential risks from natural hazards, both marine environment and land-based occurrences. This plan must span the whole of the mine life to mitigate the potential ecological and human health risks, and vulnerability of infrastructure and workers at risk. In addition, the Proponent shall identify and describe the probability of possible malfunctions and accidents occurred independently, or associated with those natural hazards.

The following issues shall be included in the Risk Management Plan:

- Assessment of potential natural hazard risks in project region and shipping corridors, and possibilities of occurrence, the natural hazards including but not limited to extreme weather events, natural seismic events, landslide, flooding, etc.;
- Analysis of malfunctions and accidents of mine facilities and transport means and ships, occurred independently or associated with natural hazards;
- Predicted frequency and magnitude of potential adverse environmental effects of occurrence of these events;
- Alerting, notification and reporting procedures, and associated responsible organizations and personnel;
- Contingency responding procedures corresponding to each risk, and associated security systems and prevention measures (monitoring systems, hazard detection systems, leak detection systems, fire-control systems, standby emergency systems, etc.);
- Discussion on options to carry out for medical transport of injured staff both within and beyond project site;
- How appropriate government agencies, Inuit organizations and local communities will be involved in the development of the plans; and
- Any other contemplated loss prevention practices including insurance.

### 9.4.2 Spill Contingency Plans

The Proponent shall develop Spill Contingency Plans based on its Environmental Policy, to promote environmental awareness and safety, as well as to facilitate efficient cleanup for spill incidents at the Project and related activities, this plan should include the following elements:

- federal and territorial regulations;
- The substances covered by the plan which includes but are not limited to: oil, hazardous materials, chemicals and other deleterious substances, etc.;
- This plan should apply to all spill (on lands, on water, and on ice if applicable, exclusive to marine shipping) and cover all project components including railway;
- The plans for marine spills from ships shall be developed or adopted based on, among other factors, the types of ships to be used and materials to be transported, in accordance with appropriate national laws and regulations, as well as international protocols and standards.
- Training on emergency response staff, including but not limited to distributing MSDS to designated emergency response and health centre staff, proper reaction and proceeding procedures, etc.;
- Alerting, notification and reporting procedures;
- Duties and responsibilities of key spill response organizations and personnel;
- Cleanup strategies, technologies and corresponding inventory of spill response equipment and kits based on different substances of spills and environment conditions where spill possibly occur;
- Spill site restoration and remediation; and
- Training and other related factors.

### 9.4.3 Air Quality Monitoring and Management Plan

This Air Quality Monitoring and Management Plan shall include the following key elements, which are associated with the baseline date and impact assessment and predictions in Subsection 8.1.2:

- An air quality monitoring and adaptive measures, which will include thresholds for action and mitigations strategies;
- An Emissions reduction strategies, through which the Proponent will employ appropriate technologies and operating practices, in effort to minimize emissions of air contaminates and complies with adopted criteria, and reduce amount of GHGs;
- A dust reduction plan which addresses the use of dust suppression agents, procedures and applicable guidelines in all the project areas where fugitive dust is a concern for air quality and human health;
- An incineration management plan describing how emissions will be minimized and the *Canada-wide Standards for Dioxins and Furans* and the *Canada-wide Standards for Mercury emissions* will be achieved through the use of appropriate technologies and operating practices; and
- Reporting of the monitoring results.

### 9.4.4 Noise Abatement Plan

This Plan should be designed to provide information on monitoring and mitigating of noise impact based on impact assessment in Subsection 8.1.3. The intents of this plan should be set to:

- Applicable standards, guidelines and regulations that the Project will incorporate to minimize and mitigate noise effects from the Project;
- The environmental noise follow-up monitoring program described in the Plan indicating location, duration, timing and type of noise monitoring to be conducted;
- Description of noise control methods based on the climatic conditions and available technologies to be employed should mitigation be required;
- Description of noise attenuation and minimization measures to be employed by choosing appropriate equipments, installation of noise silencing devices, scheduling of takeoff and landing aircrafts, blasting timing etc; and
- Occupational related noise management programs.

### 9.4.5 Site Water Management Plan

The Proponent shall develop a Water Management Plan for the Project. This Plan should provide a consolidated source of information on the strategy to be applied at the Project to intercept, collect, contain, monitor and prevent the release of potentially contaminated waters from following sources. The plan must combine with the surface water assessment required in Subsection 8.1.5 :

- Surface runoff, snowmelt, and rainwater that come in contact with contaminated areas such as, camp site, ore processing, workshops, etc.;
- Runoffs from waste rock stockpile area and quarry sites, in particular the waste rock stockpiles with ARD and ML potential;
- The lined fuel tanks farms, fuel transfer stations; the landfarm facility and the landfill facility;
- Storm water/freshet from roads, borrow areas and airstrips with emphasis on those areas relating to iron ore fines stockpiles and other contamination-sensitive areas; and
- Considerations of management measures to reduce these impacts to the receiving environment; such measures should include collection and monitoring of drainage water, installation of settling ponds/sumps and/or silt curtains, characterization of construction material, etc.

### 9.4.6 Sewage/Grey Water Management Plan

- Sewage/grey water treatment technologies and facilities, and estimated volumes and treatment targets of the effluent, as well as the applicable discharge standards;
- Sewage/grey management in the construction stage at construction camps, including treatment/disposal methods, associated facilities;
- Conceptual operation and maintenance, the options for sewage sludge; and
- Contingency measures in case of sewage plant malfunction, and or /disturbances, associated spill response measures, as well as responding treatment technologies and facilities.

### 9.4.7 Incineration Management Plan

- Standards for emission requirements for incineration operation;
- An inventory of domestic waste to be incinerated, including both land-based and onboard generated waste;
- Incineration technologies, facilities and applicable standards;
- Disposals of incineration ash; and
- Personnel training programs for incinerator management and operation.

### 9.4.8 Waste Rock Management Plan

The plan shall encompass all waste generated or produced at project site through all project phases, this section can be associated with the description of waste rock management facility in Subsection 6.4.13. The major elements of this plan should include, but be not limited to:

- An inventory of waste rock, including overburden, waste rock, off grade iron ore, low grade mineralized material, processing wastes and excavated material generated during construction of the transport system and other infrastructure;
- Stockpiles design, locations, capacities relating to the estimate of rock volume/tonnage of and physiochemical character, waste rock stockpile methods and procedures, runoff management, progressive reclamation, and other components and activities related to the waste rock management;
- The process by which the Proponent plans to select the preferred option. The determination process should include the alternative options (methodologies as well as locations) considered, and the rationale by which the proposed scheme was selected.
- Technically achievable measures to accommodate the projected volumes of material;
- Contingency plans for the proposed control measures should it be found the capacity is inadequate; and
- A conceptual plan to monitor and audit the mine wastes should be presented.

### 9.4.9 Hazardous Materials Management Plan

The Proponent shall develop a Hazardous Materials Management Plan. This plan should be in connection with Emergency Response and Contingency Plan providing instruction on the prevention, detection, containment, response, and mitigation of accidents that could result from handling of hazardous materials at the Project during the life of the Project:

- The Hazardous Materials discussed should include but be not limited to: fuel and lubricants, chemical reagents used for site laboratory, solvents and paints, medical wastes, batteries, and other office-generated hazardous waste, etc.;
- Inventory of the types and volumes of hazardous wastes generated or produced by the Project activities
- Characterization of potential environmental hazards posed by these materials, and the management of these through the environmental management system;
- Purchasing controls, shipment tracking procedures;
- Fuel storage monitoring program;
- Safe handling and storage procedures;
- Clear allocation of responsibility for managing shipments, storage, handling and use of potentially hazardous materials;
- Defined methods for transport, storage, handling, and use;
- Identification of disposal methods for potentially hazardous waste generated from use of these products;
- Preparedness of contingency and emergency response plans;
- Adequate type and delivery of training for management, workers, and contractors whose responsibilities include handling potentially hazardous materials;
- Maintenance and review of records of hazardous material consumption and incidents in order to anticipate and avoid impacts on personal health and the environment; and

- Procedures to track and manage wastes generated through use of these products, including regular shipments of potentially hazardous waste to appropriate licensed disposal facilities following all relevant regulations.

### 9.4.10 Explosives Management Plan

The Proponent shall develop an Explosives Management Plan for the Project to provide information on explosives transport, storage and handling at the site. It should include but not limited to:

- Applicable federal and territorial Regulations and Acts;
- Defined methods and procedures for manufacture, transport, storage, handling, and use;
- Manufacture and storage facilities of Ammonium Nitrate and Fuel Oil (ANFO);
- Best practices to minimise usage and loss rate;
- Spill reporting and clean up procedures;
- Personnel training program; and
- Internal audit and inspection.

### 9.4.11 Landfill Management Plan

The Proponent shall develop a landfill Management Plan for the Project on how non-combustible, non-hazardous industrial wastes will be handled in a safe and environmentally sound manner at the Project site including:

- Inventory of the types and volumes of non-combustible, non-hazardous industrial wastes generated by the project and to be land filled in the life of the Project;
- Landfill design including construction materials, locations, capacities;
- Operation management;
- Rainwater, snow and spring freshet management; and
- Final reclamation.

### 9.4.12 Borrow Pits and Quarry Management Plan

With consideration of the project scale and demand for aggregate and quarry materials, the Proponent shall develop a Borrow Pits and Quarry Management Plan; the plan should include, but is not limited to the following information:

- Regulations and Guidelines to be complied with;
- Principles of borrow pits and quarry development: to use existing pits and quarry sites to the extent possible to minimize the number of opened pits, minimize haul distances and surface disturbance;
- Erosion preventions and control measures;
- ARD potential testing results for quarried materials and pit walls, and associated mitigation measures;
- Environmental and potential archaeological impacts mitigation;
- Aggregate extraction and quarry methods, mitigation measures to minimize resulting impacts on environment and wildlife;
- Proposed methods for handling massive ice, and plans to manage water released by the thawing of permafrost and ground ice; and
- Progressive reclamation strategy and technologies.

### 9.4.13 Aquatic Ecosystem Management Plan

This plan, in conjunction with Non Net Loss Plan, should address mitigation measures to be applied pertaining to protecting and minimizing the impacts on aquatic system from project activities, which will occur in or near water bodies and water courses during construction operation or closure and reclamation phases. The following perspectives should be outlined:

- Erosion and sediment control measures for works in or near waterbodies and water courses;
- Measures to be applied to protect fish, aquatic biota, and the habitat of both during blasting in or near freshwater and marine environments;
- Monitoring and reporting protocols; and
- Other compliance requirements indicated and required by the *Fisheries Act.*

### 9.4.14 Railway Management Plan

The Proponent shall develop Railway Management Plan for the Project, it should provide the information that encompasses construction and operation phases with intention to protect environment and promote the safety in its operation, in conjunction with Spill Contingency Plan, Wildlife Mitigation and Monitoring Plan, and other related plans. Key elements in this Plan should include but not be limited to:

- Applicable Regulations and Acts, Guidelines;
- Mitigation and monitoring plan, as part of Wildlife Mitigation and Monitoring Plan, to monitor the noise and vibration impacts on caribou and other species in the proposed railway corridor;
- Mitigation measures to minimize the possible adverse impacts from frequent noise and vibrations on wildlife, if verified by impact assessment as a result of railway operation. The measures might include appropriate scheduling and timing of train operation for daily operation in critical life cycle stages when concentrations of wildlife (*i.e.*, caribou) approach, stay and/or pass or cross in the immediate proximity of rail line areas;
- Specific measures to be employed to protect wildlife from accidental injury and kill, and minimize the collision related mortalities;
- Measures to prevent spills of fuel/dangerous goods transported by train during operation, taking into account the fragile ecosystem;
- Mitigation measures to mitigate impacts, to secure the safety of traveling, fishing, hunting/trapping activities by residents of local communities by snow mobile, sledges and ATVs across rail facilities;
- Contingency Plan/Safety Plan to deal with natural disasters, hazardous weather conditions, and malfunction and accidents from failures of mechanical and/or communication equipment;
- Technical measures to prevent wind blowing of fine iron ore and other bulk materials; and
- Other management plan to mitigate/manage the adverse impacts on the ecosystem and human health directly or indirectly resulting from railway operation.

### 9.4.15 Shipping Management Plan

The Proponent shall present a Shipping Management Plan for its shipping operation, with the objectives to protect the marine environment, in connection with the Spill Contingency Plan, the Wildlife Mitigation and Monitoring Plan, and other related plans Principle elements in this Plan should include but not be limited to the followings:

- Legislation and regulations relating to shipping operation, and applicable national and internal guidelines;
- Protocols for transport of fuel and other dangerous goods;
- Ballast water management plan;
- Onboard waste management plan (including solid waste, sewage and other domestic waste);
- Marine wildlife mitigation and onboard monitoring plan (e.g. monitoring personnel, monitoring protocols, responding equipment, accident reporting procedures and action plan);
- Smuggling prevention measures;
- Third party's liabilities;
- Emergency/contingency plan and preparedness plan, spill kit, relating contents and equipment for accidental spills of fuel and chemicals;
- Contingency plans for extreme weather conditions and malfunction during shipping operations, reporting/action procedures, preparedness of adequate resources to respond to a large fuel spill from a cargo vessel in transit;
- Measures to mitigate impacts to safety of traveling by snow mobiles, sledges and other means, fishing and hunting/trapping activities by residents of communities on shipping routes;
- Measures intended to mitigate potential socio-economic impacts as results of shipping; and
- Other shipping related issues.

### 9.4.16 Wildlife Mitigation and Monitoring Plan

The Proponent shall develop a Wildlife Mitigation and Monitoring Plan with consultation with Government of Nunavut, Department of Environment (GN-DoE), Fisheries and Oceans Canada (DFO) and other government agencies. This plan should including selected territorial and marine species, taking account the detailed potential impacts predicted in the subsection Terrestrial Wildlife (Subsection 8.1.10), Birds (Subsection 8.1.11) and Marine Wildlife (Subsection 8.1.12), which includes, but is not limited to the following aspects:

- LSA and RSA, and environmental setting in the Wildlife Mitigation and Monitoring Programmes;
- Selection of wildlife species for Monitoring and Mitigation (including, terrestrial animals, marine mammals, fish and migratory birds), and rationales for the selection criteria;
- How Traditional Knowledge collected from community consultation is integrated in baseline data collection, impact prediction and significance assessment, and the development of mitigation and monitoring programmes;
- How the local hunters will be hired in wildlife baseline study and monitoring program, and the mechanisms and resources allocated for the participation of local hunters;
- Plans for coordinated wildlife studies/monitoring activities with other organizations, institutions and researchers which carry out wildlife studies in the project areas to minimize the impact on wildlife from studies/survey activities;
- How the terrestrial wildlife baseline surveys, particularly the low elevation caribou surveys, and monitoring protocols (including data confidentiality) will be designed to mitigate the spatial and temporal impacts of such survey and monitoring activities on terrestrial mammals, in particular caribou;

- Description of sampling methods and sampling locations including timing, spatial extent, Universe Transverse Mercator (UTM) of transect lines and sampling areas, etc. especially with terrestrial mammals to appropriately assess potential impacts to wildlife;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping or ice breaking activities;
- Whenever possible, use of aircrafts should be combined among studies/surveys to minimize overall air traffic to reduce impact to wildlife, relevant concerns have been raised by local communities;
- The measures to minimize noise disturbance to wildlife and hunters/travellers on ground when carrying out any wildlife surveys/studies by the aircrafts to avoid;
- Plans to facilitate the wildlife passes across the railway, and associated mitigation measures to prevent collisions with wildlife;
- Studies/monitoring design and field methods, including frequency and measured indicators;
- Data analysis methods, trigger/thresholds for adaptive management plans;
- Mitigation measures;
- Evaluation of effectiveness of mitigation measures;
- Quality assurance and quality control measures; and
- Reporting/updating procedure.

### 9.4.17 Fish Habitat No Net Loss Plan

The Proponent shall discuss measure to compensate for the loss of aquatic habitat, including habitat replacement; the principle of No Net Loss for fish habitat shall be applied where appropriate. Compensation plans should be developed in consultation with DFO and QIA. This plan should identify the following key elements:

- Requirements of the DFO policy;
- The estimated of fish habitat loss and estimate methods;
- The fisheries compensation program to ensure that "No Net Loss" in fish habitat productive capacity relating to the DFO policy for the management of fish habitats; and
- The components of proposed compensation program, locations and conceptual design for implementing the compensation program, such as rearing habitat, and migration channels, etc.

### 9.4.18 Roads Management Plan

The Proponent shall develop a Roads Management Plan apply to the Tote Road and other access/service roads in the Project (exclude the railway) covering construction, operation and reclamation phases of the project. In conjunction with the Spill Contingency Plan and the Wildlife Mitigation and Monitoring Plan, this plan shall include but are not limited to the following sections:

- Design criteria;
- Construction and maintenance methods and materials;
- Road design features such as passes facilities for wildlife and other ground transport vehicles (e.g. ATVs, snow mobiles and sledges);
- Speed limits of each type of roads;

- Construction and operation management, including dust suppression; snow drift handling and snow removal; surface runoffs including spring freshet and flooding; and sediment control measures during construction and operation;
- Access and usage management for hunters and public;
- Mitigation measures and protocols in construction and operation to minimize impact to wildlife, including wildlife kill and following up proceedings;
- Safety procedures, emergency reporting and actions for fuel/chemical pill, and other emergency events and associated facilities; and
- Reclamation plan and other options (use by the local community upon the project closure shall the local community request).

## 9.5 SOCIO-ECONOMIC ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present policies and programs to minimize potential negative socio-economic effects and to optimize potential positive effects in its EIS. These plans and policies should be reflective of those VSECs and indicators, which, through the Proponent's public consultation, are shown to be significant to potentially affected communities. These plans and policies shall be presented in a Socio-Economic Impact Management Plan. The Socio-Economic Impact Management Plan should correspond to the socio-economic impacts described in Subsection 8.2.

Socio-Economic monitoring plans should be developed to reflect life span of the Project, and contain monitoring and evaluation techniques (e.g. indicators) that will allow regulators to intervene in a timely and constructive manner.

The general areas that shall be considered are human resources, occupational health and safety, community and public involvement, IIBA's, and if applicable the Development Partnership Agreements, etc. the Proponent shall outline how the predominant regional language/dialect of the respective region in Nunavut will be incorporated into each respective plan. The management plans shall include, but are not limited the following sub plans:

### 9.5.1 Occupational Health and Safety Plan

The Proponent shall present an Occupational Health and Safety Plan; this plan should focus on the following elements in conjunction with Spill Contingency Plan, Risk Management Plan, and Noise Abatement Plan etc:

- The appropriate policy and guidance regarding interaction with Nunavut's medical system when this plan is implemented (e.g. processes, and triage);
- Good safety practices, safety awareness programs;
- Employee involvement and training programs regarding awareness of employee responsibilities in environmental and health and safety management, such as safety orientation; hazard analysis; first-aid training etc;
- Risk management, mine rescue action plan, spill response, fire-fighting and prevention;
- Preparedness of mine safety equipment and devices:
- Safety procedures and emergency reporting, and actions;
- workplace monitoring and control; and
- First aids training and occupational medical surveillance.

### 9.5.2 Community Involvement Plan

The Proponent shall present a Community Involvement Plan. The major objectives should include:

- Mechanism for providing information to the public and potentially affected communities the regular update of project progress, initiatives and future work plans;
- Identify the communication methods for communication with public and communities;
- Establishing effective two-way communications approaches for collecting public concerns, and addressing those concerned issues to public;
- Measures to assist the communities to address and solve social problems related to project development, and counselling services to employees and their families regarding matters such as substance abuse, and work-related stress management, family support, etc.;
- Framework and mechanism to identify community needs and to provide solutions, such as allocating resources to meet the needs;
- Outline an approach to promote the participation of Nunavummiut in Project employment by setting up a preferential recruitment policy;
- Plans to provide access for northern and local businesses for contracting opportunities and purchases of local products (e.g., country food);
- Setup of appropriate approaches to engage the public and communities, and mechanisms to incorporate the input from communities to update the Environmental Management Plan;
- Obtaining public input to environmental and health and safety management decisions;
- Discussing of procedures for community-based monitoring activities regarding social, cultural, and ecological conditions in order to determine if, when, and how mining can contribute to community sustainable development; and
- Discussions on how the public, in particular the residents of the North Baffin Region, could contribute to the Project implementation, including the designing, implementation of management and monitoring strategies.

### 9.5.3 Cultural and Heritage Resources Protection Plan

The Proponent shall present a Cultural and Heritage Resources Protection Plan aiming to identify the possible impacts to archaeological sites, and mitigate the impacts from the Project activities, this plan should include:

- Applicable regulation and Guidelines for impact management;
- Results of archaeological investigations and studies;
- Inventory of status of recorded archaeological resources in project areas;
- How the impact assessments have been considered and incorporated in the plan, taking into account possible impacts from this Project, in particular quarry and borrow pits, as well as access roads; and
- General and site specific measures for archaeological sites protection and mitigation.

### 9.5.4 Human Resources Plan

The Proponent shall develop a Human Resource Plan, taking account into the following points among others which are appropriate:

- Applicable human resources legislation and organization policy, compensation and benefit programs (e.g., health care plan, insurance, vacation/maternity leave etc);

- Recruitment strategies to overcome entry barriers; education and training programs both for project specific and universally applicable skills in general (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships); Education and Orientation Plan to help all employees to understand their responsibilities in environmental and health and safety management;
- Work rotation and pay schedules; health and safety programs; preferential recruitment policy and practices procedures; gender equality; skills and entry requirements; training and career development;
- How the planned work schedules that are adapted to traditional activities; whether the Proponent will provide no-cost commuting to allow workers to continue to live in their own communities and to participate in their traditional economic and cultural activities;
- Considerations on the issues, such as on-site public safety and well being policies with respect to cross-cultural orientation; firearms control; sexual and gender harassment; alcohol and drugs control measures, etc. supply of country food to Inuit workers at the mine site, and accommodation to site visit by relatives of Inuit workers;
- Recognition and management of the rights and needs of substantive hunting activities, and traveling through project areas by the residents form adjacent communities;
- Employee communications with incorporation of relevant IIBA terms and conditions;
- Permission and regulation of on-site sport hunting and fishing by non-Nunavummiut employees, while respecting the rights and needs of Nunavummiut employees to harvest and pursue traditional activities, and discuss how such policies or regulations were designed and mange to minimize potential impacts to fisheries or wildlife resources; and
- Discussion of any proposed policies or regulations regarding the prohibition of recreational hunting, fishing and other recreational activities by employees at specific locations and timing in project area;

## 9.6 MINE CLOSURE AND RECLAMATION PLAN

The Proponent shall develop a preliminary Mine Closure and Reclamation Plan for the Mary River Project (broadly include railway and port facilities), to outline how the Project will be closed and reclaimed should the project advance. The plan can be preliminary with key issues addressed for the Environmental Assessment in NIRB's Part 5 Review, and NWB Type A water license application, with following targets:

- To ensure that issues associated with the effective closure and reclamation of all project components are considered at the earliest possible stage in the mine development process, thereby influencing mine design to take into account environmental issues related to mine closure and reclamation.
- To setup the major targets on lands potentially affected by the mining operations are to be reclaimed to achieve the following objectives:
- Description of reclamation methods, time frames and schedules;
- Description of temporary closure measures and a discussion of at what point a temporary closure should be considered permanent for the purposes of requiring implementation of aspects of the Mine Closure and Reclamation Plan;
- Discussion of research programs to address challenges to reclamation, given the local conditions;
- Description to protect public health and safety through the use of safe and responsible reclamation practices;

- Description of closure and post-closure monitoring of environmental components including, but not limited to, wildlife, vegetation, air quality, landform stability and water quality;
- Discussion the need for long-term monitoring and maintenance by establishing physical and chemical stability of reclaimed areas;
- Discussion on reduction or elimination of environmental effects once the mine ceases operation;
- Discussion regarding re-establish conditions that permit the land to return to a similar pre-mining land use;
- The Plan is considered to be a "living" document; the level of detail should undergo further revision to reflect the progress of the Project as well as changes in technology and/or standards or legislation;
- Further revisions should also considerate the input from the ongoing local communities consultation, and other stakeholders on how the Project is ultimately reclaimed, and what infrastructure should be designated to community for future use, etc. This document provides a basis for continuing discussions with stakeholders and communities regarding closure and reclamation that were initiated during the Environmental Assessment process;
- It is also required to reflect how the lessons learned at each phase of the mine development process will be incorporated;
- The plan should integrate available information on ARD and/or ML potential of rocks into the development, in association with related waste rock management strategies;
- Mine Closure and Reclamation Plan should also reflect the current land/ice use of the project area by wildlife (both resident and migratory), and by local communities for traditional activities, including hunting, fishing and recreation; reclamation of the Project should target for leaving a reclaimed site that is protective of the surrounding water, air and land to enable for such traditional activities to continue; and
- Aesthetics is of concern to local communities and tourism industry in the project region; it also should be included in the considerations of the Plan.

## 9.7 FOLLOW-UP AND ADAPTIVE PLAN

A follow-up plan is a formal, ongoing process to: verify the accuracy of the environmental impact predicted in the EA and permitting stage of the Project, and to determine the effectiveness of proposed mitigation measures. If either of these two steps identifies unforeseen adverse environmental effects, then the existing mitigation measures must be adjusted, or if necessary, adaptive plan with new mitigation or compensation measures must be developed, in particular the areas where scientific uncertainty exists in the prediction of adverse effects. In order to offset the likelihood of mitigation failure and the potential severity of the consequences, the Proponent shall formulate a process through which the information related to effectiveness of mitigation measures is analyzed, and associated adaptive measures be employed in the environmental management System:

- The need for such a follow-up and adaptive plan and its objectives;
- How this plan will be structured including, enforcement and penalties for non-compliance;
- Which elements of the monitoring program described in Section 9, would be incorporate;
- The mechanisms, through which monitoring results will be analysed, and if necessary, adjusted mitigation measures or adaptive plan will be employed. in addition, how the effectiveness of the new mitigation measure will be assessed and verified;

- The roles to be played by the Proponent, regulatory agencies, and others in such a plan; and possible involvement of independent researchers; and
- The sources of funding for the plan and reporting.

In addition to the description of its biophysical monitoring and mitigation plans, the Proponent shall describe their socio-economic monitoring plans including how they will identify, react and mitigate adverse socio-economic impacts or augment positive socio-economic impacts; In consultation with Qikiqtaaluk Regional Socio-Economic Monitoring Committee (SEMC), the Proponent should identify: the role of the Proponent will play, the means to participate and responsibilities it will take in respect to the Regional SEMC throughout the project; How its Socio-Economic Monitoring plans will synergy with the regional SEMC.

### 9.8 SIGNIFICANCE OF RESIDUAL IMPACTS

After having established the mitigation measures, the EIS shall present the residual effects assessment of the project on the components of the biophysical and human environments, so that the reader can clearly understand the real consequences of the Project, the degree of mitigation of the effects and which effects cannot be mitigated or compensated for.

A summary table is expected in this section of EIS, which presents the effects before and after mitigation on the various components of the environment, the mitigation measures applied and the residual effects have been assessed.

The determination of significance of residual impact shall take into account the attributes of each impact in accordance with the criteria set up in Subsection 7.11.

## 10.0 CONCLUSION

The EIS should end with a conclusion presenting summary analysis of the overall projected biophysical and socio-economic impacts, anticipated transboundary and cumulative effects, proposed mitigation measures, and residual impacts. While highlighting the impacts in the Baffin Region, this conclusion should clearly present the importance of the EIS findings to Nunavut and Canada.

## 11.0 LIST OF CONSULTANTS AND ORGANIZATIONS

The Proponent shall prepare a list of all the consultants who contributed to the preparation of the EIS, including their role and contact information in an appendix to the EIS. In addition, the Proponent shall prepare a list of the organizations consulted, including: the time, place, and purpose of the consultation; and contact information for the organisation.

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# APPENDIX A:
## NUNAVUT IMPACT REVIEW BOARD'S 10 MINIMUM EIS REQUIREMENTS

The following are the minimum required elements for an Environmental Impact Statement required under a Part 5 Review:

**1. Statement of Consultation Principles and Practices**

The Proponent must conduct pre-Project consultations with locally affected persons. Where at all possible, information about the Project must be distributed, and comments collected with a view to resolving any differences. Discussions should include, but not be limited to, land uses, policies, resource uses, Archaeological areas, infrastructure, and terrain sensitivities. Inuit cultural concerns must be highlighted throughout. The Proponent shall explain where, how, why, and with whom it conducted public consultation, and shall demonstrate an understanding of the rights, interests, values, aspirations, and concerns of the potentially affected communities All comments from the public must be summarized, documented, and presented in the EIS.

**2. Definition of Project**

A definition of the Project must include a discussion of any connected or subsequently related projects in order to reveal the primary purpose and better understand complex or multi-staged related proposals.

**3. Statement of Project's Purpose**

Based on the concepts of the Precautionary Principle and Sustainable Development, an EIS must contain a statement explaining the need for, and the purpose of the Project. Where further economic development is needed for a given area, the Board expects the deficiencies in the economic status quo to be stated.

**4. Anticipated Impacts Analysis**

A impact assessment must be carried out which includes, but is not limited to, 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. Anticipated impacts include short and long-term, direct and indirect, positive and negative, cumulative, socio-economic, Archaeological and cultural impacts. This element of the EIS must include a Mitigation analysis that explains how the impacts could be avoided, minimized, cured, eliminated, or compensated.

**5. Cumulative Effects Analysis (CEA)**

Cumulative Effects must be analyzed for all Part 5 Reviews. A project proposal causes a Cumulative Effect if, when added to other projects in the region, or projects Reasonably Foreseeable in the region, will cause an additive effect. A comprehensive examination of all Cumulative Effects must be included in an EIS.

**6. Significant Effects Analysis**

The Board must be advised of the significant impacts of the Project. This should be based upon:

- the Project setting, taking into account the location's unique Ecosystemic characteristics, and
- the severity of the impacts, taking into account, but not limited to public health, land use plans, protected areas, habitat, or species, public concern, etc.

Ultimately, the Board will decide which effects are significant and report to the Minister accordingly.

**7. Project Alternatives**

This requirement includes, but goes well beyond, Alternative Means of carrying out the Project that might be economically and technically feasible and the environmental effects of those Alternative Means. This assessment must include the "no-go" or "no-build" alternative, as well as the "preferred" alternative. The "no-go" alternative is not only a potentially stand-alone option; it also serves as a Baseline for comparison with other development alternatives that might reasonably be proposed in the circumstances.

**8. Sustainability Analysis**

The EIS must contain an analysis of the ability of renewable resources affected by the Project to sustain current and future generations in Nunavut and Canada.

**9. Monitoring or Post-Project Analysis (PPA)**

The purposes of a PPA are to:

- measure the relevant effects of projects on the Ecosystemic and socio-economic environments of the Nunavut Settlement Area;
- determine whether and to what extent the land or resource use in question is carried out within the predetermined terms and conditions;
- provide the information base necessary for agencies to enforce terms and conditions of land or resource use approvals; and
- assess the accuracy of the predictions contained in the project impact statements.

**10. Trans-Boundary Effects Analysis**

Where relevant, an EIS must include an assessment of all significant adverse Ecosystemic or socio-economic trans-boundary effects.

It is important to note that Section 12.5.2(j) of the NLCA gives the NIRB the authority to add other requirements as deemed necessary. The NIRB will always review each project proposal on a case-by-case basis, including instructions from the Minister, and may add other requirements as per s. 12.5.2 and 12.5.5 of the NLCA.

# APPENDIX B:
## APPENDICES J AND K OF THE NORTH BAFFIN REGIONAL LAND USE PLAN

# APPENDIX J

# Marine and Terrestrial Transportation/Communications Corridor Alternative Route Assessment

Applicants wishing to develop a transportation and/or communications corridor in the North Baffin region are required to provide the NPC with the following information:

1. A description of the proposed corridor, including its use, its general routing, the possible environmental and social impacts, and any seasonal considerations that may be appropriate.

2. A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations.

3. An assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:
   - the environmental, social and terrain engineering consequences, and the cumulative impacts of the project, and
   - the environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

# APPENDIX K

# Marine and Terrestrial Transportation/Communications Corridor Guidelines

The following planning guidelines will be used in the assessment of a new transportation / communications corridor proposal:

1. The corridor width shall be a function of:
   - the number and type of identified facilities within the corridor;
   - physical and biophysical conditions;
   - availability of detailed engineering data for one or more transportation modes within the corridor;
   - safe distances between different facilities within the corridor; and
   - aesthetics.

2. Corridors shall:
   - minimize negative impacts on community lifestyles;
   - improve access to other resources having high potential for development, while still maintaining the shortest practicable distance between the primary resource areas and the trans-shipment location;
   - be designed in accordance with existing and prospective land use capability including topography, soil, permafrost and wildlife; and
   - be designed in accordance with the availability of granular supplies.

3. In keeping with existing legal and legislative requirements, including the NLCA, corridors shall not negatively impact:
   - community business, residential and projected expansion areas;
   - important fish and wildlife harvesting areas;
   - key habitat for fish and wildlife species, especially areas used by endangered species;
   - areas of high scenic, historic, cultural and archaeological value.

# APPENDIX C:
## NUNAVUT WATER BOARD INFORMATION REQUIREMENTS FOR TYPE A WATER LICENCE APPLICATION

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
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NUNAVUT WATER BOARD
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NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

# Draft

## Mining and Milling Undertaking
## Supplemental Information Guideline (SIG)
## for
## Mine Development (MM3)

Date of Issuance: September 2009

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## 1.0 Introduction

Supplemental information is required as part of the water licence application in accordance with section 48 (2) of the *Nunavut Waters Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) which states:

> *"An application, except in relation to a cancellation, shall be accompanied by the information and studies concerning the use of waters or the deposit of waste that are required for the Board to evaluate the qualitative and quantitative effects of the use or the deposit on waters."*

Also, in accordance with section 48 (3) of the Act, on the filing of an application, the Board may provide guidelines to the applicant respecting the information to be provided by the applicant in respect of any matter that the Board considers relevant including the following:

a) The description of the use of waters, deposit of waste or appurtenant undertaking;

b) Confirmation that the Nunavut Planning Commission's (NPC) requirements under the Nunavut Land Claims Agreement (NLCA) regarding land use plan conformity (Article 11 of the NLCA) have been addressed;

c) Confirmation that the Nunavut Impact Review Board's (NIRB) requirements under the Nunavut Land Claims Agreement (NLCA) regarding development impact assessment (Article 12 of the NLCA) have been addressed;

d) The qualitative and quantitative effects of the use of waters or the deposit of waste on the drainage basin where the use is to be undertaken or the deposit is to be made, and the anticipated impact of the use or deposit on other users;

e) The measures the applicant proposes to take to avoid or mitigate any adverse impact of the use of waters or the deposit of waste;

f) The measures the applicant proposes to take to compensate persons, including the Designated Inuit Organization (DIO), who are adversely affected by the use of waters, or the deposit of waste;

g) The program the applicant proposes to undertake to monitor the impact of the use of waters or the deposit of waste;

h) The interests in and rights to lands and waters that the applicant has obtained or seeks to obtain;

i) The options available for the use of waters or the deposit of waste;

j) Abandonment and Restoration;

k) Financial Responsibility; and

l) Specific Undertaking Information Requirements.

To provide further guidance for these requirements, as well as the requirements of section 6 (2) of the *Northwest Territories Water Regulations* (NTWR or Regulations) which outlines more specific information requirements for proposed undertakings, the NWB has developed Supplemental Information Guidelines (SIGs or Guidelines).

The SIGs are designed in spreadsheet format to facilitate the development of a concordance table that cross references the requirements of the SIG with the documents that make up the water licence application. The tables in the following eight (8) worksheets include columns for the applicant to enter information regarding the applicability of the requirement to the proposed undertaking; the title, author, and date of the document where information to address the requirement can be found; the electronic file name of the document; as well as the section of the document where the information can be found. Specific information about the proposed undertaking should not be inserted into these spreadsheets.

The applicant must complete the yellow sections of the SIG and submit the completed SIG along with the documents that address the requirements of the SIG to the NWB.

This SIG is for applicants seeking a water licence for water use, waste disposal, works and associated activities for Mine Development which is an undertaking classified as Mining and Milling in accordance with the Regulations. Further to these Guidelines, the applicant is referred to the NWB's *Guide 4 - Completing and Submitting a Water Licence Application for a New Licence*.

Following submission of a water licence application, the NWB will determine whether the application is complete. If the NWB determines that an application is materially incomplete, meaning that items included in Section 2: Minimum Application Requirements are missing, the applicant will be informed by the NWB that their application has been rejected. In other cases, NWB staff will correspond with the applicant to resolve deficiencies before proceeding.

The NWB cannot issue, amend, or renew a licence where there is an applicable, approved land use plan unless the NPC's requirements under the NLCA have been addressed regarding land use planning (Article 11). In addition, the NWB cannot issue, amend, or renew a licence where the appurtenant undertaking requires screening by NIRB in accordance with Part 4 of Article 12 of the NLCA until NIRB has completed its screening. Furthermore, notwithstanding sections 13.5.5 or 12.10.2 of the NLCA, where the appurtenant undertaking requires a review under Part 5 or Part 6 of Article 12 of the NLCA, the Board may not issue, amend, or renew a licence until NIRB has issued a project certificate.

The Board expects that following completion of development impact requirements in accordance with Article 12 of the NLCA, additional Project Specific Information Requirements (PSIRs) may be issued to the applicant. See section 9.0 of the SIG.

The applicant is referred to Appendix A of these Guidelines for a list of additional documents, guidelines, legislation and standards that may be of use to the applicant in preparing the information to address this SIG.

Submission of the information required by this SIG does not relieve the applicant from confirming and following up on other information requirements which may be required during the regulatory process.

## 2.0 Minimum Application Requirements (Application Checklist)

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment |
|---|---|---|---|---|---|---|---|---|
| **Minimum Application Requirements** | 1 | General Water Licence Application Form (see the NWB's *Guide 4: Completing and Submitting a Water Licence Application for a New Licence* ) or Application for Water Licence Amendment Form, if appropriate (see NWB's *Guide 7: Licensee Requirements Following the Issuance of a Water Licence* ). | | | | | | |
| | 2 | Information required to satisfy the requirements of the SIG including plans, reports and designs. | | | | | | |
| | 3 | Executive summary in english. | | | | | | |
| | 4 | Translated executive summary in appropriate language and dialect. | | | | | | |
| | 5 | Application fee. | | | | | | |
| | 6 | Water use fee. | | | | | | |
| | 7 | A table indicating concordance of the application and supporting documents to the Guidelines. These generic Guidelines are provided in excel as a tool for applicants to provide the necessary concordance table. | | | | | | |

**Qualifications:**

1 Applications that do not include all of the items listed above will be returned to the applicant as incomplete with a request for the deficient information.
2 The application must address the entire scope of the project including not only the primary undertaking, but also related activities for all phases of the project.
3 Information between all documents that make up the application package must be consistent and must be accurately cross referenced.
4 The application must distinguish between recommendations or options and actual commitments to chosen alternatives.
5 For additional guidance regarding the submission of electronic documentation, see the NWB's *Guide 6: Electronic Documentation: Submissions and Registry* .
6 The applicant, where practical, may combine components of the information requested in the SIG into more concise plans to provide clarity and eliminate duplication. If this practice is considered, then the applicant must clearly outline, through proper referencing and clearly detailed statements, how the NWB should consider the documents that have combined elements of information. Information management is the responsibility of the applicant.
7 The applicant must submit a concise executive summary of the application package. In addition, the Applicant shall submit an executive summary for each separate supporting document, report or study. All executive summaries shall be provided in English, Inuktitut and/or Inuinnaqtun (where applicable).

**The applicant must complete the yellow columns of the worksheet(s). Blue columns are for NWB use only.**

### 3.0 General Water Licence Application

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Applicant** | **1** | Provide the full name of the applicant and contact information (including phone number, address, fax number and email address). | | | | | | | |
| **Applicant Representative** | **2** | Provide the name and contact information of any party submitting the application on behalf of the applicant. | | | | | | | |
| | **3** | Provide a signed letter authorizing a party to be its representative in the licensing process. | | | | | | | |
| **Name of Project** | **4** | Provide the name of the project. | | | | | | | |
| **Location of Undertaking** | **5** | Provide coordinates of the project extents taking into account the Local Project Area (LPA) and the Regional Project Area (RPA), where applicable. | | | | | | | |
| | **a** | Provide location by Latitude and Longitude. | | | | | | | |
| | **b** | Provide location by UTM coordinates, if available. | | | | | | | |
| | **c** | Provide the distances to the nearest communities. | | | | | | | |
| **Map** | **6** | Provide a map at a 1:50,000 scale based on the National Topographic series indicating the location of the undertaking, watercourses and the location of waste deposits. Additional maps at various scales may be provided if those maps will provide additional information or clarification. All additional maps must indicate the scale, and map sheet number. | | | | | | | |
| **Nature of Interest in the Land** | **7** | Provide the nature of the interest in the land associated with the proposed undertaking, including: | | | | | | | |
| | **a** | Sub-surface leases from Nunavut Tunngavik Incorporated (NTI) and/or Indian and Northern Affairs Canada (INAC) as well as surface authorizations from INAC for crown land use, a Designated Inuit Organization (DIO) for Inuit Owned Land (IOL) use, or the Government of Nunavut for Commissioner's land use. | | | | | | | |
| | **b** | The date or expected date of issuance of any authorization and the date of expiry. | | | | | | | |
| | **8** | Indicate whether the applicant is the name of the entity holding the authorization for the interest in the land and if not, provide the name of the entity holding the authorization. | | | | | | | |
| **NPC Determination** | **9** | Provide written confirmation from the NPC confirming that NPC's requirements under the NLCA regarding land use plan conformity (Article 11 of the NLCA) have been addressed. | | | | | | | |
| **NIRB Determination** | **10** | Provide written confirmation from the NIRB confirming that NIRB's requirements under the NLCA regarding development impact assessment (Article 12 of the NLCA) have been or are in the process of being addressed. Documentation may include: | | | | | | | |
| | **a** | NIRB's screening determination; | | | | | | | |
| | **b** | NIRB's recommendation to the Minister regarding the type of review; | | | | | | | |
| | **c** | Minister's written decision regarding the review of the development proposal; | | | | | | | |
| | **d** | List of activities requested for exception in accordance with NLCA s. 12.10.2; | | | | | | | |
| | **e** | Type B water application for any activities to be considered for interim, short term approval in accordance with NLCA s. 13.5.5. | | | | | | | |

### 3.0 General Water Licence Application

| | Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|---|
| See Section 4.0 of this SIG for Specific Requirements | **Description of Undertaking** | **11** | Provide a complete description of the undertaking with detailed site plan(s) of all project infrastructure for the Local Project Area (LPA) and/or the Regional Project Area (RPA), where applicable, and differentiate temporary components from permanent components. | | | | | | | |
| | **Options (Alternatives)** | **12** | Provide a brief explanation of the alternative methods or locations that were considered to carry out the project. | | | | | | | |
| See Section 6.0 of this SIG for Additional Requirements | **Water Use** | **13** | Provide a detailed description of all types of water uses, including: | | | | | | | |
| | | **a** | Obtain water for domestic purposes | | | | | | | |
| | | **b** | Obtain water for industrial purposes | | | | | | | |
| | | **c** | To cross a water course | | | | | | | |
| | | **d** | To alter the flow of water, or store water | | | | | | | |
| | | **e** | Flood control | | | | | | | |
| | | **f** | To divert a watercourse | | | | | | | |
| | | **g** | To modify the bed or bank of a watercourse | | | | | | | |
| | | **h** | Others: | | | | | | | |
| | **Water Use: Quality and Quantity** | **14** | Provide for each type of water use: | | | | | | | |
| | | **a** | The source of water including the name of the water body and the location of the water source as shown on a map; | | | | | | | |
| | | **b** | A description of the quality of the water from the source as well as the capacity of the water source; | | | | | | | |
| | | **c** | The estimated amount of water taken from each source and the method of extraction including specific pumping rates, pumping procedures and potential for draw down; | | | | | | | |
| | | **d** | The estimated amount of water to be returned to the source; | | | | | | | |
| | | **e** | Methods to ensure the quality of water returned to the source is of an acceptable quality. | | | | | | | |
| See Section 7.0 of this SIG for Additional Requirements | **Waste Disposal** | **15** | Provide a detailed description of all forms of waste disposal indicating the type of waste(s) generated and/or to be deposited. | | | | | | | |
| | **Waste Disposal: Quality and Quantity** | **16** | Provide a description for each type of waste generated, its composition, quantity (cubic meters per day), method of treatment and disposal, including: | | | | | | | |
| | | **a** | System for the treatment and/or disposal of solid waste, liquid effluent, and gaseous materials expected from the operations, including any measures proposed to minimize the production of wastes; | | | | | | | |
| | | **b** | Substances and their amounts that will be released to the environment, methods of release and any associated control technology. | | | | | | | |
| | **Other Authorizations** | **17** | Provide a list of any authorizations required in addition to the water licence and a description of how those authorizations may affect the NWB's water licensing process. | | | | | | | |
| | | **18** | Provide an indication of whether any other authorizations are required in relation to the project. Provide the name of the authorization, the administering agency, the project activity requiring the authorization, the date or expected date of issuance and the date of expiry. | | | | | | | |

### 3.0 General Water Licence Application

| | Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 19 | Provide an overview of and a description of the status of any existing water licences currently held with the NWB and future plans for the administration of existing licences. | | | | | | | |
| | | 20 | Provide formal applications to the Navigable Waters Protection Program (NWPP) for any works. | | | | | | | |
| | | 21 | Provide a timetable for filing the appropriate plans and procedures required by government parties. | | | | | | | |
| See Sections 6.0 and 7.0 of this SIG for Additional Requirements | **Predicted Environmental Effect and Proposed mitigation measures** | 22 | Identify the potential effect of water use and waste disposal on the following components: | | | | | | | |
| | | **a** | Groundwater and Surface Water including: | | | | | | | |
| | | | changes in flow (including seasonal rate of flow) | | | | | | | |
| | | | quantity and quality | | | | | | | |
| | | **b** | Land including: | | | | | | | |
| | | | geologic structure change | | | | | | | |
| | | | soil contamination | | | | | | | |
| | | | compaction, settling and erosion | | | | | | | |
| | | | alteration of the permafrost regime | | | | | | | |
| | | | riparian zone loss | | | | | | | |
| | | **c** | Vegetation including: | | | | | | | |
| | | | species composition and abundance | | | | | | | |
| | | | non-native species introduction | | | | | | | |
| | | | accumulation of toxins and heavy metals (in relation to remediation objectives for closure) | | | | | | | |
| | | **d** | Aquatic Ecosystems including: | | | | | | | |
| | | | fish | | | | | | | |
| | | | benthic invertebrates | | | | | | | |
| | | | plankton | | | | | | | |
| | | 23 | Identify effects separately for each project phase. | | | | | | | |
| | | 24 | Describe the methods used to predict effects. | | | | | | | |
| | | 25 | Provide a cumulative effects assessment of the project's water use and waste disposal activities in relation to other activities in the same drainage basin. Predict the effects of the activities in combination with other past, present, and reasonably foreseeable future projects. | | | | | | | |
| | | 26 | Identify effects arising from accidental events or malfunctions. | | | | | | | |
| | | 27 | Provide a description of all proposed mitigation, management and monitoring programs to mitigate adverse impacts. | | | | | | | |
| | | 28 | Provide a description of the measures to be taken to mitigate impacts on historical resources or traditional uses of water and procedures to be followed should artifacts be discovered. | | | | | | | |
| | **Existing and Other User Water Rights** | 29 | Provide the names, addresses, and nature of use for any known persons or properties that may be adversely affected by the proposed undertaking, including those that that hold licences for water use in precedent to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature. | | | | | | | |
| | | 30 | Indicate whether compensation has been paid and/or agreement(s) for compensation have been reached with any existing or other users. | | | | | | | |
| | | 31 | Provide a description of the applicant's consultation plan and the concerns expressed during consultation. | | | | | | | |

### 3.0 General Water Licence Application

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | **32** | Describe how the results of consultation were incorporated into the determination of effects. | | | | | | | |
| | **33** | Describe how the results of consultation were incorporated into the design of mitigation, management and monitoring programs. | | | | | | | |
| | **34** | Provide a description of any potential effects of the project on other licensees or pre-existing applicants, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders or holders of other rights of a similar nature. | | | | | | | |
| | **35** | Provide a description of the measures incorporated into the project design to mitigate effects of the project on other licensees or pre-existing applicants, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders or holders of other rights of a similar nature. | | | | | | | |
| **Inuit Water Rights** | **36** | Provide a description of any potential effects of the project on the quality, quantity, or flow of waters flowing through Inuit Owned Land (IOL). | | | | | | | |
| | **37** | Advise the Board of any substantial affect of the quality, quantity or flow of waters flowing through IOL, and indicate whether negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more DIO. | | | | | | | |
| | **38** | Provide a description of the measures incorporated into the project design to mitigate effects of the project on the quality, quantity, or flow of waters flowing through IOL. | | | | | | | |
| | **39** | The applicant and/or DIO shall advise the Board in writing, if either party is unable to reach an agreement on compensation. | | | | | | | |
| **Security** | **40** | Provide a financial security assessment that is prepared in a manner consistent with principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut*, Indian and Northern Affairs Canada, 2002. The financial security assessment must include: | | | | | | | |
| | **a** | An estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking; | | | | | | | |
| | **b** | The cost of having the necessary reclamation work done by a third-party contractor if the operator defaults; | | | | | | | |
| | **c** | Contingency factors appropriate to the particular work to be undertaken. | | | | | | | |
| *Abandonment and Restoration* | **41** | Provide plans for the abandonment and restoration of the project. Plans must address all phases of the project including construction, operation, care & maintenance, final closure and post closure. | | | | | | | |
| | **42** | Provide a description of all remediation plans and remediation objectives. Discuss the results of any human health and ecological risk assessment used to establish remediation objectives. | | | | | | | |
| | **43** | Provide a list and description of any existing abandoned or restored site facilities. | | | | | | | |
| | **44** | Provide details regarding the timing of the removal of any dewatering dikes (if applicable) and the implications of this action on water quality. | | | | | | | |

### 3.0 General Water Licence Application

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | 45 | Provide detailed information regarding the method used to remove/breach any dewatering dykes (if applicable), including details of any mitigation measures for any adverse impacts. | | | | | | | |
| Financial Information | 46 | Provide a statement of financial responsibility. | | | | | | | |
| | 47 | If the applicant is an entity for which audited financial statements are issued, a copy of the most recent audited financial statements must be attached to the statement of financial responsibility. | | | | | | | |
| | 48 | Provide the name of the corporation, limited company or other business entity, with a list of the officers of the company and a copy of the Certificate of Incorporation or evidence of registration of the company name. | | | | | | | |
| Studies and Designs | 49 | Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including: | | | | | | | |
| | a | Design rational, design requirements, design criteria, design parameters, design standards/analysis/method; | | | | | | | |
| | b | Design assumptions and the limitations associated with such design assumptions; | | | | | | | |
| | c | The inclusion of clear, definable engineering qualifiers with all design drawings and reports; | | | | | | | |
| | d | Site specific data and analysis to support the design and management decisions made; | | | | | | | |
| | e | Materials that appropriately delineate the particulars of a design or plan. | | | | | | | |
| | 50 | Provide construction methods and procedures regarding how infrastructure will be put in place on-site. | | | | | | | |
| | 51 | Provide a timetable for submission of preliminary and final-for-construction engineered designs (note: for construction designs are required for NWB approvals). | | | | | | | |
| Proposed Time Schedule | 52 | Provide the proposed start and completion dates for each phase of development (construction, operation, closure and post closure) and any anticipated periods of seasonal shut down. | | | | | | | |
| Proposed Term of Licence | 53 | Provide a proposed term of licence including the expected date of licence issuance and the expected date of licence expiry. | | | | | | | |
| Annual Reporting | 54 | Provide detailed information regarding the content of annual reports and a proposed outline or template of the annual report. The annual report should include the following: | | | | | | | |
| | a | Water related monitoring results; | | | | | | | |
| | b | Comparison of water quality and quantity monitoring data with the water quality and quantity predictions presented in the application; | | | | | | | |
| | c | A description of how the conditions in the NIRB project certificate related to the NWB mandate have been implemented; | | | | | | | |
| | d | Project changes under adaptive management; | | | | | | | |
| | e | Any actions taken in response to direction provided by the Inspector. | | | | | | | |
| Renewals and Amendments | 55 | If the application is for a renewal or amendment of an existing licence, provide a status report. This report must document for each condition of the existing water licence, what action the licensee has taken. | | | | | | | |

### 3.0 General Water Licence Application

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | **56** | If the application is for a renewal or amendment of an existing licence, provide a compliance assessment. This assessment must indicate when facilities were inspected by regulatory agencies such as INAC or GN and which agencies. The compliance assessment must include any inspection reports and/or directions issued by the Inspector and any responses provided by the licensee. The compliance assessment must also list any spills that have occurred including a description, location shown on a map, and the action taken to address the affected area. | | | | | | | |

## 4.0 Project Description

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Description of Undertaking** | **1** | Provide a complete description of the undertaking with detailed site plan(s) of all project infrastructure for the Local Project Area (LPA) and/or the Regional Project Area (RPA), where applicable, and differentiate temporary components from permanent components. Consider the following in providing the description: | | | | | | | |
| | **a** | Raw water intake; | | | | | | | |
| | **b** | Water storage and treatment facilities including distribution systems; | | | | | | | |
| | **c** | Existing water bodies/courses and any changes to these water bodies/courses that may have or may occur as a result of water use or waste disposal facilities. Provide an outline of the drainage basin within the RPA; | | | | | | | |
| | **d** | Location of receiving water bodies and drainage pathways; | | | | | | | |
| | **e** | Transportation access routes and details of water course crossings; | | | | | | | |
| | **f** | Locations of environmental monitoring sites; | | | | | | | |
| | **g** | Traditional water use and land use areas that may be impacted by the project; | | | | | | | |
| | **h** | Sewage treatment facilities; | | | | | | | |
| | **i** | Wastewater treatment area and discharge outlet locations; | | | | | | | |
| | **j** | Solid waste disposal areas and drainage patterns; | | | | | | | |
| | **k** | Landfarm; | | | | | | | |
| | **l** | Waste rock piles (PAG and non-PAG); | | | | | | | |
| | **m** | Stockpiles; | | | | | | | |
| | **n** | Tailings containment areas; | | | | | | | |
| | **o** | Laydown areas; | | | | | | | |
| | **p** | Quarries; | | | | | | | |
| | **q** | Hazardous waste disposal area; | | | | | | | |
| | **r** | Waste discharge distribution lines; | | | | | | | |
| | **s** | Fuel and chemical storage; | | | | | | | |
| | **t** | Explosives manufacturing and storage; | | | | | | | |
| | **u** | Abandoned and/or restored facilities; | | | | | | | |
| | **v** | Existing on site infrastructure | | | | | | | |
| | **w** | Others: | | | | | | | |
| | **2** | Provide a Mine Plan Overview including: | | | | | | | |
| | **a** | Description of the location, physical nature, geology and minerology of the ore deposit and host rock. | | | | | | | |
| | **b** | Mine development plan and methods. | | | | | | | |
| | **c** | Description of any existing mine shafts or openings. | | | | | | | |
| | **d** | Description of earthworks for mine development. | | | | | | | |
| | **e** | Milling operations including capacity of the mill. | | | | | | | |
| | **f** | Predicted rate of production. | | | | | | | |
| | **g** | Expected life of the mine. | | | | | | | |
| | **h** | Camp and mine site population projections for each phase of the project. | | | | | | | |

## 5.0 Baseline Information

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| *Environmental Setting* | **1** | Provide a description of the regional and local setting. | | | | | | | |
| | **2** | Provide a description of the regional and local surface water regime. | | | | | | | |
| | **3** | Provide a description of receiving lakes (lake id, hydrology, water quality). | | | | | | | |
| | **4** | Provide a description of the groundwater regime. | | | | | | | |
| | **5** | Provide a description of the usual break-up and freeze-up periods. | | | | | | | |
| | **6** | Provide a description of the site conditions, including the location, topography, geologic and hydrologic characteristics, climate conditions and predicted future climate trends, seismicity, permafrost conditions and soil and rock conditions (provide test pit/ drill hole logs and laboratory test results). | | | | | | | |
| | **7** | Provide a description of the ground condition for design and engineering of earthwork infrastructure, including: | | | | | | | |
| | **a** | Interim and permanent waste rock facilities | | | | | | | |
| | **b** | Tailings containment area | | | | | | | |
| | **c** | Landfills | | | | | | | |
| | **d** | Landfarms | | | | | | | |
| | **e** | Fuel and chemical storage facilities | | | | | | | |
| | **f** | Explosives management areas and facilities | | | | | | | |
| | **g** | Quarries or borrow pits | | | | | | | |
| | **h** | Hazardous waste facilities | | | | | | | |
| | **i** | Wastewater treatment facilities | | | | | | | |
| | **j** | Ore stockpiles and waste rock piles | | | | | | | |
| | **k** | Overburden piles | | | | | | | |
| | **l** | Dewatering dikes | | | | | | | |
| | **m** | Mine rock geochemistry | | | | | | | |
| | **8** | Provide a description of the historical uses of the waters affected by the project. | | | | | | | |
| | **9** | Provide a description of any traditional uses of water in the project area. | | | | | | | |
| | **10** | Indicate whether fish, shellfish, or other wildlife are present and harvested in or near discharge areas and, if applicable, indicate the species harvested and the level of harvest. | | | | | | | |
| | **11** | Provide the following streamflow data in cubic metres per second for each watercourse included in the application: | | | | | | | |
| | **a** | mean annual flow; | | | | | | | |
| | **b** | mean summer flow; | | | | | | | |
| | **c** | minimum summer flow; | | | | | | | |
| | **d** | minimum annual flow; | | | | | | | |
| | **e** | mean annual flood; | | | | | | | |
| | **f** | maximum summer flood; | | | | | | | |
| | **g** | mean summer flood; | | | | | | | |
| | **12** | Provide bathymetric information for each water body in the application. | | | | | | | |
| | **13** | Provide results of any assessment of the permeability of any faults and taliks beneath water bodies. | | | | | | | |
| | **14** | Provide baseline data and an evaluation of baseline data describing surface and groundwater quality in the project area (physical, chemical, and biological characteristics). | | | | | | | |
| *Fisheries* | **15** | Provide baseline data and an evaluation of baseline data describing fish and fish habitat in the project area. | | | | | | | |
| | **16** | Provide a fisheries assessment including: | | | | | | | |
| | **a** | Detailed area description (including photographic record); | | | | | | | |
| | **b** | Description of fish habitat (including river or lake bottom substrates such as silt, sand, or cobble); | | | | | | | |
| | **c** | Presence of sensitive habitats (spawning, migration corridors etc.); | | | | | | | |
| | **d** | Description of aquatic and riparian vegetation; | | | | | | | |
| | **e** | Fish community and lifestage present; | | | | | | | |
| | **f** | Depth and width of watercourse; | | | | | | | |
| | **g** | Max/min water flows, currents, tides; | | | | | | | |

**5.0 Baseline Information**

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|---|---|---|---|---|---|---|---|---|---|
| | **h** | Turbidity and sediment loads (total suspended solids); | | | | | | | |
| | **i** | Sport, commercial, subsistence fishery present. | | | | | | | |
| *Studies* | **17** | Provide a list of baseline studies, reports and plans relevant to the application that have been undertaken to date including: | | | | | | | |
| | **a** | Geotechnical studies; | | | | | | | |
| | **b** | Geochemical studies; | | | | | | | |
| | **c** | Water quality studies; | | | | | | | |
| | **d** | Hydrological and hydrogeological studies; | | | | | | | |
| | **e** | Traditional use studies; | | | | | | | |
| | **f** | Aquatic studies; | | | | | | | |
| | **g** | Meteorological studies; | | | | | | | |

**6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Water Use** | **1** | Provide a detailed description of all types of water uses. (See the NWB definition of "use" in the NWB Guide 2: Terminology and Definitions). Categorize water consumption use(s) as either mining/industrial use and/or domestic use. | | | | | | | |
| ***Water Use: Quality and Quantity*** | **2** | Provide the name of the primary water source as well as the name of any alternative water source(s). | | | | | | | |
| | **3** | Provide a description of the source of water and the location of the water source as shown on a map. | | | | | | | |
| *Water Intake* | **4** | Indicate the type of water source(s) as lake, river, well, or other type. | | | | | | | |
| | **5** | Provide a description of the quality of the water from the source for each season (summer, fall, winter, spring). | | | | | | | |
| | **6** | Provide the capacity of the water source. | | | | | | | |
| | **7** | Indicate the amount of water taken from each source and provide a description of the method of extraction including specific pumping rates, pumping procedures and potential for draw down. | | | | | | | |
| | **8** | Provide the acquisition rate in cubic metres per day and cubic metres per year. | | | | | | | |
| | **9** | Provide a description of the water intake method including the intake facility, the operating capacity of the pump used, the details of any screening to exclude fish, and the distance the pump will be placed from the ordinary high water mark of the watercourse. | | | | | | | |
| | **10** | Provide a description of the general condition of any existing water intake facility. Rate the condition of the facility as satisfactory or unsatisfactory and explain the rating. | | | | | | | |
| | **11** | Indicate whether water is drawn from the source intermittently or continuously and if intermittently indicate during what months it is drawn and for what period it is drawn (days/weeks/months). | | | | | | | |
| | **12** | Indicate the amount of water to be returned to the source. | | | | | | | |
| | **13** | Provide a description of the methods to ensure water returned to source is of an acceptable quality. | | | | | | | |
| | **14** | Provide a description of any hydrostatic testing programs, including water sources, and treatment/disposal requirements. | | | | | | | |
| | **15** | Indicate the quantities of water required for ice road construction and provide a description of the methods of ice road construction. | | | | | | | |
| | **16** | Describe measures to reduce water consumption. | | | | | | | |
| *Water Storage* | **17** | Provide a description of any water storage facilities including the type (reservoir/pond, storage tank), location, design, and the water storage volume in cubic meters. | | | | | | | |
| | **18** | If the water storage facility is a reservoir, indicate whether the reservoir is lined, the type of liner and when it was or will be installed. | | | | | | | |
| | **19** | Provide a description of the general condition of any existing water storage facility and provide an explanation if it is unsatisfactory. | | | | | | | |
| *Water Distribution* | **20** | Provide a description of water distribution systems (ie. piped water, trucked) | | | | | | | |
| | **21** | For each phase of development, calculate the total water consumed per day (L/day) by multiplying the estimated number of persons on the system by the estimated average water consumption (Litres/ capita/day). Calculate the total water consumed for each individual distribution system if more than one is used (ie. piped water, trucked water). | | | | | | | |
| | **22** | Provide a description of the general condition of any existing water distribution system and provide an explanation if it is unsatisfactory. | | | | | | | |

**6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| *Watercourse Crossings and/or Trainings* | **23** | Provide a description of any watercourse crossings including pipelines, bridges, culverts or roads. | | | | | | | |
| | **24** | Provide a description of any watercourse trainings including channel and bank alterations, culverts, spurs, erosion control, and artificial accretion. | | | | | | | |
| *Flood Control* | **25** | Provide a description of any flood control structures. | | | | | | | |
| *Diversions* | **26** | Provide a description of any diversions including ditches and dikes. | | | | | | | |
| *Alterations in flow* | **27** | Provide a decsription of any activities or structures that could alter the flow of a watercourse including dams, spillways, berms, cofferdams, and dikes. | | | | | | | |
| *Dewatering* | **28** | Provide a description of dewatering programs, if planned, including estimated quantities, qualities, methods and schedule of withdrawl, end use or discharge location. | | | | | | | |
| | **29** | Provide an estimate of the quality and flow of groundwater that will flow into any open pits. | | | | | | | |
| *Water works* | **30** | For each water work component provide the design plans stamped for construction. Design plans shall consider the following: | | | | | | | |
| | **a** | Name of the water body(s) affected. | | | | | | | |
| | **b** | Site photos, site map, or air photos of the location. | | | | | | | |
| | **c** | Description of the existing condition of the site (see section 5). | | | | | | | |
| | **d** | Details of structures that will be placed in water on a temporary or permanent basis. | | | | | | | |
| | **e** | In water work timing restriction for fisheries. | | | | | | | |
| | **f** | Start and completion dates for construction. | | | | | | | |
| | **g** | Construction sequence taking into account any timing restrictions. | | | | | | | |
| | **h** | Methods of installation. | | | | | | | |
| | **i** | Machinery to be used. | | | | | | | |
| | **j** | Sedimentation and erosion control measures. | | | | | | | |
| | **k** | Construction monitoring plans. | | | | | | | |
| | **l** | Assessment of impacts to fish and fish habitat (see Section 6 item 39). | | | | | | | |
| | **m** | Bank stabilization measures (size range of material). | | | | | | | |
| | **n** | Operation and maintenance plans including instrumentation, monitoring and inspection requirements. | | | | | | | |
| | **o** | Contingency plans. | | | | | | | |
| | **p** | Remediation plans. | | | | | | | |
| | **31** | Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's Guide 4: Completing and Submitting a Water Licence Application for more information regarding design drawings). | | | | | | | |
| **Predicted Environmental Effects and Proposed mitigation measures** | **32** | Provide a description of the effects of water usage on the river or lake from which water will be drawn. | | | | | | | |
| | **33** | Provide a description of any expected changes in surface water flow or storage. | | | | | | | |
| | **34** | If the cross-section of any watercourse is changed, provide a description of the change and its effect on the flow capacity of the channel. | | | | | | | |
| | **35** | If the course of any channel is changed, provide a description of measures to maintain stream bed and bank stability. | | | | | | | |
| | **36** | Provide a description of mitigation measures that will be implemented when working in close proximity to water. | | | | | | | |
| | **37** | Describe measures of preventing surface water from coming into contact with waste and measures of managing surface water that does come into contact with waste (surface water management plan). | | | | | | | |

**6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | **38** | Describe measures of preventing groundwater from coming into contact with waste and measures of managing groundwater that does come into contact with waste (groundwater management plan). | | | | | | | |
| *Fisheries* | **39** | Provide a description of any potential impacts to fish and/or fish habitat. (Indirect effects may include project effects, water quality, or aquatic organisms. Direct effects may include degradation or alteration of fish habitat). The applicant is advised to consult with DFO regarding fish and fish habitat related issues. | | | | | | | |
| | **a** | Potential effects on fish or fish habitat; | | | | | | | |
| | **b** | The area in square metres to be impacted; | | | | | | | |
| | **c** | Measures to avoid sensitive periods and habitat areas (i.e., spawning beds, migration corridors); | | | | | | | |
| | **d** | Measures to avoid physical impacts on habitat; | | | | | | | |
| | **e** | Measures to maintain flows and fish passage; | | | | | | | |
| | **f** | Measures to avoid sedimentation; | | | | | | | |
| | **g** | Measures to avoid spills; | | | | | | | |
| | **h** | Detailed habitat no-net-loss plan and site restoration plan; | | | | | | | |
| **Studies** | **40** | Provide a list of studies, reports and plans relevant to the application that have been undertaken to date, including: | | | | | | | |
| | **a** | Water management plan including water balance; | | | | | | | |
| | **b** | Construction plan and construction schedule for water works; | | | | | | | |
| | **c** | Operation and maintenance plan; | | | | | | | |
| | **d** | Implementation schedule for construction of works, submission of studies and mitigation plans for operations and closures; | | | | | | | |
| | **e** | Remediation plans for water works infrastructure; | | | | | | | |
| | **f** | Fisheries assessment; | | | | | | | |
| | **g** | Monitoring plan. | | | | | | | |

**7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Waste Disposal** | **1** | Provide a detailed description of all forms of waste disposal (see the NWB definition of Waste in the NWB *Guide 2: Terminology and Definitions*) indicating the type of waste(s) generated and/or to be deposited. | | | | | | | |
| **Waste Disposal: Quality and Quantity** | **2** | For each type of waste, provide the composition and quantity generated. Also provide the location, rate, timing, frequency and duration of the deposit. | | | | | | | |
| | **3** | For each type of waste, provide the proposed methods and processes for collecting, storing, treating and discharging the waste. Indicate the capacity of these facilities. | | | | | | | |
| | **4** | For each waste facility, provide a description of the construction methods, type and composition of the materials to be used in the construction of the structure, equipment to be used, schedule, quality assurance/ quality control measures, and inspection and maintenance procedures. | | | | | | | |
| | **5** | For each waste facility provide the design plans stamped for construction. The designs shall include: | | | | | | | |
| | **a** | A description of the types of waste entering the facility (if applicable, provide a description of the source, type, and quantity of the waste); | | | | | | | |
| | **b** | The concentration of waste entering the facility; | | | | | | | |
| | **c** | The geochemical characterization of waste entering the facility, where applicable; | | | | | | | |
| | **d** | Details of the drainage basin; | | | | | | | |
| | **e** | Distance of the facility from watercourses and fish bearing waters; | | | | | | | |
| | **f** | All sources of seepage encountered near watercourse and fish bearing waters as well as the volumes (m3/day) and direction of any seepage; | | | | | | | |
| | **g** | Existing and proposed drainage modifications; | | | | | | | |
| | **h** | Details of retaining structures; | | | | | | | |
| | **i** | Level of treatment (primary, secondary or tertiary); | | | | | | | |
| | **j** | By products of treatment which may require further treatment, characterization, handling and disposal; | | | | | | | |
| | **k** | Capacity and retention time of the facility; | | | | | | | |
| | **l** | Identification of final discharge point (last point of control); | | | | | | | |
| | **m** | Method and type of discharge (seasonal, annual, continuous); | | | | | | | |
| | **n** | Estimated rates for discharge; | | | | | | | |
| | **o** | Restrictions on discharge; | | | | | | | |
| | **p** | Discharge effluent criteria proposed; | | | | | | | |
| | **q** | Receiving water quality objectives; | | | | | | | |
| | **r** | Capacity of the receiving environment; | | | | | | | |
| | **s** | Details regarding direction and path of wastewater flow from the area or infrastructure; | | | | | | | |
| | **t** | Mitigation measures; | | | | | | | |
| | **u** | Contingency measures; | | | | | | | |
| | **v** | Remediation objectives; | | | | | | | |
| | **6** | Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's *Guide 4: Completing and Submitting a Water Licence Application* for more information regarding design drawings). | | | | | | | |
| | **7** | Describe any measures proposed to minimize the production of wastes. | | | | | | | |
| | **8** | Provide detailed plans regarding the disposal of any lake bottom sediments | | | | | | | |
| | **9** | Provide a description of the general condition of any existing waste facilities and provide an explanation if it is unsatisfactory. | | | | | | | |

**7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Predicted Environmental Effects and Proposed mitigation measures** | **10** | Provide detailed treatment plans for discharges from any tailings containment area, as well as treatment plans for discharges from attenuation ponds or reclaim ponds. Water treatment plans should include estimates of treatment efficiency for each parameter of concern and a description of pH adjustment methods. | | | | | | | |
| | **11** | Clearly outline proposed discharge criteria, how the criteria were developed, standards to be applied, and how these criteria will be used to prevent ecological effects in the receiving environment. | | | | | | | |
| | **12** | If waste is expected to infiltrate into the ground, provide a description of the sub-surface soil compositions and provide information on groundwater elevations for the project area. Also provide the proximity between the proposed waste disposal system and the groundwater elevation. | | | | | | | |
| | **13** | Provide a discussion of the consequences of long-term stratification in any pit lakes and associated contingency plans. | | | | | | | |
| | **14** | Provide the geochemical characteristics of any quarry or borrow material and the methods used to determine the characteristics. | | | | | | | |
| | **15** | Provide the geochemical characteristics of host rock, ore, waste rock and tailings and the methods used to determine the characteristics. | | | | | | | |
| | **16** | Provide designs for the fuel tank farm facilities including a description of the nearest water bodies. Provide an evaluation of impacts and mitigation measures in case of a fuel spill. | | | | | | | |
| | **17** | Provide detailed contingency plans for the treatment of turbid water during dewatering activities and/or increased suspended solids during operations (i.e rewatering). | | | | | | | |
| *Operations and Maintenance* | **18** | If the project includes sewage and/or solid waste disposal, provide an Operations and Maintenance Manual in accordance with the "Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories, 1996". | | | | | | | |
| *Hazardous Materials* | **19** | Provide a description of the type of petroleum products, chemicals and/or hazardous materials on site. | | | | | | | |
| | **20** | Provide details regarding the handling and storage of petroleum products, chemicals or other hazardous or potentially hazardous materials. | | | | | | | |
| *Emergency Response and Spill Contingency* | **21** | Provide an Emergency Response and Spill Contingency Plan (ERSCP) consistent with established Water Board guidelines. | | | | | | | |
| | **22** | Plan(s) shall address phases of the project including construction, operation, and care & maintenance. | | | | | | | |
| | **23** | Provide an explanation of how the applicant will ensure project contractors meet the applicant's due diligence standards with respect to oil and hazardous material spill prevention, preparedness, response, and restoration. | | | | | | | |
| **Studies** | **24** | Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including design and management decisions. Studies, reports and plans may include: | | | | | | | |
| | **a** | Waste management; | | | | | | | |
| | **b** | Waste rock management; | | | | | | | |
| | **c** | Tailings management; | | | | | | | |
| | **d** | Metal leaching / acid rock drainage management; | | | | | | | |
| | **e** | Landfill management; | | | | | | | |
| | **f** | Landfarm management; | | | | | | | |
| | **g** | Quarry Management; | | | | | | | |

**7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | **h** | Incineration management; | | | | | | | |
| | **i** | Hazardous waste management; | | | | | | | |
| | **j** | Water management; | | | | | | | |
| | **k** | Geotechnical and geothermal assessment; | | | | | | | |
| | **l** | Permafrost protection; | | | | | | | |
| | **m** | Water quality modeling; | | | | | | | |
| | **n** | Snow drift assessments; | | | | | | | |
| | **o** | Leachate and groundwater collection systems; | | | | | | | |
| | **p** | Wastewater treatment; | | | | | | | |
| | **q** | Operation and maintenance plan; | | | | | | | |
| | **r** | Inspection plan; | | | | | | | |
| | **s** | General monitoring; | | | | | | | |
| | **t** | Tailings monitoring; | | | | | | | |
| | **u** | Mine site water quality monitoring; | | | | | | | |
| | **v** | Receiving water quality monitoring; | | | | | | | |
| | **w** | Aquatic effects monitoring; | | | | | | | |
| | **x** | Geotechnical and structural monitoring; | | | | | | | |
| | **y** | Quality assurance and quality control; | | | | | | | |
| | **z** | Spill contingency and emergency response plans; | | | | | | | |
| | **aa** | Interim and final abandonment and reclamation plans for the mine site; | | | | | | | |
| | **bb** | Remediation plans for waste disposal infrastructure; | | | | | | | |
| | **cc** | Human health and ecological risk assessment for establishment of remediation objectives for closure; | | | | | | | |
| | **dd** | The collection of weather data for purposes of mine design; | | | | | | | |
| | **ee** | Construction plan and construction schedule for waste disposal infrastructure; | | | | | | | |
| | **ff** | Implementation schedule for construction of works, submission of studies and mitigation plans for operations and closure; | | | | | | | |
| | **gg** | Options analysis. | | | | | | | |

**8.0 Monitoring**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| **Monitoring** | **1** | Provide a Monitoring Plan including a description of the methods, procedures, standards, and schedules proposed. Monitoring may be required for water use; effluent, surface and/or groundwater water quality, quantity, or flow; ground temperature; ground settlement; etc. The Monitoring Plan must consider the life of the project, temporary closure and permanent closure. | | | | | | | |
| | **2** | Indicate who is responsible for sampling including that person's position, contact information and level of training. | | | | | | | |
| | **3** | Indicate the name and contact information of the certified laboratory performing the analysis of samples. | | | | | | | |
| | **4** | Provide an Inspection Plan including a description of the methods, procedures, standards, and schedules proposed. Inspections may be required for engineered facilities related to the management of water and waste as well as spills. The Inspection Plan must consider the life of the project, temporary closure and permanent closure. | | | | | | | |
| | **5** | Provide a summary table of all monitoring commitments that details all Surveillance Network Program (SNP) locations. The table should include parameter(s), location, frequency, and mining phase, along with, cross-referencing to sub-documents where detailed information is provided. Where appropriate, a map detailing the location of monitoring sites is to be provided. | | | | | | | |
| | **6** | Provide a summary table of the expected quality and quantity of waters, over time in all sumps, SNP stations, and discharge points, along with i) if applicable, adaptive management criteria to benchmark if mitigation/contingency are to be implemented, ii) if applicable, water quality criteria, and iii) management action. | | | | | | | |
| | **7** | Provide a monitoring plan for incinerator emissions (including, but not limited to, stack testing and annual reporting). | | | | | | | |

**9.0 Project Specific Information Requirements (PSIR)**

**PSIR's will only be issued following a positive Environment Assessment Review determination by NIRB**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| Applicant | | | | | | | | | |
| Applicant Representative | | | | | | | | | |
| Location of Undertaking | | | | | | | | | |
| NPC Determination | | | | | | | | | |
| NIRB Determination | | | | | | | | | |
| Description of Undertaking | | | | | | | | | |
| Nature of Interest in the Land | | | | | | | | | |
| Water Use: (including water works) | | | | | | | | | |
| Water Use: Quality and Quantity | | | | | | | | | |
| Waste Disposal: | | | | | | | | | |
| Waste Disposal: Quality and Quantity | | | | | | | | | |
| Other Authorizations | | | | | | | | | |
| Predicted Environmental Impacts and Proposed mitigation measures | | | | | | | | | |
| Options (Alternatives) | | | | | | | | | |
| Existing and Other User Water Rights | | | | | | | | | |
| Inuit Water Rights | | | | | | | | | |
| Security | | | | | | | | | |

**9.0 Project Specific Information Requirements (PSIR)**

**PSIR's will only be issued following a positive Environment Assessment Review determination by NIRB**

| Section Title | Section No. | Information Requirement | Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA ' | If 'NA' provide justification | Insert Title, Author and Date of Document where information is provided | Insert electronic file name of document where information is provided | Insert Section of document where information is provided | NWB Concordance Assessment | NIRB Guideline Section No. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **Financial Information** | | | | | | | | | |
| | | | | | | | | | |
| **Studies** | | | | | | | | | |
| | | | | | | | | | |
| **Proposed Time Schedule** | | | | | | | | | |
| | | | | | | | | | |
| **Proposed Term of Licence** | | | | | | | | | |
| | | | | | | | | | |

## APPENDIX A: ADDITIONAL SOURCE DOCUMENTS TO ASSIST THE APPLICANT

This appendix provides a list of reference documents including legislation, guidelines and standards that may be of use to the applicant in preparing the supplemental information.

### Federal Legislation

- *Canadian Environmental Protection Act, [1999, [1999, c.33]*
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, [SOR/2008-197]*
- *Environmental Emergency Regulations, [SOR/2003-307]*
- *Fisheries Act, [R.S.C. c. F-14]*
- *Metal Mining Effluent Regulations, [SOR/ 2002-2222]*
- *Navigable Waters Protection Act, [R.S. 1985, c. N-22]*
- *Navigable Waters Bridges Regulations, [C.R.C., c. 1231]*
- *Navigable Waters Works Regulations, [C.R.C., c. 1232]*
- *Nunavut Land Claims Agreement*
- *Nunavut Waters and Nunavut Surface Rights Tribunal Act, [2002, c.10]*
- *Northwest Territories Waters Regulations, [SOR/93/303]*
- *Territorial Lands Act, [R.S. 1985, c. T-7]*
- *Territorial Land Use Regulations, [C.R.C., c. 1524]*
- *Territorial Quarrying Operations, [C.R.C., c. 1527]*
- *Transportation of Dangerous Goods Act, [1992, c.34]*
- *Transportation of Dangerous Goods Regulations, [SOR/2001-286]*

### Territorial Legislation

- *Environmental Protection Act (Nunavut), [R.S.N.W.T. 1988, c. E-7]*
- *Used Oil and Waste Fuel Management Regulations, [N.W.T. Reg. 064-2003]*
- *Mine Health and Safety Act, [S.N.W.T 1994, c.25]*
- *Mine Health and Safety Regulations, [R-125-95]*
- *Mine Health and Safety Regulations, amendment, Nu. Reg. 016-2003*
- *Safety Act, [R.S.N.W.T. 1988, c. S-1]*
- *Work Site Hazardous Materials Information System Regulations, [R.R.N.W.T. 1990 c. S-2]*
- *Transportation of Dangerous Goods Act, [R.S.N.W.T. 1988, c. 81 (Supp.)]*
- *Transportation of Dangerous Goods Regulations, [1991, N.W.T. Reg. 095-91]*

**Guidelines and Policies**

- CCME – *Environmental Code of Practice for Aboveground and Underground Storage Tank Systems containing Petroleum and Allied Petroleum Products (2003);*
- CCME – Canadian Environmental Quality Guidelines *Guidelines (CEQG) and Canadian Water Quality Guidelines for the Protection of Aquatic Life;*
- CCME – *Canada-Wide Standards for Dioxins and Furans (2001);*
- CCME – *Canada-Wide Standards for Mercury Emissions (2000);*
- DFO – *Freshwater Intake End-of-Pipe Fish Screen Guideline (1995);*
- DFO – *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (1998);*
- DFO – *Policy for the Management of Fish Habitat (2001);*
- DFO – *Habitat Conservation and Protection Guidelines (1998);*

- DFO – *Operational Statements;*
- EC – *Guidelines for the Preparation of Hazardous Material Spill Contingency Plans (1990);*
- EC – *Metal Mining Guidance Document for Aquatic Effects Monitoring (2002);*
- EC – *Guidelines for the Assessment of Alternatives for Tailings Storage for Metal Mining Projects Proposing to use Natural, Fish-bearing Water Bodies as Tailings Impoundment Areas (Draft July 4, 2008);*
- GN – *Spill Contingency Planning and Spill Reporting in Nunavut. A Guide to the New Regulations.*
- GN – *Environmental Guideline for Contaminated Site Remediation (2002);*
- GN – Environmental Guideline for *General Management of Hazardous Waste in Nunavut (2002);*
- *GN - Environmental Guideline for Ozone Depleting Substances (2002);*
- *GN - Environmental Guideline for Waste Antifreeze (2002);*
- *GN - Environmental Guideline for Waste Asbestos (2002);*
- *GN - Environmental Guideline for Waste Batteries (2002);*
- *GN - Environmental Guideline for Waste Paint (2002);*
- *GN - Environmental Guideline for Waste Solvent (2002);*
- *GN - Guideline for the Management of Waste Lead and Lead Paint (2001);*
- *GN - Municipal Solid Wastes Suitable for Open Burning;*
- *GN - Disposal Guidelines for Fluorescent Lamp Tubes;*
- GN – *Occupational Health &Safety Guidelines (2006);*

- GNWT - *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories, (1992)*

- GNWT – *A Field Guide to Ice Construction Safety (2007);*

- *Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* , Duong and Kent, 1996

- INAC - *Mine Site Reclamation Policy for Nunavut (2002);*

- INAC – *Guidelines for Spill Contingency Planning (2007);*

- INAC - *Quality Assurance (QA), Quality Control (QC) Guidelines for Use by Class "B" Licnesees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan (1996);*

- INAC - *Mine Site Reclamation Guidelines for the Northwest Territories (2007);*

- INAC – *A Policy Respecting the Prohibition of Bulk Water Removal from Major River Basins in Nunavut (2003);*

- The Mining Association of Canada "*A Guide to the Management of Tailings Facilities* " (1998), (Referenced within the guidelines as GMTF);

- Mining Association of Canada, "*Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities"*

- The proponent where applicable should consider the application of the Canadian Dam Association "*Dam Safety Guidelines* " (January 1999) in the design, construction, operation, monitoring, decommission and closure of dam infrastructure. (Referenced within the guidelines as CDA);

- *Workplace Hazardous Materials Information System* (WHMIS);

The NWB maintains a folder on its FTP site containing electronic copies of reference documents. Federal legislation may be found on the Department of Justice Canada website at http://laws.justice.gc.ca/. Territorial Legislation may be found on the Canadian Legal Information Institute's website at http://www.canlii.org/. The applicant is encouraged to consult with government agencies on technical issues and to obtain the most up to date copy of reference documents.

It is the applicant's responsibility to ensure that all relevant standards and guidelines are considered in the water licence application and to incorporate proper footnotes and references.

# APPENDIX D:
## LIST OF RECIPIENTS REQUESTING COPIES OF FUTURE EIS SUBMISSIONS