Mackenzie Valley Review Board

Terms of Reference

EA2021-01

Pine Point Mining Limited

Pine Point Mine Project

November 2021

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List of abbreviations

DAP	Developer's Assessment Proposal
DAR	Developer's Assessment Report
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
GNWT	Government of the Northwest Territories
GHG	Greenhouse Gas
MVRMA	*Mackenzie Valley Resource Management Act*
NWT	Northwest Territories
the developer	Pine Point Mining Limited
ToR	Terms of Reference
The Review Board	The Mackenzie Valley Environmental Impact Review Board
VC	Valued Component

1. Introduction

This document outlines the minimum information that the developer of Pine Point Mine Project (the Project) requires to complete its Developer's Assessment Report (DAR). The developer is Pine Point Mining Limited. If the developer believes that a requirement of this Terms of Reference (ToR) is not necessary to complete its DAR, it may submit a Request for Ruling in accordance with sections 46-50 as set out in the Mackenzie Valley Review Board's (Review Board) *Rules of Procedure for Environmental Assessment and Environmental Impact Review Proceedings, 2005*.

The Project includes the open pit and underground mining of zinc and lead deposits along a 70 km stretch of land on the south side of Great Slave Lake. The Pine Point mine property is located 42 km east of Hay River and 53 km west of Fort Resolution on the south side of Great Slave Lake. Figure 1 shows the proposed location of the Project which is located at the historic Pine Point mine. Activities are proposed in areas recovering from past mining that has not been fully reclaimed, and on surrounding lands undisturbed by past mining. Project construction will take approximately 1.5 years, followed by 10-15 years of mine operations, and approximately five years of closure and reclamation activities at the end of mine life. This document is divided into the following sections:

- Section 1 – Introduction, and how this document was developed
- Section 2 – Scope of development and scope of assessment
- Section 3 – Approach and methodology to assessing impacts
- Section 4 – Assessing impacts of the Project on the environment and people
- Section 5 – General Requirements of the Developers Assessment Report
- Section 6 – Conclusion
- Appendix A – Guidance documents
- Appendix B - Impact Assessment Methodology
- Appendix C – Baseline and existing environment

The Terms of Reference directs the developer to organize existing material from its *EA Initiation Package* and *Developer's Assessment Proposal*, and conduct additional study and analysis as appropriate, to submit a stand-alone DAR. The Terms of Reference is a list of requirements for preparation of the DAR, but the structure of the DAR is up to the developer. The DAR will be used to inform all interested parties about the proposed development and the developer's impact predictions during the analytical phase of the environmental assessment.[1]

1.1. Potentially Affected Indigenous Groups

The Pine Point Mine Project is located within the boundaries of Treaty 8, which covers a portion of the NWT south of Great Slave Lake as well as northern portions of Alberta, British Columbia, and Saskatchewan. The Project has the potential to affect the following Indigenous Nations and Governments:

[1] The role of the Developer's Assessment Report and associated next steps in the environmental assessment will be identified in the Work Plan issued by the Review Board as a companion document to the Terms of Reference.

- Deninu Kué First Nation
- Kátł'odeeche First Nation
- Northwest Territories Métis Nation
- Fort Resolution Metis Government
- Smith's Landing First Nation
- Dene Tha' First Nation
- West Point First Nation

Other potentially affected Indigenous groups may be identified during the EA process and through further engagement.

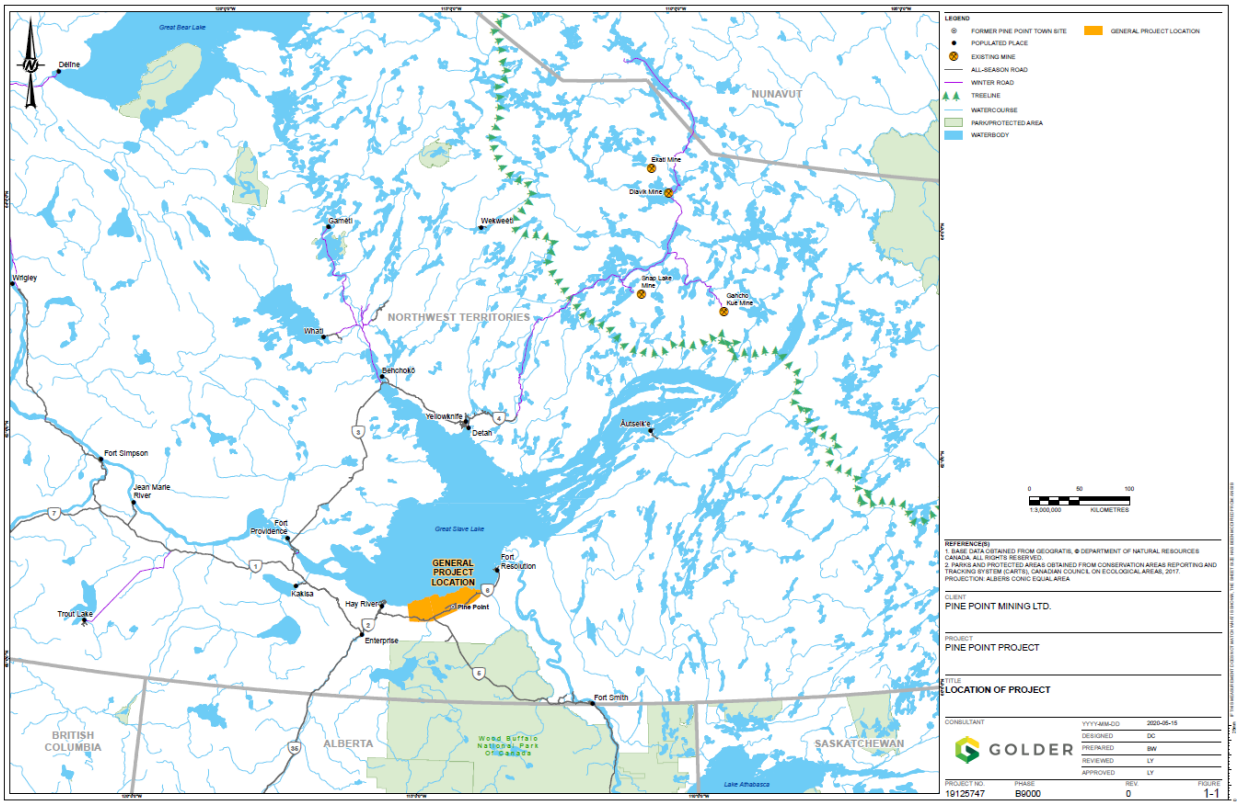

Figure 1: location of the Pine Point Mining Project.

1.2. Process of developing the Terms of Reference

On February 2, 2021, the developer submitted an *Environmental Assessment Initiation Package* to the Review Board for the Pine Point Mine Project. The Review Board used its authority under subsection 126(3) of the *Mackenzie Valley Resource Management Act* (MVRMA) to order an environmental assessment of the Project under its own motion even though a preliminary screening had not been

conducted. The Review Board issued its *Reasons for Decision* to order an environmental assessment of the Project on February 12.[1]

This environmental assessment will follow the requirements of Part 5 of the MVRMA. Section 3 of the Review Board's *Environmental Impact Assessment Guidelines* describes the environmental assessment process in detail. That document, as well as the Review Board's *Rules of Procedure,* other guidelines including *Socio-Economic Impact Assessment Guidelines* and *Traditional Knowledge Guidelines*, reference bulletins, and relevant policies applicable to this assessment are available online (see Appendix A) or by contacting the Review Board staff.

In accordance with Section 115 of the MVRMA, the Review Board will conduct an environmental assessment of the proposed development with regard for the protection of the environment from significant adverse impacts, and the protection of the social, cultural and economic well-being of Mackenzie Valley residents and communities. Paragraph 114 (c) of the MVRMA further requires the Review Board to ensure that concerns of the Indigenous peoples and the general public are taken into account. Accordingly, the Review Board has developed these ToR based on an examination of information from the following sources:

- community scoping meeting in Fort Resolution (online)
- community scoping meetings at Kátł'odeeche First Nation and West Point First Nation (in-person)
- technical scoping meeting in Yellowknife (online)
- written recommendations from parties and developer responses to the *Developer's Assessment Proposal* using the Online Review System
- written recommendations and responses on the draft *Terms of Reference* using the Online Review System
- all information on the public registry in relation to the Pine Point Mine Project, including the developer's *EA Initiation Package*
- Review Board experience in the conduct of environmental assessment

1.3. Terms of Reference workshops

The Review Board will facilitate workshops, at the request of the developer, between the developer, parties, and Review Board staff prior to the submission of the DAR. The goal of these workshops is to facilitate dialogue to assist the developer understand how best to meet the requirements of the Terms of Reference. These face to face meetings could also be a valuable and efficient way to clarify issues between the developer and parties and to present updates on the project. Review Board may amend the Terms of Reference based on the results of a workshop at the request of the developer. The Review Board expects that this approach can benefit the developer in preparing a more effective DAR to better inform the remainder of the EA process. These workshops are not intended to add any additional requirements to the Terms of Reference.

[1] Reasons for Decision to order an environmental assessment

2. Scope

This section describes the scope of development for the Pine Point Mine Project, the scope of assessment, and the scope of issues (valued components) in the assessment.

2.1. Scope of development

Under subsection 117(1) of the MVRMA, the Review Board determines the scope of development for every environmental assessment (EA) it conducts. It will do so when making EA decisions. The scope of development consists of all the physical works and activities required for the Project to proceed. It includes the use of existing infrastructure at the former Pine Point mine. Table 1 outlines a minimum listing of Project components by phase for the scope of development for this environmental assessment. The developer will describe the Project by phase (construction, operations and closure). So far, the developer has identified the following project components as part of the development:

Table 1. Scope of Development

Project component	Subjects to consider
Open pit mining	• location of deposits • sequencing of development backfilling with waste rock and closure • number and location of pits that will be backfilled with waste rock
Underground mining	• location of deposits • sequencing of development and closure
Processing and milling ore	• crushing and mineral sorting • concentrate and tailings dewatering
Waste management	• waste rock storage facilities • overburden management • tailings disposal • number and location of pits used to backfill tailings • all other waste management facilities
Buildings and infrastructure	• process plant • camp • site access roads • explosives management • fuel and hazardous materials
Transportation	• use of site access roads • employee transport • transport of concentrate to railhead • transport of mine related materials to and from mine site
Equipment	• list of equipment
Power	• projected power demand by activity • use of NTPC network • onsite power generation

	• stationary and mobile power plants
Water and water management	• site-wide water management facilities • site wide water balance • management of mine/process water including the potential use of re-injection wells and mined-out open pits • surface water runoff • waste rock storage facility runoff • open pit and underground mine dewatering • tailings and reclaim water management • freshwater requirements • existing or new works needed for the Project located in or around navigable waters
Monitoring and management plans	• engagement and collaboration plan • spill contingency plan • air monitoring plan • erosion and sediment control plan • mine water management plan • waste management plan • tailings management plan • waste rock management plan • wildlife management and monitoring plan • aquatic effects monitoring program • closure and reclamation plan
Permits, licences and authorizations	• list permits, licenses and authorizations, land dispositions required from regulatory authorities[1]

2.2. Scope of assessment

The scope of assessment is determined by the Review Board when making EA decisions. The scope of assessment describes which issues will be examined in the EA, and how broadly they will be considered. The scope of assessment includes potential impacts on valued components of the biophysical and human environment from the Project, by itself and cumulatively. The scope of assessment identifies and prioritizes the issues the developer must examine in its Developer's Assessment Report (DAR) so that the environmental assessment can focus on issues that matter most.

[1]With respect to the listing of authorizations from the *Canadian Navigable Waters Act,* the developer will distinguish between works that require approval under the Act, works that will meet the Minor Works Order under the Act, works that will undergo a public resolution process as described in the Act and any works for which the proponent intends to request approval

To determine the scope of assessment, up to this point the Review Board has considered:

- the EA Initiation Package submitted by the developer [February 2021]
- *Developer's Assessment Proposal* – recommendations and responses from the developer using the Online Review System [June 2021]
- Technical scoping meeting [May 4-5, 2021]
- information from community scoping sessions in Fort Resolution, Kátł'odeeche First Nation, and West Point First Nation [June and July 2021]

2.2.1. Valued components

Valued components (VCs) are parts of the biophysical or human environment that may be affected by a proposed development and that are identified as important, such as having ecological, scientific, social, cultural, economic, historical, archaeological, or aesthetic importance.[1] In its *Developer's Assessment Proposal* the developer identified factors used in developing a list of valued components for the EA.[2] The Review Board has used this information from the developer, parties' review of the *Developer's Assessment Proposal*, and community and technical scoping meetings to identify valued components. The following is a list of valued components the Review Board has identified so far, to be used in the assessment of biophysical, social, economic, and cultural impacts from the Project:

- air quality, acoustic environment (noise, vibration), and climate
- ground water quality and quantity
- surface water quality and quantity
- fish, aquatic life, and habitat
- terrain and soils
- vegetation
- wildlife and wildlife habitat
- species at risk (including boreal caribou and whooping crane)
- Indigenous land use
- other land uses
- heritage resources
- culture
- social and community conditions
- economy and employment
- human health

In addition to considering the impacts on these individual VCs, the assessment will also consider the relationships between the VCs when assessing impacts from the Project.

[1] draft EA Initiation Guidelines for Developer's of Major Project 2018 p8
[2] Developer's Assessment Proposal, EA Initiation Package Feb 2021 p4-5

2.2.2. Key lines of inquiry

Key lines of inquiry are areas of concern that have been identified as requiring the most attention during the EA and the most rigorous analysis in the DAR. Key lines of inquiry are identified to ensure a comprehensive, detailed analysis of the most important issues for the EA that were identified during scoping. The developer will provide a stand-alone assessment for all identified key lines of inquiry, to help parties understand the developer's predictions without using multiple documents.[1] Assessment work will encompass project-specific effects on VCs, impacts on how affected VCs interrelate in connected systems, potential accidents and malfunctions, and potential cumulative effects.

Key lines of inquiry require the developer's highest level of effort in this EA. In this EA, the three key lines of inquiry are systemic - they are made up of multiple interconnected valued components.[2] The key lines of inquiry are:

- keeping water safe and clean
- lasting well-being
- sustainable boreal caribou: protection and harvest

For each of these, scoping identified potential pathways of effects on people and ecosystems from the Project, priorities of EA participants, and corresponding responsibilities of the Review Board under section 115 of the MVRMA. The detailed reasons that Review Board decided to make these the key lines of inquiry for this EA are described in section 4.4.

In addition to its requirement to prevent significant impact on the environment under the *Mackenzie Valley Resource Management Act*, the Review Board must meet legal requirements under s. 79 of Canada's *Species at Risk Act*. All the species at risk are important. Of the listed species at risk assessed in this EA, the developer will pay particular attention to assessing and preventing any effect on whooping crane. Reasons for this are set out in section 4.2.9 below.

2.3. Geographic scope (spatial boundaries)

The geographic scope will include all areas that may be affected by activities in the Pine Point Mine Project. The geographic scope for each valued component will be appropriate for the characteristics of the valued component, or the impact and nature of the impact source. For example, consideration of impacts on air should reflect the airshed, wind patterns and mobility of airborne contaminants, while the ranges of wildlife using the area may be relevant from a project-specific and cumulative effects perspective. All of these areas together will be considered in the environmental assessment study area, which will be further defined by the developer in its DAR.

[1] A stand-alone assessment means that the sections can summarize relevant information from other sections without repeating unnecessary text.
[2] Section 3.3 below provides more detail about systems thinking for valued components that are interconnected. Section 4.4 describes why each of the following three key lines of inquiry were selected, and includes specific questions that need to be considered for each.

The developer will provide its rationale for the spatial boundaries it selects for the assessment of potential mine-related impacts on each valued component.

In its *EA Initiation Package*, the developer has proposed spatial boundaries for valued components. Based on the results of community and technical scoping meetings, spatial boundaries (geographic scope) will be expanded to include[1]:

- Little Buffalo River (with respect to impacts on wildlife, water quality, fish, and land users)
- Birch Creek (with respect to wildlife, water quality, fish, and land users)

2.4. Temporal scope

The developer will use temporal boundaries for this environmental assessment according to potential long-term impacts on valued components, rather than on a single generic timeline. In all cases, the temporal boundary may not end with the operating or closure phase of the Project.

For project-specific (that is, non-cumulative) impacts, the temporal scope will include all phases of the project life cycle including construction, operation, closure, reclamation, and post-closure. It extends until no potentially significant adverse impacts are predicted. For cumulative impacts, the temporal scope includes the period of the effects of past, present, and reasonably foreseeable future projects that are predicted to combine with the impacts of the Project.

The developer will place special focus on the consideration of time during the development when activities are particularly intense or when valued components are particularly sensitive to potential impacts (such as during wildlife migration periods, key harvesting periods, and annual cultural gatherings). The developer will also give special attention to appropriate temporal boundaries for considering any impacts that may require long-term monitoring and management after closure.

The developer is required to define and provide its rationale for the specific temporal boundaries it used to examine the potential impacts on each of the valued components in its impact assessment.

[1] Throughout this document, the words “include” and “including” imply “including, but not limited to”.

3. Overall approach to assessing impacts

This section describes the Review Board's approach on how impacts should be assessed in the DAR, including intended outcomes for each assessment step. The Review Board's rationale behind this approach will follow in the *Reasons for Decision for the Terms of Reference*.

3.1. Describe baseline conditions and the existing environment

The DAR will describe baseline conditions for each valued component in enough detail to accurately describe and assess potential impacts from the proposed development when these impacts are predicted to occur. The description of baseline conditions should include both quantitative and qualitative data, as appropriate and necessary to understand the relevant human and biophysical environments.

Appendix C includes guidance on what baseline information the Review Board expects. If the developer believes that certain items are not necessary to predict the impacts as required by section 4, the Review Board is prepared to facilitate dialogue on the subject (see section 1.3 for details). Only information that is used in the assessment of impacts needs to be presented in the DAR.

Baseline information will reflect the existing environment and existing trends. The baseline is intended to provide a contrast between the conditions in the area, over time, 1) without impacts from the proposed project and 2) with the impacts from the proposed project. Baseline information will provide a frame of reference that is a meaningful basis for accurate impact predictions.

The baseline will describe what would happen without the Project. This will describe the current environment and existing trends, including existing disturbance from previous mining on site. It will reflect the environment without predicted project-specific impacts.

The baseline is not static. It may reflect the existing conditions in the current state, but some cases, it will also reflect naturally fluctuating conditions and existing trends. For example, the developer will identify natural wildlife population cycles where relevant, and describe and consider current climate predictions over each phase of the Project when predicting impacts on various VCs. For the latter, the developer will use climate models to consider scenarios (such as high, medium, and low) that reasonably reflect uncertainties in future conditions.[1]

In describing the baseline conditions and trends, the developer will include:

- uncertainties and confidence levels
- descriptions of the specific data sets used
- key assumptions

[1] The planned life of mine for this project is 10 to 15 years. Reclamation activities are proposed for 5 years at the end of mine operations followed by 10 years of passive care. Some impacts from the Project may last beyond the Project life cycle.

When using baseline information from the Tamerlane Ventures Pine Point Pilot Project, the developer will evaluate the accuracy and applicability of this information, considering events and changes that have occurred in the 15 or more years since that information was originally collected.

3.2. Assess impacts on the environment

The DAR will assess the ways that the Project might affect the environment, which includes people. The effects assessment should provide a clear traceable path of information from baseline conditions to the identification of potential impacts, mitigation, and residual impacts. Quantitative or qualitative information may be used as appropriate. The developer should describe and provide its rationale for any methodologies, including models, used in the assessment.

The developer will identify any public concerns related to the Project, based on its past engagement, the information now available from EA proceedings such as community scoping session, and the results of its ongoing engagement (see section 5.1). The developer will include mitigations to address these concerns. This may be achieved by reducing or avoiding the potential impacts that are the basis of the concerns, or by other means appropriate to the nature of specific concerns.

The developer will identify potential impact pathways for all phases of the proposed development including construction, operation, closure and post-closure. Information in the DAR should be sufficient to understand the nature of specific impacts and how conclusions were reached.

The developer will describe all mitigations that will be put into effect during Project construction, operation, closure or post-closure to mitigate potential environmental effects. The developer will:

- identify proposed mitigation measures to avoid, minimize, or offset predicted impacts
- describe the predicted effectiveness of mitigation measures in a brief narrative, and where mitigations have been implemented effectively in a similar context
- describe any relevant best management practices
- explain how Traditional Knowledge, community engagement outcomes or other information was used in choosing appropriate mitigation

The developer should consider the predicted impacts (as described in Appendix B) and evaluate for itself whether any additional mitigations (such as improved project design, project management or offsets) are necessary to further avoid or reduce impacts to prevent significant adverse impacts. The developer will clearly identify any additional mitigations it has added beyond those described in its EA Initiation Package. Where it has added further mitigations or modified project design or management to avoid significant impacts, the developer will describe those mitigations, why they were made, and how it expects those mitigations to avoid significant adverse impacts.

The developer will assess and describe the residual impacts, after mitigation, of the Project on valued components, or (for section 4.4) on the system of interconnected components. These residual impacts will be described in terms of the nature of the impact, magnitude, direction, spatial extent, timing, frequency, duration, reversibility, and likelihood of each impact. While the developer is required to characterize each impact in this manner, it is not required to provide its opinion on impact significance at this point in the EA.

3.3. Assess impacts holistically using systems thinking

This EA will consider impacts on valued components (VCs), individually and collectively, and the relationships between the VCs as interacting parts of larger systems. The developer will assess:

1. impacts from the Project on individual VCs
2. impacts from the Project on interrelated VCs together
3. cumulative impacts from the Project and other developments

When doing 2 above, the developer will use systems thinking to integrate impacts of the whole development on multiple VCs taken together, in addition to the impacts on individual VCs.[1,2]

This is particularly relevant for section 4.4, which requires the developer to provide a holistic assessment of the potential impacts of the proposed development on selected issues related to key lines of inquiry. Each of these depend on systems of connections and interrelationships between ecological and social or cultural VCs.[3,4]

To assess collective impacts of the Project at a system level, the developer will:

1. **consider the roles each VC plays in the broader system**
    - How is the VC affected?
    - Is the VC part of a larger system?
    - How and to what is it interconnected?
2. **assess the predicted overall changes on system functioning**
    - Do the predicted impacts affect how the system will work?
    - Do they make it less resilient?
    - Is the resulting impact on the system acceptable?
3. If the resulting impact is not acceptable, **mitigate the impacts on VCs (or on the way VCs interact)** as needed to protect system functioning
    - Can the impacts be reduced or avoided to reduce the collective impact?
    - Are there other creative ways to mitigate impacts to the system?

3.4. Use and incorporation of Traditional Knowledge

The Review Board values and considers both Traditional Knowledge and scientific knowledge in its assessment of the impacts of the project on the environment and people. The developer will make all reasonable efforts to support Indigenous organizations in the collection and consideration of Traditional

[1] Section 128 (1) of the MVRMA lays out the Board's decisions on impact significance in terms of "the development", not just its parts, and applies to the development as a whole.
[2] Assessing the combined total impacts of *this* project is different from assessing the cumulative impacts of the project in combination with *other* projects as described in section 3.5.
[3] For impact predictions in sections 4.2 and 4.3, the developer should also consider relevant interconnections when evaluating impacts on individual valued components.
[4] See page 26 of the Review Board's 2018 *Report of Environmental Assessment and Reasons for Decision – GNWT Tłı̨chǫ All-Season Road Project - EA1617-01* for an illustration of an integrated system of people and the land.

Knowledge relevant to the Project. The developer will make all reasonable efforts to incorporate Traditional Knowledge from Indigenous culture holders as a tool in its evaluation of the specific impacts required in this ToR. The developer should refer to the Review Board's *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment* and Traditional Knowledge protocols specific to each Indigenous organization.

The developer will work with Indigenous communities to undertake group-specific Traditional Knowledge and Land Use studies specific to the project area. In addition, the DAR must contain a comprehensive summary on Traditional Knowledge as a stand-alone section. The summary will:

- describe, where policies and standards do not exist, what approach was taken in working with Traditional Knowledge holders in the collection and use of Traditional Knowledge when Traditional Knowledge is collected from existing studies and reports
- if Traditional Knowledge is obtained through secondary sources, present to each associated Indigenous group for comment and confirmation prior to inclusion in the DAR
- how Traditional Knowledge and Traditional Knowledge holders have influenced the developer's project design, impact assessment, monitoring and mitigation measures, as well as reclamation and closure planning
- provide a table-summary listing:
    - engagement sessions where Traditional Knowledge topics were discussed
    - what Traditional Knowledge topics were discussed
    - cross-reference to sections of the DAR that incorporates Traditional Knowledge

3.5. Cumulative effects assessment and legacy of past mining

From a cumulative effects assessment perspective, the developer will consider the effects of the Project in combination with the effects of other past, present and reasonably foreseeable future developments.

This includes the potential of the Project to add to or disturb the historical releases of contaminants in areas of past mining, or add to any ongoing socio-economic or cultural impacts resulting from past mining in the Project area, where they are relevant to the assessment of cumulative impacts of the proposed project. Such legacy issues were identified by Indigenous organizations participating in EA scoping. The effects of the Project in combination with legacy effects from past developments need to be considered.

The developer will describe impact pathways by which a cumulative effect may occur and its potential spatial and temporal scope. It will identify any baseline trends relevant to cumulative impacts. The developer will identify mitigations for its contributions to cumulative effects and describe any residual cumulative effects.

The baseline for cumulative impacts is not the same as the baseline for project-specific impacts. The baseline for cumulative impacts describes what would happen *without* the combined impacts of the Project with other developments and human activities. Cumulative impacts should be evaluated against conditions prior to these cumulative effects rather than against existing conditions. For example, the

combined effects of the Project and past mining should be compared to conditions at Pine Point prior to all industrial activity there.[1]

3.6. Sustainability and lasting well-being

The Review Board recognizes that thoughtful and comprehensive EA can contribute to sustainability and lasting well-being. Towards this end, the developer should begin thinking early in the project life cycle and assessment process about potential social, economic, and cultural impacts of closure and the post-closure phase; that is, project-specific legacy effects after closure of this project (on the human and biophysical environments). For these reasons, the Review Board requires the DAR to describe and propose mitigations for impacts during and after closure for both the biophysical and human environments.

3.7. Climate change

The Review Board's Perspectives Paper – *Evolving Environmental Impact Assessment in the Mackenzie Valley and Beyond (April 2020)* describes the Review Board's prioritization of considering climate change in EA. The crisis is global while effects are experienced locally, affecting entire systems. These effects have implications to the success of projects through a myriad of pathways including increased extreme weather events, fires, impacts to Project infrastructure, shorter ice road seasons, thawing permafrost, and many other ways. Climate change can also impact wildlife by changes to vegetation and habitat, changes to temperature and vegetation during important times such as calving, movement of invasive species into new areas, an increase or introduction of diseases and parasites, increase in biting insects, and icing events. These effects can increase the vulnerability of wildlife to project effects.

These changes can affect ecosystem health, community well-being, and the interrelationship between them. Indigenous peoples have a particularly intimate relationship with the environment, and are more likely to experience these kinds of impacts.

EA is predictive and sometimes requires robust models to make accurate predictions. Climate change is making this increasingly difficult, and makes project effects harder to predict with confidence. Despite the uncertainty, the Review Board will consider the effects of climate change on the Project, and the effects of the Project on the environment in a changing climate.

When considering the effects of climate change on the Project, the developer will assess the resilience and vulnerability of the Project to ensure that it designed to withstand the effects of predicted climate change. This will identify and reduce risks to the environment and people from potential failures of important parts of the Project. The developer will describe how current climate trends affected Project design, the resilience of components and any mitigations related to climate adaptation.

The assessment will also consider how compatible the project is with the GNWT's and Government of Canada's long term climate change plans and objectives.

[1] Information on the conditions of the area before all industrial activities may come from Indigenous Traditional Knowledge, or ecologically similar sites without development to indicate relevant reference conditions.

4. Assessing impacts

The Developer's Assessment Report (DAR) will identify and assess project-specific effects of the Project on the biophysical and human environment. The DAR will also assess cumulative effects resulting from the Project in combination with past, present, and reasonably foreseeable developments and activities. The subsections below focus on different types of project interactions and impacts as follows:

- 4.1 focuses on direct physical changes to the (primarily abiotic) environment, including air and land. These are part of the basis for assessment of impacts in 4.2.
- 4.2 and 4.3 focus on how the impacts described in 4.1 combine with direct impacts on individual valued components (including wildlife and people).
- 4.4 focuses on how the impacts described in 4.2 and 4.3 combine collectively and holistically in interconnected ecological and social systems.

The Review Board recognizes that the developer's EA Initiation Package includes valuable information related to heritage resources, including much of the information required below. The developer will use this existing material and new additional information and analyses to produce a stand-alone section of the DAR to meet the requirements of each section below. Sections 4.1, 4.2 and 4.3 identify some of the specific locations in the developer's EA Initiation Package where existing relevant information on each subject in can be found. The Review Board expects that the DAR will be easier to compile because the developer's existing information partly meets the requirements below.

4.1. Predicted changes to air and land

This section requires the developer to assess the direct impacts of the Project on components of the physical environment area.

4.1.1. Atmospheric environment

Changes to the atmospheric environment resulting from the Project can have adverse impacts on a wide range of valued components. The Project will release emissions, dust, and odours to the air. These can affect terrestrial and aquatic wildlife, vegetation, Indigenous land use, recreational land use, and human health and well-being, and contribute to climate change. The atmospheric environment can be a vector of pollution and a source of sensory disturbance.

The developer's description of changes to the atmosphere will consider all Project activities and emissions from all Project sources including mining, milling, use of all equipment and vehicles, blasting, electricity generation, and dusting including concentrate. The developer will describe all emissions (including greenhouse gases) during all Project phases and will assess their effects on the environment and people. The potential Project interactions, mitigations, and residual effects analysis of these as sensory disturbances will be described in the relevant sections of the DAR**.**

The developer's EA Initiation Package contains useful and relevant information that pertains to this subject. In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.3.2 of the Existing Environment volume, Table 1 in the Project Interactions

volume, and section 4.2.1.1 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer should:

- provide a description of emission sources of air pollutants from the Project including all point sources, fugitive sources, mobile sources, and road sources
- estimate annual volume of natural gas and diesel consumption for power generation during the construction, operation, and decommissioning phases
- estimate sulfur content in diesel fuel to be used for power generation
- provide a methodology and assumptions used to estimate emissions of air pollutants
- estimate the deposition of dust and other contaminants on sensitive receptors (including water used for drinking by people and wildlife) and on plants used for traditional purposes and by wildlife
- describe and assess odorous compounds potentially associated with the Project on sensitive receptors
- predict the fate of emissions resulting from all Project sources for emissions using atmospheric dispersion and regional air quality modelling
- provide a rationale for the choice of air quality model
- compare the predicted air quality results with applicable territorial and federal standards and management thresholds for ambient air quality and odour guidelines where applicable
- consider contaminants of potential concern with potential impacts to human health, including particulate matter (PM) 2.5, PM10, carbon monoxide, ozone, sulphur oxides, nitrogen oxides, polycyclic aromatic hydrocarbons, volatile organic compounds, diesel particulate matter, metals, and any other toxic air pollutants
- provide a description of all the methods and practices to be deployed to reduce and control emissions, dust, and odours, and provide a rationale to justify the technologies selected
- develop and implement strategies that comply with regional and national commitments, such as the Canadian Council of Ministers of the Environment commitment regarding pollution prevention

Greenhouse gas emissions

This information will help parties and the Review Board understand the Project's contribution to climate change.

The developer will describe and quantify greenhouse gas (GHG) emissions including:

- each of the Project's main sources of GHG emissions and their estimated annual GHG emissions over the lifetime of the Project
- the net GHG emissions by year for each phase of the Project based on the Project's maximum throughput or capacity
- an estimate of direct GHG emissions, acquired energy GHG emissions, CO2 captured and stored, avoided domestic GHG emissions and offset credits, if applicable, per year for each phase of the Project

- the methodology, data, emission factors and assumptions used to quantify each element of the net GHG emissions
- the emission intensity for each year of the operation phase of the Project
- a discussion on how the developer developed its emissions estimates, and evaluate the uncertainties in those estimates
- identify large sources of GHG emissions that may be the consequence of accidents or malfunctions
- a comparison of the Project's emissions to that of the NWT and Canada
- a summary of the GNWT's and Government of Canada's initiatives on climate change and greenhouse gas reductions and how these apply to the Project
- a description of how the Project may contribute to Canada's efforts to reduce greenhouse gas emissions, if applicable, including how the Project could result in GHG emission reductions in Canada (e.g. by replacing higher emitting activities)
- if the Project may induce other greenhouse gas generating projects. Provide a brief description of potential emissions typical of the types of any such identified projects
- qualitative and quantitative description of the Project's impacts on carbon sinks

The developer will describe its efforts to reduce GHG emissions including:

- any corporate policies regarding climate change, greenhouse gas reductions, and social responsibility. Provide examples of how the developer has applied these
- efforts made to avoid, reduce, mitigate, or offset greenhouse gas emissions made during project planning and design, and proposed for Project operations
- how greenhouse gas emissions were considered when determining energy sources for Project components and activities
- a cost benefit analysis of alternative energy sources including renewable energy sources
- alternative project design elements that would reduce emissions, and how these were considered

The developer will provide a net-zero GHG emissions plan. This will include a Best Available Technology and Best Environmental Practices assessment. This assessment will identify and select the technically and economically feasible technologies, techniques, or practices, including emerging technologies, to minimize GHG emissions throughout all phases of the Project with a net-zero emission perspective.

See section 5.6 and 5.7 for additional requirements on assessing the impacts of a changing climate on the Project. Consider the Strategic Assessment of Climate Change prepared by Environment and Climate Change Canada.

4.1.2. Noise and vibration

Noise and vibration from the Project can affect terrestrial and aquatic wildlife, Indigenous land use, recreational land use, and human health and well-being. The assessment will consider noise and vibration from all Project sources including mining, milling, use of all equipment and vehicles, blasting, and movement of materials, and other human activities. The developer will describe the baseline acoustic environment and will assess project changes on the environment and people. The impacts of

these sensory disturbances from the Project to fish, wildlife and people will be discussed in those sections of the DAR.

In preparing its DAR, the developer may use and combine any information already gathered in its EA Initiation Package in section 3.3.2.7 of the Existing Environment volume, Table 2 in the Project Interactions volume, and section 4.2.1.1 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will:

- describe changes in ambient sound levels resulting from the Project
- provide a list of all noise and vibration sources
- quantify sound levels at appropriate distances from any Project facilities and/or activities and describe, for each sound source, the timing, frequency, and duration of sound events and their characteristics
- describe the locations and characteristics of the most sensitive receptors (such as species at risk and Indigenous land use sites), and any particularly sensitive periods (such as nesting, brooding or post-calving)
- identify and justify the approach to characterize the effects of sound resulting from the Project that may be adverse and discuss uncertainties (Health Canada guidance on evaluating human health impact in environmental assessment listed in Appendix A)
- provide an appropriately scaled noise contour maps to identify noise levels at receptor locations
- describe procedures for documenting and addressing noise complaints as part of the community engagement activities
- describe mitigation to reduce impacts from noise and vibration

4.1.3. Visual changes

Changes to the visual environment resulting from the Project can have adverse impacts on wildlife and people. These changes include night-time light, dust plumes, and temporary and permanent changes to the landscape (including pits, waste rock storage areas, vegetation, and modified surface hydrology). These can affect wildlife, Indigenous land use, and human health and well-being, and the impacts related to sensory disturbances will be considered in these respective sections of the DAR.

In preparing its DAR, the developer may use and combine any information already gathered in its EA Initiation Package as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

For all Project sources and phases, the developer will:

- describe any changes in night-time light levels as a result of the Project
- quantify light levels at appropriate distances from any Project components and key receptor points within the defined zone(s) of influence
- describe the locations and characteristics of the most sensitive receptors, including species at risk, and areas used by Indigenous communities for traditional activities

- describe consultations and, where appropriate, provide a record of engagement with Indigenous organizations and communities regarding potential effects on the visual environment
- describe the maximum distance from high structures (such as communication towers or masts) from which lighting (including safety lighting and beacons) would be visible from the ground.
- describe any changes to the visual environment that would consist of aesthetic disruptions to the cultural landscape (such as changes to topography, vegetation removal and the presence of more people). This assessment should focus on land users and people traveling along the Buffalo River, Little Buffalo River, and on Great Slave Lake
- identify areas where changes in the visual environment may affect Indigenous communities, land users, and wildlife and identify the extent of visual night-time illumination on a map
- describe mitigations for visual impacts

4.1.4. Terrain, geology, and soil

Terrain, geology, and soils are integral to the hydrological cycle and vegetation communities. They are a basis for the assessment of impacts to other valued components of both the biophysical and human environments. Understanding the nature and quality of soils in the project area is also important for progressive reclamation during operations and final reclamation at closure. This is particularly true given that much of the Project area has seen historic mining activity and the presence and locations of contaminated soils are not fully known.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in sections 3.3.1 and 3.3.7 of the Existing Environment volume, Table 8 in the Project Interactions volume, and section 4.2.1.6 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will describe and evaluate the potential effects of the Project on terrain and soil. The developer will describe:

- land clearing, site preparation, construction of facilities and infrastructure
- characteristics of existing open pits used for storage of tailings, waste rock, surface water, or ground water
- development and mining of open pits and underground openings
- management of mine waste rock, mineralized material, and overburden
- process plant and processing
- mine site traffic
- soil and hydrological conditions
- permafrost and ground thermal conditions
- geology and karst formations
- the physical and chemical characteristics of mine rock, waste rock, and tailings
- changes to soil and terrain conditions that may affect soil productivity, chemistry, and the types of ecosystems that can be reclaimed during closure and reclamation
- topography, slope and ground stability

- how the geotechnical stability of all engineered structures, including site access roads will be ensured against:
    - a range of climate, seismic, and precipitation scenarios, and
    - any terrain hazards including potential permafrost degradations and potential karst-related subsidence
- erosion control measures
- how the geotechnical stability of the mine rock management areas, open pits, backfilled pits, and underground openings will be ensured, and for over what extent of time
- the engineering information for designed structures, as appropriate for the EA stage of design
- progressive reclamation, and how this ongoing reclamation has been informed by engagement with Indigenous organizations and potentially affected communities

4.2. Assessing impacts to the biophysical environment

This section requires the developer to assess impacts from the Project on several individual biophysical valued components, including surface water and groundwater, fish, plants, wildlife and more. Where appropriate, this includes considering the changes to air and land described in 4.1, alongside direct impacts from the Project on the listed VCs. When considering impacts on individual VCs, the developer should also consider the relationship of each VC to other components. This will form a basis for assessing then combined VC impacts in the systemic perspective of section 4.4.

4.2.1. Groundwater quality and quantity

Groundwater quality and quantity is a valued component in this *Terms of Reference* due to its importance for drinking water and Indigenous and other land uses, and its connection to other valued components including surface waters, vegetation, fish and wildlife. In this environmental assessment, "groundwater" refers to water that is stored, or moves, beneath the surface of the land.[1] The Review Board and parties need to understand how the Project could affect the quantity and quality of groundwater in the regional study area. Scoping activities and the developer's EA Initiation Package identified potential effects on groundwater quality and quantity as important issues. Some specific concerns raised during scoping include:

- changes to local and regional water levels due to dewatering and site water management processes
- deterioration of water quality due to discharge, re-injection of mine water into aquifers, tailings management and waste rock management in exhausted pits and underground workings
- metal leaching and/or acid-rock drainage from waste rock piles and tailings management facilities
- construction, operation and closure of open pit and underground mines
- accidents and malfunctions

[1] This is intended to correspond to the definition in the NWT Water Regulation, as "all water in a zone of saturation below the land surface, regardless of its origin."

- minewater management strategies and contingency options

The DAR will identify, describe, and assess impacts of the Project on groundwater quality and quantity within the Regional Study Area. The DAR should analyze and describe changes to groundwater at a scale and resolution that allows for the application of results to the assessment of impacts on interrelated parts of the environment. The results of this section will later provide part of the basis for assessing systemic impacts in section 4.4.1 (Keeping water safe and clean).

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.3.3 of the Existing Environment volume, Table 4 in the Project Interactions volume, and section 4.2.1.2 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

At a minimum, the DAR will present a 3-dimensional numerical groundwater flow model that builds on the conceptual model(s) of the hydrogeological and hydrological environments for current conditions[1] and use that model to estimate changes related to the Project. The developer will:

- extend the conceptual model for surface water and groundwater for operations and post-closure (including climate change considerations). This will illustrate how major project features such as open pits, underground workings, waste rock piles, tailings management facilities, dewatering wells, and water diversion ditches could affect groundwater and surface water
- develop the model using available data and, if necessary, collect additional data to enable the model to assess effects of the Project; demonstrate that the inputs are adequate for the purpose of the model
- calibrate the numerical model to baseline hydrogeological conditions using groundwater level and stream flow monitoring data, and provide metrics and graphs describing the quality of the calibration that was achieved, and discuss how spatial variability is considered in model calibration
- state limitations and assumptions in the modelling approach, including calibration methods, and accuracy
- include a sensitivity analysis that describes how uncertainty in the conceptual model and variability in key model inputs (e.g., hydraulic properties and climatic parameters) could impact model results
- using the calibrated numerical model, provide a baseline groundwater budget including groundwater discharge to wetlands, lakes, streams and rivers, infiltration from surface water features to the groundwater flow system, and any anthropogenic withdrawals

[1] as required in Appendix C (C-7 and C-8)

Using the numerical groundwater flow model, the developer will:

- estimate key project fluxes, including open pit or mine inflow rates, pit or mine dewatering rates, pit or mine flooding rates, and tailings seepage rates during the operations, closure and post-closure periods[1]
- describe changes to surface water and groundwater regimes during the operations, closure and post-closure periods, including
  - effects of encountering high pressure aquifers during mine operations,
  - mine dewatering on lake levels,
  - effects on base flow in rivers and streams,
  - effects on wetlands,
  - effects on recharge and discharge,
  - effects on potable supplies, and
  - effects on natural flow divides.
- provide drawings and/or figures showing groundwater piezometric contours to illustrate projected seepage patterns for applicable project components and changes in groundwater conditions

In addition, the developer will describe:

- the contaminants associated with the Project, sources, their spatial and temporal locations and their potential flow paths (that is, groundwater seepage pathways and how they relate to potential receptors). Characterize transport and fate of contaminants in the hydraulic environment and how they could affect surface and groundwater quality. Assess the potential for off-site groundwater and surface water contamination[2]
- anticipated changes caused by project activities to physical and chemical parameters in groundwater in the receiving environment
- conceptual monitoring programs for characterizing future groundwater quality and quantity, including principles of the monitoring and how the monitoring will be used to compare actual changes to the predicted effects

The developer will describe the plans to mitigate both anticipated and unanticipated adverse impacts on groundwater including:

- the project elements, designs, tools, and practices to limit, avoid or minimize adverse impacts
- strategies to manage cumulative effects due to past impacts on groundwater in the Regional Study Area in addition to project-related effects
- an estimate of the efficacy of these mitigations and their effectiveness in other projects in similar settings
- a description of the rationale for why these mitigations were selected

[1] These estimates can be made with separate models as inputs to the 3-dimensional numerical groundwater flow model, if appropriate, but rationale and explanation of additional models will be required if used.
[2] If the developer considers attenuation mechanisms important to transport and fate of constituents of concern, mechanisms will be described in detail and supported by data.

- assessment of a range of pertinent upset conditions to be defined based on the project description and assessment, the potential impacts on the Project, and any resulting impacts on VCs.
- contingency plans for upset conditions and analysis of potential impacts if contingencies fail

4.2.2. Surface water quality and quantity

Surface water quality and quantity is a valued component in this Terms of Reference due to its importance for drinking water and Indigenous and other land uses, and its connection to other valued components including vegetation, fish and wildlife. In this environmental assessment, "surface water" refers to water that is stored on or moves across the surface of the land. The Review Board and parties need to understand how the Project could affect the quantity and quality of surface waters in the regional study area (RSA)[1]. Scoping activities and the developer's EA Initiation Package both identified potential effects on surface water quality and quantity as important issues. Some specific concerns raised during scoping include:

- changes to local and regional water stream and lake levels due to dewatering and site water management processes
- deterioration of water quality due to discharge, tailings management and waste rock management in exhausted pits and underground workings, surface runoff, and seepage
- metal leaching and/or acid-rock drainage from waste rock piles and tailings management facilities
- construction, operation and closure of open pit and underground mines
- ground disturbance, water diversion or in-stream construction activities
- accidents and malfunctions
- minewater management strategies and contingency options

The DAR will identify, describe, and assess impacts of the Project on surface water quality and quantity within the RSA. The DAR should analyze and describe changes to surface water at a scale and resolution that allows for the application of results to the assessment of impacts on other parts of the environment. The results of this section will later provide part of the basis for assessing systemic impacts in section 4.4.1 (Keeping water safe and clean).

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in sections 3.3.4 and 3.3.5 of the Existing Environment volume, Tables 5 and 6 in the Project Interactions volume, and section 4.2.1.3 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. At a minimum, the Developer's Assessment Report will:

- extend the conceptual model[2] for surface water and groundwater for operations and post-closure (including climate change considerations). This will illustrate how major project features such as open pits, underground workings, waste rock piles, tailings management

[1] including Little Buffalo River
[2] as required in Appendix C (C-7 and C-8)

facilities, dewatering wells, and water diversion ditches could affect groundwater and surface water
- describe the contaminants associated with the Project, sources, their spatial and temporal locations and their potential flow paths[1]
- describe methods used to assess the potential for metal leaching and acid rock drainage for tailings, waste rock, and low-grade ore or other stockpiles and estimate the potential for mined materials (including waste rock, tailings and low-grade ore or other stockpiles) to be sources of metal leaching or acid rock drainage
- estimate surface and seepage water quality from the waste rock piles, tailings management sites, stockpiles and other infrastructure during the operations and post-closure periods
- discuss changes to the alignment and condition of all streams, waterbodies, and wetlands (permanent, intermittent, and ephemeral), including those removed or altered by the Project

The developer will present a water quality prediction model that incorporates surface and groundwater[2] and geochemical sources for all Project phases (including current conditions, operations and post-closure) that allows for the assessment of transport and fate of mine affected water and allows for potential impacts to the receiving environment to be evaluated. The developer will:

- incorporate all major project features such as open pits, underground workings, waste rock piles, tailings management facilities, dewatering wells, and water diversion ditches into predictive models
- develop the water quality prediction model using available data and, if necessary, collect additional data so that the model can assess effects of the Project; describe how inputs were determined to be adequate for the purpose of the model
- include clear description and rationale for all input parameters and assumptions; to degree appropriate surface water models should use common inputs
- model scenarios with a range of possible mining sequences and a base case and upper case for water quality
- include a description of model limitation and uncertainties
- provide a plan to update the model during the life of the Project to address changes to mine plan and/or changes to the water management plan

The developer will use the model to describe:

- the extent of hydrological changes that will result from disturbances to surface water features, considering climate change (see also section 3.7)
- predicted changes caused by project activities to physicochemical parameters in surface water in the receiving environment

[1] If the developer considers attenuation mechanisms important to transport and fate of constituents of concern, mechanisms will be described in detail and supported by data.
[2] The output of the groundwater model will be an input to the surface water model, and the two models should use common inputs.

- predicted levels and potential effects of the release of nutrients (that is, nitrogen species) to the receiving environment, and evaluate potential for trophic changes in downstream water bodies
- the quantity, quality, timing and duration of all effluent streams released from the site to the receiving environment, including seepage, overflow and surface runoff from tailings ponds and other project components during all phases of the Project
- tailings porewater geochemistry and how this may interact with surface water chemistry

The developer will also describe:

- the spatial extent of the effluent mixing zone in Great Slave Lake, if loadings of contaminants of potential concern are predicted to enter the lake
- the potential for and impact to surface water of erosion and sedimentation resulting from the Project
- the potential for and impact to surface water from deposition of fugitive dust and particulate matter resulting from the Project (see section 4.1.1)
- conceptual monitoring programs for characterizing future surface water and groundwater quality, including principles of the monitoring and how the monitoring will be used to compare actual changes to the predicted effects

For potential changes to navigable waters, describe:

- which, if any navigable waterways may be affected
- potential effects to navigation and navigation safety, including effects due to change to water levels and flows
- how potentially affected waterway users have been consulted regarding navigational use, the issues that were raised and how these issues were addressed

With respect to mitigations, describe the plans to mitigate both anticipated and unanticipated adverse impacts on surface waters including:

- the project elements, designs, tools and practices to limit, avoid or minimize adverse impacts to water resources
- strategies to manage cumulative effects due to past impacts on water quality and quantity in the Project area in addition to project-related effects
- an estimate of the efficacy of these mitigations
- a description of the rationale for why these mitigations were selected
- assessment of a range of pertinent upset conditions to be defined based on the Project description and assessment, and the potential impacts on the Project, and any resulting impacts on VCs
- contingency plans for upset conditions and analysis of potential impacts if contingencies fail

4.2.3. Fish and aquatic life

Fish and aquatic life are valued components for this EA. This includes fish and fish habitat,[1] lower-trophic level aquatic life (including plankton, zooplankton and benthic invertebrates) and stream sediment characteristics that support aquatic life. EA scoping participants identified fish as a valued resource for both local Indigenous and non-Indigenous people as a food source. Fish rely on adequate food sources, including plankton, zooplankton and benthic invertebrates, and habitat to sustain their various life cycle requirements.

During scoping, concerns were raised over the potential for fish to be harmed or contaminated due to project activities that lead to changes in water levels or poor water quality. Based on evidence from the developer and technical and community scoping sessions, the Review Board has determined that the geographic scope of assessment for fish and aquatic life and habitat should, at minimum, include Great Slave Lake, Paulette Creek, Twin Creek, the Buffalo River, the Little Buffalo River, and Birch Creek.

Impacts from the Project to fish, aquatic life from all phases of the development could arise because of:

- vibration and noise due to blasting
- changes in surface water quality or quantity
- vegetation and wetlands
- new fishing access, if any
- ground disturbance, altered drainage or instream construction activities

These disturbances may result in changes to fish and fish habitat that could traditional and other land use. The impacts of changes fish, aquatic life and fish habitat on other valued components should be addressed in the relevant section(s) of the DAR.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.3.6 of the Existing Environment volume, Table 7 in the Project Interactions volume, and section 4.2.1.5 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will identify, describe, and assess impacts of the Project on fish and aquatic life. At a minimum, the developer will describe:

- any impacts to fish (all developmental stages) and fish habitat including calculations of any potential habitat loss
- potential downstream effects to water and sediment quality including in waterbodies identified as fish habitat or possible fish habitat and areas known for traditional fishing
- the potential for contamination of fish and bioaccumulation of contaminants in fish downstream of the Project or prey
- effects on fish behaviour, distribution, movement patterns, abundance, migration patterns or food sources
- potential losses of individuals and the relationship to resiliency of local fish populations
- modifications to use of and access to habitats

[1] As defined in subsection 2(1) of the *Fisheries Act*.

- how project construction and operations timing correlates to key fisheries windows and any potential effects resulting from overlapping periods
- how vibration caused by project activities (e.g. blasting) may affect fish habitat and behaviour, such as spawning or migrations
- the need for a *Fisheries Act Authorization*, a *Species at Risk Act* permit or an amendment to the *Metal and Diamond Mining Effluent Regulations*
- methods for the prevention, management and mitigation of impacts on fish, fish habitat and aquatic life and habitat during all phases of the Project including all relevant monitoring and management plans

4.2.4. Vegetation

The Project will result in the removal and disturbance of vegetation through direct loss, alteration, and fragmentation of upland, wetland, and riparian ecosystems. The Project can also result in changes to vegetation beyond the Project footprint through changes in surface drainage, changes to groundwater levels, air emissions, and dusting. Vegetation is important as wildlife habitat, for Indigenous land uses (which depend on medicinal plants, berries and other plants, and mushrooms), for its role in soil maintenance and hydrology, and for its role in the carbon cycle and climate change. For example, mature unfragmented boreal forest is important for boreal caribou (see sections 4.2.7 and 0).

For the locally affected landscape, the developer will describe physical disturbance from Project activities to vegetation and terrestrial habitat, broken down into habitat types to a reasonable and relevant level.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.3.8 of the Existing Environment volume, Table 9 in the Project Interactions volume, and section 4.2.1.7 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will describe Project interactions with vegetation including:

- changes to vegetation through direct loss, alteration and fragmentation of upland, wetland, and riparian ecosystems
- changes to vegetation from mine water and waste water discharge, ground water drawdown and reinjection, and waste rock seepage
- impacts on any rare plants and plants of traditional, cultural, ecological, or economic importance
- impacts from introduction of non-native or invasive plant species
- potential impacts of air emissions and dusting on vegetation
- cumulative effects assessment to vegetation from the Project in combination with past disturbances from the historic Pine Point mine

State of regeneration at past disturbed sites at Pine Point mine property

Vegetation at the Pine Point mine property is healing after disturbances from mining between 1964 and 1988 as well as ongoing mineral exploration at the site. At mine closure in 1988 the property was not reclaimed, remediated, or closed to standards that would be required today. Instead, the Pine Point mine was left to regenerate naturally with varying levels of regrowth throughout the property. The term "brownfield" is not an accurate enough characterization for many of these historically disturbed, but increasingly regrown and ecologically functional sites.

The developer will:

- describe the succession and predicted trend of vegetation regrowth at areas disturbed from past mine activities throughout the mine property during all project phases
- provide specific definitions of "greenfield" and "brownfield" where the terms are applied, and provide other descriptors to distinguish areas of historic mine disturbance from areas of the PPMP where historic mining did not occur, and include rationale for these descriptions
- identify and describe areas of regeneration from past mining where there might be a gradient of regrowth conditions, using descriptors that recognize the regeneration of disturbed areas
- describe predicted revegetation rates at locations with differing past, present, and foreseeable disturbance levels throughout the Pine Point property
- describe any known past reclamation or remediation efforts at the site
- describe how the consideration of current rates of vegetation regeneration has been incorporated into proposed mitigation predictions
- describe how the succession and predicted trend of vegetation regrowth will interact with progressive reclamation during all project phases

4.2.5. Birds and their habitat

Birds were identified early in the environmental assessment as a component of high importance by the developer, governments, and Indigenous groups. Issues related to birds were included in written Online Review System submissions as well as in technical and community scoping sessions. Traditional harvest of birds (such as ducks, geese, etc.) is of particular importance to Indigenous groups in the vicinity of the Project, as noted in multiple community scoping sessions. Bird species are highly mobile and affected by human disturbance, and can be good indicators of ecosystem health and diversity, inhabiting a wide range of habitats. Migratory birds are subject to considerations under the federal *Migratory Birds Convention Act, 1994*.[1]

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, including the Wildlife Protection Plan Framework (Tables 2 and 3), section 3.3.9.6 of the Existing Environment volume, Table 11 in the Project Interactions volume, and section 4.2.1.9 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will:

[1] For clarity, the word "birds" in this ToR includes migratory birds.

- describe the interactions between the Project and birds (migratory and non-migratory) and their habitat, due to Project components and activities, for all phases, considering:
    - site preparation and vegetation removal
    - deposit of harmful substances in waters or wetlands frequented by migratory birds
    - construction and operation of tailings disposal facilities (that is, tailings ponds), wastewater ponds, or other ponds containing process liquids or substances harmful to birds
    - construction and operation of aerial structures, including transmission and distribution lines
    - changes to the aquatic flow regime and sediment load
    - changes to the atmospheric, acoustic, and visual environments (such as from noise, vibration, lighting, air emissions and dust)
    - site reclamation activities and landscape features, including quarry stockpiles and wetlands (natural or constructed)
    - possible changes to contaminant concentrations (as per the proposed Human and Ecological Health Risk Assessment [see section 4.3.7])
    - any other Project activity or component that may occur during critical periods or restricted activity periods for birds
- describe and quantify, where possible, potential effects of the Project on migratory and non-migratory birds, their eggs and nests – including on species at risk, priority Bird Conservation Region species, and those important to Indigenous and local communities. The developer will consider potential changes to:
    - habitats important for nesting, foraging, staging, overwintering, rearing and moulting
    - movement corridors between habitat, and on habitat loss, fragmentation and structural change. Provide maps showing important habitats that were considered, including forests, riparian zones, wetlands and other similar geological formations, and open waters
    - bird-habitat relationships, including avoidance of habitat, and any change in diversity, abundance, and density, including at the population-level, for birds that use the various habitat types or ecosystems
    - mortality risk, including as a result of collision with any Project infrastructure and vehicles, and as a result of indirect effects (such as an increase in the ease of movement of predators) in the prediction of mortality effects
    - relative abundance, distribution, and daily or seasonal movement patterns, due to increased disturbance (such as sound, artificial light, presence of workers), considering the critical periods for birds (such as breeding, nesting, staging, stopover, migration and overwintering)
    - contaminants and bioaccumulation of contaminants, including those that may be consumed by Indigenous communities
- provide an assessment of the availability of species for traditional use purposes that is detailed enough to carry results into the assessment of effects to Indigenous Land Use (4.2.8), and that takes into consideration the community-led Indigenous Knowledge study

- demonstrate how the developer will consider the timing of vegetation removal and construction to avoid the main breeding season or other critical periods for birds
- describe technologies and approaches to minimize the impacts of tailing ponds on migratory birds that may come into contact with process affected waters, if applicable. If not applicable, provide justification including a detailed description and evidence supporting lack of harm to birds from direct contact with tailings/process waters
- describe measures that will be implemented to help prevent adverse effects identified above to migratory birds and non-migratory birds, including species at risk, their eggs and nests, or through effects to their habitats. Include a description of measures applied during sensitive periods and in sensitive locations, such as avoiding logging/clearing activities during roosting season, avoiding lights at night during key migration peaks and avoiding excessive loud noises, vibration or blasting during breeding season
- describe the deterrent systems that will be used to help prevent impacts on migratory and non-migratory birds due to, for instance, attraction to tailings ponds, wastewater ponds, quarries and other steep slopes of certain angles, manmade structures, or other areas with open water on local and regional study areas
- provide an appropriate selection of valued component bird species representative of bird diversity in the area in consultation with ECCC, GNWT-ENR and Indigenous groups.

4.2.6. Moose, furbearers and other wildlife

Wildlife has great value to Indigenous communities and people in the area of the Project, both intrinsically and for human use. This was highlighted in many submissions and on-line and in-person scoping sessions with the Review Board. The developer in the EA Initiation Package has noted explicitly that moose (in particular) and other furbearers (that may not have been all identified) are likely of high importance for Indigenous Peoples. Concern over potential adverse impacts to all wildlife and wildlife habitat, but particularly those of high traditional use (such as moose and furbearers) were noted in the technical EA scoping session, and extensively in community scoping sessions. Responsible stewardship and conservation of all wildlife and harvested species in particular is an important part of Dene teachings.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, including the Wildlife Protection Plan Framework (Tables 2 and 3), appropriate sub-sections in 3.3.9 of the Existing Environment volume, Table 11 in the Project Interactions volume, and section 4.2.1.9 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will describe:

- the rationale and methodology for the selection of species as VCs, in consultation with affected Indigenous groups, with a particular emphasis on moose and other fur-bearing mammals that frequent the area
- the effects that each project component may have on moose, furbearers, wildlife and wildlife habitat valued components, which will include:
    - potential direct effects to habitat with a quantification of that effect, for each VC
    - potential indirect effects to habitat with a quantification of that loss, for each VC

    - potential effects to VCs from project-related vehicle traffic on Territorial Highway 5
    - direct and indirect sources of mortality (e.g., vehicle-wildlife collisions, human interactions)
    - potential effects of dusting, originating from project operations, on wildlife habitat
    - possible increased attraction to the Project
    - sensory disturbance (such as noise, light, odour, and viewscape) to reduce habitat suitability or effectiveness
    - disruption or changes (daily or seasonally) to wildlife movements and migration patterns, population cycles, home ranges, distribution and abundance
    - disruption or changes to predator-prey relationship
    - possible changes to contaminant concentrations (as per the proposed Human Health and Ecological Risk Assessment)
    - bioaccumulation of contaminants from all sources within the food chain (including, vegetation, water, sediments, and air) – this may also link to the proposed Human Health and Ecological Risk Assessment
    - physical barriers to wildlife resulting from construction and operation of the Project
  - impacts to moose and other furbearers of importance to Indigenous groups, including changes in human access including traplines and other means of access (such as roads and abandoned seismic cutlines), and changes in ability to harvest moose and other furbearers for traditional use. This should be a primary pathway, and sufficiently detailed to carry results into assessment of effects to Indigenous Land Use (4.2.8)
  - provide an assessment of the availability of species for traditional use that is sufficiently detailed to carry results into the assessment of effects to Indigenous Land use (4.2.8), and incorporates Traditional Knowledge of habitat sites, in coordination with the community-led Traditional Knowledge study
- impacts of project activities on predation (particularly of moose and other furbearers), considering the Project and cumulative impacts

The developer will describe overall how impacts to moose, furbearers and other wildlife will be mitigated. This will include a description of how mine site planning has considered potential effects on wildlife and wildlife habitat in its design, and how Project design and management will avoid predator attraction and bear/human interactions.

A draft wildlife management and monitoring plan (WMMP), including moose and furbearers,[1] will be included in the DAR. This plan should integrate population data and harvest levels.

To predict impacts of the Project on moose harvesting, the developer will include a moose harvest model applicable to the Project area. This model should incorporate changes in habitat availability, movement, wolf predation and caribou and moose demographics, to relate habitat loss to sustainable moose harvest. This would serve as a framework to assess impacts on sustainable moose harvesting. The developer should work with GNWT-ENR to develop the model.

[1] as well as caribou, migratory birds, waterfowl, whooping crane and others as determined in cooperation with GNWT

4.2.7. Boreal caribou

Caribou have also been essential to the Dene way of life since time immemorial, and were identified early in the environmental assessment by Indigenous groups and the developer as an essential valued component to monitor impacts on. Previous assessments of the project area identified caribou use in the area, and activity of boreal caribou has expanded over time as disturbance levels at the site subsided and revegetation and forest successional changes began to occur. Boreal caribou were mentioned multiple times in technical and community scoping sessions, as well as in written submissions from all levels of government and Indigenous groups.

Boreal caribou are listed as a threatened species in the NWT under both territorial and federal species at risk legislation, requiring special consideration highlighted in this as well as the species at risk section that follows. Boreal Caribou were once abundant on the NWT landscape and are highly sensitive to human development and disturbance, and thus generally understood to be a good indicator of ecosystem integrity in healthy boreal forests. Caribou in the southern NWT have been particularly affected by human and natural disturbance, with documented population declines. The *Boreal Caribou Range Planning Framework* for the NWT states that one of its explicit goals is to "strive to increase the amount of undisturbed habitat in that region <southern NWT> over time

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, including the Wildlife Protection Plan Framework (Table 3), 3.3.9.2.1 and other appropriate sub-sections (3.3.9.2.3, 3.3.9.3.2, for example) in the Existing Environment volume, Table 10 in the Project Interactions volume, and section 4.2.1.8 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. With respect to the description of effects on caribou, the developer will:

- provide an assessment of potential adverse effects on boreal caribou habitat
- describe any sensory disturbance (e.g. noise, vibration, light, smells) that could affect caribou and assess if this could lead to abandonment or reduced use of habitat
- determine whether the Project is expected to result in a reduction of connectivity within or between the ranges and provide a rationale for the conclusion
- evaluate effects to habitat and habitat connectivity at multiple spatial scales using quantitative methods (for example, habitat quality analysis), in consultation with government (GNWT-ENR and ECCC) on appropriate scales
- evaluate potential effects to existing movement corridors from Project development
- determine whether the Project is expected to result in increased predator and/or prey access to caribou habitat (by increased vegetation disturbance and linear access corridors, for instance), the effects this access may have on caribou populations, and a rationale for any conclusions, with special consideration of moose and wolves
- evaluate the effects on the population at appropriate spatial scales (as noted in the baseline section (Appendix C), and in discussion with GNWT-ENR and ECCC) by providing:
    - the best available information regarding population size and trend
    - an assessment of the potential adverse effects of the Project on population status (size and trend)

    - an assessment of the potential adverse effects on boreal caribou (such as sensory disturbance, mortality and pollution), including Indigenous harvesting
- engage in ongoing consultation with GNWT, ECCC and Indigenous groups regarding the Pine Point population status and state of its health, given its potentially precarious status and limited connectivity corridors to other suitable habitat in the area
- evaluate as a primary pathway, changes in human access and caribou harvest as a result of the Project, in consultation with communities and the Traditional Knowledge study
- include an appropriate timescale to measure effects to caribou, in consultation with appropriate regulators and Indigenous groups. The timescale should be reflective of realistic habitat reclamation for caribou, which is highly sensitive to disturbance and may be longer than for many other species
- add the following reasonably foreseeable developments in the NT1 range of boreal caribou to those mentioned in the Developer's EA Initiation Package: Digaa Enterprises (forestry), the Mackenzie Valley Highway Project, Canadian Zinc Mine and All-season Road, and forestry operations at Jean Marie River. (Removal of the Yellowknife City Gold Project and Giant Mine Remediation Project from the developer's proposed list of other projects to be considered is acceptable).
- determine possible changes to contaminant concentrations (as per the proposed Human Health and Ecological Risk Assessment) as a result of the Project
- link any relevant work to GNWT's recently released *Boreal Caribou Sustainable Harvest Assessment*
- describe overall how impacts to boreal caribou will be mitigated, and the mitigation hierarchy considered (as per the GNWT Framework for Boreal Caribou Range Planning -- avoid, minimize, restore or offset)
- work with GNWT-ENR and/or ECCC to identify options for prioritized habitat restoration, in consideration of the *Framework for Boreal Caribou Range Planning* and ongoing draft southern NWT caribou range plan, considering examples from recent work in neighbouring Alberta, British Columbia and other relevant jurisdictions
- describe how developer will prevent or fully mitigate any impacts to boreal caribou that may use both the project area and Wood Buffalo National Park

4.2.8. Species at risk considerations

Species at risk in the NWT are subject to territorial and federal species at risk legislation and its requirements. Environment and Climate Change Canada and Parks Canada have also expressed explicit concern in the technical scoping session and in written comments on the Online Review System in relation to potential impacts on *Species at Risk Act* -listed species. Biodiversity is inherently valuable provides many benefits to people (ecosystem services). Species at risk legislation requires developers to provide special consideration to species at risk in project planning. The federal Section 79 of the *Species at Risk Act* requires the Review Board to consider impacts to species at risk its environmental assessments.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, including the Wildlife Protection Plan Framework (Tables 2 and 3), appropriate sub-

sections in 3.3.9 of the Existing Environment volume including 3.3.9.1, Table 10 and 11 in the Project Interactions volume, and section 4.2.1.8 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will:

- describe the potential direct, incidental and cumulative (in combination with impacts from past, present and reasonably foreseeable developments) adverse effects of the Project on species at risk listed under Schedule 1 of the Federal *Species at Risk Act* and, where applicable, its critical habitat (including its extent, availability and presence of biophysical attributes)
- describe the potential adverse effects of the Project on species protected by territorial statutes, and those assessed by the Committee on the Status of Endangered Wildlife in Canada as extirpated, endangered, threatened or of special concern (flora and fauna), that are not currently listed under the Federal *Species at Risk Act.*
- identify critical timing windows (such as denning, rutting, spawning, calving, breeding, roosting), setback distances, or other restrictions related to these species
- identify territorial or federal permits or authorizations that may be required in relation to the species at risk
- describe all reasonable alternatives within the Project that would avoid the potential effect on species and their habitat, with particular attention to critical habitat
- describe all feasible measures that will be taken to avoid or lessen the impact of the Project on the species and its critical habitat
- describe the residual effects that are likely to result from the Project after avoidance and minimization measures have been applied, including the extent, duration and magnitude of the effects
- describe the area, biophysical attributes and location of habitat including critical habitat affected (e.g., destroyed, permanently altered, disrupted); describe all feasible measures that would betaken to eliminate the effect of the work or activity on species and their habitats, including critical habitat
- provide an account of how the Project and mitigation measures are consistent with the recovery strategy, action plan, or management plan for the species.

4.2.9. Whooping crane

In addition to the above requirements for birds, additional information is required for whooping crane. Whooping crane are endangered globally and have the highest at-risk status under Canada's *Species at Risk Act*, which describes them as "facing imminent extirpation or extinction". The requirements of the federal and territorial *Species at Risk Act* apply, as do the federal-territorial cooperation requirements of the Accord for Species at Risk Protection. In addition to its requirement to protect significant impact on the environment under the *MVRMA*, the Review Board has legal requirements under section 79 of Canada's *Species at Risk Act* that apply to whooping crane. In scoping, ECCC and Parks Canada requested that whooping crane be assessed as a key line of inquiry in this EA. The developer has noted that whooping crane was a key species of concern that led to ECCC's referral of the Tamerlane Pine Point

Pilot Project, in the same location, to an environmental assessment in 2005.[1] Parks Canada and ECCC jointly submitted multiple written comments regarding whooping crane for this EA.

Whooping crane are of particular significance in the southern Northwest Territories as they are specifically identified as a "key characteristic contributing to the criteria that defines the Outstanding Universal Value of Wood Buffalo National Park as a UNESCO World Heritage Site". Wood Buffalo National Park contains the only self-sustaining breeding habitat for whooping crane today in the world, but whooping crane have been documented as expanding their breeding and nesting habitat outside of the park in the NWT (possibly reflecting the northern range expansion of many species in response to a warming climate). Preventing impacts on whooping crane is an important part of preventing impacts on Wood Buffalo National Park.

Given their precarious status as an endangered species at risk, and the *Species at Risk Act*, effects to whooping crane and any potential critical habitat will be examined closely and given special consideration.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, including the Wildlife Protection Plan Framework (Tables 2 and 3), 3.3.9.1 and 3.3.9.6.2 of the Existing Environment volume, Table 11 in the Project Interactions volume, and section 4.2.1.9 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will:

- develop reasonable assessment boundaries for whooping crane, in consultation with ECCC, Parks Canada and GNWT-ENR, that account for direct and indirect effects to whooping crane, are justifiable and reflect the Aransas-Wood Buffalo population goals and crane habitat expansion. This may take the form of a watershed and sub-watershed approach for the local study area and regional study area.
- describe monitoring programs to detect whooping crane
- describe any potential effects on whooping crane, considering the information collected regarding whooping crane habitat use. This should include direct and indirect effects, and include: changes to available habitat (breeding and non-breeding) from dewatering or other activities, potential exposure to contaminants in food or water, increased predation, sensory disturbance (such as noise (blasting), risks from power lines, increased traffic (including air traffic)
- describe overall how impacts to whooping crane will be mitigated
- describe how the developer will prevent or fully mitigate any Project impacts to whooping crane that may use both the project area and Wood Buffalo National Park, in particular[2]

[1] developer's EA Initiation Package, Volume 3 - Description of Existing Environment. p. 61

[2] Wood Buffalo National Park is the largest National Park in Canada and a widely recognized UNESCO World Heritage Site. It contains the only self-sustaining breeding habitat for whooping crane today in the world. Whooping crane are specifically identified as a "key characteristic contributing to the criteria that defines the Outstanding Universal Value of Wood Buffalo National Park as a UNESCO World Heritage Site".

4.3. Assessing impacts on people and communities

Each community and Indigenous group has a different context and different relationships between people and the land, which affects how they experience impacts. Understanding and assessing these impacts will require close work with communities and Indigenous groups. To meaningfully assess impacts on people and communities, the developer will engage with communities to determine the appropriate scale (for example, at the scale of each Indigenous group, each community, or the region) and focus of each impact being assessed.

For example, the developer may choose (based on engagement) to assess one valued component overall at a regional scale, while assessing group or community-specific impacts identified during engagement. For another valued component, the majority of the assessment may need to occur separately for each Indigenous group.

The Review Board recognizes that different groups may experience impacts from the Project differently (including women, Indigenous Peoples, youth, and Elders). For each of the following sections in section 4.3, the developer will assess how each subgroup will be affected by the Project. This will include a GBA+ analysis, including impacts on LGBTQ+ and two spirited people.

Where appropriate, the developer should consider the impacts in sections 4.1 and 4.2, and how they relate to the impacts in this section. This will form a basis for assessing impacts holistically in section 4.4.

4.3.1. Indigenous land use

Indigenous traditional land use is a suite of important cultural activities that not only provide a source of food and medicine for many people, but also serve as a way of sharing and transferring cultural knowledge, values, skills, and virtues. Being on the land for harvesting, health, spiritual, or ceremonial purposes provides an important connection to the land and water for Indigenous Peoples. It is vital to the well-being of Indigenous Peoples that they can continue to safely use the land in the future.

The Review Board and parties need to understand how the Project could affect Indigenous land use, and particularly traditional harvesting by nearby Indigenous groups. Changes to traditional harvesting could included impacts on fishing, hunting, and trapping of wildlife, or gathering of plants for human uses (such as for food, medicine, and ceremonial purposes). Understanding impacts on Indigenous land use also requires consideration of the authenticity of the experience of being on the land, and of access to harvesting locations, drinking water, and camps or cabins.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.4.2 of the Existing Environment volume, Table 13 in the Project Interactions volume, and section 4.2.2.2 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will assess the following potential impacts of the Project on Indigenous land use:

- how any changes to the future availability, distribution, and quality of country foods and traditional medicines will affect Indigenous land use, including:

    - impacts of any changes to air or water quality on berries, medicines, or other traditionally harvested plants and resulting impacts on traditional harvesting (consider the results of the vegetation, atmospheric, and water assessments)
    - impacts of any changes to air, water quality, or other sources of disturbance or contaminants from the Project on birds, fish, moose, furbearers, caribou, or any other harvested wildlife, and the resulting impacts on traditional harvesting (consider the results of the atmospheric, water, birds, fish, moose and furbearers, and caribou assessments)
- changes to access levels, including increased access to certain areas or changes to existing trails and waterways
- changes to harvesting and gathering, including travel patterns, from changes to access, people's travel patterns, costs, seasonality, or spare time (for example, for people who work and live at the mine part time)
- economic burdens from increased time required to practice traditional activities
- how changes could affect food security
- changes to culturally important species
- increased hunting and fishing pressures (including by the Project workforce and by non-Indigenous harvesters) and how this could affect valued harvested species and locations
- changes to the perception of and connection to the land (including observed experience on the land) by traditional users, including any impacts on the safety, quality, and health of the area
- changes to the authenticity of the experience of being on the land (for example, from changes to air quality, noise, vibrations, light, odour, habitat fragmentation, or visual aesthetic) (consider the results of the assessments on the atmospheric, acoustic, and visual environments)
- people avoiding the area near the Project (for example, people changing which trails they use or where they fish to avoid being in proximity to the Project)
- changes to the safety of people using the area when there is active mining
- changes in the quality and availability of water for drinking and cultural uses (consider the results of the water assessments)
- changes to access or enjoyment of cabins, permanent residences, and camps
- changes resulting from changes to transmission of Traditional Knowledge, language, community tradition of sharing, and community cohesion (consider the results of the cultural assessment)

The developer should describe the methods used to collect information on Indigenous land use, particularly the involvement of Indigenous Governments, communities, and groups. It should also describe how traditional land and resource use and cultural values informed the biophysical assessment and how the biophysical assessments were integrated into the Indigenous land use assessment. The developer should describe any mitigation relevant to minimizing or avoiding impacts on Indigenous land use, including mitigation for other parts of the environment. For example, the developer should describe what it will do to help local people trust that the water is clean and the land is healthy.

4.3.2. Other land uses

Other land uses include human occupancy and use of the land in the project area. For example, seasonal cabin locations, travel routes, and activities like commercial fishing, non-Indigenous hunting and fishing, tourism and outfitting, and other outdoor recreation. Access to and enjoyment of activities like this can be important factors in the quality of life and well-being of people in the region.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, in section 3.4.4 of the Existing Environment volume, Table 19 in the Project Interactions volume, and section 4.2.2.4 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will assess the following potential project impacts on other land uses:

- changes to the types and frequency of land use activities in the area, including new activities made possible through increased access
- changes to recreation, hunting, and fishing, including new access (if any), changes to travel routes through the area, or changes to the abundance and distribution of harvested species (consider the results of the wildlife and fish assessments)
- impacts on commercial fishing on Great Slave Lake
- changes in access to or use of seasonal cabins or other recreational locations
- changes due to project impacts on air quality, noise, vibrations, light, odour, habitat fragmentation, or visual aesthetic (consider the results of the atmospheric, acoustic, and visual environment assessments)
- changes to tourism or outfitting
- changes in the quality and availability of water for drinking and recreational uses (considering the results of the water assessments)
- avoidance behaviour near the Project (for example, people changing which trails they use or where they fish to avoid being in proximity to the Project)
- changes to the safety of people using the area when there is active mining
- effects to waterways and navigation (consider the results of the water assessment)

The developer should describe any mitigation relevant to minimizing or avoiding impacts on other land uses, including mitigation for other parts of the environment.

4.3.3. Heritage resources

Heritage resources in environmental assessment typically indicates any remains or indicators from past human activities, including burial sites, artifacts, old dwellings, or other archaeological or historic sites. Heritage resources provide a link between the past and the present. Depending on the nature of the heritage resource, its importance may range from being a point of interest to being of significant cultural and spiritual importance. Carefully examining the heritage resources in the area, and understanding how the Project may impact those resources, is an important part of understanding effects on Indigenous People's culture, well-being, and Indigenous land use.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.4.1 of the Existing Environment volume, Table 12 in the Project Interactions volume, and section 4.2.2.1 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will assess the following related to heritage resources:

- the potential for disturbance or physical damage to known heritage resources
- how the Project may change the access to heritage resources
- how any heritage resources (known or newly discovered) near the Project will be preserved, managed, and documented, including how community members will be involved in determining appropriate mitigation for individual sites
- how Traditional Knowledge has been incorporated in the assessment of cultural and heritage resources in the area
- the potential for new physical heritage resources to be discovered on the project footprint, including a description of:
    - protocols, contingency plans, and training related to how workers will recognize and respond to a newly uncovered heritage resource
    - how Indigenous communities will be notified of and involved in any discoveries of cultural or heritage resources

The developer should describe any mitigation relevant to minimizing or avoiding impacts on heritage resources, including relevant mitigation from other parts of the environment (such as erosion control measures).

The Review Board agrees with the GNWT that the number and quality of archaeological sites are not useful measurement indicators for determining whether the assessment endpoint of *preservation of heritage resources* has been met. Neither the number nor the quality will indicate whether a site has been preserved, and these are also not appropriate measurement indicators for heritage resources that are not specific sites (for example, spiritual places, culturally important landscape features). The developer should identify new measurement indicators that can indicate whether that assessment endpoint (preservation) has been met. For example, *physical changes to heritage resource sites, community concerns regarding heritage resources*, *changes to the value or importance of heritage resources,* or *sites successfully avoided or mitigated* would all give a better indication regarding the preservation status of heritage resources.

4.3.4. Culture

Culture is a complex concept that includes customs, social institutions and practices, beliefs and values, arts and achievements, and many other intangible ideas. It goes far beyond sites and artifacts typically considered under heritage resources, to also include language, Traditional Knowledge, teaching and ceremonial locations and customs, law, and more. Indigenous culture is unique to each Indigenous group, though there may be common grounds, like respect for Elders and sharing of food.

Assessing impacts of the Project on culture includes intangible cultural resources, like language and customs, that are needed to help transmit culture between generations. Understanding the impacts of

the Project on culture also requires careful consideration of impacts on other parts of the environment, particularly Indigenous land use, social and community conditions, and heritage resources. This work is an important part of understanding overall impacts on well-being. It will require the developer to work with culture holders of individual Indigenous groups and communities to identify, characterize, and assess the impacts on culture.

In preparing its DAR, the developer may use and combine any information already gathered in its EA Initiation Package as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C. The developer will assess potential impacts from the Project related to culture, including:

- community concerns (for example, cultural and heritage resources, connection of future generations to the land, and so on)
- changes to value of cultural and heritage resources (consider the results of the heritage resources assessment)
- changes to sacred, ceremonial, or culturally important places (consider the results of the heritage resources assessment)
- changes to valued places, things and practices
- changes to cultural continuity and how knowledge is transferred to future generations
- impacts due to increased participation in the wage economy
- how the developer can avoid repeating legacy impacts on people from past mining
- how any project impacts on culturally important species or harvested species could affect culture
- any additional cultural impacts identified during engagement with communities

The developer should describe any mitigation relevant to minimizing or avoiding impacts on culture, including how Indigenous government, communities and groups were involved in identifying appropriate mitigation. Describe relevant mitigation for other parts of the environment.

Some questions related to potential impacts on culture are best answered by Indigenous groups. The Review Board plans to issue information requests on this subject to potentially affected Indigenous groups, while the developer is preparing its DAR.[1] The topics of these information requests will likely include potential impacts of the Project on:

- inherent value, spirituality, or importance of cultural and heritage resources
- use of language or place names
- stories or traditions
- Indigenous law
- ability of Indigenous groups to govern, manage, and be stewards of the land or water
- values and sense of place on the landscape
- cultural continuity and transfer of knowledge
- cultural strengths and vulnerabilities

[1] The Review Board will first engage with potentially affected Indigenous groups regarding their ability to respond and practical timing details.

Once Indigenous groups' responses to these information requests are submitted, the developer will consider these and provide its own views to the Review Board.[1] The developer will assess the Project's potential impacts related to these topics based on 1) its own ongoing and planned engagement with Indigenous groups, 2) the Review Board's engagement, and 3) the responses to Review Board information requests.

4.3.5. Social and community conditions

The social and community characteristics of the places people live have a strong effect on their day to day lives. The cost of living, social structures in a community, quality of schools, availability of emergency services, and condition of roads, and many other things, all contribute to people's quality of life in the space they live – and to their overall well-being. Transportation infrastructure and emergency response services are also important between communities, particularly for this project because it is located along a highway. Although social and community impacts from a project could be direct, they can also be the result of indirect, additive changes to other parts of the environment. It is important to consider the results from all other relevant assessments in Chapter 4 to understand the social and community impacts.

When assessing the social and community impacts of the Project, the developer should consider social 'lessons learned' from other similar projects, including past mining at the Pine Point site. This could be useful for identifying pathways of effect and appropriate mitigation. The developer should also describe in detail the work schedules, living arrangements, and transportation of workers to the camp, including how much access project crews will have to nearby communities during each phase of the Project.

As part of assessing impacts on people, in this section and elsewhere, the developer should particularly consider how vulnerable groups within the community could be particularly affected by the Project.[2]

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.4.3 of the Existing Environment volume, Tables 14 and 18 in the Project Interactions volume, and section 4.2.2.3 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will assess the following related to social and community conditions:

- overall Project impacts on social indicators, social structures, and way of life
- increases or decreases in local and/or regional populations, including the potential for speculative migration within or into the area
- how changing population and settlement patterns could affect:
    - social service providers
    - the social and cultural make-up of communities

[1] If responses to these information requests are available at a time allowing the developer to consider them in the DAR, it will do so. If the responses are not available early enough in the EA process for that, then the developer will be given an opportunity to provide its views and update its impacts predictions later.
[2] For example, see Call to Justice 13.1 of the *Inquiry into Murdered and Missing Indigenous Women and Girls*.

- impacts of changes to the cost of living in the area (consider the results of the economy and employment assessment)
- anticipated benefits and adverse impacts to different communities and subgroups within communities, including how the effects resulting from increased cash flow may affect local social infrastructure
- social impacts of income inequity and uneven distribution of benefits within communities
- potential for the Project to intensify social divisions or reduce community cohesion
- social impacts on family or household cohesion (for example, from mine work schedules and housing, with workers staying on site for two weeks)
- social impacts of worker transportation to site (considering method of travel and pick up locations)
- potential for the Project to worsen existing social issues in communities (such as alcohol and drug use, prostitution, sexually transmitted infections, crime, gambling, domestic violence, ethnicity or gender-based violence, racism, housing pressures, education access/quality/level of completion) due to:
    - increased disposable income
    - the presence of a nearby workcamp
    - other project-related changes
- impacts on the safety of Indigenous and non-Indigenous women, girls, LGBTQ+ and two-spirited people
- any potential for increased accidents or emergencies due to increase public access to the mine area
- how boom and bust cycles of mining can affect social and community conditions in remote Indigenous communities
- stress factors that may result from concerns regarding public safety or disturbances to normal daily activities (changes to viewscape, noise, traffic) (consider the results of the acoustic and visual aesthetic assessments)
- how the Project could affect people's levels of stress, feelings of isolation or remoteness, concerns for future generations, or powerlessness associated with development
- other psychosocial impacts (such as reductions in people's ability to cope, their sense of control, or feelings of safety of their environment)
- changes to local and regional infrastructure, facilities, and services (including people's ability to access these services and the capacity of community government human resources to offer these services) during all stages of the Project due to increased population pressure or other project related changes on:
    - accommodation and lodging (affordability, availability, appropriateness, crowding, home value and home ownership) including camping facilities and remote workforce accommodation facilities
    - access to green space, recreation, and parks
    - road infrastructure and traffic safety, including any predictions regarding highway maintenance or rerouting, and traffic volumes.
    - emergency services, including any changes to fire, police, or ambulance services

- health and social services (including physical and mental health), including the increased use of health services and related social services in each community
- education services, facilities, and day care
- utilities
- water and sewer services
- solid waste services
- recreation facilities
- local and regional transportation network and associated infrastructure

When assessing impacts on local and regional infrastructure, facilities, and services, the developer should consider all available information, including public information, responses to the Review Board's information requests[1] and comments during the developer's engagement. The developer should consider how the project could affect the demand for and capacity of services and infrastructure, as well as people's ability to use and access services and infrastructure.

The developer should describe any mitigation relevant to minimizing or avoiding impacts on social and community conditions, including mitigation for other parts of the environment and mitigation specific to certain communities. This should include:

- any programs, policies, or commitments to protect and promote individual, family and community wellness.
- any actions the developer may take or plans it may create to manage social impacts during closure and post-closure (for example, a social and cultural adaptive management plan or social and cultural preparedness plan)
- employee drug and alcohol policy
- any policies and programs related to the camp workers or camp security
- any need for new or expanded services, facilities, and infrastructure as a result of project-related impacts
- any plans or procedures for contributing to the maintenance of infrastructure used by the Project or for working with local governments to limit impacts on social and community services

4.3.6. Economy and employment

The Project has the potential to lead to many beneficial economic impacts that could improve the lives of people who live nearby. Some of these changes could also lead to adverse impacts such as income inequity and social divisions, or undesirable changes to the non-wage traditional economy. Understanding how the Project will affect economics and employment is an important part of assessing the overall impacts on well-being. The Review Board and parties need to understand what effects (both adverse and beneficial) will occur, as well as how those impacts will be distributed among communities, populations, and vulnerable groups, and how any adverse impacts will be mitigated.

[1] See section C-20. Social and community conditions, in Appendix C: Baseline information. If responses to these information requests are available at a time allowing the developer to consider them in the DAR, it will do so. If the responses are not available early enough in the EA process for that, then the developer will be given an opportunity to provide its views and update its impacts predictions later.

The developer will assess the potential economic effects of the Project on potentially-affected communities and populations. The developer should consider whether the Project will make economic issues better or worse and should describe any mitigation measures for adverse impacts, as well as any opportunities to enhance the benefits of the Project and complement any other community goals or aspirations.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package in section 3.4.3 of the Existing Environment volume, Tables 15 and 16 in the Project Interactions volume, and section 4.2.2.3 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will describe:

- employment and procurement opportunities by mine phase (including the basic training and skills required for different positions)
- any relevant current or forthcoming socio-economic initiatives or agreements,[1] including a socio-economic agreement with the GNWT, that aim to maximize benefits in the NWT

The developer will assess the following related to the economy and employment:

- short and long-term direct, indirect, and induced economic effects of the Project
- availability of local workforce, considering both direct and indirect employment opportunities and contracting opportunities, including:
    - availability of workers with the right skills and training by community, region, and in the NWT
    - the potential for labour shortages
    - direct and indirect effects from displacement of workers
    - the potential for increasing employment, wages, and income for underrepresented groups and for local workers
- impacts of training, employment, and procurement at local and territorial scales, including:
    - the most-affected communities
    - NWT residents and businesses
    - NWT Indigenous residents
- barriers to employing, retaining, or advancing Indigenous people and other northern residents, including how training and skill gaps that hinder employability for the Project could be resolved
- how criminal records may limit employment, and whether the developer will consider hiring people with criminal records
- how training provided to employees may affect future employment opportunities
- how well positioned communities and Indigenous Peoples in the Project area are to benefit from direct and indirect contracting and business opportunities

[1] The Review Board understands that some of the details of these agreements may be confidential, but requires that it be made aware of the existence of such agreements and be provided with a description of the topics covered in the agreement.

- anticipated local, regional, and Indigenous participation compared to the total project requirements (for workers, wages and income, and contacts)
- anticipated direct, indirect, and induced wages from the Project
- products and services required over the life of the mine, including estimated procurement and contract values and how those opportunities will be attributed (including for local and Indigenous)
- potential impacts from boom-and-bust cycle of mining
- any potential effects on the traditional economy, include potential for losses related to subsistence and any economic burdens on Indigenous land users who may have to travel further for or lose some opportunities for hunting, fishing, trapping, and gathering (consider the results of the Indigenous land use assessment)
- how the Project would affect gross domestic product at the federal and territorial levels
- predicted government revenues from the Project, including royalties and federal and provincial tax payments
- any potential effects related to inflation on local economic conditions, including changes to property values and cost of living.

The developer should describe any mitigation relevant to minimizing or avoiding impacts or to enhance benefits on the economy and employment. This may include:

- any practices, plans, or actions taken to increase education, training, hiring, and advancement of Indigenous people, poorly represented groups (such as women and single parents), or marginalized groups
- any initiatives to encourage advancement of Indigenous and NWT resident employees within the company
- any commitments to promoting gender parity
- any cultural awareness or competency training, and how those programs were developed
- any plans, programs, or policies to encourage local and Indigenous contracting and procurement
- any anti-harassment policies and procedures
- any additional mitigation measures to prevent adverse effects disproportionately affecting Indigenous and vulnerable groups
- any plans for actively soliciting and ensuring the confidentiality of complaints and encouraging suggestions, and how complaints and suggestions will be addressed
- any plans for annual reporting on hiring, employment, value of goods and services, participation in training, terminations, business forecasts, or other information

The Review Board supports the GNWT's suggested approaches to enhance the capacity of the labour force, and to increase skills relative to the labour market, and encourages the developer to consider:

- supervisor and mentor training
- on-the-job training and advancement opportunities for all employees
- participation in apprenticeship and trades training and ensuring the necessary work hours for employees to achieve trade and/or occupation certification

- on site apprenticeship and trades training opportunities including a salary and time off while away taking technical training
- on-site literacy, financial management, health, wellness, Workplace Hazardous Materials Information System, and Safety, Health and Environment training programs
- training programs schedule, including literacy, so potential employees will be ready and prepared to take advantage of immediate employment opportunities
- training for new employees
- professional development opportunities for all employees to facilitate career advancement
- programs and initiatives that address barriers to hiring and retaining employees including Local Study Area residents, women in non-traditional jobs, and/or single parents that support their participation in the workforce
- cultural awareness and diversity training to recognize, respect and support cultural differences
- an approach to addressing limited training capacity in the communities and access to training
- ability to meet Northwest Territories hiring goals based on the local study area or Northwest Territory communities' employment pool and degree of workplace readiness
- training, recruitment and retention approaches and incentives
- identification of potential training and development partners

4.3.7. Human health

Human health is a key component of understanding how the Project will affect people. Understanding the impacts on human health will require close work with communities and must consider the different context and experiences of Indigenous Peoples and diverse or vulnerable subgroups within each community. Human health refers to both physical and mental health, which are also closely tied to community, environment, and quality of life. Understanding human health is a key component of understanding how the Project may affect people's long-term well-being.[1] The developer should consider the results of all other relevant effects assessments in the DAR when assessing impacts on human health.

In preparing its DAR, the developer may use and combine information already gathered in its EA Initiation Package, in section 3.4.3 of the Existing Environment volume, Table 17 in the Project Interactions volume, and section 4.2.2.3 of the *Developer's Assessment Proposal* as part of meeting the requirements set out in this section of the Terms of Reference and relevant guidance in Appendix C.

The developer will assess potential impacts on human health, considering interconnections between all the other valued components in chapter 4. Once the most likely pathways of effects on human health

[1] The Review Board acknowledges the overlap between health and well-being. Both require holistic assessment and must consider the results of other valued component assessments. However, the questions asked are not entirely the same and the intention of the sections is different. Understanding impacts on human health is about how the project could affect physical and mental health at individual and population levels. This is just one aspect of well-being, which must also consider things like economic resilience, cultural strength, and vibrant community. Each community may define well-being and its most important aspects differently. The Review Board notes that it is up to the developer to decide how it will present the information in its assessment, as long as it meets the requirements of the ToR.

have been identified, consider which determinants of health should be used to understand impacts of the Project on health would be most appropriate for identifying those changes. If necessary, identify new indicators that can detect changes from those pathways. The developer must work closely with potentially-affected communities and groups to identify appropriate indicators or determinants and to understand impacts on health. The developer will clearly describe which indicators or determinants of health were used for physical, mental and social health, including:

- any specific indicators for Indigenous Peoples or vulnerable subgroups of the population
- any indicators, determinants of health, or community health priorities that were developed in conjunction with Indigenous groups

The developer has agreed to complete a Human Health and Ecological Risk Assessment. As part of this qualitative and quantitative assessment, the developer will follow best practices and consider:

- guidance from Health Canada
- contaminants of potential concern (including all potential exposure pathways, rationale for any contaminant or exposure pathway removed from the assessment, and multimedia assessments for contaminants with identified risk and multiple pathways of exposure)
- a traditional food exposure pathway
- results of effects assessments for other parts of the environment (for example, water)

In the Human Health and Ecological Risk Assessment or in the DAR, the developer will assess the following related to human health:

- potential effects (short and long term) resulting from changes to biophysical and social determinants of health during each project phase (including post-closure)
- potential effects (quantified, where possible) to mental health (for example, stress, depression, anxiety, sense of safety)
- the overall effects on human health,[1] including considerations of interconnections between biophysical and social health determinants and other components of the human and biophysical environment, such as:
    - air quality
    - noise and vibrations
    - access to health services
    - light levels
    - availability, access to, and quality country foods
    - availability, access to, and quality of water (for drinking, cultural uses, or recreation)
    - health care services
    - income, socio-economic status and employment
    - municipal revenues and local industries
    - migration and resettlement
    - social and community health, including effects on culture and way of life
    - services (education, social supports)

[1] How this affects the long-term well-being of communities is included in section 4.4.2.

    - psychological well-being (stress, anxiety, nuisance, discomfort)
- how any predicted effects to water could affect human health (consider the results of the water assessment)
- how local employment (direct and indirect) may affect the health of employees and their families (consider the results of the economy and employment assessment)
- any potential project effects on community health and the availability of health resources
- how physical and mental health could be affected by any predicted changes to traditional harvesting and the availability, use, consumption, and quality of country foods (which can lead to changes to cost of living, food security, food sovereignty, mental health) (consider the results of the Indigenous land use assessment)
- any project related changes that may have desirable health effects (for example, remediation, increased access to services, improved economic opportunities)
- any ways that contaminants could be absorbed into country foods or introduced to inhabited areas (consider the results of the atmospheric and water assessments)
- the potential for an increase in communicable, sexually transmitted infections or other diseases

When describing mitigation, the developer should describe how mitigation measures were developed, including any collaboration with potentially affected communities or subgroups, and consider:

- whether any specific or separate mitigations will be required for non-Indigenous or Indigenous peoples, and for each Indigenous community
- how to minimize impacts on social determinants of health (such as avoidance of traditional foods, displacement, or loss of culture)
- which mitigations for other parts of the environment are also relevant to human health

4.4. Using a holistic lens and systems thinking

Section 115 of the MVRMA requires the Review Board to have regard for the protection of the environment from significant adverse impacts, and the protection of the social, cultural and economic well-being of Mackenzie Valley residents and communities, as well as the importance of conservation to the well-being and way of life of Indigenous Peoples. Some of the most important concerns that parties identified during scoping were about potential impacts from the Project that involve multiple interrelated parts of the environment, including elements from each of the areas specified by section 115.

By examining impacts on valued components (VCs) and their relationships to one another, the developer will assess impacts not just on individual VCs but also on the functioning of the larger systems those VCs are part of. How will the Project keep water safe and clean? How will the Project affect the well-being of people and communities over the long term? How will the sustainability of boreal caribou and their harvest be protected from Project impacts? Answering these important questions requires taking a broad view, to put the separate impacts of the Project together to understand how this project will affect people and the land/ecosystem, considering how the impacts will affect interconnected VCs.

This part of the Terms of Reference identifies three such issues, involving multiple interrelated parts of the environment. It describes why they are particularly important, and describes key questions for developer about each issue. Assessing these kinds of impacts involves integrating predicted impacts across different parts of the environment. This integration should be holistic. It requires systems thinking about the *interconnections* between the evaluations of individual impacts described in sections 4.1, 4.2, and 4.3 to describe the overall effects of the whole project. More guidance on how to use a holistic lens and systems thinking can be found in section 3.3.

This section frames each issue with a suite of questions. Although for clarity they are worded as simple yes or no questions, the answers should be framed by the risk of potential impacts, considering the characteristics of each impact's severity and likelihood. The developer will provide the reasons for its answers, and identify the evidence it uses to reach its conclusions. Much of the evaluation and assessment required in sections 4.1, 4.2 and 4.3 above is needed support answers to these questions, as well as any additional assessment that may be needed to adequately address the questions.

Where the answers indicate problems, the developer will describe what it proposes to do avoid them or reduce them to acceptable levels.

4.4.1. Keeping water safe and clean

The intent of this section is to help parties to the EA and the Review Board understand how the developer plans to manage water in and around the Project area so that water remains:

- safe for people, aquatic life, and wildlife
- suitable for ongoing cultural use

Managing water in and around the Project area so that it remains safe and clean requires a holistic consideration of:

- surface water quality and quantity
- groundwater quality and quantity
- the interactions between surface and groundwater systems, and
- the relationships between these systems and other parts of the environment, regardless of the results of the individual effects assessment, including:
    - uses of water by people
    - culture
    - Indigenous and other land use
    - human health
    - fish and aquatic life
    - vegetation, and
    - wildlife.

Keeping water clean was selected as a topic for holistic assessment for several reasons:

1. Water has intrinsic value and should be treated with respect and in such a way that it remains clean, safe and plentiful. Communities, all levels of government and the developer all recognize the importance of clean water (PR#5 p12).
2. There is a high level of connectivity between the surface and groundwater systems in the project area.
3. Screening activities and experience with other developments in the project area have raised serious concerns and uncertainties about minewater management strategies and contingency options. Questions over how the developer will manage unexpectedly large amounts of groundwater inflow into pits and underground warrant special consideration.
4. Clean water is a cornerstone of ecosystem function and is linked to the health of fish, wildlife, vegetation, and people and the health, well-being and way of life of land-users (PR#5 p12; PR#55 PDF p27).
5. The Review Board is required to consider the social and cultural well-being of Indigenous people and communities in the Mackenzie Valley and the importance of conservation to the well-being and way of life of Indigenous Peoples.[1] The Review Board has clearly heard that clean, safe and plentiful water, and ongoing stewardship over the water, are essential parts of this relationship[2] (PR#67 p5; PR#3 p70).

Key questions

Building on information requested elsewhere in the Terms of Reference, the DAR must describe:

- the uses of water in the regional study area. Provide a project-specific water use assessment that identifies and describes uses of water in the project area.
- how project-related impacts to water will be assessed. Provide all thresholds for assessment, including any available community specific criteria, for groundwater and surface water quality and quantity that will used to evaluate the impact of the project in the local and regional study areas during all phases of development.[3]
- potential impacts from the project directly on surface water and groundwater and on other valued components.
- how water in the project area will be managed.

Using the information required elsewhere in the Terms of Reference and considering the results of its engagement, the developer will answer the following questions:

- Will water around the Project (that is, the local and regional study areas) be clean, safe and plentiful for people, fish, aquatic life, and wildlife during all project stages?
- Will the Project affect traditional uses of water by local Indigenous people?

[1] See MVRMA sections 115 (b) and (c).
[2] The relationship between clean water and Indigenous well-being and way of life was considered in the recent Report of Environmental Assessment for Diavik's Depositing Processed Kimberlite into Pits and Underground Project.
[3] considering relevant guidelines for human consumption, site specific water quality objectives, Canadian Council for Ministers of the Environment (CCME) guidelines or other metrics as appropriate

- Will changes to water quality or quantity from the Project lead to changes in the ways people traditionally use or experience the land (for example, due to changes in perceptions of the land, its aesthetic qualities, or its usability)?
- Will the Project affect ground or surface waters in ways that might harm or otherwise cause adverse impacts to ecosystem function(s)?
- Will the Project lead to any changes in quality or quantity of water that could harm local vegetation, wildlife, fish or birds?
- Will the Project affect the ability of local Indigenous people to take care of and steward the land and water, both now and in the future?[1]
- How might the contingency options for managing unexpectedly high volumes of minewater affect other parts of the environment both during Project operations and after closure
- What is the legacy of these contingency options on the landscape (considering viewscapes, surface features, human and ecological risk factors, and other issues)?

4.4.2. Lasting well-being

The intent of this section is to help parties to the EA and the Review Board understand:

- how the Project will affect or contribute to the lasting well-being of people and communities
- if and how the Project will support the economy and the current generation without compromising future generations
- the lasting, or long-term, impacts of the Project on people.

The Review Board is required to consider the protection of the social, cultural, and economic well-being of residents and communities in the Makenzie Valley, as well as the importance of conservation to the well-being and way of life of Indigenous Peoples. Well-being is a complex concept that considers how the various parts of the biophysical and human environment come together and interact to affect people's overall wellness. Small or large adverse impacts may combine into an overall Project impact on well-being that could be significant. Understanding the lasting impacts on well-being is a way of understanding the long-term, collective impacts of the Project on people.

To understand the effects on well-being, the developer will consider how social, economic, health, cultural, and biophysical impacts caused by the Project are interconnected and affect one another. Each community may understand well-being in a different way, and may prioritize different aspects of well-being.[2] The developer will engage with communities and Indigenous groups to:

1. understand the context of impacts to their wellbeing,
2. look at key pathways,

[1] For example, will the Project cause long-term impacts on the quality or quantity of water in the area, limiting the area's potential for rehabilitation and therefore ongoing stewardship? Will the Project change the ability of local Indigenous people to access the land to directly observe any potential changes during all project phases?

[2] For example, human health, economic resilience, vibrant community, and strong culture all contribute to the lasting well-being of communities, but the local social, cultural, and historical contexts may affect the importance of each item. Part of understanding impacts on well-being is working with Indigenous groups and communities to understand what well-being means to them.

3. borrow from specific assessment based on community priorities,
4. do an iterative assessment of impacts, and
5. answer the questions below.

As part of assessing and understanding impacts on well-being, the developer should consider the following, based on the results of its engagement and any other available information:[1]

- the impacts identified in the following effects assessments (regardless of the residual effects analysis) on:
  - air and land (section 4.1)
  - water and the aquatic environment (sections 4.2.1, 4.2.2 and 4.2.3)
  - wildlife, including caribou (sections 4.2.3 to 4.2.7)
  - people and communities (section 4.3)
- the interconnections and pathways between current use of lands and social, economic, health, and Indigenous culture for each community
- the developer will assess how each subgroup (such as (such as women, Indigenous Peoples, youth and Elders) will be affected by the Project. This will include a GBA+ analysis, including impacts on LGBTQ+ and two spirited people.
- ethical guidelines and cultural protocols related to data collection and confidentiality
- future scenario analysis of how the Project could interact cumulatively with other developments and activities (for example, the expansion at Taltson)
- future scenario analysis of different scales of mine development (for example, mine plan) and related benefits to the local region and most-affected communities

Key questions

- What will be the legacy effects of the Project on people living in nearby communities?
- What is the overall effect on long-term well-being, post-closure?
- How will the Project affect cultural well-being?
- Will the Project support health and well-being of communities (as defined or described in community wellness plans or other available information)?
- How will the Project affect communities' ability to achieve community well-being goals and address concerns (as defined or described in community wellness plans or other available information)?
- Will the Project support sustainable development in the region (that is, meeting the current needs of residents without compromising future generations)?
- How will this project act cumulatively with past, present, and reasonably foreseeable projects in the area to affect social, health, cultural, and economic conditions?

[1] such as any locally relevant and developed definitions of well-being or related goals that are relevant to the potentially affected communities, and community wellness plans, that have been shared with the developer

Supporting questions

- How will the Project affect social cohesion of families and communities?
- Will people's quality of life remain stable or improve because of the Project?
- How will the Project change the biophysical or human environment and affect culture (including cultural transmission and cultural intangibles)?
- Will the water be safe to drink and wildlife safe to harvest?
- Will the Project lead to changes in people's physical or mental health?
- Will the Project affect people's ability to practice traditional harvesting of wildlife and plants?
- Will the Project affect the subsistence economy and traditional sharing of food?
- Will the Project improve on the skills and training of local residents, for employment at the mine and for similar future work?
- Will the Project improve on the capacity of local businesses, providing goods and services to the mine and for similar future work?
- Will the Project be a culturally appropriate worksite for Indigenous employees (for example, with the use of Indigenous languages on site)?
- How will the Project support traditional activities?

Some questions related to potential impacts on well-being are best answered by Indigenous groups. The Review Board plans to issue information requests on this subject to potentially affected Indigenous groups, while the developer is preparing its DAR.[1] The topics of these information requests will likely include potential impacts of the Project on:

- particularly important aspects of well-being
- traditions, perspectives, values, worldviews, knowledge of Indigenous communities
- resilience within communities, and Indigenous groups
- continued transfer of traditions, cultural values, language, and spirituality between generations

Once Indigenous groups' responses to these information requests are submitted, the developer will consider these and provide its own views to the Review Board.[2] The developer will assess the Project's potential impacts related to these topics based on 1) its own ongoing and planned engagement with Indigenous groups, 2) the Review Board's engagement, and 3) the responses to Review Board information requests.

4.4.3. Sustainable boreal caribou: Protection and harvest

Caribou and people are key parts of the Land and integral to Indigenous culture. The intent of this section is to help the Review Board and parties to the EA understand potential Project impacts on:

- caribou health over the long-term

[1] The Review Board will first engage with potentially affected Indigenous groups regarding their ability to respond and practical timing details.
[2] If responses to these information requests are available at a time allowing the developer to consider them in the DAR, it will do so. If the responses are not available early enough in the EA process for that, then the developer will be given an opportunity to provide its views and update its impacts predictions later.

- caribou population and sustainable harvest
- the safety (and perceived safety) of eating caribou

Boreal caribou were identified early on in the environmental assessment by the developer, Indigenous groups and government as an important valued component. Caribou were once abundant on the NWT landscape and are highly sensitive to human development and disturbance. They are an indicator of ecosystem integrity. Caribou in the southern NWT have been particularly affected by human and natural disturbance, with documented population declines. The *Boreal Caribou Range Planning Framework* for the NWT states that one of its explicit goals is to "strive to increase the amount of undisturbed habitat in that region [the southern NWT] over time". Caribou have also been essential to the Indigenous way of life since time immemorial. A holistic assessment that considers impacts on caribou, the environmental components they depend on and the people who harvest them will better help the Review Board understand, predict, and mitigate impacts to boreal caribou, the Land and the Indigenous people that interact with it.

In its holistic consideration, the developer will ultimately consider the valued end uses of and relationships between caribou and other parts of the ecosystem including people and other wildlife. This will reflect potential changes caused by the Project to the relationships between these parts of the system. It will include interrelated components such as:

- vegetation
- water
- traditional harvesting
- cultural uses and values
- human health
- wolves, moose and predator-prey dynamics, and
- community well-being.

Caribou was selected as a topic for holistic assessment because:

1. Indigenous communities, all levels of government, and the developer recognize the importance of caribou to the Dene and Métis way of life and the environment.
2. Caribou are an ecological keystone species linked to the health of boreal forest ecosystems, and the well-being and way of life of land-users.
3. The Review Board is required to consider the importance of conservation to the well-being and way of life of Indigenous Peoples.[1] The Review Board has heard in previous environmental assessments that the success of boreal caribou and its ongoing stewardship are important parts of this relationship.

Key questions

The developer should answer the following questions:

- Will the Project reduce boreal caribou numbers in the area?

[1] See MVRMA section 115(c).

- How will the Project affect the local caribou population? (For example, will it make the local population less self-sustaining contrary to the goals of the Woodland Caribou Recovery Strategy- Boreal Population)?
- Will the Project change cultural harvesting experiences (due to increased industrial activities, changed viewscapes, or other perceived impacts), perceptions of contaminants, the area available for harvesting, reduce harvest success or reduce the traditional economy, in a manner that is likely to reduce caribou harvest by Indigenous people? Are there any other reasons the Project would reduce harvest?
- Will harvested caribou still be safe to eat?
- What are the interactions between habitat availability, wolf predation, and changing caribou and moose numbers, and what does that mean for Project impacts to traditional harvesters?
- Will the Project contribute to further understanding about boreal caribou in the region?
- Will the Project allow for Indigenous people to take care of and steward the Pine Point population of the herd, both now and in the future? (For example: Will the Project cause long-term impacts on the caribou population in the area, limiting the potential for ongoing stewardship? Will the Project change the ability of local Indigenous people to access the land to observe potential changes during all project phases?)

5. Developer's Assessment Report general requirements

This Terms of Reference (ToR) describes the general information required on a subject-by-subject basis so that the developer can produce an accessible, easy to read, stand alone *Developer's Assessment Report* that fulfills the requirements of the Review Board's *Document Submission Standard*.[1] The developer should consider information gaps identified and questions raised by interested parties on the public record in scoping submissions and comments on the draft ToR to determine the appropriate level of detail in its Developer's Assessment Report (DAR) for specific issues. This section of the ToR describes some general, overarching topics that must be included in the DAR.

The developer is encouraged to seek clarification from the Review Board in writing if specific requirements in the ToR are unclear. The developer should provide rationale for any items it cannot address. The Terms of Reference workshops described in section 1.3 provide the opportunity for further clarification and discussion. The Review Board may amend or add to information requirements for this EA based on the results of those workshops.

5.1. Summary materials

The DAR will contain the following summary materials:

- a plain language summary
- detailed concordance table that specifically cross references each numbered item in the relevant ToR sections with its corresponding section and page number in the DAR and to any supporting documents
- a commitments table listing all mitigation measures the developer will undertake, including mitigations described in the Project application. These should be organized by subject for easy reference (e.g. water quality, wildlife).[2]
- a table of contents for the DAR and all supplementary materials, including appendices for placement on the Review Board's public registry.

5.2. Public engagement

The DAR will describe engagement with communities, Indigenous groups, governments, or organizations with interests related to areas that might be affected by the Project. Indigenous groups, government agencies and other interested parties have information useful to the conduct of this environmental assessment and all reasonable efforts should be made to engage with them. The use of interpreters during meetings in Indigenous communities is encouraged to allow for full participation and

[1] The use of maps, aerial photographs, development component/valued component interaction matrices, full explanation of figures and table, and an overall commitment to plain language is encouraged. When it is necessary to present complex or lengthy documentation to satisfy the requirement of the ToR, the developer should make every effort to simplify its response in the main body of the text and place supporting materials in appendices.
[2] This table of DAR commitments will be supplemented by an additional table of post-DAR commitments that includes commitments generated during the ensuing EA process. These two tables will help parties to understand what additional actions the developer will take to address concerns raised during the EA.

understanding by community members. Engagement will follow community governance and cultural protocols. Please see the Mackenzie Valley Land and Water Board Engagement and Consultation Policy, which the Review Board has adopted, for guidance.

The DAR's description of public engagement activities will include:

- an engagement log describing dates, individuals and organizations engaged with, the mode of communication, discussion topics and positions taken by participants
- all commitments and agreements made in response to issues raised by the public during these discussions and how these commitments altered the planning of the Project
- all issues that remain unresolved, documenting any further efforts envisioned by the parties to resolve them
- a description of all methods used to identify, inform, and solicit input from potentially interested parties and any plans the developer has for future engagement

The Review Board further encourages the developer to meet with interested groups outside the EA process. Any information from those discussions that may be relevant to the Review Board's decision should be submitted to the Review Board for inclusion on the public record.[1]

5.3. Developer Information

The DAR will:

- describe how it will ensure that its contractors and subcontractors honor commitments made by the developer in the context of this EA
- provide environmental compliance records of other projects it has undertaken
- provide a list of all policies, codes of practice, programs or plans concerning its environmental, sustainable development, community engagement, Northern hiring, and workplace health and safety policies, with corresponding description of how they relate to the Project

5.4. Project purpose, needs, and alternatives

The DAR will describe:[2]

- the purpose of the Project. The statement of purpose should broadly classify the Project and indicate the target market.
- the need for the Project including supporting information that demonstrates this need.
- alternatives to the Project. This includes a description of the different ways that are technically and economically feasible to meet the Project need and achieve the Project purpose. For these

[1] Meeting report templates are available on the Review Board website.
[2] The developer should consider the perspectives of potentially affected communities, Indigenous groups, and government departments in establishing project objectives and assessing alternatives.

technically and economically feasible alternatives to the Project, the DAR will provide enough information for the selection of alternatives to the Project.[1]

- alternative means of carrying out the Project including:
    - the potential environmental, health, social and economic effects of alternative means of carrying out the Project that are technically and economically feasible
    - the criteria to determine technical and economic feasibility of possible alternative means
    - the best available technologies considered and applied in determining alternative means
    - those alternative means that are technically and economically feasible
    - assumptions made regarding economic feasibility in appropriate detail to provide transparency in alternative means that are screened out
- the preferred alternative means of carrying out the Project[2] based on the consideration of environmental, health, social and economic effects, and of technical and economic feasibility and through the use of best available technologies. The alternative means analysis will be conducted in such a way that it clearly demonstrates that the chosen location or methodology is the most appropriate option from environmental, technical, economic, social and health perspectives.
- the methodology and criteria used to determine the preferred alternative means and the unacceptability of excluded alternative means, including consideration of trade-offs associated with the preferred and alternative means
- criteria to examine the environmental, health, social and economic effects of each remaining alternative means to identify a preferred alternative

5.5. Potential accidents and malfunctions

The DAR will:

- conduct a risk assessment using best practices for the Project including planned and legacy components, systems, hazards, and failure modes and carry this assessment forward to describe the potential impacts to all relevant valued components.
- ensure that risk assessments associated with accidents or malfunctions consider the impacts of such events in conjunction with the conditions at site that existed prior to this project
- assess likelihood and severity of each risk identified
- assess consequences holistically
- provide rationale for criteria used for decisions on the various risks related to malfunctions/accidents during all Project phases from construction through post-closure
- describe acceptability criteria for each risk
- describe mitigation measures or project design features that may prevent potential accidents or malfunctions

[1] The analysis of alternatives to the Project should serve to validate that the preferred alternative for the Project is a reasonable approach.
[2] including all aspects of the project as identified in Table 1. Scope of Development

- describe contingency plans for accidents, malfunctions, or unforeseen impacts of the environment on the Project, and any resulting impacts on VCs
- describe water and tailings containment features, pumping systems, and detections systems used for early warning of spills
- describe all accident and emergency response plans that will be in place during the construction, operations, and closure phases, including materials transport, along with emergency communications plans

5.6. Effects of the environment on the Project

The DAR will:

- consider the effects of the environment on the Project during all project phases including:
    - climate change impacts. Describe:
        - how climate change was considered in the project design including its components, all project phases, mitigations, and adaptations
        - climate change scenarios considering current trends and Intergovernmental Panel on Climate Change climate projections
        - how adaption and resilience was considered for each project component that is susceptible, or vulnerable, to the effects of climate change for different climate scenarios
        - environmental thresholds and conditions that would lead to a vulnerable project component or activity to fail, substantially reduce its longevity, or cause disruptions to the performance of a project component or the Project in its entirety
        - the environmental, financial, or human health and safety consequences of failure of a vulnerable project component due to environmental thresholds being exceeded, and the holistic combination of these consequences
        - alternative project design elements that would mitigate effects of climate change on the Project and describe the resilience of the alternatives
    - seasonal flooding and melt patterns
    - changes to permafrost
    - extreme precipitation events
    - seismic events
    - wildfire
    - changes to the social and economic environment and the resiliency of the Project to adapt to those changes
- describe any mitigation measures that can be implemented in anticipation or in preparation for effects from the environment on the Project.
- identify any changes to the design or management of the Project as a result of considering potential impacts to the environment should be noted in the relevant sections.

5.7. Monitoring, evaluation, and follow-up

Monitoring helps the developer recognize problems early, before they cause significant adverse impacts, and can direct timely preventive measures to ensure that small problems do not grow into unacceptable ones. This can include effects of the Project on the environment or on people, or effects of the environment on the Project. To help detect and prevent significant adverse impacts on the environment and people, the Review Board will analyze the adequacy of monitoring and management programs.

The DAR will include follow-up, monitoring and adaptive management plans and programs. For each plan or program, the DAR will describe:

- responsibilities for data collection, evaluation and dissemination
- if and how project-specific monitoring will be compatible with any regional monitoring and research programs[1]
- how the plans adhere to adaptive management best practices[2]
- how these plans relate to regulatory and non-regulatory monitoring requirements for the life of the Project
- how climate change considerations are systematically included in follow-up plans and adaptive management plans or will be included by creating specific climate change follow-up programs as needed including:
    - environmental thresholds that will trigger adaptive management actions (these thresholds will remain below levels that would exceed the resilience of project components or acceptable levels of environmental risk such as extreme precipitation, floods, or extreme wind)
    - collection of data over the lifespan of the Project to verify that predictions are accurate and to understand if further adaption actions are required
    - timing of feedback loops and related information
    - how contingency and emergency plans will be updated to accommodate any new problems due to climate change.

See Appendix A for additional information on monitoring and management plans.

[1] The developer should discuss and adopt common data collection and monitoring protocols with local and regional monitoring programs, including those of GNWT – ENR, to facilitate project impact analysis.
[2] See the WLWB document *Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring* for more information.

6. Conclusion

The Review Board anticipates that the requirements described in this document will result in a Developer's Assessment Report that builds on material already presented in the developer's *Environmental Assessment Initiation Package*. The Review Board encourages Pine Point Mining Ltd. to continue to engage and collaborate with Indigenous governments and organizations, potentially affected communities, and other parties in preparing its Developer's Assessment Report. The Review Board looks forward to a Developer's Assessment Report that provides a better understanding potential impacts and a solid basis for the EA going forward.

Appendix A: Guidance documents

The following is a list of guidance documents related to environmental assessments, monitoring and management plans.

Mackenzie Valley Environmental Impact Review Board

- Environmental Impact Assessment Guidelines 2004
- Socio-Economic Impact Assessment Guidelines 2007
- Guidelines for Incorporating Traditional Knowledge 2004
- Draft EA Initiation Guidelines for developers of Major Projects 2018

Government of the Northwest Territories

- Wildlife Management and Monitoring Plan - Process and Content Guidelines
- Framework for Boreal Caribou Range Planning 2019
- Influence of Land Cover, Fire, and Human Disturbance on Habitat Selection by Boreal Caribou in the NWT, 2020
- Northwest Territories Boreal Caribou Population and Harvest Models, 2020
- Boreal Caribou Sustainable Harvest: Plain Language Summary Report

Fisheries and Oceans Canada

- Fisheries and Oceans Canada - Policies and codes of practice

Natural Resources Canada

- Natural Resources Canada - Explosives resources and guidelines

Transport Canada

- Transport Canada guidance documents
- Transport Canada's *Navigation Protection Program* information

Health Canada

- Health Canada's Participation in Environmental Assessment under CEAA 2012
- Guidelines Canadian recreational water quality - third edition
- Guidelines for Canadian drinking water quality - summary table
- Guidance for evaluating human health impacts in environmental assessment - Human health risk assessment
- Guidance for evaluating human health impacts in environmental assessment - Country foods
- Guidance for evaluating human health impacts in environmental assessment - Noise
- Guidance for evaluating human health impacts in environmental assessment - Air-quality
- Guidance for evaluating human health impacts in environmental assessment - Water-quality
- Guidance for evaluating human health impacts in environmental assessment - Radiological impacts

Environment and Climate Change Canada

- Strategic Assessment of Climate Change - a new impact assessment system 2020
- Canadian Ambient Air Quality Standards, CCME

Mackenzie Valley Land and Water Board

The Mackenzie Valley Land and Water Board has published guidelines related to Engagement and Consultation, Management and Monitoring Plans, Closure and Reclamation and regulatory standards. They are located here:

- Mackenzie Valley Land and Water Board Policies and Guidelines
- Guidelines for Effluent Mixing Zones

Appendix B: Assessment methodology

The developer will describe how the predicted impacts of proposed development for each individual valued component and for the subjects of section 4.4 that involve interconnected valued components.

When assessing impacts on the biophysical and human environment, the DAR will do the following:

1. Describe baseline conditions and trends, as described in section 3.1. For the cumulative effects assessment, describe the baseline for cumulative effects (where historic information is available- see section 3.5). Differentiate between natural fluctuations in conditions and the effects of human activity.
2. Identify predicted climate trends. When assessing predicted effects, the developer will consider reasonable climate change scenarios (high, medium and low) when predicting impacts of the Project on valued components. Discuss how the changing climate may affect the development (such as a consideration of road stability in areas of permafrost), and any resulting impacts on valued components.
3. Reflect on potential impacts, to identify the need for additional mitigation. Identify and evaluate the developer's proposed mitigation measures during construction, operations, closure and post-closure. Consider technical and economic feasibility and likely effectiveness to reduce or avoid the predicted impact. Discuss constraints, uncertainties and implementation challenges to the effective use of the developer's proposed measures and clearly identify all mitigation commitments. Include a description of any plans, strategies or commitments to avoid, reduce or otherwise manage and mitigate the identified potential adverse impacts, considering best management practices for the valued component or development component in question.
4. Identify potential interactions of the Project with valued components and any potential direct and indirect residual impacts (that is, after the developer's proposed mitigation). Predict and assess potential project-specific impacts, holistic/systemic impacts (per section 3.3) and cumulative impacts on the valued components. When predicting impacts:
    a. Describe impact prediction methods and models. Identify all analytical assumptions and where professional judgement was used. Identify and provide rationales for using quantitative or qualitative methods. Describe uncertainties and confidence levels for each prediction.
    b. Consider Traditional Knowledge in impact predictions where appropriate.
    c. Describe causal mechanisms for each predicted effect.
    d. Compare the predicted project-specific impacts to the baseline, and predicted cumulative impacts to the baseline for cumulative effects.
    e. Use a methodology for characterizing residual impacts that includes:
        - nature of the impact
        - geographic extent
        - duration, timing and frequency of the impact
        - magnitude of the impact (what degree of change is expected)
        - reversibility of the impact
        - likelihood of the impact
        - uncertainty associated with prediction

5. Include a cumulative impact assessment that assessed potential residual impacts from the proposed project in combination with the effects from other past, present and reasonably foreseeable human activities and developments. The cumulative effect assessment will:
    a. identify the valued components of the environment affected by the development and by other human activities
    b. determine what other developments and activities could substantially affect those values components
    c. predict the combined effects of the Pine Point Mine Project in conjunction with the developments and activities identified in (b) above
    d. identify mitigations as needed to reduce or avoid significant cumulative effects.

    When doing (c) the developer will describe how a cumulative effect may occur and its potential spatial and temporal extent, and describe the baseline for cumulative effects (see section 3.5).
6. For VCs where follow-up programs are proposed, present the impact predictions in a manner that facilitates the formulation of testable questions. When designing follow-up, consider timing of feedback loops and related information. Describe monitoring, evaluation, and adaptive management plans used to:
    a. detect potential unexpected changes
    b. ensure that EA predictions are accurate
    c. determine the effectiveness of mitigations
    d. proactively manage to prevent adverse impacts of uncertain likelihood and severity

The criteria described above will be used in the DAR as a basis for the developer's effects predictions.

When developing its DAR the developer will consider all applicable guidelines, services, and programs including those listed in Appendix A.

The Review Board will make the ultimate determinations of significance after considering all the evidence on the public record in the EA. For more information on the above criteria, please refer to Section 3.11 and Appendix H of the Review Board's *Environmental Impact Assessment Guidelines*.

Appendix C: Baseline information

The following section describe the baseline information the Review Board expects the developer will need to meaningfully assess the impacts of the Project. In the DAR, the developer will describe and provide the baseline information that it used to reach its predictions on the impacts of the Project. Refer to section 3.1 for more information on the baseline (and, for cumulative effects, section 3.5).

C-1. Meteorological environment

- describe the local and regional climate including relevant historical records
- describe mean, maximum, and minimum temperatures, monthly and annually
- describe typical wind speed and direction by season
- identify potential for extreme weather events including precipitation, wind, and temperature
- identify stable conditions including strong temperature inversions and stagnation episodes
- describe the variability in meteorological conditions
- provide estimates of evapotranspiration
- describe current climate trends and predicted changes in the above over the project lifecycle

C-2. Atmospheric environment

- provide an assessment of the ambient air quality in the local area and identify existing emissions and contaminant sources
- provide the results of a baseline survey of ambient air quality, in particular near key receptors (such as areas used for drinking water by people or wildlife) by identifying and quantifying emission sources for relevant contaminants including odorous compounds
- describe engagement with Indigenous communities to identify receptor locations (such as areas used for traditional purposes)
- consider seasonal variability in the baseline survey, and include a determination of existing ambient contaminant concentrations with monitoring data of appropriate duration, representativeness, data completeness, data validation, and quality control
- provide dispersion modelling to establish a baseline case for existing pollutant sources and odorous compounds in local and regional study areas

C-3. Noise and vibration

- provide current ambient noise levels at key receptor points, including the results of a baseline ambient noise survey and permissible noise levels for each receptor
- describe use of any previous baseline noise surveys used to establish or characterise ambient noise levels
- provide information on typical noise sources (natural and anthropogenic), their geographic extent, and temporal variations

- justify the selection of, and provide information, on all noise-sensitive and vibration-sensitive receptors in the study area, including any predicted receptors, and distances of receptors from the Project
- describe engagement with Indigenous communities to identify receptor locations (such as nearby communities, seasonal and permanent residences, any traditional land use areas)

C-4. Visual changes

- describe existing ambient night-time light levels at the project site and at any other areas where project activities could affect light levels
- describe night-time illumination levels during different weather conditions and seasons (noting night-time or "dark sky" periods are longer during winter months and shorter during summer)
- describe the baseline visual environment, including existing structures and activities (such as flares, light, and plumes) from key receptor points, including Indigenous land use and recreational use locations
- describe landscapes of interest, visual screens, and other components of the visual environment and locate them on a map

C-5. Geology

- describe the bedrock and host rock geology, using a table of geologic descriptions, including alteration styles, geological maps, and cross-sections of appropriate scale
- describe the geomorphology, topography, and geotechnical characteristics of areas proposed for construction of major project components, including the presence and distribution of permafrost, if applicable
- identify any areas with potential for acid-generating rock and predict metal leaching and acid rock drainage including oxidation of primary sulphides and secondary soluble sulphate minerals
- identify any geological hazards that exist in the areas planned for the project facilities and infrastructure, including:
    - history of seismic activity in the area
    - evidence of active faults
    - isostatic rise or subsidence
    - history of landslides, slope erosion and the potential for ground and rock instability, and subsidence during and following Project activities
- provide a characterization of the geochemical composition of expected mined materials such as waste rock, ore, low grade ore, tailings, overburden and potential construction material, which should include: ore mineralogy, major and trace elements, and potential for acid generation, neutralization and contaminated neutral drainage
- provide a geochemical characterization of leaching potential

C-6. Terrain and soil

- describe the landforms, terrain, soils, and sediments within the local and regional study areas, including sediment stratigraphy. Provide maps to illustrate surficial geology and cross-sections of appropriate scale
- identify and map landforms associated with important wildlife habitat features
- provide a description and location of any erosion-sensitive soils and areas of ground instability
- describe permafrost including thermal condition (ground temperature) and ground ice content in the local study area, if applicable
- provide maps depicting soil depth by horizon and soil order within the Project area to support soil salvage and reclamation efforts
- describe the suitability and availability of reclamation material (soils, suitable overburden) taking into account the acid generating and metal leaching potential of overburden to be used, if applicable
- identify soils within the local and regional study areas susceptible to potential acidification (by soil type)
- describe baseline soil concentrations of contaminants of concern based on historic mining within the local, regional, and downstream receiving environments
- describe any known or suspected soil contamination within the study area that could be re-suspended, released or otherwise disturbed as a result of the Project

C-7. Groundwater quality and quantity

The DAR will describe the baseline conditions within the regional study area in enough detail to identify and evaluate potential impacts of the Project on groundwater quality and quantity.

- describe past and current groundwater characterization programs including information about:
    - use of Traditional Knowledge in establishing and/or refining programs
    - sampling site selection and locations
    - monitoring duration and frequency
    - parameters measured
    - sampling methods and analytical protocol, including quality assurance and quality control measures
    - how sites were selected to ensure ongoing and long-term data collection including monitoring requirements for all Project phases
- describe the geographical and temporal resolution of baseline data for the Project, and provide a rationale of why the data adequately represent the groundwater environment for the assessment of other valued parts of the environment
- present a conceptual model of the hydrogeological and hydrological environment for current conditions
    - the conceptual model should be developed to support the assessment of potential changes to water quantity and quality in rivers, streams, lakes, springs and wetlands.

    - the conceptual model will include enough information to support the definition of geomorphic, hydrostratigraphic, hydrologic, climatic, and anthropogenic controls on surface and groundwater flow
- at minimum, the groundwater characterization and conceptual model development will:
    - summarize groundwater monitoring wells and testing locations within the regional study area used to inform the conceptual model, and identify their location and use (such as testing, monitoring, and groundwater quality), groundwater quality information and monitoring frequency
    - describe the hydrostratigraphic units and relation to geological units (aquifers, aquitards, aquicludes) of the affected hydrogeological environment, illustrated using geological cross-sections and maps
    - describe the structural geology of the affected hydrogeological environment, including any major faults and fracture or bedding information (such as fracture density or characteristics, orientation), with respect to groundwater flow directions or quantities
    - provide the hydraulic properties of the hydrostratigraphic units (including structures as possible), including data on hydraulic conductivity, specific storage, transmissivity, storativity, saturated thickness, porosity, and specific yield, as applicable
    - describe the groundwater flow boundaries of the hydrogeological environment, including groundwater divides and boundaries as well as interactions with surface water
    - provide hydrogeological maps and cross-sections of the study area showing water table elevations and/or potentiometric contours for aquifers, interpreted groundwater flow directions, groundwater divides and areas of recharge and discharge
    - provide representative hydrographs showing the range of seasonal and inter-annual water level variations and indicate any spatial variation in the regional study area
    - provide baseline data for physicochemical parameters and relevant chemical constituents[1] for and groundwater
    - identify groundwater-producing strata (such as coarse-grained sediments and permeable bedrock) that may be affected by the Project. Where current domestic, communal, or municipal water wells access these strata, their distance from the Project will also be marked and added to the map
- describe uncertainties in the conceptual model
- within the limits of available data, describe impacts of historical mining or stresses on local and regional groundwater quantity and quality, including if the system is in a state of equilibrium or may still be changing because of historical activities

[1] Relevant physical and chemical parameters include, at minimum, temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, and total dissolved solids. Relevant chemical constituents include, at minimum, major and minor ions, and total and dissolved trace metals.

C-8. Surface water quality and quantity

The DAR will describe the existing conditions within the regional study area[1] in enough detail to identify and evaluate potential impacts of the Project on surface water quality and quantity. The Review Board needs to understand what is happening to water underground to understand what could happen to water on the surface. The DAR will also describe how changes to either groundwater or surface water could affect the other. At minimum, the Developer's Assessment Report will:

- describe past and current surface water baseline characterization programs including information about:
    - use of Traditional Knowledge in establishing and/or refining programs
    - sampling site selection and locations
    - monitoring duration and frequency
    - parameters measured
    - sampling methods and analytical protocol, including quality assurance and quality control measures
    - how sites were selected to ensure ongoing and long-term data collection including monitoring requirements for all Project phases
- describe the geographical and temporal resolution of baseline data for the Project, and provide rationale data to adequately represent the surface water and groundwater environment for the assessment of other valued parts of the environment
- present a conceptual model of the hydrogeological and hydrological environment for current conditions
    - the conceptual model should be developed to support the assessment of potential changes to water quantity and quality in rivers, streams, lakes, springs and wetlands.
    - the conceptual model will include enough information to support definition of geomorphic, hydrostratigraphic, hydrologic, climatic, and anthropogenic controls on surface and groundwater flow
    - conceptual models for groundwater and surface water can be separate but appropriate rationale should be provided and conceptual model(s) will consider groundwater – surface water interaction
- minimum requirements for the surface water characterization and conceptual model development include:
    - a description of the drainage basins in relation to key project components using one or more topographic maps. On the map(s), identify all waterbodies and watercourses, including intermittent streams, springs, wetlands, watershed and sub-watershed boundaries, and direction of flow
    - a description of waterbodies and watercourses in the region, including the type (for example, flooded open pits, lotic or lentic system, lake, river, pond, intermittent or permanent stream) and the size (for example, width at the ordinary high watermark, linear length, area) of the waterbodies and watercourses

[1] including Little Buffalo River

    - the seasonal baseline flow and full range of seasonal and inter-annual variation for streams and rivers in the regional study area
    - stage hydrographs for lakes that might be affected in the RSA showing the full range of seasonal and inter-annual water level variations
    - identification of contaminants of potential concern through screening against relevant guidelines (for example, CCME)
    - a description of existing quality of waterbodies and watercourses in the regional study area, including analysis of trends for waterbodies in the project area previously affected by mining
    - description of stratification within flooded open pits in the project area

  provide baseline data for physicochemical parameters and relevant chemical constituents for surface water[1]
- describe and delineate groundwater–surface water interactions, including identifying groundwater-dependent ecosystems, wetlands, discharge and recharge areas and high-pressure aquifers that could potentially be affected by the Project
- describe uncertainties in the conceptual model(s)
- within the limits of available data, describe impacts of historical mining or stresses on local and regional surface and groundwater quantity and quality, including if the system is in a state of equilibrium or may still be changing because of historical activities

C-9. Vegetation

Describe:

- vegetation and plant communities in the local and regional study area and provide relative abundance and distribution at the species and community level
- vegetation species and communities that are of particular ecological, economic, and cultural importance
- vegetation species and communities that are important for traditional use by Indigenous people including medicinal plants
- vegetation species and plant communities, including those of importance within the local study area, and where available, extend mapping to describe vegetation species and communities of importance within the regional study area
- natural disturbance regimes in the local and regional study area, including context on how past projects have affected those regimes (such as flood, drought, groundwater changes, insects, disease, fire)
- the extent of any weedy species, other invasive species and introduced species of concern in the project study areas
- the current levels of anthropogenic and natural disturbance affecting vegetation and other ecological communities, including a description and quantification of the current extent of

[1] Relevant physical and chemical parameters include, at minimum, temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, and total dissolved solids. Relevant chemical constituents include, at minimum, major and minor ions, and total and dissolved trace metals.

habitat fragmentation, the extent of human access and use, past and current fire patterns and suppression

- how climate change has affected vegetation in the area in the past, at present and predicted future change
- the current use of vegetation on local study area and regional study area including plants used for traditional purposes, construction materials, medicinal purposes, and as a source of traditional foods, and indicate whether its consumption has Indigenous cultural importance (such as berries, roots, mushrooms, leaves, and bark)
- engagement with Indigenous communities leading to identification of plants used for medicinal, cultural, or traditional uses
- wetlands potentially affected by the Project using the Canada Wetlands Classification System including bog (muskeg/peatlands), fens (muskeg/peatlands), swamps, marshes and shallow open water wetland types
- wetlands and current level of disturbance

C-10. Use of water by people

The developer will:

- describe the traditional, historical, and current uses of water resources within the local study area and regional study area by local communities. Include:
    - water resources that have special Indigenous cultural importance
    - place names in local Indigenous languages where applicable and available
    - groundwater capture zones for drinking water supply wells, if applicable
    - private wells that serve as drinking water sources
    - drinking water sources for on-site workers
    - location of drinking water treatment facilities, including their distance from Project activities and capacity to remove contaminants of potential concern resulting from Project activities.
- provide baseline data for physicochemical parameters and relevant chemical constituents[1] for water resources in the local and regional study areas
- describe past, current, and planned water resource baseline characterization programs. Provide information about:
    - sampling site selection and locations
    - monitoring duration and frequency
    - sampling methodology, and analytical protocol, including quality assurance and quality control measures
    - parameters measured
    - how sites were selected to ensure ongoing and long-term data collection (e.g. monitoring requirements for all project phase)

[1] Relevant physical and chemical parameters include, at minimum, temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, and total dissolved solids. Relevant chemical constituents include, at minimum, major and minor ions, and total and dissolved trace metals.

C-11. Fish and aquatic life

Describe the existing baseline and environmental conditions for fish and aquatic life and habitat in enough detail to describe and evaluate potential project impacts.

- incorporate Traditional Knowledge and involve Indigenous groups in the documentation and/or collection of the baseline information, and document how this was done
- describe fish, important culturally important species, present in the project areas. Include a description of:
    - resident and migratory species
    - food webs and trophic levels
    - structural and functional linkages
    - life history and population dynamics
    - presence/absence and seasonal or life cycle migration patterns
    - sensitive habitats and periods in relation to the study area
    - behavioural habitat selection, mating strategies, social interactions, predator-prey interactions at multiple spatial and temporal scales, which are critical to identifying effects to population persistence and ecological processes
    - relevant Traditional Knowledge where applicable and available
- describe fish habitat including:
    - habitat type (for example pool, riffle, run, historic open pit), including the length of the section, width of the channel from the high-water mark, bankfull width, water depths, type of substrate (sediments), aquatic and riparian vegetation. Include photos whenever possible
    - natural obstacles (for example falls, beaver dams) or existing structures (for example water crossings) that hinder the free passage of fish
    - a description of fish habitat features that may demonstrate the presence of fish species in terms of appropriate habitats[1] including water quality and quantity characteristics, sediment characteristics, prey, shelter, refuge, feeding, spawning habitats, nursery habitats, rearing habitats, overwintering, migration routes and the sensitive times for these activities
- describe the lower trophic communities in the project area and their importance as a source of food for fish
- list and describe critical habitat for any aquatic species at risk that are known to be present within the study area
- describe the use of fish and/or aquatic species as country foods

[1] Intermittent and ephemeral watercourses or waterbodies may constitute fish habitat or contribute indirectly to fish habitat during a certain period. The absence of fish or water at the time of a survey does not necessarily indicate an absence of fish and fish habitat (for example, a fish migratory corridor may only contain fish sometimes)

- describe baseline contaminant concentrations in harvested species that may change as a result of the Project and any known issues with respect to health of harvested species (e.g. parasites, disease, condition)
- describe fish, fish habitat, aquatic life, and sediment quality baseline characterization programs. Provide information about:
    - sampling site selection and locations
    - monitoring duration and frequency
    - sampling methodology, and analytical protocol, including quality assurance and quality control measures
    - how sites were selected to ensure ongoing and long-term data collection including monitoring requirements for all project phases
- clearly document how baseline data was collected or obtained, and Traditional Knowledge incorporated

C-12. Birds and their habitat

- incorporate Traditional Knowledge and involve Indigenous groups in the documentation and/or collection of the baseline information, and document how this was done
- identify any applicable Bird Conservation Regions and related strategies applicable to the local and regional study areas describe the biodiversity of bird species and their types of associated habitat that are found or are likely to be found in the study areas, noting all avian species at risk and species of Indigenous importance or use, provide estimates of the abundance and distribution, and information on the life history of migratory and non-migratory birds (such as waterfowl, raptors, shorebirds, forest birds, fen/bog/marsh birds, and other land birds) in the study areas
- provide maps showing areas of highest concentrations of species and identify areas of concentration of migratory birds, including sites used for migration, staging, breeding, feeding, and resting.
- provide a characterization of potential VC habitat and habitat features found in the project area that are associated with the presence of those bird species that are likely to be affected, based on the best available existing information (e.g. land cover types, vegetation, aquatic elements, fragmentation, disturbance). Provide maps showing the location of identified habitat and habitat features associated with the presence of those bird species that are likely to be affected.
- provide estimates of year-round bird use of the area (such as for winter, spring migration, breeding season, and fall migration), based on data from existing sources, and surveys to provide current field data if required to generate reliable estimates
- identify all federal/territorial species at risk, critical habitat and any potentially affected residences in the study areas; sites that are likely to be sensitive locations and habitat for birds; and environmentally significant areas. These areas include National Parks, Areas of Natural or Scientific Interest, Migratory Bird Sanctuaries, Important Bird Areas[1] or other priority areas or sanctuaries for birds, National Wildlife Areas, World Biosphere Reserves and provincially or territorially designated areas, such as Wildlife Areas.

[1] BirdLife International, https://www.ibacanada.com/

- describe the use (magnitude, timing) of migratory and non-migratory birds as a source of country foods (traditional foods) and, where use has Indigenous cultural importance, coordinate with the community-led Indigenous Knowledge study
- describe current levels of contaminants in country (traditional) food bird species, and link appropriately to the Human Health and Ecological Risk Assessment
- consider the effects of changing climate and past activities on birds, changing climate and the potential for cumulative or systemic impacts on birds as a result of these factors

C-13. Moose, furbearers and other wildlife

While assessing impacts on moose, furbearers, and other wildlife based on identified valued components, specific consideration should be given to:

- incorporate Traditional Knowledge and/or Indigenous groups in the documentation and/or collection of the existing environment/baseline data, and document how this was incorporated
- map the known distribution of each VC species or group, their likely and preferred range in the area, their habitat usage intensity broken down seasonally, migration corridors and any particularly important habitat sites
- work with the GNWT to conduct a population survey for moose and caribou in the study area, to identify current population status and (ultimately) sustainable harvest levels
- for moose and other furbearers, analyze estimated current harvest levels for traditional and other land use should also be ascertained in coordination with the community-led Traditional Knowledge study
- consider existing effects of prior disturbance on moose predation as part of the cumulative assessment
- describe current levels of contaminants in traditionally harvested food species, linked appropriately to the proposed Human Health and Ecological Risk Assessment
- identify existing traplines that may be affected by the proposed Pine Point Mine Project, in coordination with GNWT-ENR and Indigenous groups
- clearly document how baseline information was collected or obtained, and Indigenous knowledge incorporated
- use baseline information to create a moose harvest model or framework to assess impacts on sustainable moose harvest

C-14. Boreal caribou

The DAR will use the best information available, including data and reports from the Government of Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR), to characterize population size, habitat metrics and trends for boreal caribou at the following spatial scales:

1. the NT1 range (using the ECCC threshold[1]),

[1] As noted in *A Framework for Boreal Caribou Range Planning, August 2019*."

2. the southern NWT planning region identified in the GNWT's Framework for Boreal Caribou Range Planning (using the region specific threshold identified in that plan)
3. the area east of the Hay River and south of Great Slave Lake as proposed by the developer as the Regional Study Area,
4. the range of the local Pine Point caribou corresponding to a minimum convex polygon or kernel density contour (subject to further discussion with ENR) around the Pine Point collar locations, and
5. the proposed local study area.

This information will provide the basis for both the residual effects analysis and the cumulative effects analysis. Data from a population survey in the Pine Point area, consistent with the methods used by ENR in previous surveys, and of sufficient statistical power should also be used. The developer should work with and consult Traditional Knowledge holders on other survey approaches that may support baseline work. The developer should also keep ECCC informed of its approach throughout.

The developer will:

- incorporate Traditional Knowledge and/or Indigenous groups in the documentation and/or collection of the existing environment/baseline data, and document how this was incorporated
- describe the use of the study areas by boreal caribou (for example, distribution, movement and timing) over time using survey data to supplement existing data, and produce a population estimate for the project area
- evaluate, where telemetry data are available, movements of collared individuals using quantitative methods to determine existing movement corridors and use, particularly within the project area or areas of potential for sensory disturbance or increased predator access
- include maps showing the proximity of caribou range in relation to the project area;
- evaluate whether caribou have potential to interact with the Project during sensitive periods associated with caribou life stages (such as calving, post-calving and overwintering), and any seasonal movements
- consider sensitive periods associated with caribou life stages such as calving, overwintering, movements, and specific sensitive time periods for caribou (identified in consultation with ECCC and/or GNWT-ENR) that are used to identify, delineate and take into account habitat features
- describe the type and spatial extent of biophysical attributes present in the study areas and defined in the *Amended Recovery Strategy for the Woodland* Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020,[1] and
- present total habitat disturbance for boreal caribou at appropriate spatial scales, and also in a manner that clearly indicates critical habitat disturbance within federal lands
- within the Local Study Area, link the baseline information on the state of regeneration at previously disturbed sites required in Section 4.2.4 of the Terms of Reference to use by collared caribou

[1] https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/plans/Rs-CaribouBorealeAmdMod-v01-2020Dec-Eng.pdf

- determine current levels of contaminants in traditionally harvested caribou and link appropriately to the proposed Human Health and Ecological Risk Assessment
- consider the effects of past activities on caribou, changing climate, and the potential for cumulative and/or synergistic impacts as a result of these factors

C-15. Whooping crane

For whooping crane, in addition to the information required in s. 4.2.3:

- clearly document how baseline information was collected or obtained, and Traditional Knowledge incorporated, while still accounting for and respecting the sensitive nature of endangered species data and confidentiality, as appropriate.
- involve Indigenous groups in the documentation and/or collection of the baseline information
- develop reasonable assessment boundaries for whooping crane in consultation with ECCC and Parks Canada that will account for direct and indirect effects to whooping crane, are justifiable and reflect the Aransas-Wood Buffalo population goals. This may take the form of a watershed and sub-watershed approach for the local study area and regional study area
- work closely and (if necessary) confidentially with ECCC and Parks Canada, using their existing data on this endangered species to quantify potential whooping crane habitat in the proposed spatial study areas
- explore with ECCC and Parks Canada the potential for additional surveys that identify any additional use (beyond known use areas) of habitat in the spatial study areas suggested (particularly for nesting) and fill in any gaps in habitat knowledge that could potentially be affected by the Project. The developer will show how it has used this new data (if collected) to complement existing data on use of different habitats and features in the assessment areas. Describe if and how this information has been used to support the evaluation of Project and project component siting decisions and impact predictions
- provide the best available information concerning baseline range population size and trend, and consider Traditional Knowledge and community knowledge; and
- document and demonstrate how the information was developed, including how the developer consulted:
    - experts of the relevant jurisdiction (ECCC and Parks Canada, with possible input from GNWT-ENR on appropriate survey methodologies
    - regional and site-specific bird monitoring programs, if applicable, and
    - relevant published studies, such as any describing use of different habitat types by whooping crane during nesting (or stopovers), relative to overall habitat availability in the region, and studies of expansion of nesting habitat over time

C-16. Indigenous land use

Describe:

- past and present traditional activities in the region, including:
    - hunting, fishing, and trapping
    - gathering (for example, of edible and medicinal plants and mushrooms, or of wood)

    - use of cabins, camps, permanent residences, and staging areas
- culturally important species
- abundance and health of harvested and gathered species (for example, describe any known issues with respect to health of harvested species such as parasites, disease, contaminants, condition)
- harvest levels, participation in traditional harvesting, and harvest locations (with specific attention to high use or sensitive areas)
- existing sources of, and concerns about, contamination in the project area (consider the results of the human health assessment)
- current avoidance of the project area by people, and previous use of the area before mining
- existing climate change impacts on Indigenous land use (for example, ice conditions, weather predictability, or wildlife distribution and availability)
- harvest pressures on species of particular importance to traditional harvesters, by species or population, season, and geographic area
- rotational harvesting and gathering practices and how they vary over time (for example, berry and tea harvesting, bait harvesting and fishing, big game hunting, trapping of small furbearers)
- access and travel routes for Indigenous land use activities (including physical land or water access, culturally important locations, timing, seasonality, and distance)
- water sources used for drinking water, including the quality and aesthetic properties of those water sources
- waterways and waterbodies used for travel and recreation, including entry and exit locations
- the cultural and economic importance of harvesting and gathering to potentially affected communities and to the traditional economy
- existing local or regional Indigenous governance systems for managing land and resource use for traditional purposes
- efforts by Indigenous communities to restore traditional practices, where applicable
- features that are important to the experience of Indigenous people on the land (such as connection to the landscape without artificial noise and sensory disturbances, privacy, safety, air quality, visual landscape, perceived contamination)

Some harvesting and Indigenous land use information is confidential. Where possible, the developer should work with harvesters to understand Indigenous land use (for example, to understand harvesting locations and related potential impacts on health), while following appropriate protocols and ethical standards to maintain confidentiality and ownership of such information.[1]

C-17. Other land uses

Describe:

- general patterns of human occupancy and resource use in the region, including types and importance of activities near the Project, including:
    - tourist activities, including outfitting, in the region and near the mine

[1] The Review Board has procedures for handling confidential evidence in impact assessment.

    - important land and water recreational routes or trails
    - commercial or recreational hunting and fishing, including non-Indigenous harvesting
    - locations of existing permanent or seasonal residences
    - parks, including Wood Buffalo National Park
- any local, regional, or territorial land use or resource development plans

C-18. Heritage resources

Describe:

- all known archaeological and heritage resources, sites, or areas of cultural significance in the project area (using maps if appropriate), including spiritual places, burial sites, ceremonial or sacred sites, trails, and culturally important landscape features
- heritage resource potential in the project area
- engagement with Traditional Knowledge holders, archaeologists, anthropologists, and the Prince of Wales Northern Heritage Centre and how such interactions influenced:
    - heritage resource survey locations
    - heritage resource management plans
    - programs related to community capacity and sustainability

Some heritage resource information is confidential. Where possible, the developer should work with communities while following appropriate protocols and ethical standards to maintain confidentiality and ownership of such information.[1]

C-19. Culture

The developer will work with Indigenous groups and communities to describe:[2]

- important cultural locations, such as sacred sites, locations that are important for teaching or knowledge transfer, cultural or special landscape features, and any places associated with Indigenous law or language (consider the baseline for the heritage resources assessment)
- relevant oral histories of the region
- intangible values of the environment or landscape
- Indigenous governance systems in communities and the region
- Indigenous law in communities and the region
- participation in and importance of traditional activities
- local Indigenous practices for water stewardship
- Indigenous language knowledge and use

[1] The Review Board has procedures for handling confidential evidence in impact assessment.

[2] The Review Board's information requests (described in Section 4.3.4) may include the following baseline topics:

- cultural values that shape the perspectives of community members
- cultural strengths and sources of resilience rooted in Traditional Knowledge
- cultural vulnerabilities
- any governance systems or Indigenous laws associated with the landscape and resources

- language and place names, and the relationship to culture and knowledge transfer between generations
- on-going legacy impacts on culture experienced by Indigenous Peoples in this region from past mining and development activity
- the interconnections between heritage resources and current use of lands, Traditional Knowledge, Indigenous Rights, and other social components for each Indigenous community

C-20. Social and community conditions

Describe:

- demographic information for communities and the region (including age, ethnicity, sex, gender, language), including:
    - a comparison to the territorial and national level
    - disaggregated data to understand different access to resources, opportunities, and services for diverse groups and subgroups
- social and Indigenous indicators of quality of life (such as disposable income, cost of living, lifestyle, language, education levels, housing adequacy and crowding, family structure, access to health care and social services, connectedness to community, levels of traditional activities and country foods in diet, youth-Elder dynamics, time on the land, rates of alcohol and substance abuse, rates of illegal activities and violence, rates of sexually transmitted infections)
    - include indicators proposed by Indigenous communities
- community cohesion, including factors such as community or neighbourhood engagement, support and social networks, and other social activities
- the psychosocial environment and its influence on social and community conditions
- community vulnerabilities
- the geographical area where the Project will influence social and community conditions
- safety of Indigenous and non-Indigenous women, girls, youth, LGBTQ+, and two-spirited people
- relevant historical community background (including on-going legacy social and community impacts of past mining and development activity)
- community leadership and governance structure

Some questions related to about the status and capacity of existing services and infrastructure are best answered by appropriate government departments. The Review Board plans to issue information requests about these while the developer is preparing its DAR. The topics will likely include:

- status and capacity of existing services and infrastructure within potentially affected communities (including Hay River, Kátł'odeeche First Nation Reserve, Fort Resolution, Fort Smith, and Enterprise), including:
    - medical and health services, including physical and mental health services
    - schools, educational facilities, and day care
    - wellness centres, victim supports, and women's shelters
    - Elder care and services

- utilities (water, power, internet, cellular service)
- accommodation and lodging
- road infrastructure and traffic, including
  - the typical volume and type of traffic on highway and community infrastructure in the area
  - existing maintenance and operational management
  - number of existing reported accidents
  - emergency public and private service available on highway
- important water crossings
- water and sewer infrastructure
- solid waste services
- recreation facilities
- emergency response services (ambulance, fire protection, police services)

The developer will consider these responses to these information requests when assessing the Project's potential impacts related to these topics.

C-21. Economy and employment

Describe:

- existing education, training, and skills
  - types and levels of skills and education relevant to the Project, as available in each community
  - available training and skills that would facilitate additional work opportunities with the Project (for example, trade schools, environmental monitoring training, other educational facilities, services, and skills programs)
  - location of available training and skill development (for example, online, in Yellowknife, in Fort Smith, or in Edmonton).
  - time required to achieve competency in the specific training or skill
- the local and regional economies, using existing relevant data to the communities and regions most affected (including the communities of Kátł'odeeche First Nation Reserve, Hay River, Fort Resolution, Fort Smith, and Enterprise)
  - main economic activities and industries that could be affected by the Project (for example, outfitting, hunting, and trapping, accommodation facilities, commercial forestry or fisheries)
  - local and regional workforce, including:
    - availability of skilled and unskilled workers
    - labour force statistics (employment, unemployment, participation rates; job vacancy rates; income levels and use of social assistance; full time, part time, or seasonal employment)
    - industry and business activity (employment by industry and occupation, including those related to traditional activities)

        - trends in the labour force
        - gaps in wages and qualification for skilled trades by gender and for Indigenous vs non-Indigenous peoples
        - barriers to employment, including a description of groups most affected
    - community and regional economic and social development plans
    - traditional economies in the local and regional area and associated employment
    - overview of business that may provide supplies and services for the Project

C-22. Human health

Describe:

The developer will provide enough information for the parties to the EA and the Review Board to understand how the Project could affect determinants of health and health outcomes. Information should be specific to each community wherever possible, while providing comparison of data with the territorial and national level (that is, use disaggregated data to understand health differences between and within communities and compared to the territorial and national data). Describe:

- existing community health concerns and challenges for the region and for each community, including:
    - context-specific physical, mental, and social health considerations that are specific to each community, including relevant perspectives from Indigenous culture
    - context for health considerations in the region, including historical impacts on health, intergenerational trauma, existing impacts of climate change
- community self-identified strengths and goals (for example, from NWT Community Well-being Plans)
- vulnerable groups in each community, including how each group experiences health inequalities due to different access to resources, opportunities, or services
- human health conditions by community, using community health profiles, considering:
    - physical, mental, and social health and appropriate determinants of health for all three
    - available information on community relevant health information (such as birth rates, death rates, sexually transmitted infections, injuries, chronic disease rates, mental health status)
    - qualitative determinants of health (and how those were selected)
    - how different determinants of health may be required for different communities or subgroups
    - community and Traditional Knowledge understandings of health
- levels of food security (available and accessible food) and food sovereignty (the right and ability to produce and make decisions about their own healthy and culturally appropriate food)
- consumption of traditional medicines and traditional foods as they relate to health (for example species consumed, quantities, frequency, and harvesting locations) (consider the results of the Indigenous land use assessment)
- any human health receptors that could be affected by changes to other components such as air, water, country food quality, noise, and light (potential receptors include traditional use areas,

recreational use, permanent and temporary residences, and sensitive receptors such as hospitals, schools or camps) (consider the results of other relevant assessment sections)
- any impacts on health from increased pressure or changes to the status and capacity of health infrastructure (consider the results of the social and community conditions assessment)
- availability and quality of drinking water sources, including distance from and potential connections to Project activities (consider the results of the water assessment)
- baseline concentrations of contaminants in air, water, soil, traditional foods
- existing sources of contamination in the project area (for example, the contaminated railbed from the past Pine Point Mine)