



Draft Terms of Reference

EA2021-01

Pine Point Mining Limited

Pine Point Mine Project

July 2021

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Table 1. Scope of Development 4

DRAFT

List of Abbreviations

ARD	Acid Rock Drainage
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DAR	developer's Assessment Report
DAP	Developer's Assessment Proposal
EA	Environmental Assessment
GNWT	Government of the Northwest Territories
GHG	Green House Gas
LSA	Local Study Area
ML	Metal Leaching
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	Mackenzie Valley Resource Management Act
NWT	Northwest Territories
the developer	Pine Point Mining Limited
PDR	Project Description Report
RSA	Regional Study Area
SARA	Species at Risk Act
SON	Subject of Note
TK	Traditional Knowledge
ToR	Terms of Reference
The Review Board	The Mackenzie Valley Environmental Impact Review Board
VC	Valued Component

1. Introduction

This document outlines the information required for the environmental assessment of the Pine Point Mining project (the Project). The developer of the Project is Pine Point Mining Limited (the developer or “the developer”). The project includes the open pit and underground mining of zinc and lead deposits over five years along a 70 km stretch of land 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 on disturbed lands recovering since mining ceased in the 1980s, as well as on surrounding lands undisturbed by past mining. Project construction will take approximately 1.5 years, followed by 10-15 years of mine operations, and more than 10 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

The Terms of Reference (ToR) will direct the developer to organize existing material (including from the *Developer’s Assessment Proposal*), and conduct additional study and analysis as appropriate, to submit a “stand-alone” developer’s Assessment Report (DAR). That report will then be used to inform all interested parties concerning the proposed development during the analytical phase of the environmental assessment.¹

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.

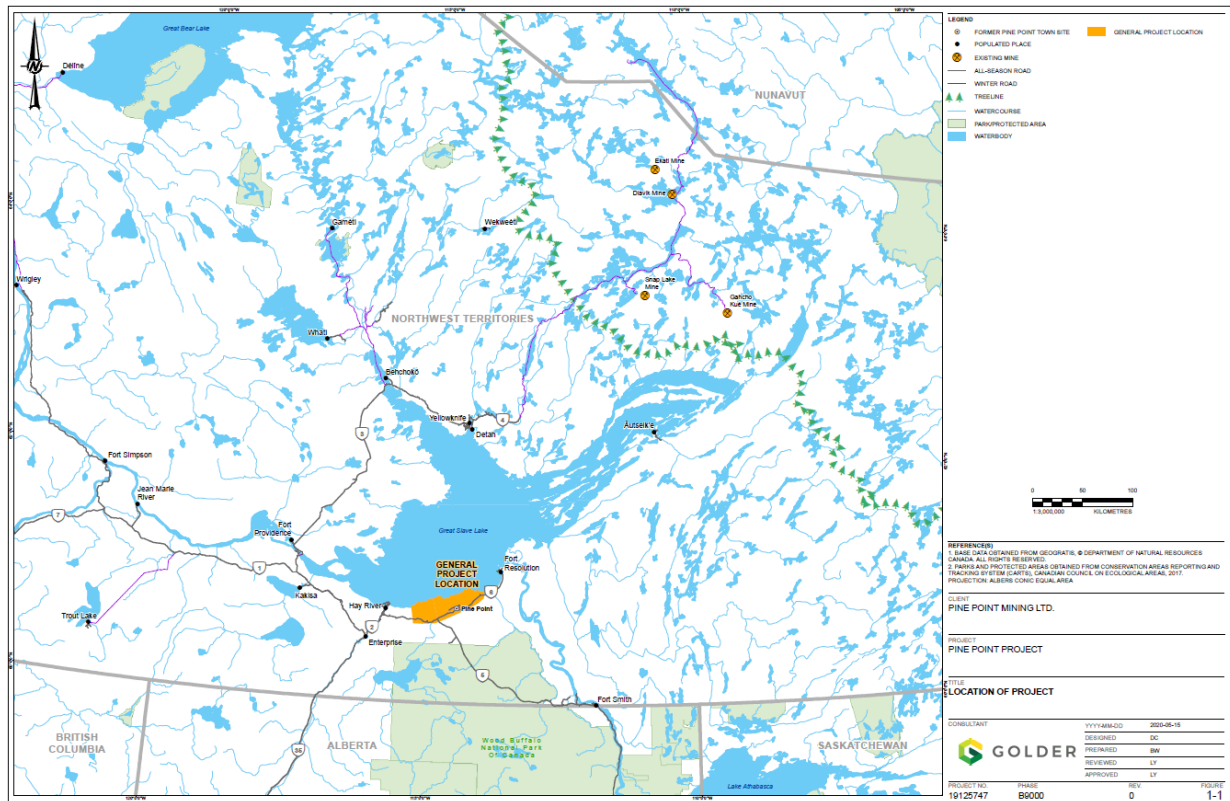


Figure 1: location of the Pine Point Mining Project.

1.1. Past mining

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. The Project is within the traditional territories of the Akaitcho Dene First Nation, including the Deninu Kué First Nation, the Katl'odeeche First Nation, and the Northwest Territories Metis Nation, including the Fort Resolution Metis Government. During the late 1800's Indigenous people alerted prospectors to the presence of minerals in the area. This would result in the eventual development of the area as a mine site.

Cominco Ltd. built and operated a zinc and lead mine at the Pine Point property between 1964 and 1988. About 50 open pits, waste rock piles, a network of roads, and a tailings facility remain on the property from that era. There has not been an active mine at Pine Point since 1988.

Exploration occurred throughout the 1990's and 2000's and the property was owned by several companies before being acquired by Darnley Bay Resources, who changed its name to Pine Point Mining Ltd. In 2017. In 2018 Osisko Metals acquired Pine Point Mining and is the sole owner of the Project.

Lands in the area are managed by the Government of the Northwest Territories (GNWT) except for the historic railbed which is federal land. The historic tailings facility at the property remains the responsibility of Teck Metals Ltd, which is active in maintaining that site.

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* 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 12.² The primary reasons are as follows:

- the Project involves a large-scale industrial development
- the area is traditionally used by several Indigenous groups and is relatively close to Indigenous communities and the town of Hay River
- the Project partially overlaps and uses the location of the historic Pine Point mine, which has not been fully reclaimed
- the potential impacts of the Project may combine cumulatively with past, present, and future activities in the area.

This environmental assessment will be conducted in accordance with 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, reference bulletins, and relevant policies applicable to this assessment are available online (www.reviewboard.ca) 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 Kat'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

² [Reasons for Decision to order an environmental assessment](#)

- Review Board experience in the conduct of environmental assessment

2. Scoping considerations

This section describes the scope of development for the Pine Point Mine Project (the Project), the scope of assessment, and an outline of valued components in the assessment along with the geographic and temporal scope considerations.

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. 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 This description of existing project components will provide enough detail to allow for an assessment of their impacts on the valued components including Key Lines of Inquiry and Subjects of Note. The information will be used in this EA to determine whether there is the potential for significant adverse environmental effects. The onus is on the developer to demonstrate that the Project is not likely to cause significant adverse impacts.

Table 1 outlines a minimum listing of project components by phase for the scope of development for this environmental assessment.

This description of existing project components will provide enough detail to allow for an assessment of their impacts on the valued components including Key Lines of Inquiry and Subjects of Note. The information will be used in this EA to determine whether there is the potential for significant adverse environmental effects. The onus is on the developer to demonstrate that the Project is not likely to cause significant adverse impacts.

Table 1. Scope of Development

Project Component	Subjects to consider
Open pit mining	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • location of deposits • sequencing of development and closure
Processing and milling ore	<ul style="list-style-type: none"> • crushing and mineral sorting • concentrate and tailings dewatering
Waste management	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • process plant • camp • site access roads • explosives management • fuel and hazardous materials
Transportation	<ul style="list-style-type: none"> • use of site access roads • employee transport • transport of concentrate to railhead • transport of mine related materials to and from mine site
Equipment	<ul style="list-style-type: none"> • list of equipment
Power	<ul style="list-style-type: none"> • projected power demand • use of NTPC network • onsite power generation • stationary and mobile power plants
Water and water management	<ul style="list-style-type: none"> • 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
Monitoring and management plans	<ul style="list-style-type: none"> • engagement and collaboration plan • spill contingency 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	<ul style="list-style-type: none"> • list permits, licenses and authorizations, land dispositions

2.2. Scope of Assessment

The scope of assessment defines which issues will be examined in the EA. The scope of assessment includes potential impacts on valued components of the biophysical and human environment from the

Project, by itself and in combination with other past, present, and reasonably foreseeable future developments. The scope of assessment identifies the issues to examine in the developer's Assessment Report (DAR), and also to prioritize them, so that the environmental assessment can focus on issues that matter most.

To determine the scope of assessment, the Review Board 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, Katl'odeeche First Nation, and West Point First Nation [June and July 2021]

2.2.1. Valued Components

Valued components are elements 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.³ In its *Developer's Assessment Proposal* the developer identifies factors used in developing a list of valued components for the project.⁴ 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 prepare a list of valued components.

The following is a preliminary list of valued components to be used in the assessment of biophysical, social, economic, and cultural impacts from the Project:

- air quality, acoustic environment (noise, vibration), and climate
- surface and ground water quality and quantity and the use of water by people
- 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

³ [draft EA Initiation Guidelines for developer's of Major Project 2018 p8](#)

⁴ [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 to facilitate public evaluation for all identified key lines of inquiry. Assessment work will encompass project-specific effects, potential, holistic impacts of all project-specific impacts taken together, potential accidents and malfunctions and potential cumulative effects.

In this EA, each key line of inquiry is interconnected to other valued components in a dynamic system. The developer will consider collective impacts effects on multiple interconnected valued components. Section 3.5 below provides more detail.

Key lines of inquiry require the developer's highest level of effort in this EA. Rationales for why each of these key lines of inquiry were selected and specific questions that need to be considered for each key line are in section 4.3. The key lines of inquiry are:

- managing water so that it remains clean in the future lasting well-being
- sustainable boreal caribou

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*. 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 4.2.7 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.

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

In its DAR, the developer has proposed spatial boundaries for valued components (key lines of inquiry and subject of note). Based on the results of community and technical scoping meetings, spatial boundaries (geographic scope) will be expanded from the *Developer's Assessment Proposal* to include:

- 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 lifespan including construction, operation, closure and reclamation, and 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 (such as during the initial construction phase) 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.

3. Overall approach to assessing impacts

This section describes the Review Board's approach on how impacts should be assessed in the Developer's Assessment Proposal (DAR), including intended outcomes for each assessment step. The Review Board's rationale behind this approach is described in the Reasons for Decision for the Terms of Reference (ToR).

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 state of the existing human and biophysical environments, at the time when effects are predicted occur.

Assuming no additional deposits are mined, the project will finish mining in 2037, with reclamation activities continuing for 15 years (to 2052) approximately.⁵ Climate change has likely altered the

⁵ Pine Point Mine Project Preliminary Information Package, Dec. 2020. Project description- Plain Language Summary- Project Schedule, p. v

environment in the project area (in terms of temperature, precipitation, hydrology etc.) and is expected to continue to do so over this period. The developer will account for potential change in the future environmental baseline, based on existing climate trends and projections, in the developer's predictions of impacts. To do this, the developer will describe how climate change is expected to alter the Project setting over each phase of the project. This may require the need to use predicted future environmental conditions that account for a range of climate change scenarios, to reflect uncertainties. The developer will clearly identify, describe, and justify the use of adjusted future conditions in its predictions of how the Project will affect VCs. This will include:

- uncertainties and degrees of confidence
- the specific data sets used
- key assumptions that were used

Based on this future baseline the developer will provide:

- a description of how projected future environmental conditions related to climate were used in determining project design, including the resilience of project components and adaptation measures
- how projected future environmental conditions related to climate were used in the assessment of effects for VCs in the future environmental setting of the Project.

3.2. Identify predicted changes to the environment

The DAR will identify the ways that the proposed development might change the existing biophysical and human environments. This should include a detailed description of potential impact pathways during all phases of the proposed development including construction, operation, closure, and post-closure. The DAR should also characterize the magnitude, direction, extent, timing, likelihood, duration, and scale of predicted changes.

3.3. Assess impacts on valued components

The DAR will assess the potential impacts of the proposed development to valued components based on the predicted changes to the environment. This will include a description of the magnitude, direction, extent, timing, likelihood, duration, and scale of impact. The developer will use science and Traditional Knowledge to present quantitative or qualitative parameters to evaluate potential project-specific and cumulative effects on the valued component. The spatial and temporal boundaries for the assessment of effects on the valued component will be presented and justified.

3.4. Identify mitigation

The DAR will describe all mitigations that will be put into effect during project design, construction, or operation to mitigate potential environmental effects, for any potentially affected valued components. The developer will:

- identify proposed mitigation measures to avoid, reduce, or minimize predicted impacts

- describe the effectiveness of mitigation measures, and where mitigations have been implemented 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 will assess potential effects on the valued component after implementation of mitigations. Residual effects will be clearly identified and characterized based on methodology presented in Appendix B.

3.5. Assess impacts holistically and systemically

The DAR will provide a holistic assessment of the potential impacts of the proposed development on selected issues related to key lines of inquiry. This assessment should draw from predicted changes to the environment (see section 4.1) and the evaluation of impacts to valued components (see section 4.2). The developer will identify how the proposed development will affect the things that matter to people and communities.

What the developer had proposed: In s. 2.1 of the Identification of Potential Project-Interactions and Proposed Mitigation Measures, EA Initiation Package the developer has proposed a pathway analysis describing how separate project activities are likely to change the environment and assessing how the potential effects of those on individual valued components [project activity → potential change in environment → potential effect on component]. Sections 4.1 and 4.2 of this *Terms of Reference* provide detailed requirements for this analysis.

Use systems thinking to integrate impacts of the whole development on multiple VCs: The Review Board will consider impacts of the whole development on all VCs taken together, in addition to the impacts on individual VCs.⁶ The Review Board requires the developer to predict how the multiple effects of the project on individual but interrelated VCs may combine to cause impacts on certain broader systems, to show what all the impacts add up to collectively and holistically. This involves *integrating* the different impacts of this project on people and on the land/ecosystem.⁷ The developer will assess the collective integrated impact of all the interrelated project-specific effects together at the systems level.

This kind of systems thinking is particularly important when assessing impacts on certain issues (related to the key lines of inquiry) that are identified in section 4.3, because each of these depend on connections and interrelationships between ecological and social or cultural VCs. (Some of the predictions in 4.2 may also be systemic in nature). Section 4.3 includes key questions about the most important issues. the developer will examine the separate impacts of *this* project collectively to understand their holistic impact on the systems that underlie the issues identified in s. 4.3 (which is different from assessing the cumulative impacts of this project in combination with *other* projects as described in s. 3.7). Regardless of the significance determination for individual valued components, the

⁶ 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.

⁷ See page 26 of the Review Board's 2018 *Report of Environmental Assessment and Reasons for Decision – GNWT Tłı̄chq All-Season Road Project - EA1617-01* for an illustration of an integrated system of people and the land.

collective impacts of the Project on these valued components need to be carried forward into the holistic assessments required in section 4.3.

Secondary pathways: In section 4.1 and table 4-1 of the *Developer's Assessment Proposal*, the developer has proposed assessing the effects of primary, but not secondary, pathways for assessing impacts on individual VCs. Even if secondary pathways do not lead to a significant effect on a VC in isolation, they may contribute to a collectively significant impact at a system level. Assessing impacts collectively and systemically may require revisiting secondary pathways to consider their ramifications beyond their individual VCs. the developer should consider secondary pathways if they interact with other VCs, to evaluate the combined effects of multiple impacts from the project, as part of evaluating the systemic impacts of the project.

To assess collective impacts at a system level, the developer will 1) consider the roles each VC plays in the broader system, 2) assess the predicted overall changes on system functioning and 3) mitigate the impacts on VCs (or on the way VCs interact) as needed to protect system functioning.

3.6. 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 project on the environment and people. In addition, subsection 115(c) of the MVRMA provides as a guiding principle for the Review Board the importance of conservation to the well-being and way of life of the Indigenous peoples of Canada to whom Section 35 of the *Constitution Act* 1982 applies and who use an area of the Mackenzie Valley.

The developer will make all reasonable efforts to provide assistance to Indigenous organizations in the collection and consideration of Traditional Knowledge relevant to the Project. The developer will make all reasonable efforts to incorporate Traditional Knowledge from Indigenous culture holders as a tool to collect information on and evaluate 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.

In addition, the DAR must contain a comprehensive summary on Traditional Knowledge as a stand-alone section. The summary will:

- list, by Indigenous group, how the developer adhered to acceptable standards for working with Traditional Knowledge holders and handling Traditional Knowledge
- 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, describe how the secondary sources are contextually appropriate
- how Traditional Knowledge and Traditional Knowledge holders have influenced the developer's project design, impact assessment 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

3.7. Cumulative Effects Assessment

For each predicted impact, the developer will assess the potential for cumulative effects resulting from a combination of effects of the Project with effects from other past, present, and reasonably foreseeable human activities and developments. The developer will describe impact pathways by which a cumulative effect may occur and its potential spatial and temporal scope. Residual cumulative effects will be identified. The developer will estimate the significance of residual project effects which may combine with cumulative environmental effects from other human activities and identify mitigations that already exist or would be required for cumulative effects beyond those for project specific effects.

3.8. Closure and Legacy Effects

The Review Board has heard that past industrial development has resulted in a legacy of adverse impacts for the people and communities in and around the project area. Some of these impacts are biophysical in nature, relating to the quality of the land, vegetation, and water resources. However, many of these legacy issues relate to the human environment and are concerned with social, economic, and cultural impacts. These legacy effects from past developments need to be considered in the description of baseline conditions.

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 and assessment process about potential social, economic, and cultural impacts of closure and the post-closure phase; that is, project-specific legacy effects. 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.

3.9 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, melting permafrost, changes to wildlife, and many other ways. These relate to interrelated ecosystem health and community well-being. The intimate relationship between the environment and Indigenous groups increases the likelihood of negative effects being experienced by Indigenous people.

EA is predictive and sometimes requires robust models to make accurate predictions. Climate change is making this increasingly difficult, resulting in greater uncertainties of project effects. Despite this uncertainty the Review Board will fully consider the effects of climate change on the project and the effects of the project on the environment. For the latter, the EA process can be instrumental in ensuring

that projects are designed to withstand climate change by assessing the resilience and adaptability of projects. To achieve this the EA process will consider the parts of the Project that are most susceptible to climate change. The assessment will also consider how projects undergoing EA fit into the GNWT's and Government of Canada's long term climate change plans and objectives.

4. Assessing impacts

The Developer's Assessment Proposal (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 land, air, and water.
- 4.2 focuses on how the impacts described in 4.1 combine with direct impacts on certain valued components (including wildlife and people).
- 4.3 focuses on how the impacts described in 4.2 combine collectively and holistically in interconnected ecological and social systems.

4.1. Predicted Changes to the Environment

This section requires the developer to assess the basic and direct impacts of the project on 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 may release emissions, dust and smells 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 impacts of these as sensory disturbances will be described in the relevant sections of the DAR.

Existing environment and baseline conditions – meteorological environment

The developer's Assessment Report will:

- describe the local and regional climate including relevant historical records
- describe mean, maximum, and minimum temperatures

- describe typical wind speed and direction
- identify potential for extreme weather events including precipitation, wind, and temperature
- describe the variability in meteorological conditions
- provide estimates of evapotranspiration
- describe current climate trends and predicted changes in the above over the project lifecycle

Existing environment and baseline conditions – atmospheric environment

The developer's Assessment Report will:

- provide an assessment of the ambient air quality in the local and regional study areas 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)
- compare ambient air quality results with applicable territorial and federal standards
- refer to the new Canadian Ambient Air Quality Standards established by the Canadian Council of Ministers of the Environment (CCME) for PM2.5, O3, SO2 and NO2 to take effect in 2020 and 2025⁸
- consider seasonal variability in the baseline survey, and include a determination of background 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

Changes to the atmospheric environment

The developer's Assessment Report will:

- provide a description of emission sources of air pollutants from the project including all point sources, mobile sources, and road sources
- 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
- provide a description and assessment of 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 rationale for the choice of air quality model

⁸ [Canadian Ambient Air Quality Standards, CCME](#)

- compare the predicted air quality results with applicable territorial and federal standards and management thresholds for ambient air quality and odour guidelines where applicable
- use the most stringent air quality standards in Canada for the effects assessment whether federal, provincial, or territorial
- provide a description of all the methods and practices to be deployed to reduce and control emissions and provide a rationale to justify the technologies selected
- provide a description of existing and planned measures to reduce odours and dust
- develop and implement strategies compliant with regional and national commitments, such as the CCME's commitment regarding pollution prevention

greenhouse gas emissions

The information requested in the DAR is intended to help the parties and the Review Board understand the Project's contribution to climate change and how a changing climate may impact the Project. This information will help the Review Board make wise decisions about the Project.

The developer's Assessment Report will:

- describe any corporate policies regarding climate change, greenhouse gas reductions, and social responsibility. Provide examples of how the developer has applied these
- describe how greenhouse gas emissions were considered when determining energy sources for project components and activities
- provide a cost benefit analysis of alternative energy sources
- provide a description of each of the Project's main sources of greenhouse gas emissions by type
- provide the estimated annual greenhouse gas emissions from each source
- provide an estimate of yearly net greenhouse gas emissions, including an uncertainty assessment
- compare the Project's emissions to that of the NWT and Canada
- describe efforts made to avoid, reduce, mitigate, or offset greenhouse gas emissions
- identify alternative project design elements that would reduce emissions
- provide a qualitative description of the Project's positive or negative impacts on carbon sinks
- include 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
- describe how the Project may contribute to Canada's efforts to reduce greenhouse gas emissions, if applicable
- identify if the Project may act as a catalyst for other greenhouse gas generating projects (that is, to induce development). Provide a brief description of these potential emissions.

See section 5.7 and 5.8 for additional requirements on assessing the impacts of a changing climate on the Project. Additional guidance related to greenhouse gas emissions and climate change is included in the draft [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 the relevant sections of the DAR.

Existing environment and baseline conditions – acoustic environment

The developer's Assessment Report will:

- 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
- 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 foreseeable future receptors, and distances of receptors from the project
- describe engagement with Indigenous communities to identify receptor locations

Changes to the acoustic environment

The developer's Assessment Report 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

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, as well as temporary and permanent changes to the landscape including pits, waste rock storage areas, vegetation, and modified surface hydrology. These can impact terrestrial wildlife, Indigenous land use, and human health and well-being.

Impacts to the visual environment will include activities from all project sources and phases. The impacts of sensory disturbances will be considered in the relevant sections of the DAR.

Existing environment and baseline visual conditions

The developer's Assessment Report will:

- 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
- 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

Visual changes

The developer's Assessment Report 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 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

4.1.4. Terrain, geology, and soil

Terrain, geology, and soils are integral to the hydrological cycle and vegetation communities. They primarily form the basis for the assessment of impacts to other valued components of both the biophysical and human environment. Understanding the nature and quality of soils in the project area is 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 unknown. In addition, this section should focus on the karst terrain as it relates to groundwater flow and interactions with surface water, as this is an important consideration in this environmental assessment.

Existing environment and baseline conditions – geology

The developer's Assessment Report will:

- describe the bedrock and host rock geology, including 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
- describe baseline concentrations of contaminants of concern based on historic and proposed mining within the local, regional, and downstream receiving environments
- provide a geochemical characterization of leaching potential

Existing environment and baseline conditions – terrain and soil

The developer's Assessment Report will:

- 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, as well as soil series
- 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 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 the historical land use and the potential for contamination of soils and sediments

- 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

Changes to terrain and soil

The developer will describe and evaluate the potential effects of the Project on terrain and soil. The developer's Assessment Report 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 and slope 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
- 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
- progressive reclamation, and how this ongoing reclamation has been informed by engagement with Indigenous organizations and potentially affected communities

4.1.5. Surface and groundwater quality and quantity

The Review Board understands that there is a high level of connectivity between the surface and groundwater systems in the project area. Because of this connectivity, the Review Board believes that it is appropriate and necessary to consider the surface and groundwater system as a single valued component in this assessment.⁹ Scoping activities and the developer's EA Initiation Package both identified potential effects on surface and 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

⁹ Detailed rationale will be provided in the Reasons for Decision that will be released alongside the final Terms of Reference.

- 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, surface runoff, and seepage
- metal leaching and/or acid-rock drainage (ML/ARD) from waste rock piles
- 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

Changes to surface and groundwater quality and quantity can lead to impacts on many other parts of the environment including terrestrial and aquatic wildlife, fish, birds, vegetation, Indigenous land use, other land use, culture and human health and well-being. The impacts of changes to groundwater and surface water quality and quantity on each of these valued parts of the environment should be addressed in the relevant section(s) of the Developer's Assessment Report.

Existing environment and baseline conditions

The DAR will describe the existing conditions in enough detail to identify and evaluate potential impacts of the Project on groundwater and 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 and groundwater quality baseline characterization programs including information about:
 - sampling site selection and locations
 - monitoring duration and frequency
 - 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
- explain how baseline data were gathered at a scale and resolution that allows for the results about groundwater and surface water to be applied in the assessment of other 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

- 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 for surface water 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
- 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 project area, 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
 - the seasonal baseline flow and full range of seasonal and inter-annual variation for streams and rivers in the project area
 - stage hydrographs for lakes, including Great Slave Lake, that might be affected by the Project 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 project 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
- 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

Changes from the Project on groundwater and surface water quality and quantity

The Developer’s Assessment Report will identify, describe, and assess changes of the Project on groundwater and surface water quality and quantity. The DAR should analyze and describe changes to groundwater and surface water at a scale and resolution that allows for the application of results to the assessment of impacts on interrelated parts of the environment, notably for fish and aquatic life and habitat, human health, and Indigenous land use. At a minimum, the developer’s Assessment Report will:

- provide a project-specific water use assessment that identifies and describes the quantity and quality of waters potentially affected by the Project, including water withdrawn from local waterbodies used as a supply source, the flow or volume of water available in the waterbodies, and how and where waste waters would be discharged
- present a conceptual model for surface water and groundwater for operations and post-closure (including climate change scenarios) that illustrates 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
- present a 3-dimensional numerical groundwater flow model based on the conceptual model of the hydrogeological environment for current conditions and use that model to estimate changes related to the Project. The developer will:
 - state limitations and assumptions in the modelling approach, including calibration methods, and accuracy
 - 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
 - analyse the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge
 - describe how uncertainty in the conceptual model could impact model results
 - using the calibrated numerical model, provide a baseline groundwater budget including recharge, groundwater discharge to wetlands, lakes, streams and rivers, infiltration from

- surface water features to the groundwater flow system, and any anthropogenic withdrawals
- 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
 - using the numerical groundwater flow model
 - 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 (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)
 - 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 baseflow 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
 - 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 in the hydraulic environment and how they could affect surface and groundwater quality and assess the potential for off-site groundwater and surface water contamination¹⁰
 - incorporate results from groundwater modeling into a predictive water and load balance as appropriate
 - describe methods used to assess the potential for ML/ARD 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 ML/ARD
 - 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
 - present a water quality prediction model that incorporates surface and groundwater 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. Include:
 - clear description and rationale for all input parameters and assumptions
 - model scenarios with a range of possible mining sequences and a base case and upper case for water quality

¹⁰ 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.

- a description of model limitation and uncertainties
 - any plans to update the model during the life of the Project to address future changes to mine development or water management plans
- using the model, describe:
 - the extent of hydrological changes that will result from disturbances to aquifers and surface water features, considering climate change (see also sections 3.9 and 5.7)
 - predicted changes caused by project activities to surface water and groundwater quality in the receiving environment. Include a description of changes to physicochemical parameters and chemical constituents
 - 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 groundwater chemistry
- determine 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 by surface or groundwater pathways
- describe the potential for erosion and sedimentation resulting from the Project, and the impact to surface water from deposition of fugitive dust and particulate matter
- describe proposed programs for characterizing future surface water and groundwater quality. Include:
 - 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 (e.g. monitoring requirements for all project phases)
 - how future data will be gathered at a scale and resolution that allows for the application of results about groundwater and surface water to the assessment of interrelated parts of the environment.
- describe the plans to mitigate both anticipated and unanticipated adverse impacts on ground and 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 upset conditions (e.g., extreme flow conditions, delayed availability of pits for water storage, unexpectedly high groundwater infiltration rates into operational

- or exhausted pits and underground, etc.) and impacts on the Project (performance of relevant infrastructure, water management plan)
- contingency plans for upset conditions and analysis of potential impacts if contingencies fail

4.1.6. Vegetation

The Project will result in the removal and disturbance to 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 including medicinal plants, mushrooms, berries and other plants, for its role in soil maintenance and hydrology, and for its role in the carbon cycle and climate change.

Existing environment and baseline conditions

The Developers Assessment Report will 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 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 changes
- 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 (including muskeg, fens, marshes, peat lands, bogs)
- wetlands in the context of vegetation community type, biodiversity, abundance at local and regional level, distribution, and current level of disturbance

Changes to vegetation

For the locally impacted 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.

The DAR 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, 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 an inaccurate reflection of 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 clear definitions of “greenfield” and “brownfield” with rationale for these descriptions
- 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. Assessing impacts to individual valued components

This section requires the developer to apply and assess the changes to air, land, water, and plants described in 4.1 alongside direct impacts from the Project on several individual valued components, including fish, wildlife, people, and more.

4.2.1. Use of water by people

The use of water by people is a valued component for this environmental assessment. Water uses by people includes the use of ground and surface waters by people including for consumption and navigation. It is characterized by the quality and quantity of groundwater and surface water systems in the Project area. The Project could affect water resources at all stages of development due to changes in groundwater or surface water quality or quantity (as described in section 4.1.5).

Changes to water resources could affect other parts of the environment including human health, culture, Indigenous land use, and other land uses. The impacts of changes to other parts of the environment as an indirect result of changes to water resources should be addressed in the relevant section(s) of the DAR.

Existing environment and baseline conditions

In addition to the information requested in section 4.1.5 the Developer's Assessment Report will:

- describe the traditional, historical, and current uses of water resources within the LSA and RSA 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
- provide baseline data for physicochemical parameters and relevant chemical constituents¹¹ 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
 - how sites were selected to ensure ongoing and long-term data collection (e.g. monitoring requirements for all project phase)

¹¹ Relevant physicochemical 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.

Impacts from the Project on the use of water by people

The Developer's Assessment Report will:

- list all applicable water resource permits, licences, and authorizations that will be required from regulatory authorities
- provide all water quality requirements that will need to be met, or that the developer is proposing to meet, in the local and regional study areas during all phases of development
- quantitatively describe the range of potential impacts to drinking water sources from the Project because of the changes described in section 4.1.5
- compare any changes to groundwater and surface water quality and quantity, as identified in section 4.1.5, to applicable guidelines, objectives or standards for water consumption, use, aesthetics, recreation or other
- describe potential changes to navigable waters including:
 - which 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
- carry forward the assessment of potential adverse effects due to change in water quality and quantity to other valued parts of the environment as appropriate
- describe all planned mitigations, monitoring and adaptive management plans relevant to the protection of water resources

4.2.2. Fish and aquatic life

Fish and aquatic life is a valued component for this EA. This valued component includes fish and fish habitat¹², and lower-trophic level aquatic life including plankton, zooplankton and benthic invertebrates, and stream sediment characteristics that support aquatic life. Scoping activities determined that fish are a valued resource to 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

¹² As defined in subsection 2(1) of the *Fisheries Act*.

- 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.

Existing environment and baseline conditions

The DAR will describe the existing baseline and environmental conditions for fish and aquatic life and habitat in enough detail to describe and evaluate potential project impacts. At a minimum, the DAR will:

- describe fish 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
 - seasonal and annual trends in abundance
 - 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 habitats¹³ 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

¹³ 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/or fish habitat (for example, a fish migratory corridor may only contain fish sometimes)

- describe the use of fish and/or aquatic species as country foods
- 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

Impacts from the Project on fish and aquatic life

The DAR will identify, describe, and assess impacts of the Project on fish and aquatic life. At a minimum, the DAR 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
- 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

4.2.3. Birds and their habitat

Birds were identified early in the environmental assessment as of high importance by the developer, governments, and indigenous groups. Mention of birds was included in written Online Review System submissions as well as in Technical and Community Scoping Sessions. Traditional use and 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 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*. For clarity, the word “birds” in this ToR includes migratory birds.

Existing environment and baseline conditions

The DAR will:

- 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 an appropriate selection of valued component bird species representative of bird diversity in the area in consultation with ECCC, provide a characterization of potential 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 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 include National Parks, Areas of Natural or Scientific Interest, Migratory Bird Sanctuaries, Important Bird Areas¹⁴ or other priority areas or sanctuaries for birds, National Wildlife Areas, World Biosphere Reserves and provincially or territorially designated areas, such as Wildlife Areas.
- 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, in coordination with the community-led Indigenous knowledge study
- describe current levels of contaminants in country (traditional) food bird species, and/or link appropriately to the Human Health and Ecological Risk Assessment that was undertaken

¹⁴ BirdLife International, <https://www.ibacanada.com/>

- consider the effects of past activities on birds, changing climate and the potential for cumulative and/or synergistic impacts on birds as a result of these factors, going forward in the assessment

Impacts to birds

The DAR will:

- describe the interactions between the Project and birds (migratory and non-migratory) and their habitat, due to project components and activities, for all phases, including from:
 - site preparation and vegetation removal
 - deposit of harmful substances in waters 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
 - possible changes to contaminant concentrations (as per the proposed Human and Ecological Health Risk Assessment)
 - 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 – from 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

4.2.4. Moose, Furbearers and other wildlife

Wildlife has great value to Indigenous communities and people in the area of the Project, both intrinsically and for traditional use purposes. 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 traditional use purposes. 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.

Existing environment and baseline conditions

While assessing impacts on moose, furbearers, and other wildlife based on identified VCs, specific consideration should be given, but not limited, to:

- 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

- mapping the known distribution of each 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.
- working with GNWT to determine if a population survey for moose is appropriate for the Project area
- For moose and other furbearers, an analysis of estimated current harvest levels for traditional and other land use should also be ascertained
- Existing effects of prior disturbance on moose predation should be considered for the cumulative effects they may confer throughout the effects assessment.
- Current levels of contaminants in traditionally harvested food species should be ascertained and linked appropriately to the Human Health and Ecological Risk Assessment that was undertaken.
- Existing traplines that may be affected by the proposed Pine Point Mine Project should be identified in coordination with GNWT-ENR and Indigenous groups.
- Population estimates of moose and caribou in the Project area should be discussed with GNWT.

Impacts from the Project on Moose and furbearers, other wildlife and wildlife habitat

The developer will describe:

- the effects that each project component may have on moose, furbearers, wildlife and wildlife habitat VCs, which will include, but not be limited to:
 - potential direct effects to habitat with a quantification of that effect, "per VC"
 - potential indirect effects to habitat with a quantification of that loss, "per 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, smell, 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 and Ecological Health Risk Assessment)
 - bioaccumulation of contaminants from all sources within the food chain (including, vegetation, water, sediments, and air) – this may also link to the 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

- 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)
- impacts of project activities on predation (particularly for moose and other furbearers), considering the Project and cumulative impacts
- how mine site planning has considered potential effects on wildlife and wildlife habitat in its design
- A draft wildlife management and monitoring plan (WMMP), including moose and furbearers, (as well as caribou, migratory birds, waterfowl, and/or others as determined in cooperation with GNWT), to be included in the developers Assessment Report (DAR).

4.2.5. Boreal Caribou

Caribou were identified early on in the environmental assessment by the developer and Indigenous groups as an essential valued component to monitor impacts on. Caribou have also been essential to the Dene way of life since time immemorial. Previous assessments of the project area identified caribou use in the area and activity of boreal caribou has only expanded over time as disturbance levels at the site subsided and revegetation has begun 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 below. 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.

Existing environment and baseline conditions

The DAR will provide the best information available from the Government of Northwest Territories (GNWT) Environment and Natural Resources (ENR) Branch regarding population size and trends for herds within appropriate spatial scales. Consideration and mention will be given at multiple resolutions, in consultation with GNWT-ENR and Environment and Climate Change Canada. Consideration for measurement at the federal NT1 Range for boreal caribou, the Southern NWT Range Plan¹⁵, the area east of Hay River and south of Great Slave Lake (as described in the developer's proposed RSA), and incorporating detailed collar information for a local Pine Point population(s) polygon, will be considered for cumulative and residual effects, in consultation with ENR. The developer should work with and

¹⁵ As noted in "A Framework for Boreal Caribou Range Planning, August 2019."
https://www.enr.gov.nt.ca/sites/enr/files/resources/boreal_caribou_range_planning_framework_2019_-_cadre_de_planification_de_laire_de_repartition_du_caribou_boreal_2019.pdf

consult Indigenous knowledge holders and territorial experts on appropriate survey methods for caribou and provide justification for the methodology used.

The DAR will:

- 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 effects at multiple spatial scales decided in consultation with ECCC and GNWT-ENR, likely at the NT1 range-scale, the southern NWT range planning region¹⁶ and the local Pine Point herd population-level
- 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
- take into account 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*,¹⁷ 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.
- determine current levels of contaminants in traditionally harvested caribou and link appropriately to the Human Health and Ecological Risk Assessment that was undertaken
- consider the use of up to five appropriate spatial scales (detailed above) for the assessment of cumulative and residual effects, in consultation with GNWT-ENR
- 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, going forward in the assessment

Impacts from the Project on caribou

With respect to the description of effects on caribou, the DAR will:

- provide an assessment of potential adverse effects on boreal caribou habitat

¹⁶ Ibid.

¹⁷ https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/plans/Rs-CaribouBorealeAmdMod-v01-2020Dec-Eng.pdf

- describe any sensory disturbance (e.g. noise, vibration, light) 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 or use from project development
- determine whether the Project is expected to result in increased predator and prey access (by increased vegetation disturbance and cleared linear access corridors) to caribou habitat, the effects this may have on caribou populations, and a rationale for any conclusions, with special consideration of moose
- evaluate the effects on the population at appropriate spatial scales (as noted in the baseline section above, and in discussion with GNWT-ENR and Environment and Climate Change Canada) 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 harvesting by Indigenous peoples
- engage in ongoing consultations with GNWT and ECCC regarding the Pine Point population status and state of its health, given the potentially precarious status and lack of connectivity corridors to other suitable habitat in the area for this population of caribou
- evaluate changes in human access and harvest as a result of the Project, as a primary pathway
- 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 reasonably foreseeable developments in the NT1 range of boreal caribou: 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 is acceptable
- determine possible changes to contaminant concentrations (as per the proposed Human and Ecological Health Risk Assessment) as a result of the Project
- describe how the developer will prevent or fully mitigate any impacts to boreal caribou that may use the project area and Wood Buffalo National Park.

4.2.6. 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 SARA-listed species. Biodiversity is valuable in terms of ecosystem

services to people and inherently. The requirements under Species at Risk legislation compel developers to provide special consideration to species at risk in project planning. The federal *Species At Risk Act* also requires the Review Board to consider this in environmental assessment.

The developer's assessment report 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 (COSEWIC) as extirpated, endangered, threatened or of special concern (flora and fauna) and their habitat 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 to 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 be taken 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.

4.2.7. 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, the Review Board has legal requirements under s. 79 of Canada's *Species at Risk Act*. 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 2005.¹⁸

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. 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.

Parks Canada and ECCC also jointly submitted multiple, substantial written comments regarding whooping crane.

Existing environment and baseline conditions- Whooping Crane

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

- 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 LSA and RSA
- work very 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 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 Indigenous 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 Territorial input (GNWT-ENR)) on appropriate survey methodologies
 - regional and site-specific bird monitoring programs, if applicable, and

¹⁸ developer’s EA Initiation Package, Volume 3 - Description of Existing Environment. p. 61

- 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

Impacts to whooping crane

The DAR will:

- develop reasonable assessment boundaries for whooping crane in consultation with ECCC and Parks Canada 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 LSA and RSA.
- 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, but not be limited to: changes to available habitat from dewatering 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 how the developer will prevent or fully mitigate any project impacts to whooping crane that may use the area and Wood Buffalo National Park¹⁹

4.2.8. 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 include 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 experience of being on the land, and of access to harvesting locations, drinking water, and camps or cabins.

Existing Environment and Baseline Conditions

the developer will describe the following:

- past and present traditional activities in the region, including:

¹⁹ Wood Buffalo National Park (WBNP, or the “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”. For details, see ORS Comment #24 – CANNOR.

- hunting, fishing, and trapping of wildlife
- gathering edible and medicinal plants
- use of cabins, camps, permanent residences, and staging areas
- abundance and health of harvested 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 contamination in the project area (consider the results of the human health assessment)
- how climate change has already impacted traditional harvesting
- harvest pressures for species of particular importance to traditional harvesters by species or population, season, and geographic area
- rotational harvesting 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 traditional harvesting 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 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
- important features for the experience of the time 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 traditional harvesting (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.

Effects on Indigenous Land Use

In the developer's Assessment Report, the developer will assess the following related to Indigenous land use:

- how any changes to the future availability, distribution, and quality of country foods and traditional medicines will affect harvesting (consider the results of the fish, wildlife, and vegetation assessments)
- changes to access levels, including increased access to certain areas or changes to existing trails and waterways used for harvesting

- changes to harvesting and harvest patterns from changes to access, travel patterns, costs, seasonality, or spare time (for example, for people who work and live at the mine part time)
- any economic burdens from increased time required to practice traditional activities
- overall impacts on Indigenous Peoples' ability to practice Treaty Rights
- how any predicted changes will affect food security
- the potential for increased hunting and fishing pressures and how this could affect valued harvested species and locations
- the potential for and impacts of increased competition between Indigenous and non-Indigenous harvesters
- any impacts from project workforce related to hunting, fishing, or disturbance of wildlife near the mine site
- any project-related changes to the perception of the land by traditional users, including any perception of impacts on the safety, quality, and health of the area
- 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)
- any changes to the safety of people using the area when there is active mining
- any changes to 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)
- any project-related changes on place names and Indigenous land use
- 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 contaminants 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)
- impacts of climate change on Indigenous harvesting and land use (for example, ice conditions, weather predictability, or wildlife distribution and availability)
- any changes in the quality and availability of water for drinking and cultural uses (consider the results of the water assessment)
- changes to access or enjoyment of cabins, permanent residences, and camps
- any changes to transmission of Traditional Knowledge, language, community tradition of sharing, and community cohesion from changes to Indigenous land use activities (consider the results of the cultural assessment)
- the interconnections and pathways between current use of lands and social, economic, health, and Indigenous culture for each community

the developer should describe the methods used to collect information on Indigenous land use. 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.

4.2.9. 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.

Existing Environment and Baseline Conditions

the developer will describe the following:

- general patterns of human occupancy and resource use in the region, including types and importance of activities near the Project, including:
 - tourist activities in the region and near the mine
 - important recreational routes or trails
 - commercial or recreational hunting and fishing, including non-Indigenous harvesting
 - revenue from tourism, outfitting, or similar activities
 - locations of existing permanent or seasonal residences
 - parks, including Wood Buffalo National Park
- any local, regional, or territorial land use or resource development plans

Effects to Other Land Uses

In the developer's Assessment Report, the developer will assess the following related to other land uses:

- any anticipated project effects on activity in the area, including new activities made possible through increased access
- any predicted changes to recreation, hunting, and fishing activity in the project area, 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
- any changes to due to changes to air quality, noise, vibrations, light, odour, habitat fragmentation, or visual aesthetic (consider the results of the atmospheric, acoustic, and visual environment assessments)
- any changes in the quality and availability of water for drinking and recreational uses (considering the results of the water assessment)
- 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)
- any changes to the safety of people using the area when there is active mining
- any 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.

4.2.10. 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.

Existing Environment and Baseline Conditions

the developer will describe the following:

- 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

Impacts on Heritage Resources

In the developer's Assessment Report, the developer will assess the following related to heritage resources:

- the potential for physical damage to known heritage resources
- how the Project may change the access of 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 and describe:
 - protocols, contingency plans, and training related to how workers will respond to a newly discovered 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 mitigation for other parts of the environment.

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 come up with 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.

4.2.11. 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 objects typically considered under heritage resources, to also include language, Traditional Knowledge, teaching and ceremonial locations and customs, law, and many other facets. Indigenous culture is unique to each Indigenous group, though there may be common grounds, like respect for Elders and sharing of food. The culture of Indigenous communities in the project area is strong and will remain so for future generations. This requires careful assessment of impacts on culture, and particularly on 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 and will require close work with individual Indigenous groups and communities.

Existing Environment and Baseline Conditions

the developer will work with Indigenous groups and communities to describe the following:

- 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)
- oral histories of the region
- intangible values of the environment or landscape
- cultural values that shape the perspectives of community members
- cultural strengths and sources of resilience rooted in Indigenous Knowledge
- cultural vulnerabilities
- Indigenous governance systems in communities and the region
- Indigenous law in communities and the region
- any governance systems or Indigenous laws associated with the landscape and resources
- participation in and importance of traditional activities
- Indigenous approaches to water stewardship

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

Impacts on Culture

In the developer's Assessment Report, the developer will assess the following related to culture:

- change to the inherent value, spirituality, or importance 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 the use of language or place names
- changes to stories or traditions (for example, how the availability of country foods could lead to impacts on Indigenous traditions of sharing)
- changes to values and sense of place on the landscape
- changes to how Indigenous law, language, and other aspects of culture are taught and learned
- any potential change to the ability to transfer knowledge to future generations
- community concerns related to culture (for example, cultural and heritage resources, connection of future generations to the land, and so on)
- impacts of the project on the ability of Indigenous people to be stewards of the land or water
- how the developer can avoid repeating legacy impacts from past mining
- how any cultural vulnerabilities that would be exacerbated by the project could be mitigated

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

4.2.12. 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.

Existing Environment and Baseline Conditions

the developer will describe the following:

- 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 indicators of quality of life (such as disposal income, cost of living, lifestyle, language, rates of alcohol and substance abuse, rates of illegal activities and violence, rates of sexually transmitted infections, ethnicity, gender-based violence)
 - 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 relationship between psychology and the social and physical environments, and its influence on community
- community vulnerabilities
- the social area of influence of the project
- safety of Indigenous and non-Indigenous women, girls, youth, LGBTQ+, and two-spirited people
- relevant historical community background (including on-going legacy impacts of past mining and development activity)
- community leadership and governance structure
- status and capacity of existing services and infrastructure within potentially affected communities (including Hay River, K'at'odeeche First Nation, Fort Resolution, and Fort Smith).
 - 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
 - emergency response services (ambulance, fire protection, police services)

Impacts on Social and Community Conditions

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.

In the developer's Assessment Report, 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
- project impacts to the cost of living in the area
- anticipated benefits and adverse impacts to different communities and subgroups within communities, including:
 - how different populations may experience social and community impacts differently (including women, Indigenous Peoples, youth, Elders, LGBTQ+ and two spirited people, and vulnerable groups)
 - how the effects resulting from an increased cash flow may affect local social infrastructure
- any social impacts of income inequity and uneven distribution of benefits within families and communities
- potential for the project to intensify social divisions or reduce community cohesion
- potential social impacts on family or household cohesion (for example, from mine work schedules and housing, with workers staying on site for 2 weeks)
- potential 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 to 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
- any emotional or stress factor 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
- changes to local and regional infrastructure, facilities, and services (including people's ability to access these services) during all stages of the project due to increased population pressure or other project related changes:
 - 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
 - local and regional transportation network and associated 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 government or the developer expenditure 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

4.2.13. 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.

Existing Environment and Baseline Conditions

the developer will describe the following:

- 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 K'at'l'odeeche, Hay River, Fort Resolution, and Fort Smith)
 - 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 skills trades in 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

Effects on the economy and employment

the developer will assess the potential economic effects of the project on each potentially-affected community and population. 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 the developer's Assessment Report, the developer will describe:

- employment and procurement opportunities by mine phase (including the basic training and skills required for different positions)
- any socio-economic initiatives or agreements that aim to maximize benefits

In the developer's Assessment Report, the developer will assess the following related to the economy and employment:

- 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 northern and/or Indigenous 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
- anticipated local, regional, and Indigenous participation compared to the total project requirements (for workers, wages and income, and contracts)
- anticipated direct, indirect, and induced wages from the project
- how different populations may experience economic impacts differently (including women, Indigenous Peoples, youth, Elders, LGBTQ+ and two spirited people, and vulnerable groups)
- 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)
- short and long-term direct, indirect, and induced economic effects of the project
- 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 uses 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, as well as the net economic benefits to the Canadian economy
- 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 developer
- 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 soliciting and ensuring the confidentiality of complaints or 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, including:

- 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, Workplace Hazardous Materials Information System, and Safety, Health and Environment training programs, health, and wellness
- 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
- 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

4.2.14. 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 will 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 well-being long-term. the developer should consider the results of all other relevant effects assessments in the developers Assessment Report when assessing impacts on human health.

Existing Environment and Baseline Conditions

the developer will provide enough information to let readers 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).

the developer will describe the following:

- 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
- communities using community health profiles that summarizes human health conditions for communities, 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 Indigenous knowledge and 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 or schools)
- 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)

Effects to Human Health

the developer will assess potential impacts on human health, considering interconnections between all of the other valued components in chapter 4. Once the most likely pathways of effects on human health 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 will clearly describe which indicators or determinants of health were used for physical, mental and social health, including whether there are:

- 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 consider:

- guidance from Health Canada
- contaminants of potential concern

- a traditional food exposure pathway
- results of effects assessments of other parts of the environment (for example, water)

In the human health and ecological risk assessment or in the developer's Assessment Report, 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) to mental health (for example, stress, depression, anxiety, sense of safety)
- the holistic effects on human health²⁰, 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 and access to and quality country foods
 - availability and 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)
 - psychological well-being (stress, anxiety, nuisance, discomfort)
- how different populations may experience impacts differently (including women, Indigenous Peoples, youth, Elders, LGBTQ+ and two spirited people, and vulnerable groups)
- 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 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, mental health) could affect physical and 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

²⁰ How this affects the long-term well-being of communities is included in section 4.3.

- how diverse groups or subpopulations of people may be affected by project changes (considering intersectionality)

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

4.3. Using a holistic lens and systems thinking

Some of the most important issues (key lines of inquiry) identified in scoping involve multiple interrelated parts of the environment. This section identifies these issues, describes why they are particularly important, and describes key questions the developer will answer about each issue. Assessing these kinds of impacts involves integrating predicted impacts from across parts of the environments. This integration should be holistic and requires systems thinking about the interconnections between the evaluations of individual impacts described in sections 4.1 and 4.2, 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 3.5

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. Much of the evaluation and assessment required in section 4.1 and 4.2 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.

4.3.1. Managing water so that it remains clean for the future

Objective

The intent of this section is to ask questions that will enable to the Review Board to understand how the developer plans to manage water in and around the project area in such a way that water remains clean and plentiful for future generations.

Rationale for conducting holistic assessment

Keeping water clean requires a holistic consideration of:

- surface and 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 because:

1. Communities, all levels of government and the developer all recognize the importance of clean water (PR#5 p12).
2. 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.
3. 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).
4. 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.²¹ The Review Board has heard that clean water, and ongoing stewardship over the water, are essential parts of this relationship²² (PR#67 p5; PR#3 p70).

Key Questions

In addition to the information requested about changes to the environment in section 4.1, and based on the results of the assessments of other valued parts of the environment described in section 4.2, the DAR will answer the following questions:

- Will water around the mine (that is, the local and regional study areas) be safe and clean for people, fish, aquatic life, and wildlife during all project stages?
- Will water in the project footprint area be safe and clean for people, fish, aquatic life, and wildlife after the project has closed?
- Will the project affect traditional uses of water by local Indigenous people?
- Will people still know that the water is clean, as a sign that the land is healthy?
- Will changes to water affect how local Indigenous people feel on the land?

²¹ See MVRMA sections 115 (b) and (c).

²² 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.

- Will changes to water quality or quantity lead to changes in the ways people traditionally 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? (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? Or, will the project change the ability of local Indigenous people to access the land to observe potential changes during all project phases?)
- How might the contingency options for managing unexpectedly high volumes of minewater impact other parts of the environment both during operations and after closure? What is the legacy of these contingency options on the landscape (considering viewscape, surface features, human and ecological risk factors, and other issues as appropriate).

4.3.2. Lasting Well-being

How will the Project contribute to the lasting well-being of people and communities in the future?

Objectives

- To determine the Project impacts on well-being, as defined by communities.
- To determine if the Project will support the economy and the current generation without compromising future generations.
- To understand the lasting, or long-term, impacts of the Project on people.

Rationale for conducting holistic assessment

The Review Board will consider the protection of the social, cultural, and economic well-being of residents and communities in the Mackenzie Valley, as well as the importance of conservation to the well-being and way of life of Indigenous Peoples. Commonly during environmental assessments, impacts are assessed by category or value component, which is a useful organizing tool for dividing and presenting findings, but has the potential to miss some of the more complex impacts that may be experienced by people. For this environmental assessment, the Review Board is requiring that the developer assess the impacts on lasting well-being from a holistic perspective.

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 well-being. To understand the effects on well-being, the developer will consider how social, economic, health, cultural, and biophysical impacts are interconnected and affect one another. Each change to the environment (including people) has the potential to cause ripple effects on other parts of the environment. Small or large adverse

impacts may combine into an overall 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 on people.

As part of assessing and understanding impacts on well-being, the developer should consider:

- the impacts identified in the following effects assessments (regardless of the residual effects analysis) on:
 - Water and the aquatic environment (Sections 4.2.1 and 4.2.2)
 - Wildlife, including caribou (Sections 4.2.3 to 4.2.8)
 - Socio-economic environment (Sections 4.2.9 to 4.2.15)
- locally relevant and developed definitions of well-being or related goals that are relevant to the potentially affected communities
- any particularly important factors that may support well-being and the resilience of community or individual well-being, such as people's sense of belonging, cultural continuity, language, and family supports
- how potential impacts to well-being could be felt differently by diverse groups within each community (such as women, Indigenous Peoples, youth, Elders, LGBTQ+ and two spirited people, and vulnerable groups) (include gender-based analysis)
- ethical guidelines and cultural protocols related to data collection and confidentiality
- the traditions, perspectives, values, worldviews, and knowledge of Indigenous communities
- 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?
- What could be the intangible, long-term effects on cultural wellbeing?
- Will the resilience of communities and individuals allow them to adapt successfully to changes from the project?
- Will the project support health and well-being of communities, as defined and understood by communities?
- How will the project affect communities' ability to achieve community well-being goals and address concerns?
- 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 other projects in the area to affect social, health, cultural, and economic conditions?

Supporting Questions

- How will social cohesion of families and communities be affected?

- Will people's quality of life remain stable or improve?
- 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 people still be able to practice traditional harvesting of wildlife and plants?
- Will the subsistence economy and traditional sharing of food continue?
- Will the physical and human environment support the continued transfer of traditions, cultural values, language, and spirituality between generations?
- 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 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?

4.3.3. Sustainable boreal caribou

Objectives

Caribou and people are key parts of the Land and integral to Dene and Métis culture. The intent of this section is to ask questions so that the Board can understand how the Project can occur and maintain:

- healthy caribou over the long-term
- a caribou population that allows for sustainable harvest
- caribou that are safe to eat and are perceived as being safe to eat

Rationale for conducting holistic assessment

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, and thus generally understood to be a good indicator of ecosystem integrity. Caribou have also been essential to the Dene and Métis way of life since time immemorial. A holistic assessment of caribou will better help us understand, predict, and mitigate impacts to boreal caribou, the Land and the Dene and Métis people that interact with it.

Caribou as a topic for holistic consideration should ultimately consider the valued end uses of and relationships between caribou and other parts of the ecosystem including people and other wildlife. This should incorporate changes to the relationships between these parts of the system and include related 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.²³ 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 DAR should answer the following questions:

- Will the project reduce boreal caribou numbers in the area?
- Will this project help or hinder 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 reduce caribou harvest by Indigenous people? (for any reason, such as fewer caribou, different cultural harvesting experiences (due to increased industrial activities, changed viewsapes, or other perceived impacts), perceptions of contaminants, or a reduced traditional economy)
- Will that harvested caribou be safe to eat?
- How could the linked interaction between potentially increasing caribou numbers and decreasing moose numbers (or vice-versa), and its implications for harvesters be studied and communicated to land users?
- 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

The Final Terms of Reference (ToR) document describes the general information required on a subject-by-subject basis. The developer is encouraged to consider the information gaps identified and questions raised by interested parties on the public record in scoping submissions and comments on the draft ToR

²³ See MVRMA section 115(c).

when determining the level of detail required in its Developer's Assessment Report (DAR) for specific issues covered in this Final ToR.

The developer is encouraged to seek clarification from the Review Board in writing if specific requirements in the ToR are unclear. If the developer finds that an item cannot be addressed, the developer should provide a rationale.

Summary materials

The following summary materials are required:

- 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). 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
- a table of contents for the DAR and all supplementary materials, including appendices for placement on the Review Board's public registry.

5.1. Public engagement

This section should 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 may have information useful to the conduct of this impact assessment, 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 understanding by community members.

The following items are required for consideration of public engagement:

- an engagement log describing dates, individuals and organizations engaged with, the mode of communication, discussion topics and positions taken by participant
- 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.

5.2. Presentation of material

The Review Board encourages the developer to present information in DAR in user-friendly ways. 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. The developer will produce printed copies of its DAR for the Review Board and parties who request it. The developer will also produce all electronic documents in pdf format.

The DAR will be submitted as a stand-alone document. Relevant information and analyses from any previous project description should be incorporated into the DAR and combined with the supplementary material and analyses required by this ToR. Further, any information referenced will be made accessible.

5.3. Use of information from developer's EA Initiation package

The developer prepared an EA Initiation Package and submitted it to the Review Board to initiate this environmental assessment. The material submitted includes a preliminary project description, early baseline information, a description of how early engagement has improved the project, as well as a *Developer's Assessment Proposal* and associated identification of potential project interactions. The information collected by the developer in the EA Initiation package can be used as a foundation for preparing the DAR. This existing information, along with early collaboration with Indigenous organizations and other parties, can assist the developer in meeting the requirements of the ToR as it prepares its DAR.

To assist the Board and parties the developer will provide a table in the DAR of all commitments and mitigation measures made during early engagement and in the *Developer's Assessment Proposal*. The developer will provide a description of the purpose of the mitigations or commitment and identify the responsibly authority for implementing and enforcing them.

5.4. Developer Information

The following information about the developer is required:

- how the developer 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 the developer has undertaken
- provide a list of all policies, codes of practice, programs or plans concerning the developer's environmental, sustainable development, community engagement, northern hiring, and

workplace health and safety policies, with corresponding description of how they relate to the Project.

5.5. Project purpose, needs, and alternatives

This section requires the developer to describe the purpose of the project. In addition, the developer is asked to describe alternatives to the Project and alternative means of carrying out various components of the Project.

Purpose of the project

The DAR will outline what is to be achieved by carrying out the Project. The statement of purpose should broadly classify the project and indicate the target market. The developer should consider the perspectives of potentially affected communities, Indigenous groups, and government departments in establishing objectives that relate to the intended effect of the Project on society.

Need for the project

The DAR will describe the need for the project and provide supporting information that demonstrates this need. The developer should include the results of engagement with potentially affected communities and Indigenous groups when describing the need for the project.

Alternatives to the project

The DAR will provide a description of the different ways that are technically and economically feasible to meet the project need and achieve the project purpose. For these technically and economically feasible alternatives to the project, the DAR will provide enough information for the selection of alternatives to the project. The process of identifying and considering alternatives to the project will consider the views, information and knowledge from Indigenous groups and potentially affected communities. This engagement will be described.

The analysis of alternatives to the Project should serve to validate that the preferred alternative for the Project is a reasonable approach.

Alternative means of carrying out the project

The DAR will identify and consider the potential environmental, health, social and economic effects of alternative means of carrying out the Project that are technically and economically feasible.

The DAR will describe:

- the criteria to determine technical and economic feasibility of possible alternative means
- the best available technologies considered and applied in determining alternative means
- each alternative means in enough and appropriate detail
- those alternative means that are technically and economically feasible

The DAR will identify the elements of each alternative means and the associated adverse and positive environmental, health, social or economic effects or impacts on rights of Indigenous peoples, as identified by the Indigenous group(s). The developer will conduct a Gender Based Analysis Plus (GBA+) to the project to describe disproportionate effects for diverse subgroups. The developer will also consider the views or information provided by Indigenous people, the public and other participants in establishing parameters to compare the alternatives means.

The DAR will then identify:

- the preferred alternative means of carrying out the project 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 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

In its alternative means analysis, the developer will address all project elements, including:

- mining operations, including open pit and underground
- processing facilities location and design
- mine waste management facilities including tailings, waste rock, overburden, low-grade ore, and other waste facilities
- on-site or off-site camp location, employee work schedule shift length
- 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 assessment of alternatives report shall include the following steps with all supporting documents and references

5.6. Potential Accidents and Malfunctions

For this section, the developer will first discuss impacts in relation to valued components from an accident or malfunctions as though it has happened, then discuss the associated probability of the event. The assessment would then be carried forward to describe the potential impacts to all relevant valued components. The developer will:

- conduct a risk assessment using best practices for the project including components, systems, hazards and failure modes
- assess likelihood and severity of each risk identified
- 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 contingency plans for accidents, malfunctions, or unforeseen impacts of the environment on the project
- describe water and tailings containment features, dykes, 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
- describe the likelihood that invasive species will be introduced, by what means, the potential impacts, and any mitigation practices to be implemented to reduce the likelihood.

5.7. Effects of the Environment on the Project

The developer will consider the effects of the environment on the project during all project phases. The developer will describe potential impacts of the physical environment on the development including:

- climate change impacts
- seasonal flooding and melt patterns
- 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.

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.

Climate change

With respect to the effects of climate change on the project, the DAR will:

- describe how climate change was considered in the project design including its components, all project phases, mitigations, and adaptations
- describe climate change scenarios considering current trends and International Panel on Climate Change best climate predictions
- clearly state how adaptation and resilience was considered for each project component that is susceptible, or vulnerable, to the effects of climate change for different climate scenarios
- identify 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
- describe 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

- identify alternative project design elements that would mitigate effects of climate change on the project and describe the resilience of the alternatives

5.8. Monitoring, evaluation, and follow-up

Monitoring helps the developer recognize problem early, before they cause significant adverse impacts, and can direct preventive measures to ensure that small problems do not grow into unacceptable ones. This can include effects of the project on the environment, or effects of the environment on the project. To prevent significant adverse impacts on the environment, and in keeping with the principle of integrated resource management in the Mackenzie Valley, the Review Board will analyze the adequacy of monitoring programs to detect and prevent potentially significant adverse impacts.

The DAR will include a section that summarizes proposed follow-up, monitoring and adaptive management plans and programs. This summary will:

- describe any monitoring, evaluation and adaptive management plans that will be used to achieve the following objectives:
 - detect unexpected changes
 - determine whether impact predictions are accurate
 - evaluate the effectiveness of mitigations
 - adjust management actions to minimize adverse impacts
 - discuss responsibilities for data collection, evaluation and dissemination
- describe how project-specific monitoring will be compatible with the NWT Cumulative Impact Monitoring Program or any other regional monitoring and research programs
- demonstrate how the plans adhere to adaptive management best practices
- describe how these plans relate to regulatory and non-regulatory monitoring requirements for the life of the project

The developer is encouraged to 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. The extent and quality of data used to establish baseline conditions for any monitoring program should be explained.

The developer is encouraged to use management response plans to accomplish adaptive management. Guidance on management response frameworks, how to link monitoring results to management decisions and how management activities can be developed adaptively in response to changes in the environment can be found in the WLWB document *Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring*.

Accounting for climate change in monitoring and follow-up

The NWT is already experiencing changes in average temperature, shifts in the seasons and an increasing frequency of extreme weather events, fires, and other climate change impacts and slow low onset events. Some of these changes are gradual while some are extreme and difficult to predict. Effective monitoring and evaluation of results may provide the time needed to identify issues and

implement adaptation measures. The risk of a project component failing can also be mitigated by building in resilience to cope with and absorb unanticipated environmental changes and events.

The developer will describe 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. The developer will describe:

- 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 adaptation actions are required
- 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.

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 early collaboration work done by Pine Point Mining Ltd. has helped focus the analysis of impacts from the Pine Point Mine Project on the issues that matter most to Indigenous governments and organizations, and potentially affected communities.

Appendix A: Guidance documents

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

Government of the Northwest Territories

- [Wildlife Management and Monitoring Plan - Process and Content Guidelines](#)

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](#)

Health Canada

- [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](#)
- [Guidelines for Environmental Assessments on Human Health](#)

Environment and Climate Change Canada

- [Strategic Assessment of Climate Change - a new impact assessment system 2020](#)

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 a regulatory standards. They are located here:

- [Mackenzie Valley Land and Water Board Policies and Guidelines](#)

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](#)

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Appendix B: Assessment Methodology

the developer will describe how the predicted impacts are expected to arise from the proposed development, as well as its opinion on impact significance. An assessment that considers applicable valued components, will be completed.

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

1. identify valued components and provide rationale for them
2. identify the natural range of the cumulative baseline conditions (where historic information is available), and the Project-specific baseline of current conditions, and analyze for discernible trends over time in each valued component, where appropriate, in light of the natural or existing variability for each
3. identify likely future climate trends. When assessing predicted effects, the developer will consider likely climate change scenarios and how scenarios affect predicted effects of the Project and valued components. The developer will also provide a discussion on how this changing climate may impact the development, such as a consideration of road stability in areas of permafrost
4. identify potential interactions of the Project with valued components and any potential direct and indirect impacts, identifying all analytical assumptions or where professional judgement was used. The developer will identify and provide rationale for quantitative or qualitative parameters used to measure potential environmental and cumulative effects on the valued component. This will include a consideration of:
 - a. causal mechanisms for the predicted effect
 - b. Traditional Knowledge
 - c. geographical extent of the impact and rationale for its selection
 - d. timing of the impact including: duration, frequency, extent and a rationale for it
 - e. magnitude of the impact (what degree of change is expected)
 - f. reversibility of the impact
 - g. uncertainty associated with prediction
 - h. likelihood of the impact
5. identify and evaluate any proposed mitigation measures during construction, operations, closure and post-closure as to their technical and economic feasibility to reduce the predicted impacts, discuss constraints, uncertainties and implementation challenges to the effective use of the proposed measures and clearly identify all mitigation commitments
6. predict the likelihood of each impact occurring after the mitigation commitments are implemented, and provide a rationale for the confidence held in the prediction. The developer will also present the predictions in a manner that facilitates the formulation of testable questions for future follow-up programs, as well as textually and schematically indicate the pathways of predicted impacts
7. compare the predicted impacts to the cumulative baseline conditions or to project-specific baseline conditions without the Pine Point Mine Project as appropriate. Include a description of any plans, strategies or commitments to avoid, reduce or otherwise manage and mitigate the

- identified potential adverse impacts, with consideration of best management practices in relation to the valued component or development component in question
8. describe techniques utilized in impact prediction, such as models, including where any uncertainty in impact prediction was identified
 9. predicted impacts that remain after mitigations are applied are referred to as residual effects. These will be clearly identified and the developer will provide its opinion on the significance of these impacts. The developer will provide the methodologies for reaching such conclusions
 10. provide a cumulative effects assessment for each predicted residual effect from the development. Cumulative effects result from a combination of residual effects of the development with 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, and provide the developer's views of the significance of any cumulative environmental effects
 - d. identify mitigations as needed to reduce or avoid the significant cumulative effects. When doing (c) the developer will describe the way in which a cumulative effect may occur and its potential spatial and temporal scope, and describe the baseline or conditions used to compare the cumulative effects against. The developer will also include a separate cumulative effects section that provides a summary of the predicted cumulative effects.
 11. 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 against developing adverse impacts when they (or unexpected changes) are encountered

The criteria described above will be used in the DAR as a basis for the developer's effects predictions. The developer will evaluate these predictions based on explicit significance thresholds (related to impact acceptability) to provide its opinions on the significance of impacts on the biophysical and human environment. The Review Board requires that these topics be addressed in order to understand the developer's views on the potential for significant adverse effects.

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 of the Review Board's *Environmental Impact Assessment Guidelines*, linked in Appendix A.