CANADIAN ZINC CORPORATION

DRAFT

Developer's Proposed Terms of Reference

Prairie Creek All Season Road Project

June, 2014

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1 INTRODUCTION

1.1 Background

The Prairie Creek Mine site is located in the southern Mackenzie Mountains in the south-west corner of the Northwest Territories (Figure 1-1). The Mine is 100% owned by Canadian Zinc Corporation (CZN), and consists of significant mine infrastructure and facilities constructed in the early 1980's. The Mine received an operating Water Licence in 1982 and Land Use Permits (LUP) in 1980 to allow production of concentrates of lead and zinc and a silver-bearing copper concentrate and use of an access road from the Mine to the Liard Highway. The Mine was three months from production when it was placed into receivership due to market conditions.

CZN, formerly named San Andreas Resources Corporation (SARC) acquired the property in 1991, and has since expanded and developed the mineral resource. After completing numerous engineering, environmental and economic studies, CZN applied to the Mackenzie Valley Land and Water Board (MVLWB) for a Type "A" Water Licence and a Type "A" LUP to support reactivation of the Mine for production, and two Type "A" LUP's for transfer facilities approximately half-way along the access road and at the junction of the road with the Liard Highway. CZN already held LUP MV2003F0028 for operation of a winter road. The applications were referred to environmental assessment (EA). In the terms of reference (TOR) for EA0809-002, issued by the Mackenzie Valley Review Board (MVRB), construction and operation of the access road in support of mine operations was included in the scope of development.

The MVRB issued their Report of EA (REA) on December 8, 2011. The MVRB concluded that the proposed development, as described in the REA and including CZN's commitments, is not likely to have any significant adverse impacts on the environment or to be a cause for significant public concern. The file was returned to the MVLWB for the permitting phase, and mine operations permits were subsequently issued, including Water Licence MV2008L2-0002 issued on September 24, 2013. As changes were made to the access road alignment during the EA, CZN applied for and received new access road LUP's and Water Licences from both the MVLWB and Parks Canada.

CZN's current access road operating plans include early winter opening of the road from the Mine to the Tetcela Transfer Facility (TTF) at Km 84 (see Figure 1-2), roughly mid-way along the road to the Liard Highway, in order to start the haulage of concentrates to the TTF. This is imperative because of the volume of material to be moved in a limited and unpredictable time period. Concerns were raised in the EA process by Parks Canada and others regarding the ground being sufficiently frozen to support the weight of vehicles in early winter. Sufficient snow availability at this time of year for road bed construction was also a concern. If conditions are not favourable, road construction and opening could be delayed. CZN has considered these risks, and the data available indicate that road construction should be possible as planned most years. However, the risk of seasonal delay remains, and this risk could change negatively in the longer term with the effects of climate change. Concern was also expressed during the EA regarding the road conditions through the mountains in winter, and the potential for spills and effective spill response.

FIGURE 1-1

FIGURE 1-2

For these reasons, CZN is now applying for permits to use the road in all seasons to the TTF. This will enable the year-round transport of concentrates to the TTF, and alleviate the concerns described above.

From an economic perspective, the operation will be penalized by only seasonal road access because significant working capital is required upfront to finance annual operating activities before any revenue from the concentrates produced in that year is available. All season access would remove this penalty, but is counter-balanced by the anticipated significant cost to upgrade the portion of the access road from the TTF to the Liard Highway. However, all season access could promote other activities, such as increased tourism, and greater involvement of local aboriginal groups may occur. Also, with all season access, CZN could consider alternate, cheaper and more environmentally-friendly fuels to power the operation, such as propane or liquefied natural gas (LNG). Therefore, in addition to applying for all season road use from the Mine to the TTF, CZN is now applying for all season road use from the TTF to the Liard Highway also, which when combined includes the entire road.

The road bed from the Mine (Km 0) to Km 39 (Cat Camp) is already of all season quality. In addition, Cadillac's road LUP provided for all season use of that section. The majority of the remainder of the road to the TTF location is on solid ground with very little muskeg terrain. While initial road use for early mine operations would be winter only using existing permits, CZN wishes to obtain new permits to allow all season use in phases. Phase 1 would see the western portion of the road upgraded for all season use to allow all mineral concentrates to be transported to the TTF. A second airstrip would also be built at this time on the Ram Plateau near the road to facilitate air access to the Mine in bad weather, since the existing CBH4 Prairie Creek Airstrip has a limited approach and is frequently closed due to poor weather. Phase 2 would see the eastern portion of the road upgraded.This phase will also provide an opportunity for multi-party collaboration for financing and use.

1.2 Access Road Regulatory History

Between 1970 and 1980, extensive underground development of the Mine took place. A winter tote road from Camsell Bend into the Mine was established in 1974/75 in order to bring supplies and heavy equipment in. An engineering feasibility study was completed by Kilborn Engineering (B.C.) Ltd. in 1980 for Cadillac, with environmental assessments directed by Ker Priestman, culminating in Preliminary Environmental Evaluation reports, one on the Mine, Mill and Camp, and one on the Winter Access Road, both dated May 1980. The latter study was the basis for a successful application for Land Use Permit N80F249.

A new access road was constructed from the recently built Liard Highway (Northwest Territories Highway 7) into Prairie Creek, beginning in the summer of 1980. The road intersected the Highway 3 km north of Lindberg Landing, approximately 7 km north of the Blackstone River. At that time, the Highway south to Fort Liard was not completed. The access road was used extensively over the

period from late January to the end of March in both 1981 and 1982. In excess of 800 loads were hauled into the Mine over these two years.

CZN applied for a LUP to use the existing access road alignment to re-supply the Mine in May, 2003. The MVLWB referred the application to EA, however CZN requested a judicial review of the referral decision, and the Supreme Court of the Northwest Territories ruled that the road was 'grandfathered' according to Section 157.1 of the Mackenzie Valley Resource Management Act, because the undertaking was previously assessed in the 1980's and LUP N80F249 was issued. LUP MV2003F0028 for use of the road was subsequently issued by the MVLWB on April 7, 2007. Subsequent to receiving the road permit, an evaluation of the road determined that washed-out sections of the road required repair, and further permits were needed. A quarry permit and Water Licence were issued in relation to the repairs, as well as an authorization from Fisheries and Oceans Canada following several fisheries studies.

As noted above, in the terms of reference (TOR) for EA0809-002, construction and operation of the access road in support of mine operations was included in the scope of development. However, the MVRB indicated that it would not be assessing structures already in existence in connection with the access road, as explained in the following statement contained in the MVRB ruling:

"The Review Board accepts the argument made by Canadian Zinc and others that conducting an impact assessment of the construction of facilities, including the road, which have been present on the land for over 25 years is not likely to generate any useful information even if it is possible. The Review Board will not be assessing construction impacts of already built structures."

The Board also indicated that it would consider proposed changes to the access road. CZN did indeed propose changes, and these were assessed. Changes were made to the access road alignment during the EA to address concerns from the Naha Dehe Dene Band about wetland/wildlife issues, and from Parks Canada regarding re-routing around the unique Polje-karst features.

As a result, after the EA, CZN applied for and received new access road LUP's and Water Licences from both the MVLWB and Parks Canada. The MVLWB issued LUP MV2012F0007 and Water Licence MV2012L1-0005 on January 10, 2013 and Parks Canada issued LUP Parks2012-L001 and Water Licence Parks2012_W001 on August 26, 2013.

1.3 Winter Road and All Season Road Footprint Differences

The intention is that the proposed all season road will generally follow the same alignment as the already assessed winter road. CZN's development plan for the Mine includes use of the winter road for at least the first few years of operations, after which the road might be upgraded for all season use. It would not be logical to use a different alignment which would require additional vegetation clearing and road bed preparation. However, CZN may propose relatively minor alterations of the exiting alignment. These would be considered and assessed in this EA.

The footprint of the all season road will be less than the winter road. This is because the winter road is intended to be double-lane as much as possible because of the volume of traffic over the short winter period, whereas the all season road would be mostly single-lane with short turn-outs for passing approximately every 1 km. The all season road traffic volume would be much less than

for the winter road, but would remain the same all year. Therefore, on a yearly basis, the total traffic volume will be the same.

The addition of an airstrip in the Sundog-Ram Plateau area, and the expansion of the Tetcela Transfer Facility, will be a footprint addition. However, this addition will be relatively small.

1.4 Referral to environmental assessment

To be populated by the Review Board.

1.5 Legal context and the Terms of Reference development process

To be populated by the Review Board.

2 DEVELOPER'S ASSESSMENT REPORT GENERAL REQUIREMENTS

2.1 Presentation of Material

To be populated by the Review Board.

2.2 Incorporation of Traditional Knowledge

Where it is applicable, the developer will make all reasonable efforts to incorporate traditional knowledge from Aboriginal culture holders into the DPToR. The developer should refer to the Review Board's *Guidelines for Incorporating Traditional Knowledge into the Environmental Impact Assessment Process*.

2.3 Public engagement

Engagement with communities, other Aboriginal groups, other governments, or other organizations with interests related to areas that might be affected by the project will help inform the DPToR. To assist with public engagement, the developer should refer to guidance provided in the Mackenzie Valley Land and Water Board`s *Engagement and Consultation Policy.*

2.4 Summary materials

The following summary materials will be required in the Developer`s Assessment Report (DAR):

- plain language summary in English and South Slavey
- a concordance table that cross references the items in the Terms of Reference with relevant sections of the DAR
- a commitments table listing all mitigation measures the developer will undertake, including but not limited to those described in the project application.

3 SCOPE CONSIDERATIONS

3.1 Scope of development

Under Subsection 117(1) of the MVRMA, the Review Board determines the scope of development for every environmental assessment it conducts. The scope of development consists of all the physical works and activities required for the project to proceed. Within this project the scope of development includes the construction, operation, reclamation, and closure of the all season road and the air strip. The road and airstrip are expected to be utilized during the construction, operation, closure, and reclamation of the Prairie Creek Mine.

The DAR will fully describe all required facilities and activities for the development. In addition, the developer will identify all permits, licences or other regulatory approvals necessary for the different phases of the development, and all land tenure agreements required. The Review Board may amend the scope of development at any time during the environmental assessment if the proposed development changes.

The project is envisaged to consist of two phases. The Phase 1 development would include an all weather road between the Mine and the Tetcela Transfer Facility (TTF) at Km 84 on the winter road, and a second airstrip somewhere close to the road in the Sundog-Poljes area (east of Cat Camp but west of the TTF). As part of this development, the TTF would be expanded in order to be the main storage location for concentrates, and to accommodate a small fuel storage and fuelling station. With Phase 1 implementation, concentrates would be transported to the TTF year-round, however they would remain there until removed over the winter road to the Liard Highway. The airstrip would also be used year-round, however it would only serve as a back-up to the existing strip in the Prairie Creek valley, so will likely have comparatively less activity.

The Phase 2 development would include an all weather road between the TTF and the Liard Highway, including a barge on the river for open water months with the associated ramps and set-down areas. With Phase 2 implementation, concentrates would be transported to the Liard Highway year-round without storage at the TTF, although will be periods of transportation hiatus in the spring and fall during switch-overs between the ice bridge and barge crossings of the river. Usage of the second airstrip would remain the same as for after Phase 1 implementation.

3.2 Scope of Assessment

3.2.1 Overview

The scope of assessment defines which issues will be examined in the environmental assessment. This includes all potential impacts on valued components of the biophysical and the human environment (for example, wildlife species or social concerns) from the development, by itself and in combination with other past, present and reasonably foreseeable future developments.

3.2.2 *Effects Assessments – Valued Components*

Below is a list of valued components to be used in the assessment of impacts from the project on biophysical, social and economic values:

- Harvesting
- Terrain, soils, permafrost, and karst topography
- Granular materials
- Air quality (dust only since other emissions are common to the winter road)
- Noise
- Water quality and quantity
- Species at risk and species of concern
- Fish and aquatic habitat
- Wildlife and wildlife habitat
- Vegetation (including invasive species, but excluding rare plants for which surveys were completed and impacts assessed during EA08-09)
- Traditional land use
- Ecological Integrity and Visitor Experience of Nahanni National Park Reserve
- Employment and benefits to the community
- Transportation infrastructure (Nahanni Butte access road and Liard River only)

The assessment of impacts will be limited to those related to the all season project development and only impacts over and above those related to the already assessed and permitted winter road. In addition, it should be noted that the existing road already has an all season road bed from Km 0 (the Mine) to Km 39 (Cat Camp), and historical land use permit N80F249 provided for all season use of that road section.

Land use is excluded as a valued component because other than traditional land use and NNPR activities, which will be assessed separately, there is no other land use in the immediate area. The potential for increased hunting and fishing from improved road access will be assessed in the sections for wildlife and fish respectively.

Potential impacts to cultural resources will not be assessed in this EA because two field investigations were completed for EA08-09 involving investigations at those locations most likely to host cultural resources, and none were found. The investigation locations were defined by elders of the Naha Dehe Dene Band during consultations in the community. An elder and other Band members also accompanied investigators in the field. Further, the LUP's for the winter road issued by the MVLWB and Parks Canada subsequent to the EA contain conditions for the protection of cultural resources, should they be found. The same conditions would likely be included in LUP's for an all season road. As such, the appropriate mitigation is already and will be in place, and further assessment is not warranted and is unlikely to result in additional requirements.

Impacts on existing territorial road transportation infrastructure will not be assessed because these were assessed in EA08-09, and there will be very little change as a result of the all season road compared to the winter road. This is because, while the haul of concentrates from the Mine to the Liard Transfer Facility (LTF), to be located close to the terminus of the Nahanni Butte access road with the Liard Highway, is currently to occur over the winter road, the haul of the concentrates out of the LTF to the Fort Nelson rail-head will be a year-round operation, subject to highway closures and seasonal load limits. Hence, this will not change with all season road use. However, there will be increased use of the Nahanni Butte access road outside of the winter period, and there will be a barge crossing of the Liard River. These aspects will be assessed.

3.2.3 Key Lines of Inquiry

For the Phase 1 development, the main change in project footprint is the second airstrip. Potential impacts on karst features will need to be assessed. There may be some minor re-alignment of the road alignment in the broad and flat Sundog Creek floodplain between Km 30 and Km 40, and there are likely to be one or two locations where the stream bed will need to be moved to accommodate the road remaining on the south bank. These changes will require assessment of potential impacts to fish and fish habitat. In addition, creek crossings and crossing structures that were not assessed previously will need to be assessed. The Phase 1 development will also result in road use beyond the winter period. The potential for impacts on wildlife from sensory disturbance and possible truck-animal collisions will need to be considered for the non-winter period. In addition, the risk of spills and the ability to respond will need to be assessed in terms of potential impacts to water quality and fish for the same period.

For the Phase 2 development, the following key lines of inquiry are expected:

- potential impacts to fish and fish habitat from creek crossings and crossing structures;
- the potential for impacts on wildlife from sensory disturbance, possible truck-animal collisions and hunting pressures associated with increased accessibility; and,
- the risk of spills and the ability to respond will need to be assessed in terms of potential impacts to water quality and fish for the non-winter period.

3.3 Geographic Scope of Assessment

The geographic scope for each valued component, and the rationale for it, is as follows:

- Harvesting – within 50 km of the access road east of the NNPR because no harvesting currently occurs west of this location, and because beyond 50 km the presence of the road is unlikely to have any practical effect;
- Terrain, soils, permafrost, and karst topography – within 30 km of the road because beyond 30 km the presence of the road is unlikely to have any practical effect;
- Granular materials - within 30 km of the road because access roads to borrow are unlikely to be built beyond 30 km;

- Air quality (dust) - within 30 km of the road because beyond 30 km the presence of the road is unlikely to have any practical effect;
- Noise - within 50 km of the road because beyond 50 km the presence of the road is unlikely to have any practical effect;
- Water quality and quantity - within the immediate basin crossed by the road because beyond that dilution effects are likely to render any impacts insignificant;
- Species at risk and species of concern – dependent on the species, but for birds, within 50 km of the road because beyond 50 km the presence of the road is unlikely to have any practical effect;
- Fish and aquatic habitat - within 1 km of the road downstream and all of the habitable portion of the stream upstream because any loss of habitat or impediment to migration is unlikely to have any practical effect beyond this;
- Wildlife and wildlife habitat - within 50 km of the road because beyond 50 km the presence of the road is unlikely to have any practical effect, and because for caribou, the road does not cross the range of any significant herd;
- Vegetation (invasive species) - within 50 m of the road because beyond 50 m the presence of the road is unlikely to have any practical effect, and because no invasive species were found during previous surveys of the road alignment;
- Traditional land use - within 50 km of the access road east of the NNPR because no traditional land use currently occurs west of this location proximal to the road, and because beyond 50 km the presence of the road is unlikely to have any practical effect;
- Ecological Integrity and Visitor Experience of Nahanni National Park Reserve – for ecological integrity within 50 km of the road because beyond 50 km the presence of the road is unlikely to have any practical effect, and for NNPR visitor experience the lowland portion of the NNPR where the main attractions exist;
- Employment and benefits to the community – the Dehcho region which hosts the main communities gaining employment and receiving benefits; and,
- Transportation infrastructure – limited to the Nahanni Butte access road east of the Liard River, and Liard River barge crossing location.

3.4 Temporal Scope of Assessment

The temporal scope for all valued components is the Mine life period covering all season road construction and use, unless the road is used for non-Mine activities subsequent to mine closure.

3.5 Consideration of Alternatives to the Development

The purpose of the proposed project is to gain road access to markets for mineral concentrates produced year-round. The only alternative, other than to remain with the already permitted winter road, is to consider air transport. Because of the weight of the concentrates, air transport is not economically viable.

The purpose of the proposed second airstrip is to reduce the number of days when the Mine is not accessible due to poor weather. Delayed access complicates crew changes and the delivery of

supplies. The only alternative, other than to only use the existing airstrip, is to use all season road access.

Therefore, there are no practical alternatives to the project proposals, and no further analysis of alternatives will be made.

4 ASSESSMENT METHODOLOGY

4.1 Impact Assessment Steps

To be populated by the Review Board.

5 DESCRIPTION OF THE EXISTING ENVIRONMENT AND BASELINE CONDITIONS

In the DAR, the developer will provide a description of existing conditions in sufficient detail to enable the Review Board and parties to understand how the valued components might be affected by the proposed development. The existing conditions should be described for the study area - the area affected by the development.

The Terms of Reference will describe how the following topics (Sections 5.1.1 to 5.2.5) will be addressed in the DAR. The following subsections provide a framework for each topic but require additional site-specific information. CanZinc should add subjects and details to the preliminary list below, based on its detailed knowledge of site-specific conditions and of the proposed development. If CanZinc deems any of the following topics or items inapplicable, it will provide a written justification.

5.1 Biophysical information requirements

5.1.1 Terrain, geology, soils, and permafrost

In the DAR, the existing terrain, geology, soils and permafrost in the study area will be summarized. Subjects to consider include:

- topography, geology, bedrock, unconsolidated surficial materials and terrain types, and soil types
- borrow materials (including permafrost and ownership)
- permafrost and ice-rich soils in the area of the all season road and regional climate and ground temperature changes

Terrain and geology has been well established from previous studies. There are data on soil conditions and permafrost, but this will be augmented by additional surveys, including the locations and nature of borrow materials.

5.1.2 Climate

In the DAR, the existing or baseline climate conditions and climatic variability and trends will be described. The description of baseline conditions will be presented in a manner that reflects the potential variability and facilitates subsequent discussion of how changes in climate could change the project or particular project components. The existing climatic baseline was well established in EA08-09 and no further data collection is warranted.

5.1.3 Water quality and quantity

In the DAR, a description and maps of the existing water resources, major drainages and watercourses will be included. For each major drainage or major watercourse, as appropriate, this will consist of a detailed description of its hydrological characteristics. In addition, flood levels and volumes will be determined for each major drainage or major watercourse. Baseline water quality samples were collected previously from the major watercourses crossed by the road.

5.1.4 Fish and aquatic habitat

In the DAR, the existing fish and aquatic habitat in the study area will be summarized. Subjects to consider include:

- a description of fish habitat present at each of the planned water crossings
- fish species
- seasonal and life cycle movements and sensitive periods
- habitat requirements for each life stage
- local and regional abundance, distribution and use of habitat types and known sensitive or important areas
- harvest pressures (subsistence and sport fishing) by species, season and geographic area.

The baseline for fish and aquatic habitat was well established in EA08-09, except for habitat conditions at watercourse crossings where snow-fill was to be used. This information will be collected for those crossings that are judged to be potentially fish-bearing.

5.1.5 Wildlife and wildlife habitat

In the DAR, the existing wildlife[1] and wildlife habitat within the study area will be summarized. Subjects to consider include:

- wildlife species presence, distribution and abundance, seasonal movements, habitat requirements and sensitive time periods
- species of importance to subsistence harvesters and to the guiding or outfitting industries
- species sensitive to harvest pressures
- habitat types and sites of special value or sensitivity
- migratory patterns, routes, and timing in relation to all season road route alternatives, construction activities, and operation

[1] Including birds

- existing invasive species.

The baseline for wildlife and wildlife habitat was well established in EA08-09, including the regional occupancy and movements of caribou. However, the data collected previously identifying sensitive wildlife ranges in proximity to the road for rutting and natality is somewhat dated. Aerial surveys of the alignment will be undertaken to update the historical data, focusing on caribou, moose, Dall's sheep, and grizzly bear.

The biggest risk for non-winter use of the road is likely to be the potential for wildlife collisions, hence the need to know where wildlife (particularly ungulates) is likely to be, and where and when animal movements could occur. The main concern is caribou rutting and birthing areas and Dall's sheep birthing areas. Moose can be expected along most of the alignment during most seasons, and traffic management will be a key component of a mitigation approach.

5.1.6 *Vegetation*

In the DAR, a description of the existing vegetation within the study area will be summarized. Subjects to consider include:

- vegetation and vegetation assemblages
- identification of rare species or assemblages
- human use and merchantable timber
- existing invasive species
- frequency of forest fires and post-fire succession.

The baseline for vegetation in proximity to the road was well established in EA08-09 and no additional data collection is considered to be necessary.

5.2 Human environment baseline information requirements

5.2.1 *Education, training, and skills*

In the DAR, a description of the education, skills and training levels in the communities relevant to the road, including graduation and achievement rates including high school or higher, and trade certification levels will be summarized. This will be drawn from the DAR for EA08-09.

5.2.2 *Harvesting*

In the DAR, a description of current and traditional harvesting, focusing on subsistence and commercial harvesting, including harvesting activities and other traditional uses by Aboriginal peoples within study area will be summarized. This will include harvest levels, participation, and locations. This will also be drawn from the DAR for EA08-09.

5.2.3 *Tourism*

In the DAR, a description of the current tourist activity in the study area and revenue generated as a result of tourism in the region will be provided. Specific attention will be given to the revenue

generated both directly and indirectly by Nahanni Butte. This will also be drawn from the DAR for EA08-09.

5.2.4 *Regional and local economies*

In the DAR, a description of the local and regional economies and their performance will be summarized. Subject to consider include:

- employment rate
- employment by industry and occupation, including occupations related to traditional activities
- job vacancy and unfilled positions, labour force growth, participation and balance between wage and non-wage sector activities and earnings growth.

This will also be drawn from the DAR for EA08-09.

5.2.5 *Existing transportation routes and related infrastructure*

In the DAR, a description of the use of the Nahanni Butte access road, and the navigable water use of the Liard River at the proposed barge crossing location, will be presented.

6 DEVELOPMENT DESCRIPTION

The developer will fully describe the facilities and activities associated with all phases of the development, including a discussion of the need for the project, alternatives for carrying out the project, and development schedule.

6.1 Project components and activities

The project includes three distinct components: construction and operation of an all season road, construction and operation of an expanded transfer facility approximately mid-way along the road, and construction and use of an airstrip. The all season road will use the same alignment as the winter road. Where studies define a preferred minor re-alignment of the road, and subject to regulatory approval, the re-aligned road will be adopted for both winter and all-season use. Construction and use of the Tetcela Transfer Facility has already been assessed and permitted. An expanded facility will be assessed, but there are no practical alternatives to the expansion. The construction and use of a second airstrip will include consideration of site selection and the basis for the preferred site.

Project components and activities will be described, and will include the following topics:

- design standards
- land requirements (footprint, location, permanent or temporary)
- any proposed re-alignments
- road construction methods
- cut and fill estimates and plans for excess material disposal/storage
- water crossing structures and locations

- alterations to stream flow
- borrow source locations, quality and desired/expected quantities, activities and methods
- temporary winter or all-season access roads to borrow areas
- camps, staging areas, laydown areas, access roads and other support facilities
- fuel storage and management
- explosives storage, transportation, and use
- toxic or hazardous materials to be used
- equipment requirements (by phase)
- solid and liquid waste management
- water use
- wastewater treatment
- mobilization and demobilization (this should include a discussion of related activities and land requirements which are necessary for construction but not a part of the project)
- frequency of vehicle and aircraft movement during construction
- routine maintenance activities
- expected traffic volumes during operational phase
- clean-up and restoration of work areas during construction phase
- reclamation
- procurement and implementation approach
- training, employment and business opportunities
- ongoing operations and maintenance of the all season road
- land requirements including footprint, location, permanent or temporary.

6.2 Construction phases and schedule

In the DAR, the development description will contain an overall activity schedule for the development which outlines the scheduling and duration of each activity. This will include timelines and contingencies for the timing for each project activity during construction, operation, and closure.

6.3 Existing infrastructure and facilities

In the DAR, a description of previously assessed, existing, and approved facilities that are to be used as part of the project will be presented. Subjects to consider include:

- infrastructure and facilities, including the winter road, transfer facilities, and operation of the airstrip, frequency of use, type of aircraft, and estimated number of passengers and volume of material
- how it will be used in the context of the proposed development
- capacity of existing facilities and infrastructure to handle the proposed development
- any changes to the existing infrastructure or facilities that will occur as a result of the project.

6.4 Existing Management Plans

As part of the environmental assessment, the adequacy of existing and already required management plans and monitoring programs with respect to detecting and preventing potential significant adverse impacts from developing will be assessed. These documents are listed in LUP's MV2012F0007 and Parks2012-L001.

7 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND CUMULATIVE EFFECTS

7.1 Effects Assessment

To be populated by the Review Board.

7.2 Key Components of Interest

The following section outlines valued components to be investigated and topics to consider within the investigation in the DAR. In the DPToR, CanZinc will amend this section given its site specific knowledge and will be cognizant of the effects of construction, operation, and closure periods.

The Terms of Reference will describe how the following topics (Sections **Error! Reference source not found.** to 7.2.13) will be addressed in the DAR. The following subsections provide a framework for each topic but require additional site-specific information. CanZinc should add subjects and details to the preliminary list below. If CanZinc deems any of the following topics or items inapplicable, it will provide a written justification.

7.2.1 Harvesting

The DAR will describe and list the potential effects of the project on caribou, moose, and sheep and the effect on harvesting. This section will also include any impacts to harvesting of other species. This will include an examination of:

- sensitive or important areas or habitat
- direct and indirect alteration of habitat
- sensory disturbance and predicted changes in behaviour (including habitat avoidance and effective habitat loss in relation to all season road facilities or activities), energetics, health and condition
- wildlife movement patterns, home ranges, distribution and abundance
- wildlife mortality due to harvesting and vehicle collisions
- disruption of sensitive life stages or habitat (e.g., migration, calving, denning, overwintering)
- population cycles, predator-prey relationships and increased human-wildlife interactions
- changes in access, including increased access to the land and surrounding waters.

7.2.2 Terrain, soils, permafrost, and karst topography

The DAR will describe and list the potential effects of the project on terrain, geology, soils, permafrost, and karst topography. Topics to consider include:

- slope and soil stability, erosion and subsidence
- karst topography
- thaw slumps, compaction of organic peat lands, and potential for melt of ice rich ground
- snow distribution, drainage, and avalanches.

7.2.3 Granular Materials

The DAR will describe granular materials required for the proposed project. Topics to consider include:

- locations and desired/expected volumes of material from each proposed borrow site
- potential for excavation and use of rock that could generate acid rock drainage/metal leaching
- measures to limit the effect on the surrounding environment
- excavation requirements.

7.2.4 Air quality

The DAR will describe and list the potential effects of the project on dust levels. Topics to consider include:

- dust emissions from vehicles, equipment and stationary sources
- dust emissions by source for each phase, including quantity, timing and duration, normal operation conditions and upsets
- how changes in dust levels could have an impact on humans, wildlife and vegetation.

7.2.5 Noise

The DAR will describe and list the potential effects of the project on noise. Topics to consider include:

- road components and activities that could produce undesirable noise levels including source location, timing and duration
- sensory disturbance to fish, birds and wildlife, including caribou and moose
- disturbance of harvest and recreational activities, including tourism
- potential impacts to wildlife harvesting activities and impacts to communities.

7.2.6 Water quality and quantity

The DAR will describe and list the potential effects of the project on water. Topics to consider include:

- changes to surface drainage patterns and surface water hydrology

- alterations to streamflow
- hydrogeological resources
- possible contamination to surface water and groundwater
- drinking water quality for humans and wildlife
- discharge or seepage of wastewater effluent, contaminants, chemical additives, etc.
- changes to water quality at water crossings (bridges, culverts and other wetted areas)
- changes to water quality due to thaw slumps and other slope instability at water crossings
- erosion, sediment deposition, sediment re-suspension
- related impacts on sediment quality.

7.2.7 Species at risk and species of concern

The DAR will identify the species at risk and species of concern[2], and identify the adverse effects of the project on *Species at Risk Act* and *Species at Risk (NWT) Act* listed wildlife species and critical habitat. Topics to consider include:

- the geographic extent of the species
- the timing and duration of key life cycle stages
- methods to minimize the effects of the project on the species.

7.2.8 Fish and aquatic habitat

The DAR will describe and list the potential effects of the project on fish and aquatic habitat. Topics to consider include:

- alteration or loss of fish distribution, abundance and habitat (including riparian areas) due to development activities during all project phases
- effects of proposed watercourse crossings and temporary vehicle crossing methods
- relevant policies, management plans or other measures to protect or enhance fish and aquatic habitat, such as timing restrictions, protected areas or regulations
- sensitive or important areas
- blockages to movement
- potential for increased fishing
- reclamation

7.2.9 Wildlife and wildlife habitat

The DAR will describe and list the potential effects of the project on wildlife (including birds) and wildlife habitat. Topics to consider include:

- impacts on distribution and abundance, movements and home ranges
- direct and indirect alteration of habitat including direct project footprint impact
- habitat fragmentation and barriers to movement and gene flow

[2] Refer to both the Government of Canada (http://www.sararegistry.gc.ca/default_e.cfm) and Government of the Northwest Territories (http://www.nwtspeciesatrisk.ca/) guidance

- visual or auditory disturbance and effective habitat loss
- effects of construction and pre-construction activities, including aircraft
- wildlife mortality due to harvesting and collisions
- changes to species distribution and abundance
- disruption of sensitive life stages
- important areas or habitat
- population cycles and predator-prey relationships
- increased human-wildlife conflicts (e.g. bear encounters)
- location of raptor nesting sites within 1km of the proposed road
- use of the project area by birds protected by the *Migratory Birds Convention Act, 1994*
- how road-related changes in harvest pressures could impact the resource
- ability of habitat or species to recover
- response to edge effects
- invasive species (vegetation and wildlife)

7.2.10 Vegetation

The DAR will describe and list the potential effects of the project on vegetation. Topics to consider include:

- alteration or loss of species or vegetation assemblages that are rare, valued, protected or designated sensitive areas, important areas, or habitat
- amount of merchantable timber removed and potential for facilitating use by communities
- vegetation clearing, invasive species, road emissions and dust
- changes to the soil, hydrological or permafrost regimes related to vegetation changes and right of way clearing
- re-establishment of vegetation and reclamation of borrow sites and other disturbances.

7.2.11 Traditional Land Use

The DAR will describe and list the potential effects of the project on traditional land use (beyond those described in response to the discussion of impacts on harvesting). Topics to consider include:

- traditional lifestyles, values and culture
- cultural and spiritual sites and activities.

7.2.12 Employment and Benefits to the Community

The DAR will describe and list the potential effects of the project on the community. Topics to consider include:

- direct and indirect employment opportunities generated by the development and the potential for uptake of these opportunities locally by aboriginal peoples
- employment and income for every year of construction and operation, with particular reference to wage and salary employment by length of employment, form of employment (full time, part time, seasonal), and skills category

- measures, plans and commitments for maximizing local aboriginal employment and businesses
- maximizing local aboriginal participation in contractor and sub-contractor business opportunities
- effects on capacity of local businesses to service other sectors during the construction phase
- timing and duration of education and skills development programs that would be required for road-related employment
- proposed education and training programs required for road-related construction and operation employment.

7.2.13 Impacts on existing transportation infrastructure

The DAR will describe and list the potential effects of the project on the water crossing of the Liard River (i.e. barges).

7.2.14 Ecological Integrity and Visitor Experience of Nahanni National Park Reserve

In addition to the evaluation above, the DAR will also evaluate potential effects in the context of Parks Canada's legislated and mandated priorities. This evaluation should consider impacts to ecological integrity and visitor experience.

8 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The DAR will describe and list the potential effect of the environment on the project. Topics to consider include:

- long-term climate change scenarios[3] (e.g., loss of permafrost, increased evaporation and evapotranspiration, greenhouse gas emissions)
- how changes in permafrost are likely to affect the amount the granular material required for care and maintenance of the all season road
- short-term climatic and extreme weather events
- flooding, landslides and ground movement, changes in permafrost regime, subsidence, seismic activity, avalanches and fire.

9 POTENTIAL ACCIDENTS AND MALFUNCTIONS

The DAR will describe and list how potential accidents and malfunctions for each phase will be assessed and addressed. Tasks completed for the DAR will include:

- a risk assessment using best practices[4] for the development including components, systems, hazards, and failure modes
- an assessment of the likelihood and severity of each risk identified, integrating combined ecological, social and economic costs of accidents and malfunctions
- a description of contingency plans for accidents, malfunctions, or unforeseen impacts of the environment on the development and the development on the environment
- a description of emergency response plans that will be in place.

For each project phase, accidents and risks to consider include:

- concentrate spills, fuel spills, and resulting contamination of soil and water
- explosion and/or fire
- transportation accidents (air, land, water).

10 CUMULATIVE EFFECTS ASSESSMENT

In EA08-09, the DAR considered the following topics for cumulative effects assessment:

- Water Quality
- Wildlife
- Air Quality
- Socio-Economics
- Access Road and the Liard Highway
- Historic Developments
- Human Activities

[3] See the Intergovernmental Panel on Climate Change's most recent assessment report at http://www.ipcc.ch/report/ar5/
[4] See http://www.robertsongeoconsultants.com/rgc_enviromine/issues/cls_fmea-2.html

The water quality cumulative effects assessment (CEA) for this DAR will similarly consider the possible impacts on tributaries of the South Nahanni River. Cumulative impacts on the Ram River, which Sundog Creek and the Tetcela River flow into, will not be considered because there is no current industrial development in that basin.

The CEA for wildlife will be performed in the context of residual effects from the Prairie Creek Mine access road, and how the potential residual effects could be additive to residual effects from other resource development projects in the immediate vicinity or broader geographic region.

Since the scope of air quality impacts is limited to dust, and dust dispersal will be limited in areal extent, no CEA will be completed.

A socio-economics CEA will be completed to consider the additive effects of other actual or potential developments in the region.

As noted above, impacts on the Liard highway will not be assessed because this was done in EA08-09. However, summer use of the Nahanni Butte access road for concentrate haulage was not considered, and therefore a CEA will be completed for this.

In EA08-09, a CEA was completed for the Cat and Grainger Camps, the old transfer facility on the Liard River at Lindberg Landing, and Mine area roads and clearings. The first two of these were historically used in winter only. Therefore, there is no need to repeat this CEA.

In the DAR for EA08-09, it was noted that past human activities in the area include traditional hunting and trapping and mineral exploration. Present activities are the same, with the addition of hunting by outfitters. Other sections of that DAR described that traditional hunting in the Mine area is less than historically recorded, and with the expansion of the NNPR, outfitting will cease in 2019. However, a potential cumulative aspect exists associated with impacts on wildlife from improved access to the area using the all season access road. The improved access may lead to increased hunting pressure by persons from and outside of the region. A CEA will be completed for this.

11 FOLLOW-UP AND MONITORING

A summary of the follow up and monitoring considerations for the project will be included in the DAR. "Follow-up" means a program for verifying the accuracy of the environmental assessment of a project and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project. Topics to consider include:

- The regulatory and non-regulatory monitoring requirements for the life of the project
- Use of an adaptive management process

The developer is encouraged to discuss and adopt common data collection and monitoring protocols with local and regional monitoring programs including GNWT-Wildlife to facilitate project impact analysis. In addition, the developer is encouraged to use management response plans to accomplish adaptive management. Guidance on a management response framework, how to link monitoring results to management decisions, and how management activities are developed adaptively in response to changes in the environment can be found in the Wekeezhi Land and

Water Board document *Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring. Draft. Oct 17, 2010.*

12 CLOSURE AND RECLAMATION

The developer will provide a framework for the conceptual closure and reclamation of the project. Guidance on reclamation is provided in the Mackenzie Valley Land and Water Board – Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and the Mine Sites in the Northwest Territories*[5].

13 CONCLUSION

The Review Board anticipates that the requirements described in the Terms of Reference will produce a DAR that clearly describes its predictions of the impacts from the proposed development and the likely effectiveness of proposed mitigation and management plans. The resulting DAR should therefore provide an adequate initial basis for the Review Board and parties to analyze and evaluate those predictions.

[5] See http://mvlwb.com/sites/default/files/documents/wg/WLWB_5363_Guidelines_Closure_Reclamation_WR.pdf