

EA1415-01
May 22, 2015

Alan Taylor
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Vancouver, BC V6B 4N9

Dear Mr. Taylor,

Re: Developer's Assessment Report DAR adequacy review

The Mackenzie Valley Environmental Impact Review Board (the Review Board) has completed its adequacy review of Canadian Zinc Corporation's (CanZinc) *Developer's Assessment Report* (DAR) in support of its proposed Prairie Creek all season road and airstrip project. The Review Board has decided that the DAR does not meet the requirements of the Terms of Reference.

The attached report documents the specific items in the DAR that do not adequately respond to the Terms of Reference. To move forward, CanZinc must provide appropriate information for all of the items set out in this report. The environmental assessment cannot proceed until this is done.

To ensure an efficient review, CanZinc's response must be in the form of a stand-alone DAR Adequacy Supplement document. This document must be organized in a way which shows clear correspondence between the relevant sections in the DAR and the listed adequacy concerns.

Given the range of additional information required as a result of the adequacy review, Review Board staff are available to discuss anticipated timelines for the completion of this work. They can also provide further detail about the required information to assist CanZinc, if necessary. Appendix B of the adequacy review describes various baselines studies that are needed. The deadline for those studies should be discussed with the Review Board.

Please contact Sachi De Souza at 867-766-7054 or sdesouza@reviewboard.ca with any questions regarding the Adequacy Review, or to set a time for the above discussion.

Regards,



JoAnne Deneron
Chairperson



EA 1415-01

Adequacy Review

Prairie Creek All Season Road

Canadian Zinc Corporation

May 22, 2015

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APPENDICES

Appendix A: Non-conforming items

Appendix B: Summary of outstanding baseline information

1 DEVELOPER'S ASSESSMENT REPORT ADEQUACY REVIEW OVERVIEW

Mackenzie Valley Environmental Impact Review Board (the Review Board) has conducted an adequacy review of the Developer's Assessment Report (DAR) submitted by the Canadian Zinc Corporation (CanZinc) in support of its proposed all-season road project. The DAR was submitted by CanZinc on April 23, 2015.

The purpose of the adequacy review is to ensure that each item in the Terms of Reference (ToR)¹ is addressed in the DAR and that the information provided met the requirements and intent of the ToR.

This adequacy review considers whether the DAR is in conformity with the Terms of Reference, and also involves considerations that are more detailed for each item described in the Terms of Reference. It evaluates the following:

1. Are all items in the ToR addressed?
2. Do the project description and baseline information provide enough detail to enable a thorough understanding of the proposed development and determine the potential impacts?
3. Does the DAR include all the impact predictions required by the ToR?
4. Are the assumptions, predictions, uncertainties and proposed mitigation measures clearly explained and reasonable?
5. Does the developer provide a thorough explanation of the significance of impacts, and are the methodology and terminology for significance determinations clear?
6. Has the developer satisfied all instructions given by the Review Board to that point in the proceeding?

Each section of the adequacy review begins with a conformity checklist. Conformity is the first step in the adequacy evaluation (step 1 above) and is needed to progress to the subsequent adequacy steps. The non-conformity tables are presented to indicate where the DAR was considered out of conformity and needs to be updated to reflect items in the ToR. Items that were not in conformity must be provided by the developer and must meet the impact assessment steps described in sections 4.1 and 7.1 of the ToR. A summary conformity table which encompasses all of the conformity items is provided as Appendix A.

Following the non-conformity table are the review items that require further information from the developer in order for the DAR to be considered adequate by the Review Board. The document lists the items that require further information from CanZinc. For each item, it presents:

1. the broad topic for the item
2. the section of the ToR where a response is required
3. for items where a response to the Terms of Reference item was provided by CanZinc,
 - i) the corresponding section(s) in the DAR

¹ [Terms of Reference](#)

- ii) a description of why the response provided by the developer in the DAR is not adequate for review
- 4. the information required from the developer in order to be adequate for review

1.1 Summary of adequacy review findings

This document itemizes numerous items required by the ToR were not addressed, and several that lack necessary information. Although these are all necessary for proceeding in the EA process, the following deficiencies are flagged as being of particular importance:

1. Project Description: The DAR did not present adequate information to determine if the road is acceptable from a safety perspective. The development description does not demonstrate adequate consideration of the challenges of building a road in this environment.
2. Assessment steps: The DAR did not complete an effects assessment for the key lines of inquiry or any of the subjects of note. This is particularly important given 1) the integrated nature of the key lines of inquiry of a) the integrity of NNPR and b) traditional harvesting and traditionally harvested species, and 2) the lack of information presented on the subjects of note for species at risk, wildlife, and vegetation. The DAR provided an inadequate assessment of potential effects on karst, a key feature of the park and part of the basis for the United Nations' World Heritage Site designation for the area. In addition, the DAR did not present sufficient baseline information. The specific baseline studies required for the EA are outlined in Appendix B.
3. Risk assessment: The key line of inquiry on the effects of potential accidents and malfunctions required a risk assessment. This was not done adequately. The DAR considered risk and likelihood to be synonymous. However, risk is dependent on the likelihood of an event occurring in combination with the potential consequence if it occurs. In addition, the risk assessment did not adequately integrate all of the potential risks. For example, there was no integration of the effect of road grades with potential geohazards and weather considerations.

1.2 Assessment steps

The purpose of an environmental assessment is to assess the potential effects of a proposed project. In assessing the effects the Review Board considers whether the development is likely to cause a significant adverse impact to specific valued components. If there is the potential for significant adverse impacts, the Review Board needs to understand what these may be and what mitigations could minimize the impacts. In the ToR, the Review Board outlined *Impact Assessment Steps* in sections 4.1 and 7.1. The purpose of these sections was to provide the developer with clear steps on how to conduct its effects assessment.

Numerous sections within the DAR did not complete all of the impact assessment steps; therefore, the Review Board could not ascertain the potential effects of the project. As stated in the ToR, the developer must complete these impact assessment steps in the DAR. The assessment steps from the ToR are quoted below and referred to throughout this document.

4.1 Impact Assessment Steps

1. *identify any valued components used and how they were determined*
2. *identify the natural range of background conditions (where historic data are available), and current baseline 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 any potential direct and indirect impacts on the valued components that may occur as a result of the proposed development, identifying all analytical assumptions*
4. *identify and evaluate any proposed mitigation measures as to their technical and economic feasibility to reduce the predicted impacts and discuss constraints, uncertainties and implementation challenges to the effective use of the proposed measures and clearly identify all mitigation commitments*
5. *predict the likelihood of each impact occurring after the committed to mitigation measures are implemented, providing 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*
6. *compare the predicted impacts to pre-development conditions or to conditions without the 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*
7. *describe techniques such as models utilized in impact prediction including techniques used where any uncertainty in impact prediction was identified*
8. *identify, and provide an opinion on the significance of any residual adverse impacts predicted to remain after any mitigation measures and indicate the methodologies for reaching such conclusions*
9. *identify any monitoring, evaluation, and adaptive management plans required to:*
 - i. *detect potential unexpected changes*
 - ii. *ensure that predictions are accurate*
 - iii. *proactively manage against developing adverse impacts when they (or unexpected changes) are encountered.*

The developer will describe how the predicted impacts are expected to arise from the proposed development, as well as its views on impact significance. This will include describing the mechanisms for cause and effect and providing supporting references (including where Traditional Knowledge was used). Where professional judgment has been used in determining impacts, this must be made clear. The developer will also provide a discussion on the uncertainty involved with each prediction. For each predicted impact, the developer will describe:

10. *the nature or type of the impact*
11. *the geographical range of the impact*
12. *the timing of the impact (including duration, frequency and extent)*
13. *the magnitude of the impact (what degree of change is expected)*
14. *the reversibility of the impact*
15. *the likelihood and certainty of the impact.*

An example summary matrix has been included as Appendix B. Please use the example table to help summarize the narrative description in the DAR.

7.1 Effects Assessment

For each valued component described in this section, the following topics will be addressed, consistent with the methodology identified in Section 4 of this document [ToR].

Identification of potential environmental effects: The potential interactions of the development with the valued component and resulting potential environmental effects to the valued component will be identified. The developer will present quantitative or qualitative parameters to measure potential environmental 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.

Mitigations and residual effects: The developer will describe all mitigations that will be put into effect during project design, construction or operation to mitigate potential environmental effects. 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 DAR.

Assessment of cumulative effects: For each residual effect resulting from the development, the developer will conduct an assessment of the potential for cumulative effects resulting from a combination of effects of the development with effects from other past, present and reasonably foreseeable human activities and developments. The way in which a cumulative effect may occur and its potential spatial and temporal scope, will be discussed. Residual cumulative effects will be identified. The developer will characterize the significance of residual project and cumulative environmental effects and identify mitigations that may exist for cumulative effects beyond those for project specific effects.

2 SUMMARY MATERIALS – CONCORDANCE TABLE

ToR section :

2.4 Summary Materials

DAR section

Table A Concordance Table

Item rationale

The ToR required a concordance table to assist with the review of the DAR. The concordance table provided did not provide references for everything listed in the table nor did it include the detailed items referenced in the ToR.

Required Item

Please provide an updated concordance table with specific references to where in the DAR or associated appendices each numbered item for each section can be found. For example, a reference

to the concordance table should indicate where item 1 from section 7.2.3 can be found.¹ This is needed for the Review Board and parties to ensure an efficient review of the DAR.

3 ALTERNATIVES TO THE DEVELOPMENT

3.1 Consideration of Alternatives to the development

ToR section

3.5 Considerations of alternatives to the development

DAR section

3.3 Alternatives to the development

Item rationale

The purpose of the alternatives analysis was to compare alternatives to the project which could accomplish the same objective. For the purposes of this project, the objective is to transport mineral concentrates to the market. The DAR stated that the quantified objective is to transport 120, 000 tonnes of concentrate per annum (tonnes/yr).

The alternatives assessed in the DAR were:

1. an all season road which would transport concentrate continuously,
2. a winter road with increased truck traffic, and
3. flying out excess concentrate.

These alternatives were considered for both phase 1 (the western portion of the road) and phase 2 (the eastern portion of the road).

There are a number of issues with the approach taken for the alternatives assessment. Firstly, alternatives two and three do not accomplish the same objective alone, and would need to be used in conjunction. Alternative two would only be able to transport 90, 000 tonnes/yr and alternative three, 30, 000 tonnes/yr (DAR, pg 55). Combined, alternatives two and three result in transporting 120, 000 tonnes/yr. Secondly, the analysis did not compare the alternatives to a “no project” (winter road only) scenario.²

Finally, in describing each indicator (technical, cost-benefit, socio-economic and environmental), qualitative statements were given to describe why the each alternative was scored differently; however, the amount of detail presented does not allow for an appropriate assessment of the alternatives. To allow for a fair comparison, the Review Board needs to see a listing of the factors considered for each indicator for each alternative accompanied with a detailed explanation of the ranking.

¹ An example of a concordance table from Fortune Minerals Ltd’s NICO Project can also be found on the registry using the following link:

http://www.reviewboard.ca/upload/project_document/EA0809-004_Appendix_01_II_Concordance_Table.PDF

² From the DAR it is understood that a winter road may only be able to transport 90, 000 tonnes/yr.

Required Adequacy Item

Please update the alternatives assessment to address and compare the following alternatives using the multiple accounts analysis (MAA)¹:

1. All-season road for the entire length of the road
2. A winter only road where the excess is flown out
3. No project case (a winter only road).

For each alternative, describe each item considered for each indicator and the same indicators should be used for all alternatives. For example, the environmental account could include the effects of spills and the effects of the road to species at risk during operations. The alternatives assessment should describe how each alternative performs with respect to the effect of spills and the effects to species at risk, bearing in mind the differences in effects during each stage of the project. For example, the effects may differ between construction of the road and operations of the road.

4 DEVELOPMENT DESCRIPTION

4.1 Summary of non-conforming and inadequate sections

Table 1 Development description - non-conformity

Terms of Reference Section	Description of item not in conformity
6.2, item 7 i	Freeboard when adjacent to or crossing watercourses for multiple flood events (see Section 5.1.3 for flood events)

4.2 Concentrate and Traffic Estimates

ToR section

6.1, item 22 Expected traffic volumes and weights during all phases

DAR section

6.3.3 Vehicle and Aircraft Frequencies
Appendix 1, Transportation Approach and Truck Configuration
section 3

Item Rationale

The DAR referenced a production rate of ~120,000 tonnes per annum, a daily production of approximately 330 tonnes/day, and 8 to 9 concentrate trucks per day. These rates differ from those in Appendix 1 which stated a production rate of 107,000 tonnes per annum, a daily production rate of 293 tonnes/day, and 10 to 14 concentrate trucks per day.

¹ See guidance at http://technology.infomine.com/enviromine/issues//cls_maa.html

Required Item

Please confirm the production rates and traffic estimates.

4.3 Traffic Estimates

ToR section

6.1, item 22 Expected traffic volumes and weights during all phases

DAR section

6.3.1 Concentrate Containment
Appendix 1, Transportation Approach and Truck Configuration
section 3

Item Rationale

The DAR stated that the trucks used to transport the concentrate may change the transportation method from bulk bags inside a trailer box to a containerized form of bulk concentrate. The understanding was the concentrate transport trucks would be used to back haul materials to the mine, including fuel. It is unclear if the alternate concentrate transport trucks could be utilized for back hauling materials, particularly fuel.

Required Item

The developer will indicate if the concentrate trucks back-hauling fuel tank and other materials are compliant with all applicable transport regulations if not, what would be the resulting change in traffic frequency along the roads (all season road and existing roads and highways).

In addition, please provide a photo of a typical truck to be used for transporting bagged concentrate and provide examples of where this type of concentrate transport is used presently at existing mines.

4.4 Existing Infrastructure – airstrip

ToR section

6.4, item 1i Operation of the airstrip, frequency of use, type of aircraft, and estimate number of passengers and volume of material

DAR section

6.6 Existing Infrastructure and Facilities

Item Rationale

The frequency and use of the existing airstrips at Nahanni Butte and the mine site were only considered as being used occasionally. With Parks Canada's decision regarding an airstrip within Nahanni National Park Reserve the use of the other airstrips will likely need to increase.

Required Item

Please describe air traffic for the existing airstrips for all project construction, operations and maintenance, and closure. As stated in the ToR, this should include the frequency of use, type of aircraft, estimated number of passengers, and volume of material.

4.5 Runaway lanes

ToR section

6.4, item 3 Runaway lanes

DAR section

6.4 Road Design Considerations

Item rationale

The DAR referenced a SNC report which stated that road grades did not warrant runaway lanes. The associated documentation was not included in the DAR.

Required Item

The developer will provide documentation that supports the statement that runaway lanes are not needed.

4.6 Safety railings

ToR section

6.4, item 4 Safety railings

DAR section

6.4 Road Design Considerations

Item rationale

The DAR states that safety railings would be ineffective in stopping trucks and are not warranted. There is no supporting documentation for this statement.

Required Item

The developer will provide documentation that supports its statement on safety railings.

4.7 Pull-outs

ToR section

6.4, item 8 Pull-outs

DAR section

Appendix 1

Item rationale

Appendix 1 stated that pull-outs would be improved but did provide any details.

Required Item

The developer will provide additional documentation describing the pullouts specifically including how they will be improved for the all-season road.

4.8 Freeboard at watercourse crossings

ToR section

6.4, item 7i Freeboard when adjacent to or crossing watercourses for multiple flood events (see Section 5.1.3 [of the ToR] for flood events)

DAR section

Appendix 1

Item rationale

Appendix 1 provided drawings for the water crossings; however, it did not show freeboard in elevation view. This is needed in order to demonstrate the proposed designs will be effective and safe with respect to the passage of debris under the structures.

Required Item

The developer will indicate the freeboard for watercourse crossings or when immediately adjacent to water crossings. The freeboard will consider the water and debris flow.

4.9 Estimated peak flow rates and water surface elevations

ToR section

5.1.3, 7 iii estimated peak flow rates, water surface elevation, and erosion potential for flood events (considering multiple events from a 1 in 10 year event to a 1 in 250 year event)

DAR section

4.3 Water Quality and Quantity

Item rationale

Erosion potential is not adequately addressed. For example, Section 4.3 of the DAR (p. 79) refers to two intense rainstorm events in 2006 and 2007 that were "considered abnormal because they caused erosion of stream banks and CZN's access road to a degree not seen since the Mine and road were built" (around 25 years earlier). Rather than dismissing these events as "abnormal", these events should be treated as valuable sources of information regarding erosion potential during rainstorm events; any available information about erosion during these events should be compiled and used to develop an understanding of erosion potential in the study watercourses.

Preliminary designs for watercourse crossings and riparian road segments are provided in Appendix 1. The current level of detail is from LiDAR and is generally suitable at this submission level. However, erosion and sedimentation potential and channel stability should be addressed more explicitly. For example, no mitigation is described that links the design to the observed sedimentation. Baseline characterization and metrics are needed to determine whether mitigation would be appropriate and effective.

This information is needed to ensure that the engineering design is defensible, and the information is required to ensure that safety measures are adequately addressed in the project design

Required Item

Additional information should be presented covering the regional data/methods used to generate the Q100 values, in-depth analysis of the 2006 and 2007 flood events and how these were used to inform/validate the Q100 estimates, and a discussion of uncertainty in the peak flow estimates. In addition, the developer will describe the erosion and sedimentation potential and channel stability more explicitly including what specific mitigations can be used.

4.10 Sediment and erosion control

ToR section

6.4, item 11 Sediment and erosion control especially where immediately adjacent to a waterbody

DAR section

6.7 Existing Management Plans

Item rationale

The DAR stated that a sediment and erosion control plan would be followed; however, specifics of the plan were not provided.

Required Item

As stated in section 25 below, the developer will provide a conceptual, draft or final version of this plan.

4.11 Water withdrawal

ToR section

7.3.5, item 13 water withdrawal and volume of withdrawal (e.g., for potable water, dust suppression)
6.1, item 17 water use

DAR section

11.5.4 Water Withdrawal

Item rationale

No estimation of the water needed for the project or the effects of potential water withdrawals was described in the DAR. While it is appreciated that withdrawals may be from the same sources as in the winter road and minimized to 10% of the water volume, this does not help in understanding the potential effects.

Required Item

Please provide an estimation of how much water will be needed for the road construction, operation, and closure for both phase 1 and phase 2 of the all season road. The estimation should be broken down according by the time of year (either seasonal or monthly), describe the natural range of capacity of the water sources to be used (either a volume for lakes or a volumetric flow rate for streams), and describe possible contingencies if water cannot be sourced from the preferred locations. A map showing the water withdrawal locations should also be included. As water will be drawn during the open water season, there should also be a consideration of mitigations to reduce potential impacts to the aquatic environment. Estimations should explicitly include water withdrawals for dust suppression during construction, operations, and closure.

4.12 Bedrock type and depth

ToR section

5.1.1, item 2 bedrock type and depth

DAR section

4.1 Topography, Terrain, Geology, and Karst Features

Appendix 2

Item Rational

Insufficient information on the bedrock type and depth was provided to assess the foundation type at each bridge site.

Required Item

The developer will provide information about the bedrock type at each bridge site.

4.13 Location of borrow areas

ToR section

5.1.1, item 5 Borrow locations

DAR section

Appendix 1A

Appendix 2

Item Rationale

There are significant gaps in the descriptions of the proposed borrow areas along the route in Section 5 of the TetraTech report. For example, proposed borrow areas between km 28.3 and 48.8 are not described.

Required Item

The developer will provide specific locations and descriptions of all borrow areas.

4.14 Scope of development

ToR section

3.1 Scope of development

DAR section

6.2, 6.3.2, 6.3.1 Alternatives to the development, Tetcela transfer facility, concentrate hauling

Item rationale

The modified location and expanded footprint for the Tetcela Transfer Facility (TTF) is briefly mentioned along with a preliminary layout concept in Appendix G. A fuelling station and dry storage shed are described briefly in section 6.3.2 but neither are shown on the figure in Appendix G. An eight person camp is shown on the Figure in Appendix G but the facility is not described in the DAR. There is not enough information provided for the expanded TTF or the structures and facilities that may be located on the site to determine the potential impacts of the facility on the environment and people.

The bulk transport system for concentrate haulage to be used if and when Phase 2 of the road is constructed is described in Section 6.3.1. A photo of a typical transport and unloading system is shown in Figure 6-1. During the time when only Phase 1 of the all season road is constructed, bulk bags will be used to transport concentrate. A photo of a typical transport vehicle showing loaded concentrate bags for transport is required to evaluate potential impacts on the environment and people from transporting concentrate in bags on the all season road.

Required Item

Please provide a detailed description of all permanent and temporary structures and facilities for the TTF including concentrate storage facilities, facilities to store other materials, fuel storage and filling facilities, accommodations or emergency shelters and any other structures. Please distinguish between the uses of the TTF and structures that may be present on it during both the phase 1 construction and phase 2 construction scenarios. Also, please provide locations for emergency shelters along the 174 km access road for use in the event of vehicle breakdowns.

Please describe contingency uses of the TTF in the event of poor weather conditions, avalanches, road washouts or other events where vehicles and drivers may need to shelter at the TTF overnight.

4.15 Construction phases and schedule

ToR section

6.3 Construction Phases and Schedule

DAR section

6.5 Construction Phases and Schedule

Item rationale

The ToR specifically requested that the developer describe the schedule and duration for each activity of the development, that the developer be cognisant of key timing constraints, and that timing contingencies be described. The DAR did not meet all of the requirements in the ToR. For example, Table 6 of Appendix 1 outlined the optimal time for construction of the Sundog Creek realignment is summer/fall. There was no discussion of how long this construction would take or how missing this window could affect the overall timing for construction. In addition, the timing considerations only outlined the key times of year to minimize effects to fish, and no other wildlife species or valued ecosystem components were considered.

Required Conformity Item

The developer will describe the specific construction activities and the associated durations. In addition, the developer will describe the key timing constraints. These will consider all the valued ecosystem components discussed in the DAR, and not just fish. The developer will describe which valued ecosystem components could be affected and provide a rationale for those which would not be affected. Given the optimal times for construction, the durations for each activity, and valued ecosystem components considered, the developer will describe possible contingencies and mitigation steps and the implications if the timing were changed.

4.16 Impacts on fish habitat due to development during all project phases

ToR section

- 7.3.7 Item 1 Describe and evaluate the potential effects of the project on fish and aquatic habitat due to alteration or loss of fish habitat due to development activities during all project phases

DAR section

- 11.6.1 and Road Construction and distribution, abundance, health and harvesting
11.6.2

Adequacy item rationale

The ToR requires a discussion of the effects of loss or fish alteration of habitat. This should include a discussion of the potential effects of habitat fragmentation for valued species. Habitat fragmentation is a key threat to a number of species present in the area that may be potentially affected by the proposed road construction and operation including Boreal Woodland Caribou and Bull Trout. Both are important harvest species and listed on the NWT Species at Risk registry.

Required Adequacy Item

Please complete a discussion of habitat fragmentation in addition to any other indirect habitat effects that may affect key harvested species.

4.17 Existing management plans

ToR section

- 6.5 Existing Management Plans

DAR section

- 6.7 Existing management plans are listed here in accordance with the ToR

Item Rationale

Throughout the DAR, existing plans are mentioned along with plans that will be revised or updated in the future. These plans are referred to in many sections of the DAR as documents that contain or will contain mitigation measures to reduce impacts from the project on the environment and people.

Required Item

In numerous occasions throughout the DAR, it states that measures are proposed to mitigate impacts to valued components (identified in the key lines of inquiry and subjects of note) so that they are no longer significant, and that these will be included in various plans. Since the mitigation to reduce impacts from the project on the environment and people relies on the contents of these plans, they need to be submitted so that parties and the Review Board can evaluate their effectiveness (ToR, Section 4.1, 9.)

Please provide the existing monitoring plans described in section 6.7 of the DAR with updates that specifically consider the predicted impacts, mitigation and monitoring for the Prairie Creek All Season Road and Airstrip Project.

The Controlled Road Use Plan is referenced in Appendix 1, p 76 and elsewhere in the DAR but not in Section 6.7. The Review Board requests this plan in draft conceptual form so that it can consider the effectiveness of mitigation for access control along the proposed all season road. Similarly, a proposed invasive species management plan is described in the vegetation section but is not provided (Section 11.8.8).

The Wildlife Mitigation and Monitoring Plan as described in this section does not incorporate the Prairie Creek Mine All Season Road. As outlined in Appendix C of the *Terms of Reference*, the GNWT has prepared a *Draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program Guideline (2013)*. Please consult with GNWT and prepare a draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Plan for the all season road project in order to be in conformity with the ToR.

The list of plans requested is as follows:

- Spill Risk Analysis Plan
- Spill Contingency Plan
- AEMP with any updates relevant to the All Season Road
- Contaminant Loading Management Plan
- Quarry Management (Aggregate) Plan
- Sediment and Erosion Control Plan
- Road Operations Plan
- Construction, Operations and Maintenance Plan
- Interim Closure and Reclamation Plan
- Waste Management Plan
- Wildlife and Wildlife Habitat Protection Plan
- Wildlife Effects Monitoring Program
- Controlled Road Use Plan
- Invasive Species Management Plan
- Air Quality Monitoring and Management Plan
- Socio-Economic Agreement and non-confidential details of IBA's

Please provide these plans in conceptual or draft form as they apply specifically to the Prairie Creek Mine All Season Road and Airstrip Project.

5 CONSIDERATION OF PROJECT PHASES

Section 3.4 of the ToR specifies that the DAR must identify effects of the project on valued components of the project during construction, operation, closure and post-closure. The DAR must further define and provide rationales for the specific temporal boundaries it has used to examine potential effects of the project on each valued component. In the DAR, all effects assessment matrices (e.g., Table 8-6) for all key lines of inquiry and, where presented, subjects of note, do not specify during which project phase the predicted effects would be observed (i.e. construction, operation, closure and post-closure). These tables do, however, indicate to which *road phase* the effect predictions relate.

Similar to the consideration of the assessment step, the developer will describe which project phase (i.e. construction, operation, closure and post-closure) the term “road phase” refers. If the effects predicted vary depending on the project phase, please include a discussion of these differences in the affects assessment.

6 TRADITIONAL HARVESTING AND TRADITIONALLY HARVESTED SPECIES

6.1 Summary of non-conforming and inadequate sections

Table 2 Traditional harvesting and traditionally harvested species - non-conformity

Terms of Reference Section	Description of item not in conformity
7.2.1- General Comment	culturally or recreationally important fish harvest species in the assessment of effects on Traditional harvesting and traditionally harvested species, nor any rationale explaining this exclusion.
7.2.1 Item 6	disruption of sensitive life stages or habitat (e.g., migration, calving, denning, overwintering).
7.2.1 Item 7	effects to population cycles.
7.2.1 Item 11	changes in access including increased access to the land and surrounding waters, as well as increased access to environmentally and culturally sensitive areas.
7.2.1 Item 19	other traditional harvesting of berries and medicinal plants

6.2 Impact Assessment Steps and Baseline Information

ToR section

- 4.1 Impact Assessment Steps
- 7.1 Effects Assessment

DAR section

- 5.2, 8.0, App 7 Ch 4.3 and 5 Harvesting Baseline and Effects Assessment-Traditional Harvesting

Conformity item rationale

Section 4.1 of the ToR identifies the steps required for impact assessment. For the assessment of effects to the key line of inquiry of Traditional Harvesting and Traditionally Harvested Species, the DAR did not adequately complete several of these assessment steps. For example, for section 5.0 of Appendix 7 (and therefore Section 8.0 of the DAR), assessment steps 2, 7 and 9 are not clear.

Required Conformity Item

Please complete all of the steps outlined in Section 4.1 and 7.1 of the ToR for Sections 5 and 8 for each valued component. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B for details).

6.3 Impacts to traditional harvesting and traditionally harvested species

ToR section

- 7.2.1 Items 12-16
12. Describe changes in hunting and fishing pressures from people who do not reside in the region and how road-related changes in harvest pressures could impact the resource.
 13. Describe changes in the abundance and distribution of harvested resources, including caribou, moose, sheep, and other wildlife (e.g. furbearers, waterfowl) that would adversely affect harvesting.
 14. Describe disturbance of harvest patterns, or loss or alteration of high-value harvest areas including
 - i. changes to harvest effort as perceived by harvesters,
 - ii. changes in harvester travel patterns,
 - iii. changes in harvest levels, changes in harvesters' costs and
 - iv. changes in seasonal harvesting patterns.
 15. Describe competition among harvesters within and between communities as a result of increased access and loss or alteration to the land resulting from the project
 16. Describe changes in the quality of harvest species (including contamination) that would negatively affect their consumption.

DAR section

- 8.2, 8.3, 8.4, 8.5 and 8.8
- Effects to harvesting and harvesting areas, Effects on wildlife from harvesting pressure, Effects of direct habitat loss on harvested wildlife, Effects from project-related wildlife disturbances and Effects to predator-prey relationships of harvested wildlife.

Adequacy item rationale

The TOR requires a clear distinction between and discussion of potential effects due to each of the potential effects pathways listed in the ToR sections 7.2.1.12-16. The approach taken in the DAR includes combining several distinct effects pathways into one overall assessment. This makes it difficult for the Review Board to interpret the significance of individual effects and the effectiveness of mitigation strategies. For example, Section 8.5 (Effects from project-related wildlife disturbances) discusses effects in two broad categories: those that might lead to avoidance behaviour and those that might lead to altered movements. Each of these sub-categories contains within it several effects (such as functional habitat loss, dust and habituation).

This approach is problematic for three main reasons. Firstly, by combining disparate effects into a single effects analysis (i.e. Table 8-4) it is impossible to identify which effects pathways are contributing to the overall significance assessment and in what way. Secondly, by combining effects pathways into a single overall assessment, and then applying blanket "general mitigation strategies" it will be virtually impossible to track which strategies are most effective at mitigating which effects, which is an essential component of both successful Environmental Assessments and functioning adaptive management frameworks. Thirdly, artificially separating stressors (for example, dust) into the avoidance category rather than the altered movements category effects overly simplifies the potential effects of some of these pathways. In the case of dust, increased deposition rates could potentially lead to both avoidance AND altered movement pathways, in

addition to a host of other potential effects including effects to vegetation, water quality, fish and animal tissue metals concentrations and human health risks.

Required Adequacy Item

Please complete effects assessments for the specific impacts identified in Section 7.2.1.12-16.

Complete an effects assessment following the example provided in Appendix B of the ToR.

Particular items of importance from the ToR include items 14, 15, and 16 from Section 7.2.1, with special focus on the effects predicted for the months of April to December.

6.4 Sensory disturbance- Effects on harvesting activities and communities

ToR section

7.3.4 Item 4 Describe the potential for project effects on noise with consideration of potential impacts to wildlife harvesting activities and impacts to communities.

DAR section

11.4.3 Humans

Adequacy item rationale

The ToR required an assessment of the potential impacts to wildlife harvesting activities and impacts to communities from noise effects. The DAR indicates that since construction and operation of the all season road allows harvesters, community members and tourists to gain access to previously inaccessible areas, it is “unlikely that harvesters would complain about traffic noise.” A similar rationale is applied to potential effects on tourists and residents of Nahanni Butte. With respect to mitigating or remediating effects, section 3.11 of the EIA Guidelines, to which the developer was directed in ToR section 4.2, states that “(t)he Developer will describe what measures have been designed or added into the development to reduce or avoid impacts. Where an impact is unavoidable and cannot be mitigated on site, then off site mitigation suitable to the impacts will be implemented”. The information presented in that DAR indicates that rather than implementing mitigation or remediation measures to minimize potential effects of noise on humans, these effects will simply be accepted as a trade off with improved access. The basis for this conclusion is unclear, and does not appear to be supported by data, nor in line with standard EIA methodology.

Required adequacy item

Please include a discussion of potential or planned mitigation or remediation measures to reduce potential adverse effects on noise on humans and human activities including tourism, harvesting and local communities.

7 EFFECTS OF POTENTIAL ACCIDENTS AND MALFUNCTIONS

7.1 Risk assessment

ToR section

4.1 Impact Assessment Steps

7.1 Effects Assessment

7.2.2 The TOR required the developer to conduct a risk assessment using best practice identified in the ToR as a Failure Modes and Effects Analysis (FMEA).

This section of the ToR required the developer to describe and evaluate spills and leaks along the access road and at storage areas using the methodology outlined in section 4.1 and 7.1 of the TOR.

DAR section

9 Effects Assessment – Accidents and Malfunctions

Item rationale

The ToR required the developer to complete a risk assessment using best practice, including an assessment of components, systems, hazards, and failure modes. The DAR (section 9, Effects Assessment – Accidents and Malfunctions) does consider certain risks. However, it does not state which risk assessment best practice method was used and it does not conform to the best practice referenced in the ToR, or on page 193 of the DAR (that is, the FMEA in this case).

When assessing the potential effects of accidents, malfunctions, and spills on the environment and valued components the ToR, Section 4.1 and 7.1, describes the impact assessment methodology to be used. The assessment of effects provided in section 9 of the DAR does not conform to these steps.

Required Item

The developer is required to conduct a risk assessment using best practice for the project including components, systems, hazards, and failure modes. The risk assessment must consider accidents, malfunctions and spills and assess potential effects to the environment. The risk assessment methodology must follow best practice which, in this case, is described as the FMEA approach.

The risk assessment must consider hazards and failure modes that include, but is not limited to:

- effects of weather
- effects of geohazards identified in appendix 2, *Geotechnical Evaluation and Developer's Assessment Report Sections for Proposed Prairie Creek All-Season Road Near Nahanni Butte, Northwest Territories.*,

The assessment of effects to valued components must include, but is not limited to, wildlife, fish, and vegetation. Particular attention should be given to sensitive environments including, but not limited to, karst areas and groundwater in and passing through it.

The assessment of potential effects to the environment from accidents, malfunction, and spills must include, but is not limited to:

- contamination to soil from concentrate aerial dispersal and spills along the road
- contamination of surface water, groundwater, and subsurface water from concentrate aerial dispersal and spills along the road
- spills of concentrate at transfer facilities
- leaks of fuel or other materials during transport
- fuel leaks during extraction for road building
- fuel or contaminant leaks at storage facilities

The assessment of effects must use the methodology provided in section 4.1 and appendix B of the ToR.

7.2 Existing topography – characterization of geohazards

ToR section

5.1.1, item 1 topography and geology, including key terrain features such as rivers, lakes, karst features and wetlands and other important processes and features

DAR section

4.1 Topography, Terrain, Geology, and Karst Features

Item Rational

Insufficient baseline characterization and metrics have been provided to allow for the prediction of quantitative and qualitative effects to the terrain features. This information is required to ensure that safety measures for the all-season road are adequately addressed in the project design. Specifically, the information feeds into the considerations of terrain stability with respect to road construction and the consideration of erosion potential, and for the assessment of the key line of inquiry of the effects of potential accidents and malfunctions.

Required Item

The developer will provide the following:

- descriptions of the variation in slope aspect along the alignment (this is of significance to the permafrost conditions)
- descriptions of the variations in the natural slope angle along the alignment. Slope angle maps generated from the LiDAR survey would add significant value to the understanding of the baseline conditions.
- an evaluation of the likelihood of the alignment, particularly the bridge sites, being affected by meander mitigations and channel avulsions. This requires the review of historic air photos across a time span that is considerably greater than the design life of the project.
- comprehensive landslide mapping that differentiates the landslides types and shows the locations of past landslides and hazard zones. For example, there are extensive talus slopes in the west part of the alignment that could be used as a basis for delineating the extents of rockfall hazard zones. In addition, debris flood and debris flows have been identified in the west part of the alignment but these have not been mapped, and neither have the fans.
- An assessment of the frequency and magnitude of the various natural terrain landslide and snow avalanche hazards along the alignment. In the case of the landslide hazards, it is necessary to review a suite of years of historic air photos across a time span that is considerably greater than the design life of the project, whereas it appears that only one year (1994) of air photos has been studied.
- a comparison of the present day extents of the areas of large scale slope instability between Km 39 and 60 with the extents on older years of air photos
- a detailed characterization of permafrost and karst hazards that have been identified between Km 48 and Km 59

- an integration of surficial geology and slope angle data. This is needed in order to analyze the likelihood of landslide occurrence in relation to the proposed road cutting and clear cutting. This information can be presented in the form of terrain stability maps. The analysis could be calibrated by assessing the performance of previous clear cutting operations and road construction in relation to the surficial geology and slope angle
- details regarding how the road design has been modified to mitigate the rock fall risk (refer to recommendations on Page II-4 of the Golder report)

7.3 Unconsolidated surficial materials

ToR section

5.1.1, item 3 unconsolidated surficial materials and terrain types, including thickness of landforms

DAR section

4.1 Topography, Terrain, Geology, and Karst Features
Appendix 2

Item Rationale

Insufficient baseline characterization and metrics have been provided to allow for the prediction of quantitative and qualitative effects.

Required Item

The developer will provide:

- An overlay map showing the findings of the published surficial geology mapping (Hawes, 1975) for the alignment.
- Terrain maps for the alignment (terrain mapping is discussed in various sections but the terrain maps are not included).

7.4 Soil types

ToR section

5.1.1, item 4 Soil types, including group, series and type, as applicable

DAR section

4.1 Topography, Terrain, Geology, and Karst Features
Appendix 2

Item Rationale

The types of soils along the various segments of the alignment are described in general terms. What is missing is a description of the predicted spatial extents of the various soil types along with descriptions of their texture. This information is essential for interpreting the erosion potential and permafrost conditions.

Required Item

The developer will provide a description of the predicted spatial extents of the various soil types along with descriptions of their texture.

7.5 Stability of landforms with respect to permafrost

ToR section

- | | |
|----------------|--|
| 5.1.1, item 14 | permafrost processes, features and landforms and their stability, including slopes, shorelines and stream banks |
| 5.1.1, item 15 | probable ground ice conditions, temperature and ground thermal regime |
| 5.1.1, item 18 | thaw slumps in the area |
| 5.1.1, item 19 | how regional climate variation and documented warming of ground temperatures in the region may affect ground conditions. |

DAR section

Appendix 2

Item Rationale

Insufficient baseline characterization and metrics have been provided for the prediction of quantitative and qualitative effects. The information is required to ensure that safety measures are adequately addressed in the project design. In addition, the information feeds into the considerations of terrain stability with respect to road construction and operations, and the assessment of the key line of inquiry of the effects of potential accidents and malfunctions.

Required Items

The Developer will:

- provide an estimation of the retrogression rates of the thaw slides and thaw flows by comparing the present day back scarp locations with historic locations (this can be determined by reviewing historic air photos over a time span that is significantly greater than the life span of the project.)
- provide a description of the inferred significance of elevation, slope aspect and slope angle to the ground temperature regime and the presence of permafrost.
- consider the potential climate change effects in relation to variations in the altitude and slope aspect along the alignment.

7.6 Channel morphology and stability

ToR section

- | | |
|-------------|--|
| 5.1.3, 7 iv | channel and bed morphology and stability |
| 5.1.3, 7v | bank stability and areas of erosion |

DAR section

- | | |
|-----|----------------------------|
| 4.3 | Water Quality and Quantity |
|-----|----------------------------|

Item rationale

Preliminary designs for watercourse crossings and riparian road segments are provided in Appendix 1. The watercourse crossings were reportedly designed to accommodate the passage of 100-year flood flows, as well as debris and ice; however, the designs lacked site-specific information such as:

- The Casket Creek crossing is located on an active alluvial fan; however, the potential for channel avulsion and road washout has not been assessed or mitigated. In particular, the potential for the road surface or ditch-line to capture stream flow and divert it away from the creek is not addressed (this is a common problem at alluvial fan crossings).
- The crossings on braided watercourses with wide active channel zones will constrict the active channel zone, potentially affecting bedload transport and channel stability. The DAR did not account for the extent of encroachment at these crossings (e.g. Sundog, Tetcela, Grainger). [To note, the active channel zone of a braided channel is defined here as the wetted channel(s) plus the annually mobilized gravel bars.]

The riparian road segment along the edge of the Sundog Creek channel zone, and the associated realignment of the Sundog Creek channel, are described in Section 6.4 of the DAR. The preliminary design of the riparian road segment is provided in Appendix 1. These descriptions/designs lack certain information that is required to assess effects:

- The channel realignment is described as a one-off construction event. It is not clear if the realignment is expected to last for the duration of the project life, or whether ongoing maintenance and re-construction will be required, or whether the design of the road depends on the channel remaining in its realigned course. No channel stability assessment is provided that could be used to predict future maintenance requirements. This section should present fundamental physical dimensions, and design considerations for the channel.
- The road segment will be armoured against lateral channel erosion, but no mention is made of vertical scour and undermining of the riprap armour, despite the observations of deep scour pools in the existing channel. An effort is being made to keep the width of the road fill as narrow as possible, which limits the room available for toe protection. It should be clarified whether the riprap armour design will include scour protection and whether this would increase the width of the road footprint in the channel zone.

This information is needed to ensure that the engineering design is defensible, and the information is required to ensure that safety measures are adequately addressed in the project design.

Required Item

The developer will improve its channel stability assessment to include:

- a review of sequential historical air photos to assess lateral channel instability, including channel avulsion frequency on alluvial fans and meander migration rate on floodplains;
- site inspections of bed material deposition/erosion features to assess vertical channel instability, especially in braided channel zones where long-term, reach-scale aggradation may need to be addressed in road or crossing design.

The developer will provide:

- site specific information for the potential for channel avulsion and road washout with particular attention to where there is the potential for the road surface or ditch-line to capture stream flow and divert it away from the creek,
- estimates of the potential changes to channel bed, morphology, and stability as a result of constricting wide active channel zones. This will account for the extent of encroachment at crossings (e.g. Sundog, Tetcela, Grainger).
- details about the proposed Sundog Creek realignment including:
 - the expected duration of the realignment
 - ongoing maintenance and re-construction that will be required,
 - whether the design of the road depends on the channel remaining in its realigned course.
 - fundamental physical dimensions, and design considerations for the channel
 - a channel stability assessment that could be used to predict future maintenance requirements.
- estimates of vertical scour and potential undermining of the riprap armour
- clarification of whether the riprap armour design will include scour protection and whether this would increase the width of the road footprint in the channel zone.

8 IMPACTS TO NAHANNI NATIONAL PARK RESERVE (NNPR)

8.1 Impact assessment and baseline information

ToR section

- | | |
|------------|--|
| 4.1 | Impact Assessment Steps
A summary matrix in Appendix B of the ToR is required for all eleven items in section 7.2.3 |
| 7.2.3 NNPR | Items 1, 2, 7, 8 10, 11 in Section 7.2.3 do not meet conformity requirements with the ToR |

DAR section

- | | |
|--|-----------------|
| DAR Section 10
and Appendix
7, Section 6 | Impacts to NNPR |
|--|-----------------|

Item rationale

Section 4 of the ToR outlined the impact assessment steps methodology to be used for each valued component (see page 2 above). The items in Section 10 of the DAR do not conform with these impact assessment steps.

Required Item

In accordance with the ToR methodology outlined in Section 4.1, 7.1, and ToR Appendix B, please conduct a complete assessment of impacts from the project on the following items as required under the key line of inquiry for Impacts to NNPR, Section 7.2.3 of the ToR:

2. Wilderness quality
7. Changes to karst formations

10. Overall visitor experience
11. Long term changes to Nahanni National Park Reserve
(numbers correspond to items in 7.2.3 of the ToR)

Please also include a summary table as described in Appendix B of the ToR for these items.

To mitigate project-related wildlife disturbances on the all season road, mitigation measures are provided on page 103 of Appendix 7. These include: “strict use of CZN’s Controlled Road Use Plan” to minimize traffic and other disturbances and maintain low speed limits”. The Controlled Road Use Plan is not included in the DAR. Section 4.1, 4 of the ToR stated:

“identify and evaluate any proposed mitigation measures as to their technical and economic feasibility to reduce the predicted impacts and discuss constraints, uncertainties and implementation challenges to their effective use of the proposed measures and clearly identify all mitigation commitments”

The developer has not fulfilled this requirement. Please either provide at minimum a conceptual Controlled Road Use Plan with mitigation measures needed to fulfil Section 4.1, 4. of the ToR or provide the mitigation for habitat fragmentation and movement.

In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

8.2 Cumulative effects assessment

ToR section

10 Cumulative effects assessment

DAR section

14.1 Key lines of inquiry - NNPR

Item Rationale

The cumulative effects section in 14.1 of the DAR appears to be based on effects assessment predictions, mitigation and residual impacts from the environmental assessment of the Prairie Creek Mine and winter road (EA0809-002) along with supporting reports from 2010. Similarly the information provided in Appendix 7, Section 8, relied on data from a previous EA (EA0809-002). Neither Section 14 of DAR nor Appendix 7, Section 8 answered the questions required in Section 10 of the ToR.

The Prairie Creek Mine All Season Road Project (EA1415-01) may have substantially different cumulative effects on the NNPR than the previously assessed winter road (which was part of EA0809-002). The DAR did not describe an effective method to control access along the proposed all season road. There is the potential for use of the all season road into the NNPR by the public, tourists, hunters and others that is additive to use of the road by the developer. A new all season road into the NNPR will attract visitors. There is not enough information in the cumulative effects section of the DAR to determine potential cumulative impacts from the project on the NNPR. The DAR therefore does not meet adequacy requirements.

Required Item

Please conduct a cumulative effects assessment of the project (EA1415-01) on the NNPR that meets the requirements set out in Section 10 of the ToR.

8.3 Effects of introduction of invasive species and threats

ToR section

7.3.9 Item 2 Describe and evaluate the effects of the project on vegetation including consideration of the introduction of invasive species and threats

DAR section

11.8.8 Introduction of Invasive Plants

Adequacy item rationale

The proposed project runs through a National Park and as such there is significant concern regarding the spread of invasive plants species. While the proponent has recommended that an invasive species management plan be developed prior to construction, more detail is required in order to assess the potential for this plan to adequately minimize risks.

Required Adequacy Item

Please provide a draft framework for the proposed management plan that outlines a) stakeholders that should be involved in the development of the plan b) possible prevention strategies, c) mitigation options and d) the potential for minimizing risks associated with the introduction of invasive plants.

8.4 Sensory disturbance to fish, birds and wildlife

ToR section

7.3.4 Item 2 Sensory disturbance to fish, birds and wildlife, including caribou and moose.

DAR section

11.4.1 and Wildlife and Fish
11.4.2

Adequacy item rationale

The ToR specifically requires an examination of the effects of sensory disturbance to fish, birds, and wildlife, including caribou and moose, including a discussion of source location, timing and duration of the disturbance. The DAR indicates that “(n)oise disturbances from the operation of the all season road differ from the winter road in temporal extent, not noise level”. This difference in temporal extent must be assessed, especially with respect to potential effects on different species that may occupy the area near the road during the summer season.

Additionally, p. 240 of the DAR indicates that “Noise levels will remain the same as winter operations; estimated at approximately 99 dBa...at 0.5km from the road, this noise level is expected to reduce to 35 dBa”. On the following page, however, the DAR states that “Since the noise of a truck at 0.5km from the road is 99 dBa, vehicles have the potential to cause effects on fish in the proximity”. It is unclear whether the DAR is predicting noise levels at 0.5km from the road to be 99 dBa or 35 dBa, and therefore impossible to predict effects.

Required adequacy item

Please include a discussion of how noise effects may be differently experienced by wildlife (including moose and caribou), birds and fish in the spring, summer, fall AND winter seasons. Please also clearly explain how the discussion of sound effects on fish accounts for differences in sound propagation in air versus water. Please also clarify the actual predicted noise level at both the road and 0.5km from the road. Please conduct an assessment of possible effects on fish from noise levels at each predicted level, and discuss mitigation options to minimize the risk of adverse impacts.

9 CLIMATE

9.1 Climatic conditions, trends and extremes

ToR section

- | | |
|---------------|--|
| 5.1.2, item 2 | prevailing climatic conditions, seasonal variations, predominant winds including direction and velocity, temperature and precipitation (snowfall, snow depth, rain, fog, wind) |
| 5.1.2, item 4 | any current climate-related extreme events that may affect the project and frequency of occurrence. |
| 5.1.2, item 5 | define the variability and trends within the “current” climate normal period and within the historical period of instrumental record |

DAR section

- | | |
|-----|---------|
| 4.2 | Climate |
|-----|---------|

Item rationale

Climate data were presented from the mine site, Fort Simpson, and Fort Liard. This included a time-series plot of temperature and rainfall from Fort Simpson from 1964 to 2008, a time-series plot of temperature at the mine site, and monthly mean temperatures from all three sites for particular years (Table 4-1). From the data presented it is difficult to get an understanding of the prevailing climatic conditions, seasonal variations, variability, and trends for the area over the past 50 years. The only discussion of extreme events was to describe two flood events that occurred at the mine site in 2006 and 2007 (DAR pg 67).

Required Item

Please provide:

1. temperature and precipitation plots for all of the sites superimposed onto one chart,
2. a chart showing the average temperature and precipitation by month for each station for the duration of the record,
3. updated charts to 2014 (the Fort Simpson data end in 2008)
4. a summary table describing the maximum, mean, and minimum daily temperatures and precipitations observed by month for each climate station for each year of record, with a discussion of observed trends based on the tabulated information.

10 TERRAIN, SOILS, PERMAFROST, AND KARST TOPOGRAPHY

10.1 Summary of non-conforming and inadequate sections

Table 3 Terrain, soils, permafrost, and karst topography - non-conformity

Terms of Reference Section	Description of item not in conformity
5.1.1, item 12	probable distribution (thickness and lateral extent) on land, water, shoreline and slope crossings
5.1.1, item 13	permafrost distribution and stability beneath waterbodies
7.3.1, item 5	snow distribution and consequences on ground thermal regime
7.3.1, item 7	avalanche risks and the effect of avalanche management on the environment.
7.3.1, item 12	frost heave or frost susceptible soils in thin permafrost as well as seasonally frozen soils
7.3.1, item 13	thaw or settlement-related impacts on drainage and surface hydrology (see also Section 7.3.5 on water and water quality)
7.3.1, item 14	shorelines and channels
7.3.1, item 15	combined impacts of the all season road and fires
7.3.1, item 16	how warming ground temperatures and deepening active layers will affect the all season road and how mitigation measures will remain effective in various climate warming scenarios.

11 GRANULAR MATERIALS

11.1 Summary of non-conforming and inadequate sections

Table 4 Granular materials- non-conformity

Terms of Reference Section	Description of item not in conformity
7.3.2, item 2	potential for excavation and use of hot rocks (rocks with high sulphur content within shale)
7.3.2, item 5	talus slope stability

12 AIR QUALITY

Table 5 Air - non-conformity

Terms of Reference Section	Description of item not in conformity
7.3.3	emissions by source for each phase (construction, operation and maintenance, and closure), including quantity, timing and duration,

	normal operation conditions and upsets
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ToR section

- 4.1 Impact Assessment Steps
- 7.1 Effects Assessment
- 7.3.3 Air Quality

DAR section

- 9 Air Quality

Conformity item rationale

The ToR required an assessment of the project on air quality. The DAR does not provide an assessment of air quality. The DAR references an air quality assessment from EA0809-002 which was conducted for the mine site and not this Project. The DAR states that this document is located in Appendix 20 of the DAR. However, the DAR does not contain an Appendix 20 and the Review Board is unable to locate this assessment elsewhere in the DAR.

Required Conformity Item

Please provide an assessment of the project on air quality. This will include emissions (such as dust and carbon) by source for each phase (construction, operation and maintenance, and closure), including quantity, timing and duration, normal operation conditions and upsets. The assessment will consider how changes in air quality may affect the environment including, but not limited to, humans, wildlife, vegetation and waterbodies.

The assessment of the project on air quality will follow the assessment steps provided in section 4.1 and Appendix B of the ToR.

13 NOISE

13.1 Summary of non- conforming and inadequate sections

Terms of Reference Section	Description of item not in conformity
7.3.4 Item 2	sensory disturbance to birds or wildlife, including a specific discussion of effects on caribou and moose.
7.3.4 Item 3	The DAR indicates that the discussion on effects of noise to “wilderness tourism” is presented in Section 10. The Review Board was unable to locate this discussion in Section 10, including the Section 10.11- Wilderness Quality and Visitor Experience.

13.2 Impact assessment steps

ToR section

- 4.1 Impact Assessment Steps
- 7.1 Effects Assessment

DAR section

- 11.4 Noise

Conformity item rationale

Section 4 of the ToR identifies the steps required for impact assessment (see page 2 above). For the assessment of effects to the subject of note for noise, the DAR did not adequately complete several of these assessment steps. For example, assessment steps 1, 2, and 4-15 are not apparent in DAR Section 11.4.

Required conformity item

Please complete all of the steps outlined in Section 4.1 and 7.1 of the ToR for the assessment of effects to the subject of note for noise.

14 WATER QUANTITY AND QUALITY

14.1 Summary of non-conforming and inadequate sections

Table 6 Water quantity and quality - non-conformity

Terms of Reference Section	Description of item not in conformity
5.1.3, item 4	the extent of connectivity to adjacent watercourses including any potential seasonal variation
5.1.3, item 6	naturally occurring icings
5.1.3, item 12	the role of wetlands (e.g. bogs, fens and peat plateaus)
5.1.3, item 13 ii	hydraulic conductivity
7.3.5, item 10	issues related to borrow extraction including melting of ground ice and potential changes to drainage patterns etc.
7.3.5, item 12	changes to flow or water levels including potential for glaciation and icings at watercourse crossings
7.3.5, item 14	potential effects on the aquatic environment including invertebrates.

Table 7 Water quantity and quality – inadequate with respect to impact assessment steps

Terms of Reference Section	Description of item not in conformity
7.3.5, item 1	changes to surface drainage patterns and surface water hydrology including changes caused by road-related impacts on terrain, soils and permafrost
7.3.5, item 2	alterations to streamflow
7.3.5, item 3	possible contamination to surface water, subsurface water and groundwater including within karst features
7.3.5, item 4	drinking water quality for humans and wildlife
7.3.5, item 5	recreational water quality
7.3.5, item 6	discharge or seepage of wastewater effluent, contaminants, chemical additives, etc.
7.3.5, item 7	changes to water quality at water crossings and realignments (bridges, culverts and other wetted areas)
7.3.5, item 8	changes to water quality due to thaw slumps and other slope

Terms of Reference Section	Description of item not in conformity
	instability at water crossing
7.3.5, item 11	erosion, sediment deposition, sediment re-suspension

14.2 Effects to drainage and surface hydrology from the project

ToR section

- 7.3.5, item 1 changes to surface drainage patterns and surface water hydrology including changes caused by road-related impacts on terrain, soils and permafrost
- 7.3.5, item 2 alterations to streamflow

DAR section

- 11.5.1 Drainage and Hydrology

Item rationale

The DAR stated that “no overall changes in flow will occur” as a result of the project. However, a portion of Sundog creek will be realigned and may result in a change to the surface area flow that can be conveyed through, and in turn, the volumetric flow rate. In addition, the road and associated facilities may change drainage paths. For example, where the road is perpendicular to the natural drainage flow paths, flow may need to be diverted through swales and culverts. Finally, changes in permafrost may result in changes to the surface topography, which may change drainage paths. All of these alterations need to be addressed in the DAR.

Required Item

The Developer will complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR for the potential effects of changes to surface drainage patterns and alterations to streamflow.

14.3 Effects to water and sediment quality

ToR section

- 7.3.5, item 3 possible contamination to surface water, subsurface water and groundwater including within karst features
- 7.3.5, item 4 drinking water quality for humans and wildlife
- 7.3.5, item 5 recreational water quality
- 7.3.5, item 6 discharge or seepage of wastewater effluent, contaminants, chemical additives, etc.
- 7.3.5, item 11 erosion, sediment deposition, sediment re-suspension

DAR section

- 11.5.2 Water Quality

Item rationale

The assessment of potential effects to water quality relies solely on the results from the assessment of the key line of inquiry of potential accidents and malfunctions. It neglects consideration of non-spill sources of contamination such as increased sediment deposition from road construction and operations or increased sedimentation and erosion associated with increasing the number of

exposed slopes without vegetation. The DAR also does not address potential changes to water quality resulting from seepage of wastewater effluent or other contaminants.

Required Item

The Developer must complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR for the potential effects of changes to water quality. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

14.4 Effects from water crossings

ToR section

- 7.3.5, item 7 changes to water quality at water crossings and realignments (bridges, culverts and other wetted areas)
- 7.3.5, item 8 changes to water quality due to thaw slumps and other slope instability at water crossing

DAR section

- 11.5.3 Terrain and Permafrost

Item rationale

Changes to water quality at the watercourse crossings resulting from the structures themselves or possible slope stabilities associated with the structures were not included. The DAR only stated the crossing locations have been chosen to minimize instabilities. Regardless of the optimal approach, impacts may occur and they need to be identified and assessed.

Required Item

The Developer must complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR for the potential effects of changes to water quality from the watercourse crossings.

15 SPECIES AT RISK

15.1 Summary of non-conforming and inadequate sections

Table 8 Species at risk - non-conformity

Terms of Reference Section	Description of item not in conformity
7.3.6, bullet 1	methods to minimize the effect of the project on the species including strategies for mitigation and monitoring
7.3.6, bullet 2	direct and indirect alteration of habitat including direct road footprint impact
7.3.6, bullet 3	visual or auditory disturbance, including habitat avoidance and effective habitat loss in relation to all season road facilities or activities
7.3.6, bullet 4	effect of construction and pre-construction activities, including aircraft effects
7.3.6, bullet 5	mortality due to harvesting and vehicle collisions

Terms of Reference Section	Description of item not in conformity
7.3.6, bullet 6	disruption of sensitive life stages or habitat (e.g., migration, calving, denning, overwintering)
7.3.6, bullet 7	changes to movement patterns and corridors, home ranges, distribution and abundance
7.3.6, bullet 8	effects to sensitive or important areas of habitat
7.3.6, bullet 9	habitat fragmentation
7.3.6, bullet 10	effects to population cycles
7.3.6, bullet 11	effects to predator-prey relationships
7.3.6, bullet 12	attraction to predators of birds and bird eggs
7.3.6, bullet 13	increased human-wildlife conflicts (e.g. bear encounters)
7.3.6, bullet 14	mortality from collisions with temporary or permanent structures and wires
7.3.6, bullet 15	potential disturbance to raptors nesting within 1km of the proposed project footprint
7.3.6, bullet 16	use of the project area by resident and migratory birds protected by the <i>Migratory Birds Convention Act</i> , 1994
7.3.6, bullet 17	how road-related changes in harvest pressures could impact the resource
7.3.6, bullet 18	ability of habitat or species to recover
7.3.6, bullet 19	response to edge effects
7.3.6, bullet 20	Invasive species (vegetation, wildlife and other threats)

15.2 Effects assessment

ToR section

7.3.6 Species at Risk

DAR section

8 Effects Assessment – Traditional Harvesting

10 Effects Assessment – NNPR

Appendix 7

Item rationale

There is no section in the concordance table for the DAR that answers the questions listed in 7.3.6. The concordance table lists DAR sections 8 and 10 as locations where this ToR section is evaluated, but these sections do not specifically respond to the items listed in Section 7.3.6 of the ToR.

The tables in section 8 (8-1 to 8-7) do not correspond to the species at risk identified in Section 4.4 of the DAR.

Appendix 7 section 7.1.1 to section 7.1.7 answers some but not all of the required items in ToR 7.3.6. Section 7.1 of Appendix 7 lists the requirements of ToR (ToR section 7.3.6) but then completes an effects assessment on only a portion of that list. This section of the DAR is therefore not in conformity with the ToR.

Required Item

Please conduct a complete effects assessment to species at risk as required under section 7.3.6 using methodology in Section 4 of the ToR including the summary table in Appendix B of the ToR. Please respond to all items in this section with a concordance table identifying where a response to each item is located in the DAR. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

16 FISH AND AQUATIC HABITAT

16.1 Conformity table

Terms of Reference Section	Description of item not in conformity
5.1.5 Item 3	seasonal and life cycle movements and sensitive periods.
5.1.5. Item 4	habitat requirements for each life stage.
5.1.5. Item 6	of known sensitive or important areas in terms of habitat type (e.g., spawning, overwintering, refugia, feeding), species and timing of use.
5.1.5 Item 8	known issues with respect to health of harvested species (e.g. parasites, disease, condition).
5.1.5 Item 11	a listing of existing invasive species.
7.3.7 Item 2	the estimated time required to redevelop habitat.
7.3.7 Item 3	The Review Board could not locate a discussion on the effects of proposed water crossings, realignments and temporary vehicle crossing methods.
7.3.7 Item 6	the disruption of sensitive life stages or habitat (e.g. spawning and incubation, rearing, overwintering) including loss of substrate habitat and known sensitive or important sites.
7.3.7 Item 8	potential effects to specific species and locations of particular importance to subsistence harvesters including Sundog Creek, Polje Creek , Tetcela River and Grainger Gap. The Review Board was unable to locate a discussion of potential effects for Bluefish Creek or Fishtrap creek, as was specifically requested in the ToR.
7.3.7 Item 9	potential changes to water quality as a result of the project, but not of potential changes to water quantity.
7.3.7 Item 10	changes to distribution or abundance of fish and aquatic habitat
7.3.7 Item 11	potential effects to sensitive or important areas or habitat.
7.3.7 Item 18	Section 11.6.2 of the DAR indicates that a discussion of the potential for increased pressure on fisheries resources that could arise from improved access was provided in Section 8.5. However, section 8.5 includes a description of effects of avoidance and altered movement of wildlife, not a discussion of the effects of the project to fish harvesting.
7.3.7 Item 20	success of mitigation or reclamation measures or an indication of when and how this evaluation would be conducted.

16.2 Impact assessment steps

ToR section

- 4.1 Impact Assessment Steps
- 7.1 Effects Assessment

DAR section

- 11.6 Fish and Aquatic Habitat

Conformity item rationale

The ToR outlined the impact assessment steps methodology to be used for each valued component. The DAR did not conform with all of the steps. For example, assessment steps 1, 2, and 4-15 are not clearly discernable for Section 11.6.

Required adequacy item

Please complete all of the steps outlined in Section 4.1 and 7.1 of the ToR for the assessment of effects to the subject of note for fish and aquatic habitat. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

16.3 Impacts on fish habitat due to development during all project phases

ToR section

- 7.3.7 Item 1 Describe and evaluate the potential effects of the project on fish and aquatic habitat due to alteration or loss of fish habitat due to development activities during all project phases

DAR section

- 11.6.1 and Road Construction and distribution, abundance, health and harvesting.
- 11.6.2

Adequacy item rationale

The TOR requires a discussion of the effects of loss or fish alteration of habitat. This should include a discussion of the potential effects of habitat fragmentation for valued species. Habitat fragmentation is a key threat to a number of species present in the area potentially affected by the proposed road construction and operation including Boreal Woodland Caribou and Bull Trout, which are both important harvest species and listed on the NWT Species at Risk registry.

Required Adequacy Item

Please complete a discussion of habitat fragmentation in addition to any other indirect habitat effects that may affect key harvested species.

16.4 Relevant policies, management plans or other measures to protect or enhance fish and aquatic habitat

ToR section

- 7.3.7 Item 5 Describe the relevant policies, management plans or other measures to protect or enhance fish and aquatic habitat, including timing restrictions, protected areas or regulations

DAR section

- 11.6 Fish and Aquatic Habitat

Adequacy item rationale

Section 11.6.3 of the DAR indicates that the developer will “make use of DFO’s *Operational Statements* for creek crossings, including span structures and culverts. However, DFO’s *Operational Statements* are no longer the most appropriate source of information regarding methods and measures to avoid causing harm, as the operational statements have been updated and replaced with DFO’s *Measures to Avoid Causing Harm to Fish and Fish Habitat*. Additionally, DFO has released a number of additional guidance documents based on changes to the Fisheries Act which should be considered for any project that has the potential to affect fish or fish habitat (e.g., Fisheries Protection Policy, Pollution Prevention Provisions, Guidelines for the Use of Explosives in or near Canadian Fisheries Waters and Northwest Territories Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat).

Required Adequacy Item

Please review DFO’s updated “Measures to Avoid and Mitigate Impacts” and include any updated measures into plans for protecting or enhancing fish and aquatic habitat. Please also review all other relevant DFO guidelines including those mentioned above and include any applicable mitigation measures into project design plans.

16.5 Effects on riparian areas

ToR section

- 7.3.7 Item 7 Describe effects on riparian areas

DAR section

- 11.6 Fish and Aquatic Habitat

Adequacy item rationale

Section 11.6.1 of the DAR indicates “a limited amount of riparian area loss in unavoidable” however does not provide a discussion of the potential of this loss to affect the overall integrity of fish habitat or populations in the area.

Required Adequacy Item

Please complete a discussion of the potential effects of the project on riparian areas. This discussion will include

- a complete habitat assessment of the road alignment including documentation of riparian area habitat types and areal extents,
- an assessment of the importance of riparian areas to fish health and populations, including a consideration of various uses by species and season,
- an quantitative assessment of the amount of riparian area to be lost or affected by the project and
- an assessment of the effect of this habitat loss on fish.

16.6 Effects of dredging or disposal of sediments

ToR section

7.3.7 Item 17 Describe effects of dredging or disposal of sediments

DAR section

11.6.1 Road Construction

Adequacy item rationale

Section 11.6.1 of the DAR indicates “dredging of stream will not be required, with the possible exception of the Liard River”. No discussion, however, is provided regarding the potential effects of dredging the Liard River at the crossing.

Required Adequacy Item

Please describe the potential effects and mitigation measures available and applicable to minimize adverse impacts of dredging to fish and aquatic habitat.

17 WILDLIFE AND WILDLIFE HABITAT

17.1 Summary of non-conforming and inadequate sections

Table 9 Wildlife and wildlife habitat - non-conformity

Terms of Reference Section	Description of item not in conformity
7.3.8, bullet 1	methods to minimize the effect of the project on the species including strategies for mitigation and monitoring
7.3.8, bullet 2	direct and indirect alteration of habitat including direct road footprint impact
7.3.8, bullet 3	visual or auditory disturbance, including habitat avoidance and effective habitat loss in relation to all season road facilities or activities
7.3.8, bullet 4	effect of construction and pre-construction activities, including aircraft effects on wildlife
7.3.8, bullet 5	wildlife mortality due to increased harvesting and vehicle collisions
7.3.8, bullet 6	disruption of sensitive life stages or habitat (e.g., migration, breeding, calving, denning, overwintering)
7.3.8, bullet 7	wildlife movement patterns and corridors, home ranges, distribution and abundance
7.3.8, bullet 8	effects to sensitive or important areas or habitat
7.3.8, bullet 9	habitat fragmentation
7.3.8, bullet 10	effects to population cycles
7.3.8, bullet 11	effects to predator-prey relationships
7.3.8, bullet 12	attraction to predators of birds and bird eggs
7.3.8, bullet 13	increased human-wildlife conflicts (e.g. bear encounters)
7.3.8, bullet 14	mortality from collisions with temporary or permanent structures and wires
7.3.8, bullet 15	potential disturbance to raptors nesting within 1km of the proposed project footprint
7.3.8, bullet 16	use of the project area by resident and migratory birds protected by the <i>Migratory Birds Convention Act</i> , 1994
7.3.8, bullet 17	how road-related changes in harvest pressures could impact the resource
7.3.8, bullet 18	ability of habitat or species to recover
7.3.8, bullet 19	response to edge effects
7.3.8, bullet 20	invasive species (vegetation and wildlife)

17.2 Effects Assessment

ToR section

7.3.8 Wildlife and Wildlife Habitat

DAR section

11.7 Wildlife and Wildlife Habitat

Appendix 7,
section 7.1

Item rationale

Section 11.7 of the DAR does not respond to all of the items required in ToR Section 7.3.8 of the ToR. Some of the items have a response in this section but most items do not. The DAR is therefore not in conformity with the ToR. Please respond to all of the items and provide a concordance table that identifies where a response to each item in Section 7.3.8 of the ToR is provided in the DAR.

Required Item

Please conduct an effects assessment on section 7.3.8 of the ToR using the methodology described in Section 4 of the ToR. Please also provide the summary table described in Appendix B of the ToR. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

18 VEGETATION

18.1 Summary of non-conforming and inadequate sections

Table 10 Vegetation - non-conformity

Terms of Reference Section	Description of item not in conformity
5.1.7 Item 6	existing contaminant concentrations in harvested species or vegetation (e.g. berries) that may change as a result of the all season road.
7.3.9, bullet 1	alteration or loss of species, or vegetation assemblages that are rare, valued, protected or designated sensitive or important areas or habitat
7.3.9, bullet 2	amount of merchantable timber removed during right of way clearing and the potential for facilitating use of waste timber by communities
7.3.9, bullet 3	amount of vegetation clearing
7.3.9, bullet 4	introduction of invasive species and threats
7.3.9, bullet 5	effects to rare plants
7.3.9, bullet 6	effects of fire management practices
7.3.9, bullet 7	potential changes to fire risk
7.3.9, bullet 8	effects of road emissions including dust
7.3.9, bullet 9	how changes in right of way clearing might impact permafrost and

Terms of Reference Section	Description of item not in conformity
	the all season road itself
7.3.9, bullet 10	changes to the soil, hydrological or permafrost regimes related to vegetation changes
7.3.9, bullet 11	re-establishment of vegetation and reclamation of borrow sites and other disturbances (particularly identification of vegetation types and seed mixes to be used, and identification of the specific borrow site to be re-vegetated, and those borrow sites that will not be re-vegetated)
7.3.9, bullet 12	vegetation control during operations.

18.2 Effects assessment

ToR section

7.3.9 Vegetation

DAR section

11.8 Vegetation

Appendix 7,
section 7.2

Item rationale

Item 2, Section 7.3.9 of the Terms of Reference requires an estimate of the amount of merchantable timber to be removed during right of way clearing and the potential for facilitating the use of waste timber by communities. This has not been completed and the item is not in conformity with the ToR.

Please provide an assessment summary table for each item in Section 7.3.9 as described in Appendix B of the ToR.

Section 7.2.8 of Appendix 7 recommends but does not provide mitigation methods as required under Section 4 of the Terms of Reference, specifically items 4, 6 and 9. The DAR is not in conformity without this information. An invasive species management plan is mentioned as a document that may contain mitigation for the spread of invasive species, however, neither the plan nor the mitigation is presented or described. Please provide a conceptual invasive species management plan.

Required Item

Please prepare a concordance table that lists where each specific item in Section 7.3.9 of the ToR is described and evaluated in the DAR. In addition, please improve the baseline information used for the effects assessment (refer to Appendix B).

19 CULTURAL AND HERITAGE RESOURCES

19.1 Conformity table

Terms of Reference Section	Description of item not in conformity
7.3.10. Item 1	potential effects of the project on traditional lifestyles, values and culture.

19.2 Impact assessment steps

ToR section

4.1	Impact Assessment Steps
7.1	Effects Assessment

DAR section

11.9	Cultural and Heritage Resources
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Adequacy item rationale

Section 4 of the TOR identifies the steps required for impact assessment. For the assessment of effects to the Subject of note for noise, the DAR did not adequately complete several of these assessment steps. For example, assessment steps 1-3, 5-7 and 10-15 are not clearly discernable for Section 11.9.

Required adequacy item

Please complete all of the steps outlined in Section 4.1 and 7.1 of the ToR for the assessment of effects to the subject of note for culture and heritage resources.

20 EMPLOYMENT AND BENEFITS TO THE COMMUNITY

20.1 Baseline tourism

ToR section

5.2.4	Tourism
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DAR Section

5.4

Item rationale

The Developer is required to describe the current tourist activity in the study area and revenue generated as a result of tourism in the region, with specific attention to the revenue generated both directly and indirectly by Nahanni Butte. The developer has provided visitation data for the NNPR for 2009, information on the predicted hiring and revenue from the expansion of the NNPR (which was completed in 2013), and referred to IBA negotiations between Parks Canada and the Naha Dehe Dene Band. Given that the information provided on visitation data, hiring and revenue predictions is now quite dated, and that the NNPR expansion has been completed, updated information is required.

Required item

Please provide updated information, including NNPR visitation data post 2009, the number of hired staff and revenue since the NNPR expansion, and the current status of the IBA between Parks Canada and the Naha Dehe Dene Band.

20.2 Baseline regional and local economies

ToR section

5.2.5 Regional and Local Economies

DAR Section

5.5

Item rationale

The Developer is required to provide a description of the local and regional economies and their performance. Given that the information provided in Table 5-6 is now quite dated (traditional activities, labour force, etc.), updated information is required.

Required item

Please provide any updated information, including labour force and engagement in traditional activities.

20.3 Socio-economic initiatives and agreements

ToR section

7.3.11, item 2

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The Developer is required to list and provide the non-confidential details of proposed socio-economic initiatives or agreements. While reference is made to one agreement (the Socio-Economic Agreement), a complete list and the non-confidential details of the initiatives and/or agreements is not included.

Required item

Please provide a complete list of the initiatives and/or agreements and their non-confidential details.

20.4 Employment and income

ToR section

7.3.11, item 4

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The developer is required to describe and evaluate employment and income for every phase and year or construction and operation of the all-season road, including reference to wage and salary employment by length, form (full/part-time/seasonal) and skill category of employment. The developer describes the difficulty of providing estimates for employment and income due to the variability in construction intensity. The Review Board appreciates that employment will vary seasonally and by phase. However, estimates are still needed in order to evaluate the impacts of the project on the community.

Required item

Please provide a description of the potential employment, including a range of values for income, length and form of employment, and skills category.

20.5 Location of camps and size of crews

ToR section

7.3.11, item 5

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The developer is required to describe and evaluate the potential impacts of the all-season road on the community with respect to the location of camps and size of crews working at each camp. The DAR gives an estimate of 50 for the total crew size. It is unclear if this figure refers to the total for all crews combined, or the total for each individual crew.

Required item

Please clarify if 50 is the total for all crews combined or the total for each individual crew; if the latter, give an estimate for individual crew size (i.e. per camp)

20.6 Anticipated access to surrounding communities

ToR section

7.3.11, item 8

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The Developer is required to describe and evaluate the potential impacts of the all season road on the community with respect to the anticipated access of crews to surrounding communities. In response, CanZinc states that road crews will not be permitted to enter Nahanni Butte unless they are residents. While CanZinc will not permit access to surrounding communities and thus anticipates no impacts, impact predictions must describe mitigation(s) that will preclude the impact.

Required item

Please describe how the developer will enforce restricting road crews from accessing surrounding communities.

20.7 Crime and substance abuse

ToR section

7.3.11, item 10

DAR section

11.10 Employment and Benefits to the Community

Item rationale

In response to item number 10 of section 7.3.11 of the Terms of Reference, the developer states that there will be no significant effects of the project on crime and substance abuse. Additionally, the developer predicts no changes to policing demands. The analytical assumptions used in impact predictions must be identified. Given that the expectation of no significant impacts of the project on crime and substance abuse is used in predicting no changes to policing demands, this assumption must be both reasonable and defensible.

Required Item

The Developer must complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR (see page 2 above) for the potential effects of the project on employment and benefits to the community.

Please describe the methodology used for this determination of significance related to crime and substance abuse, and indicate the threshold beyond which, in the developer's opinion, these predicted impacts would be significant.

Upon clarifying this significance determination, please re-evaluate and describe the predicted impact on policing demands.

20.8 Local and aboriginal participation in business opportunities

ToR section

7.3.11, item 16

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The Developer is required to describe and evaluate the potential impacts of the all-season road on the community with respect to the maximization of local and aboriginal participation in contractor and sub-contractor business opportunities. The DAR makes reference to programs and commitments from documents that are part of a previous environmental assessment, but does not provide the location or details of these programs and commitments.

Required item

Please indicate the particular documents where we can find information about these programs and socio-economic commitments made as part of EA0809-002.

Please provide relevant points about, or examples of, programs and commitments from these documents.

20.9 Capacity of local businesses

ToR section

7.3.11, item 17

DAR section

11.10 Employment and Benefits to the Community

Item rationale

The developer is required to describe and evaluate the potential impacts of the all-season road on the community with respect to the effects on capacity of local businesses to service other sectors during the construction phase. The DAR states that local businesses are currently underutilized and their capacity to service other sectors is unlikely to be significantly impacted during road construction, and provides no indication of the number of potential contractors in the area. Both the assumption that local businesses are underutilized and the ambiguity around the number of contractors in the area need to be reasonable and defensible in order to predict the impact on the capacity of local businesses to service other sectors during road construction.

Required item

Please provide reasons for the assumption that local businesses are under-utilized, and an estimate of the number of potential contractors in the area.

21 IMPACTS ON EXISTING TRANSPORTATION INFRASTRUCTURE

21.1 Highway 7 improvements

ToR section

7.3.12, item 1

DAR section

11.11 Impacts on Existing Transportation Infrastructure

Item rationale

The Developer is required to describe how the development will affect existing transportation infrastructure, including the effects on the Nahanni Butte access road and Liard Highway from increased traffic during construction and operation of the all season road with respect to dust, safety concerns, and the possibility of collisions and spills. The DAR states that there will likely be increased dust, safety concerns, and possibility of collisions and spills from GNWT improvements to

highway 7 that may be catalyzed by mine operations, but it is unclear whether these effects will be due to traffic from road improvements or the mine, or both.

Required item

Please clarify if these effects will be related to traffic from the road improvements only or traffic from the mine operations and road construction (wording conflates these and is not clear).

21.2 Additional roadway use

ToR section

7.3.12, item 1

DAR section

11.11 Impacts on Existing Transportation Infrastructure

Item rationale

The Developer is required to describe how the development will affect existing transportation infrastructure, including the effects on the Nahanni Butte access road and Liard Highway from increased traffic during construction and operation of the all season road. In the DAR, the developer states that the highway and Nahanni Access road are currently underutilized, tourist traffic is small, and that additional roadway use by mine vehicles is not expected to be significant. The assumption that the roads are underutilized must be reasonable and defensible in order to predict the impact of additional traffic during construction and operation of the all-season road. For significance determinations, there must be a description of the methodology used, including how significance is defined, and beyond what threshold impacts become significant.

Required item

The Developer will complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR for the impacts on existing transportation infrastructure.

Please identify the analytical assumptions that the highway and Nahanni Access road are currently underutilized, including traffic estimates.

Please describe the methodology used for this determination of significance related additional roadway use, and indicate the threshold beyond which, in the developer's opinion, these predicted impacts would be significant.

21.3 Existing water transportation routes and navigable waters

ToR section

7.3.12, item 2

DAR section

11.11 Impacts on Existing Transportation Infrastructure

Item rationale

The Developer is required to describe how the development will affect existing transportation infrastructure, including the effects on existing water transportation routes and navigation on navigable waters (i.e. Liard River crossing). In response, the DAR states that summer barge crossings for mine operations are unlikely to have any significant effects on the existing use of the river (from tourists, residents of Nahanni Butte, etc.). For significance determinations, there must be a description of the methodology used, including how significance is defined, and beyond what threshold impacts become significant.

Required item

The Developer must complete all of the impact assessment steps outlined in Section 4.1 and 7.1 of the ToR for the impacts on existing transportation infrastructure.

Please describe the methodology used for this determination of significance related to the effect of summer barge crossings on existing uses of the river, and indicate the threshold beyond which, in the developer's opinion, these predicted impacts would be significant.

22 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

22.1 Fires

ToR section

- | | |
|--------------|--|
| 8, item 1 | long-term climate change scenarios[1] (e.g., loss of permafrost, increased evaporation and evapotranspiration, greenhouse gas emissions) |
| 8, item 6 | fires |
| 8, item 7 ii | an assessment of the likelihood and severity of each risk identified including site-specific contingencies for high risk areas |

DAR section

- | | |
|----|---|
| 12 | Effects of the Environment on the Project |
| 13 | Potential Accidents and Malfunctions |

Item rationale

An assessment of how climate change may affect the incidence of forest fires was not discussed in the DAR. The assessment of fires stated that fires are common but do not pose a high risk to the road. Fires would affect the road operation and may affect the maintenance of the road. For example, forest fires may result in road closures and reduce the operating season, thawing of permafrost that may result in subsidence or thaw slumps, or increased risks of landslides.

Required Item

The developer will describe how the long term climate change scenarios could affect the occurrence of fires. The developer needs to clearly describe how fires could affect the project, such as the examples given above. Following the description of the potential impacts, the developer will describe potential contingencies and mitigations. If emergency plans are proposed or referenced, conceptual versions of these plans should be provided.

22.2 Changes to permafrost and subsidence

ToR section

- 8, item 2 how likely changes in permafrost will affect the amount the granular material required for care and maintenance of the all season road
- 8, item 5 subsidence
- 8, item 7 An assessment of the likelihood and severity of each risk identified including:
- i. a map of high risk zones
 - ii. site-specific contingencies for high risk areas

DAR section

- 12 Effects of the Environment on the Project
- Appendix 2, Climate Change Considerations
section 6
- Appendix 2, Effects Assessment – Terrain, Soils, Permafrost, and Karst
section 8

Item Rationale

Appendix 2 adequately outlined that climate change may result in permafrost thaw and associated subsidence. The mitigations described relied on the construction approach. There was no discussion of what mitigations would be taken if the effects of permafrost thaw or subsidence were observed throughout the operation of the project.

Required Item

The developer will:

1. provide a map indicating high risk zones for effects from permafrost thaw and subsidence,
2. describe specific mitigations and contingencies that would take place if permafrost thaw and subsidence are observed during operation of the road, and
3. if the mitigations require additional fill placement, estimate how much additional granular material may be needed.

23 FOLLOW-UP AND MONITORING

23.1 Summary of non-conforming and inadequate sections

Table 11 Employment and benefits to the community - non-conformity

Terms of Reference Section	Description of item not in conformity
11, item 4	describe how the results of follow-up monitoring and the management response framework would be used and incorporated into land use permit and water license applications in support of the all season road construction and operations.

23.2 Monitoring and management requirements

ToR section

11, item 2

DAR section

15.1 Monitoring

15.2 Adaptive Management

Item rationale

In item number 2 of section 11 of the Terms of Reference, the developer is asked to provide a description of the purpose of each program, responsibilities for data collection, analysis and dissemination, and how results will be used in an adaptive management process. The DAR makes reference to monitoring and management requirements in the plans for the existing winter road (listed in the DAR section 6.7), and states that these requirements would also apply to the proposed all-season road. However, it does not describe the monitoring components of these plans, including their purpose, responsibilities for data collection, analysis and dissemination, and how the results will be used for adaptive management.

In addition, the DAR states that the short- and long-term road maintenance program(s) described in section 15 will be implemented and “evaluated on an ongoing basis”. However, there is no description of the evaluation and/or monitoring techniques that will be used, including data collection, analysis and dissemination methods and responsibilities, as well as how the results will be used in an adaptive management process.

Required item

Please describe the monitoring components of each of the management plans referred to in Section 6.7 that would be relevant to the all-season road, including their purpose, responsibilities for data collection, analysis and dissemination, and how the results will be used for adaptive management.

Please describe what evaluation and/or monitoring techniques will be used in the short- and long-term road maintenance program(s), including data collection, analysis and dissemination methods and responsibilities, as well as how the results will be used in an adaptive management process.

23.3 Compatibility with other monitoring and research programs

ToR section

11, item 3

DAR section

15.1 Monitoring

Item rationale

The developer is required to describe how project-specific monitoring will be compatible with the NWT Cumulative Impact Monitoring Program or other regional monitoring and research programs. The DAR states that monitoring data “will be compatible with the NWT Cumulative Impact

Monitoring Program, where possible”, but does not describe how this data will be compatible with the NWT Cumulative Impact Monitoring Program and any other monitoring programs.

Required item

Please describe how this data will be compatible with this and any other monitoring programs.

24 CLOSURE AND RECLAMATION

24.1 Summary of non-conforming and inadequate sections

Table 12 Closure and reclamation - non-conformity

Terms of Reference Section	Description of item not in conformity
12, item 4	discuss long-term physical integrity of any permanent features
12, item 5	discuss monitoring plans during reclamation

24.2 Closure plans and timing (road and borrow pits)

ToR section

- | | |
|------------|--|
| 12, item 1 | what the proposed closure and intermediate closure plans are, including the duration of the activities |
| 12, item 2 | identify areas where pre-project conditions will not be returned |

DAR section

- | | |
|----|-------------------------|
| 16 | Closure and Reclamation |
|----|-------------------------|

Item rationale

The DAR describes closure activities that may occur but does not state the objective of the closure activities or the duration of the closure period and specific closure activities. This is needed in order to understand the potential impact of the project into the future and to understand the duration of how long potential effects may occur for.

Required Conformity Item

The developer will provide clear goals and objectives for closure and will include a conceptual closure plan. The developer will also provide a conceptual closure map indicating key closure features as well as where closure objectives will not be met, and a table indicating projected closure times and durations.

24.3 Long-term integrity of permanent features

ToR section

- | | |
|------------|--|
| 12, item 4 | discuss long-term physical integrity of any permanent features |
|------------|--|

DAR section

- | | |
|----|-------------------------|
| 16 | Closure and Reclamation |
|----|-------------------------|

Item rationale

It is not clear if there will be permanent features remaining post closure.

Required Item

The developer will indicate which features of the road may be in place permanently and the predicted physical integrity of the features.

24.4 Reclamation of in-stream and riparian areas

ToR section

7.3.7 Item 19 Describe reclamation of in-stream and riparian work areas during construction and also during maintenance operations

DAR section

11.6.3 Mitigation

Adequacy item rationale

Section 11.6.3 of the DAR describes a number of mitigation options available to reduce the potential for adverse effects of the project on fish and aquatic habitat including “promote re-vegetation of riparian areas to further reduce the potential for sedimentation”. Section 11.8.8 of the DAR indicates that, to limit the potential for introducing invasive species into the area, seed mixes will not be used for re-vegetation and that this process is expected therefore to rely primarily on natural encroachment. It remains unclear what the long term objectives for closure and reclamation are, with respect to re-vegetation and rehabilitation of disturbed riparian areas, as well as the potential means that may be used to meet these objectives. It is standard practice that during the EA phase, a conceptual Closure and Reclamation Plan is provided so that the Review Board may determine that reclamation objectives are appropriate and possible to achieve.

Required Adequacy Item

Please provide a conceptual Closure and Reclamation plan that includes a discussion of reclamation objectives for disturbed riparian and in-stream areas, as well as a list of possible reclamation strategies that will enable these objectives to be met.

24.5 Engagement with potentially affected communities

ToR section

12, item 6 identify how potentially-affected communities were engaged in determining end land use and water objectives for reclamation.

DAR section

16 Closure and Reclamation

Adequacy item rationale

The developer indicated that engagement over closure has been completed but no firm positions have been taken.

Required Adequacy Item

Please indicate which potentially affected communities were consulted with respect to closure considerations.

25 REQUIRED DRAFT OR CONCEPTUAL PLANS

In order for the Environmental Assessment process to proceed, the Review Board requires the following plans, policies or procedures (as mentioned in the DAR or as required by GNWT's Wildlife Act) to be submitted, either in conceptual, draft or final form:

1. Closure and reclamation plan (p. 277)
2. Spill contingency plan (p. 201)
3. Incident Command System (p. 201)
4. Spill risk analysis plan (p. 155)
5. Road operation plan (p. 156)
6. Quarry Management Plan (p. 155)
7. Construction, operation and maintenance plan (p. 277)
8. Waste management plan (p. 156)
9. Wildlife effects monitoring plan (as per GNWT's Wildlife Act)
10. Wildlife and wildlife habitat monitoring plan (p. 184)
11. Emergency response plan (p. 183)
12. Controlled road use plan (p. 211)
13. Winter driving policy (p. 183)
14. Wildlife right of way policy (p. 184)
15. Contaminant loading management plan (p. 192)
16. Sediment and erosion control plan (p. 155)
17. Invasive species management plan (p. 183)

All additional monitoring or management plans for the existing winter road that will be updated to accommodate any changes associated with the all season road, and a description of specific updates to be included.

APPROVED BY THE REVIEW BOARD MAY 20, 2015



JoAnne Deneron

Chairperson

Appendix A: Non-conforming items

Below is a summary table summarizing where the DAR is out of conformity with respect to the requirements in the ToR. An abbreviated version of this table is provided at the beginning of each relevant section.

Terms of Reference Section	Description of item not in conformity
11, item 4	describe how the results of follow-up monitoring and the management response framework would be used and incorporated into land use permit and water license applications in support of the all season road construction and operations.
12, item 4	discuss long-term physical integrity of any permanent features
12, item 5	discuss monitoring plans during reclamation
5.1.1, item 12	probable distribution (thickness and lateral extent) on land, water, shoreline and slope crossings
5.1.1, item 13	permafrost distribution and stability beneath waterbodies
5.1.3, item 12	the role of wetlands (e.g. bogs, fens and peat plateaus)
5.1.3, item 13 ii	hydraulic conductivity
5.1.3, item 4	the extent of connectivity to adjacent watercourses including any potential seasonal variation
5.1.3, item 6	naturally occurring icings
5.1.5 Item 11	The Review Board could not locate a listing of existing invasive species.
5.1.5 Item 3	The Review board could not locate discussion of seasonal and life cycle movements and sensitive periods.
5.1.5 Item 8	The Review Board could not locate a discussion of any known issues with respect to health of harvested species (e.g. parasites, disease, condition).
5.1.5. Item 4	The Review Board could not locate a discussion of habitat requirements for each life stage.
5.1.5. Item 6	The Review Board could not locate a discussion of known sensitive or important areas in terms of habitat type (e.g., spawning, overwintering, refugia, feeding), species and timing of use.
5.1.7 Item 6	existing contaminant concentrations in harvested species or vegetation (e.g. berries) that may change as a result of the all season road.

Terms of Reference Section	Description of item not in conformity
6.2, item 7 i	freeboard when adjacent to or crossing watercourses for multiple flood events (see Section 5.1.3 for flood events)
7.2.1- General Comment	The Review Board could not locate any assessment of culturally or recreationally important fish harvest species in the assessment of effects on Traditional harvesting and traditionally harvested species, nor any rationale explaining this exclusion.
7.2.1 Item 11	The Review Board could not locate a discussion on the effects of changes in access including increased access to the land and surrounding waters, as well as increased access to environmentally and culturally sensitive areas.
7.2.1 Item 6	The Review Board could not locate discussion on the potential for disruption of sensitive life stages or habitat (e.g., migration, calving, denning, overwintering).
7.2.1 Item 7	The Review Board could not locate discussion on effects to population cycles.
7.2.1 Item19	While the DAR included an overview of potential effects to traditional harvesting of berries and medicinal plants, the Review Board was unable to locate an effects assessment matrix for this effect pathway.
7.3.1, item 12	frost heave or frost susceptible soils in thin permafrost as well as seasonally frozen soils
7.3.1, item 13	thaw or settlement-related impacts on drainage and surface hydrology (see also Section 7.3.5 on water and water quality)
7.3.1, item 14	shorelines and channels
7.3.1, item 15	combined impacts of the all season road and fires
7.3.1, item 16	how warming ground temperatures and deepening active layers will affect the all season road and how mitigation measures will remain effective in various climate warming scenarios.
7.3.1, item 5	snow distribution and consequences on ground thermal regime
7.3.1, item 7	avalanche risks and the effect of avalanche management on the environment.

Terms of Reference Section	Description of item not in conformity
7.3.10. Item 1	potential effects of the project on traditional lifestyles, values and culture.
7.3.2, item 2	potential for excavation and use of hot rocks (rocks with high sulphur content within shale)
7.3.2, item 5	talus slope stability
7.3.3	emissions by source for each phase (construction, operation and maintenance, and closure), including quantity, timing and duration, normal operation conditions and upsets
7.3.4 Item 2	The Review Board could not locate discussion of sensory disturbance to birds or wildlife, including a specific discussion of effects on caribou and moose.
7.3.4 Item 3	The DAR indicates that the discussion on effects of noise to “wilderness tourism” is presented in Section 10. The Review Board was unable to locate this discussion in Section 10, including the Section 10.11- Wilderness Quality and Visitor Experience.
7.3.5, item 10	issues related to borrow extraction including melting of ground ice and potential changes to drainage patterns etc.
7.3.5, item 12	changes to flow or water levels including potential for glaciation and icings at watercourse crossings
7.3.5, item 14	potential effects on the aquatic environment including invertebrates.
7.3.6 (items 1 – 20)	Species at risk
7.3.7 Item 10	The Review Board could not locate a discussion regarding changes to distribution or abundance of fish and aquatic habitat
7.3.7 Item 11	The Review Board could not locate a description of the potential effects to sensitive or important areas or habitat.
7.3.7 Item 18	Section 11.6.2 of the DAR indicates that a discussion of the potential for increased pressure on fisheries resources that could arise from improved access was provided in Section 8.5. However, section 8.5 includes a description of effects of avoidance and altered movement of wildlife, not a discussion of the effects of the project to fish harvesting.
7.3.7 Item 2	The Review Board could not locate a discussion on the estimated time required to redevelop habitat.

Terms of Reference Section	Description of item not in conformity
7.3.7 Item 20	The Review Board could not locate a discussion of criteria for evaluating the success of mitigation or reclamation measures or an indication of when and how this evaluation would be conducted.
7.3.7 Item 3	The Review Board could not locate a discussion on the effects of proposed water crossings, realignments and temporary vehicle crossing methods.
7.3.7 Item 6	The Review Board could not locate a discussion on the disruption of sensitive life stages or habitat (e.g. spawning and incubation, rearing, overwintering) including loss of substrate habitat and known sensitive or important sites.
7.3.7 Item 8	The Review Board was able to locate some discussion regarding potential effects to specific species and locations of particular importance to subsistence harvesters including Sundog Creek, Polje Creek , Tetcela River and Grainger Gap. The Review Board was unable to locate a discussion of potential effects for Bluefish Creek or Fishtrap creek, as was specifically requested in the ToR.
7.3.7 Item 9	The Review Board was able to locate a brief discussion on the potential changes to water quality as a result of the project, but not of potential changes to water quantity.
7.3.8 (items 1 – 20)	Wildlife and wildlife habitat
7.3.9 (items 1 – 12)	Vegetation

Appendix B: Summary of outstanding baseline information

1 BASELINE INFORMATION REQUIREMENTS- SPECIES AT RISK

ToR section

5.1.4 Species at Risk

DAR section

4.4 Species at Risk

Adequacy item rationale

Bull trout are not included in the listing of species at risk, despite being described in the Federal Species at Risk Act list as “under consideration”, with a COSEWIC Assessment of “special concern” and NWT General Status Rank of “may be at risk”. Potential threats to Bull Trout in the NWT include industrial activities and infrastructure projects that can lead to poor habitat quality and habitat fragmentation.” <http://www.nwtspeciesatrisk.ca/en/content/bull-trout>

Required Adequacy Item

Please describe bull trout and potential impacts to bull trout in the same manner as other species at risk in this section and the effects assessment section as a subject of note.

2 BASELINE INFORMATION REQUIREMENTS- SPECIES AT RISK PRESENCE, DISTRIBUTION AND ABUNDANCE

ToR section

5.1.4 Item 1 For species at risk, provide a description of wildlife species presence, distribution and abundance

DAR section

4.4 Species at Risk

Adequacy item rationale

Appendix 7, Table 4.1 Summary of Prairie Creek Mine and Access Road Field Surveys lists surveys conducted since 1980. The surveys are described as vegetation and/or field studies specific to the Prairie Creek Mine and its access road. It is unclear which of these surveys are for wildlife, which are for vegetation and which are for both vegetation and wildlife. It is also unclear which, if any, of the surveys have been conducted along the portions of the permitted access route that were realigned under EA0809-002. Additionally, Appendix 7, p20, states that the Golder 2010 and 2014 reports are provided in “Appendix B”. Appendix B is not listed in the Table of Contents for Appendix 7 and these reports cannot be found in the DAR.

Required Adequacy Item

Please provide these reports and indicate which relate to wildlife, which relate to vegetation and which are for both. Please provide the Golder reports from the missing Appendix B.

3 BASELINE INFORMATION REQUIREMENTS- VEGETATION BASELINE CONTAMINANT CONCENTRATIONS

ToR section

5.1.7 Item 6 Provide a description of existing baseline contaminant concentrations in harvested species or vegetation (e.g., berries) that may change as a result of the all season road and as available.

DAR section

4.7 Vegetation

Adequacy item rationale

This ToR item has not been completed and the DAR is therefore not in conformity with the ToR.

Required Adequacy Item

Please provide the baseline requirements of ToR 5.1.7 item 6 in order to meet conformity requirements.

4 BASELINE INFORMATION REQUIREMENTS- HARVESTING

ToR section

5.2.2 Provide 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. This will include harvest levels, participation, and locations (with specific attention to high use areas and areas of sensitivity, and seasonal access). Describe any recent and current encroachments and restrictions of harvesting activities (i.e. by competing uses of land and resources or related regulations).

DAR section

5.2, 8.1 Harvesting and Current knowledge on harvested wildlife and harvesting areas

Adequacy item rationale

The ToR requires a description of “any recent and current encroachments and restrictions of harvesting activities”. The DAR describes declines in rates of harvest for a number of different species including caribou, which, based on information gathered from a discussion with Mr. Leon Konisenta, have not been harvested for approximately 20 years, and Dall sheep, which are no longer harvested at all. Understanding the reasons behind these recent declines in harvest rates is important from an effects perspective, as it is essential for understanding cumulative effects.

Required Adequacy Item

Please describe any recent or current encroachments and restrictions on harvesting activities or other contributing factors that may help to explain the recent decreasing trends in harvest rates observed.

5 BASELINE INFORMATION REQUIREMENTS- HARVEST PRESSURES**ToR section**

- 5.1.6 Item 7 Describe harvest pressures (subsistence, resident and non-resident harvesting) by species, season and geographic area.
5.1.5 Item 10

DAR section

- 5.2, 8.1, 4.5.2 Harvesting and Current knowledge on harvested wildlife and harvesting areas

Adequacy item rationale

The DAR provides a qualitative description of many of the culturally important harvesting areas and species based on information gathered from the Traditional Knowledge Assessment and through discussion with local harvesters. However, only one semi-quantitative description is offered for actual harvest pressures based on information obtained from Parks Canada in 1984. In 1984, the Nahanni National Park Boundary was only a small fraction of its current extent, and the description of harvest pressures inside this boundary as “minimal to non-existent” may not adequately describe harvest pressures in the areas proximate to the entire road alignment or currently. Additionally, no assessment is made regarding differences in harvest pressure by species or season.

Required Adequacy Item

Please provide additional quantitative and recent descriptions of harvest pressures for the entire area that may be affected by the proposed road alignment. Include a discussion of trends in harvest pressures by species, season and geographic area.

6 BASELINE INFORMATION REQUIREMENTS- WATER AND SEDIMENT QUALITY**ToR section**

- 5.1.3 Item 9 Water quality, including seasonal variability in quality.

DAR section

4.3.2 Surface Water Quality

Adequacy item rationale

The ToR required data describing baseline water quality characteristics for surface water bodies that may be potentially affected by the construction of the all season road, including a description of seasonal variability. The DAR provided water quality data from nine locations along the road alignment for up to two dates in one summer season. This minimal amount of data does not allow for adequate characterization of the range of variability in existing conditions that is required for effects assessment. Furthermore, none of the locations sampled represent a location upstream of potential road effects which will be essential for the development of a future monitoring program which includes reference (or unaffected) locations.

Required Adequacy Item

Please provide additional baseline water quality data including an assessment of seasonal variability.

7 BASELINE INFORMATION REQUIREMENTS- FISH AND AQUATIC HABITAT

ToR section

5.1.5 Item 1 Provide a description of fish habitat present at each of the planned water crossings and realignments including references (such as photographs and diagrams) at each of those locations with particular emphasis on riparian areas.

DAR section

4.3.2 Appendix 8, DAR section 4.5.1

Adequacy item rationale

Section 4.5.1 of the DAR provides a brief description of some locations along the proposed road alignment, however no combined assessment of abundance, distribution and use of habitat types was provided. This information is required in order to understand the potential consequences of effects. For example, if 100m of stream will be altered in order to facilitate road crossings, the effect of this disturbance would be very different depending on if these stream reaches were an important area for bull trout spawning, a species which has been given a COSEWIC assignment of Special Concern and is currently under consideration for the Federal Species at Risk Act.

Required Adequacy Item

Please provide a combined assessment of aquatic habitat including metrics of habitat type abundance, distribution and use along all stream crossings and other potentially affected aquatic habitats of the proposed road alignment.

8 BASELINE INFORMATION REQUIREMENTS- BASELINE CONTAMINANT CONCENTRATIONS

ToR section

- 5.1.5 Item 7 Provide existing baseline contaminant concentrations in harvested species that may change as a result of the all season road and as available.

DAR section

- 4.5.2 Harvesting

Adequacy item rationale

The DAR does not provide baseline fish tissue concentration data from the areas that may be potentially affected by the proposed project. Reference is made, however, to data collected by Beak (1981) and previous information collected for EA0809-002. The DAR also states that “to our knowledge, there are no fish tissue data for fish collected from stream crossed by the road”. These two conflicting statements, therefore, make it unclear if and what fish tissue data might be available for use as baseline. Given information provided in the Traditional Knowledge Assessment of the Prairie Creek Mine, stating that fish harvesting in the area of the proposed all season road is an important historical and current harvest activity, baseline tissue metals concentration is a required piece of information.

Required Adequacy Item

Please provide baseline information on fish tissue chemistry including any relevant information from the Beak (1981) study or other sampling programs in the assessment of baseline conditions for fish and aquatic habitat. If no previously collected data are available, please provide baseline fish tissue chemistry data during the EA process.

9 BASELINE INFORMATION REQUIREMENTS- EFFECTS ON FISH HEALTH

ToR section

- 7.3.7 Item 13 Describe potential effects on fish health

DAR section

- 11.6 Fish and Aquatic Habitat

Adequacy item rationale

Section 11.6.2 of the DAR indicates that “overall, no negative effects on fish health are expected”. However, the DAR does not provide baseline information on fish health (i.e. growth rates, parasitism, tumours or lesions, tissue metals concentrations) nor does it provide predicted rates of deposition or contamination, due for example, to road runoff or dust. The Review Board, therefore, is unable to assess the validity of this prediction as it has not been given a starting point from which

to gauge impacts, nor an estimate of predicted effects. Similarly, section 4.1.9 of the ToR indicates that the developer must identify any monitoring, evaluation and adaptive management plans required to detect changes, ensure that EA predictions are accurate and proactively manage against adverse impacts. No monitoring or mitigation plan is mentioned for potential effects to fish health, as is standard in other mining operations throughout the NWT and in Canada.

Required Adequacy Item

Please provide baseline information on fish health in the area as well as an assessment of predicted effects to fish health. Please describe any potential updates to the existing Aquatic Effects Monitoring Program, which will enable the developer to monitor and adaptively manage any potential adverse effects to fish health as a result of the all season road.

10 BASELINE INFORMATION REQUIREMENTS- HISTORIC AND CURRENT USE OF VEGETATION

ToR section

5.1.7 Item 5 Describe historic and current use of vegetation, including subsistence and commercial harvesting (e.g., berry picking, forestry)

DAR section

11.8.6 Effects on Harvest Plants

Adequacy item rationale

The DAR specifically states that “There is no direct information with which to assess the potential for impacts related to cultural uses of plant species in the Prairie Creek Mine site area or along the access road” (p. 262). It falls to the developer, therefore, to collect this information so that a baseline of information regarding the uses and locations of traditionally important plants and plant assemblages is established. Baseline information of this nature is essential in order to adequately predict effects and determine appropriate mitigation strategies, if adverse effects are anticipated.

Required Adequacy Item

Please provide baseline information on the uses and locations of historically or currently important vegetation, including mention of subsistence or commercial harvesting. Please ensure to incorporate traditional knowledge into this dataset wherever possible.

11 BASELINE INFORMATION REQUIREMENTS- FREQUENCY OF FOREST FIRES AND POST-VEGETATION SUCCESSION

ToR section

5.1.7 Item 9 Describe the frequency of forest fires and post-fire vegetation succession.

DAR section

11.8.3 Introduction of Invasive Plants

Adequacy item rationale

The DAR (p. 260) describes the mean fire return interval and cycle length for a fire greater than 200 ha. However, the Review Board could not locate a description of post-fire succession regimes. In fact, App 7 Section 4.4.4.1 describes the “burn” Vegetation Cover Unit described by Beak in 1981 and 1982, indicating specifically that “no examination of regenerating vegetation was made at that time”.

Required Adequacy Item

Please provide a description of post-fire vegetation succession trajectories in either the study area, or areas featuring comparable vegetation assemblages and climactic conditions.