



June 5, 2017

Mr. Chuck Hubert
Senior Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
5102 50th Avenue,
Yellowknife, NT
X1A 2N7

Dear Mr. Hubert

Re: EA1415-001, Prairie Creek Mine All Season Access Road
Closing Comments

Canadian Zinc Corporation (CZN) is pleased to provide closing comments to EA1415-001. In the text below, we provide comments on some key topics. We have also provided comments and responses to closing comments from parties in an attached document.

We note that “GNWT continues to believe that Canadian Zinc can undertake the development in a way that is not likely to cause significant adverse impacts to the environment, providing that it complies with all regulatory requirements and implements the commitments it has made for this development and applicable commitments from the EA of the Prairie Creek Mine and winter road”. Further, DFO stated that “no significant adverse impacts are anticipated on fish and fish habitat”. We agree with the GNWT and DFO and pledge that we will comply and implement the many commitments made. As a result, we see no reason for any measures. We also note that regulators are not requesting measures, other than Parks Canada.

In our closing comments, we have proposed some additional or modified commitments. Accordingly, we have updated the draft Commitments Table and attach a copy.

Hunting Pressure

In the early stages of the EA, a prime issue, at least for the Nahanni Butte Dene Band (NBDB), was access control. The concern was that an all season road would enable hunters from outside of the region to access the area and cause hunting pressure. While the NBDB were in favour of the road at that time as it would facilitate their own harvesting, concern remained regarding access control.

A number of different access control instruments were considered initially, but none provided a legal basis to restrict access. During land tenure discussions, the GNWT and Indigenous and Northern Affairs Canada (INAC) informed CZN that CZN would be required to obtain leases for water lots and staging areas on each side of the Liard River crossing. Such leases will include the

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right to deny access to unauthorized persons. We believe this right will effectively allow CZN to control access. With reference to the May 25, 2017 letter from the GNWT (PR #542), CZN will exercise its right to restrict access on and/or through its leases. We also want to be clear that we understand that CZN will be solely responsible for the leases and the activities that occur on them. We noted that we intend to engage NBDB members to undertake lease activities on our behalf. The reasons for this were to indicate to the NBDB that we intend to uphold our commitment to them to engage their members in the project, as much as possible, and to have personnel that would be the most motivated to restrict unauthorized access.

In terms of access by interested hunters, it is worth reviewing their opportunities and obstacles, starting with non-indigenous people. They would not be allowed to cross CZN's lease areas. They would have to cross the Liard River in a different location, they would not have access to CZN's barge. Should they manage to cross the river with wheeled transport and gain access to the road, they would have to ignore CZN's checkpoint staffed by NBDB members who would make it clear that their presence was not wanted. If they continued, they would have to ignore the presence of a NBDB Monitor who would be shadowing them. They would also have to navigate the road and avoid the Mine trucks that they would encounter. They would not be able to continue beyond the boundary of the Nahanni National Park Reserve (NNPR).

Assuming non-indigenous hunters are prepared to accept those obstacles, what opportunities would be available to them in terms of animals? There may be some moose, especially in the fall. They would be very lucky to encounter a boreal caribou. We have not seen any boreal caribou in our surveys. The paucity of boreal caribou is borne out by comments made by the GNWT during the public hearing (PR #528, p.178, line 7 to p.179, line 9), particularly "we haven't seen any caribou near the mountains. They're more towards Antoine Lake. That's probably about 40 kilometres on the north side of the Liard River. We've done multiple annual moose surveys there, and I've personally flown that area a lot, and I've seen tracks, but very, very far from the mountains, and nowhere near where the road is going to be". Also, "for non-residents and non-resident aliens, most hunting seasons are open in the summer and closed by October 31st before the ice bridge would even be open, and also bag limits for residents and non-residents, and non-resident alien hunters for dall sheep, mountain goat, woodland caribou, moose, and bison are already limited to one individual per licence holder per year, and tags are required to harvest these species" (PR #528, p. 151, line 20).

Therefore, we believe the obstacles that non-indigenous hunters would face compared to the hunting opportunities available would not make it worth their while to make a trip.

For indigenous hunters, they would also not be allowed to cross CZN's lease areas, unless they were NBDB members or had verifiable permission from the NBDB. They would also have to cross the Liard River in a different location, they would not have access to CZN's barge. Should they manage to cross the river with wheeled transport and gain access to the road, they would also have to ignore the checkpoint and a NBDB Monitor. They would also have to navigate the road and avoid the Mine trucks that they would encounter. We believe the vast majority of indigenous hunters will respect the wishes of the NBDB and the fact that it is their traditional territory. We also believe there are many other areas for moose hunting more easily accessible to indigenous hunters. We doubt many would make a trip to hunt caribou (boreal and mountain) because of the low numbers proximal to the road.

Consequently, we are convinced that the proposed access controls and low hunting opportunities will not be appealing to hunters, and so there will not be a significant increase in hunting pressure.

Road Design and Risk

There was a significant amount of discussion during the public hearing regarding road design and the risks posed by the proposed road. From our point of view, as we noted at the time, we still have significant issues with the Oboni Riskope assessment and conclusions and we were not fully able to explore these through the hearing process, particularly as they relate to road design. We disagreed with their results and provided evidence to show that the accident projections (off-road excursions) are an order of magnitude too high. Oboni benchmarked their results using road examples from Europe and Latin America. Particularly frustrating was the fact that the examples Oboni used to benchmark were confidential. Oboni said that the examples were 'comparable', and the traffic volumes 'similar'. We have no way to verify that, and frankly, we are skeptical.

As a result, we recognized that the Board and parties may not be able to properly weigh the evidence on the record between Oboni and CZN. Given the late stage of the EA process and a desire to advance in a timely manner, CZN proposed a solution to resolve the uncertainty without unduly delaying the process. We proposed the formation of an independent technical review panel. This approach was based on a similar one adopted for the Jay Project during EA1314-01 in connection with dike stability and safety.

The mandate of the panel would be to recommend road design principles. Since the intent of the review and design would be to reduce and minimize risk to a suitable degree, improvements and/or updates to the existing risk assessments would be part of the panel's scope. While the focus is road design, the panel would be free to make recommendations regarding the proposed road operations and maintenance requirements to promote safety and reduced risk.

Similar to the Jay Dike Review Panel, panel member selection will include a short list of potential candidates who are Professional Engineers, have worked on previous road projects in the North and are free from conflict with CZN's engineering team and Oboni Riskope. Three panel members will be selected and the scope and mandate for their work will be agreed with them, followed by the preparation of a report detailing the selection process and panel terms of reference. As for the Jay project, this report would be submitted to the Mackenzie Land and Water Board, the GNWT and Parks Canada for comment.

We see the formation of the panel, their deliberations and incorporation of their results into the detailed design process prior to construction being a condition of issued permits, and occurring after permit issuance. Road designs would require approval before construction in any event, therefore the input of the panel's results into suitable road design is safeguarded.

CZN commits to form such a review panel as described above (Commitments, Table 2, no. 32), and we anticipate that this commitment will be included in the Report of EA, and that therefore, a measure is not required for road design and/or further risk assessment.

Indigenous Monitors

During the previous EA for the Mine and winter road, EA0809-01, CZN extensively engaged with the NBDB and LKFN and concluded an Impact Benefit Agreement (IBA) with each. Included in those IBA's were commitments that we would hire Environmental Monitors (EM's), from the NBDB for the access road, and from the LKFN for the Mine. In subsequent discussions, and during the course of the current EA, we have maintained this position, and in the NBDB's case, extended the commitment to the all season road. The duties of the EM's will include observing conditions, collecting data including monitoring data, inspecting, and in the road EM's case, assisting with road use and access control monitoring.

Also during the previous EA, we proposed the formation of a Technical Advisory Committee (TAC) that would meet three times per year, and at which CZN would present results and indigenous groups and regulatory agencies could ask questions and raise any issues. It is our expectation that the Environmental Monitors will not only be CZN employees but they will be stewards on behalf of their communities, just as the other employees from local communities will be, feeding information back to their respective members and leaders. We have committed to extend the mandate of the TAC to include the all season road (Commitments, Table 1, no. 190 (modified)).

We are providing these details for the Board's information, and we respectfully ask the Board to bear them in mind when making decisions and to not impose any requirements that may overlap or lead to conflict with these previously agreed positions.

Hydrologic Data

As a follow-up to ECCC's reply to Undertaking 7, and in response to a question from the Board's consultant during the Hearing regarding hydrologic data applicable to the road, CZN requested comments from Tetra Tech. These are provided in an attached letter.

Invasive Species

Subsequent to the public hearing, the Board posed the following question to CZN:

“Is there a likely increased risk of invasive species spread if the wheel wash is on the north side of the Liard crossing (rather than the south side), considering more invasive species are likely present on the south side of the river due to the proximity to the Liard highway?”

In our opinion, while there may be a slightly increased possibility of invasive species occurring on the south side of the Liard River as opposed to the north side, we do not think this means there is an increased risk of invasive species spread if the proposed wheel wash is located on the north side. This is because the wheel wash would be located within a gravel-based staging area, not conducive for the establishment and spread of invasive species. Operation of the wheel wash will require management and oversight, therefore preferably staff will be present, or at least proximal. It is more likely that this will occur on the north side where it is likely that the in-bound and out-bound trailers will be exchanged between mine road cabs and highway cabs.

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Thank you for your attention and if you have any questions, please contact us at 604 688 2001.

Yours truly,

CANADIAN ZINC CORPORATION



David P. Harpley, P. Geo.
VP, Environment and Permitting Affairs

RESPONSES TO CLOSING COMMENTS – EA1415-01

NBDB

We appreciate the Band's support of the project. We share their conviction that potential negative impacts can be managed. We also agree with the Band's comment that we recognize the importance of protecting water quality, and we also recognize the importance of the youth/wellness centre to the NBDB that the Band proposes to build at Second Gap. We commit to do our utmost to protect the environment and operate the road responsibly and safely, while minimizing intrusion into the community and disruption of traditional lifestyles. It is also our intention to complete a Traditional Land Use Agreement with the NBDB.

LKFN

In their closing comments on p.7, LKFN notes that "the proponent has previously committed to funding a traditional knowledge (TK) study with LKFN, but that this commitment has not yet been fulfilled". LKFN made similar remarks during the Public Hearing on the morning of April 28, and again that afternoon. We wish to confirm that LKFN is mistaken.

On the morning of April 28, 2017 LKFN indicated that they had correspondence confirming that LKFN had approached CZN for support to undertake a TK study (PR #528, p.55, lines 1-8). Our reply at the time (lines 19-22) was that our recollection was there was some discussion during the Cultural Technical Session on that point, but that LKFN had not approached CZN.

We subsequently reviewed the Cultural Technical Session report (PR #276), and noted that on p.7 it states "Liidlii Kue First Nation requested funding support from Canadian Zinc and government to carry out a traditional knowledge study project". CZN's response is on p. 8 where it is stated "Canadian Zinc pointed out that they understood that there were no cultural or traditional knowledge concerns from LKFN as there was no response to their enquiry. Canadian Zinc supports LKFN compiling TK, noting that the NBDB TK study was funded by a government grant".

LKFN accepted a meeting request from CZN over the lunch break of April 28 to clarify the misunderstanding, and CZN presented LKFN with the above evidence.

During the afternoon session of April 28, with reference to the comments in the morning, LKFN said they had located the correspondence and that further, during the "Yellowknife Public Hearing on June 25th, 2016", CZN had confirmed that they would enter into discussions with LKFN in regards to a TK study (PR #528, p.241, lines 19-25, p.242, lines 1-8).

The correspondence LKFN referred to was letters dated February 16th (PR #150, and actually February 12th) and June 1st (PR #221), 2016. Neither letter discusses LKFN asking CZN for support to undertake a TK study. The first letter, addressed to the Board, states that the all season road application is outside the scope of the current Impact Benefits Agreement (IBA), and that the proponent has not consulted LKFN on the application. CZN replied to the letter on February

24, 2016 (PR #162) refuting the latter claim. The second letter, also addressed to the Board, discusses the proposed agenda for the Cultural Technical Session.

Regarding the “Yellowknife Public Hearing” (actually the Technical Session, June 14-16, 2016), LKFN mentioned the IBA and that the all season road was a new application, and invited CZN to meet (PR #232, p.45, line 23 to p.46, line 13). CZN’s reply was that CZN had been trying to confirm a meeting with LKFN for some weeks (p.46, lines 16-20). There was a lengthy discussion later regarding heritage resources, (p.75, line 4 to p.109, line 18), but this did not include a commitment by CZN to support a TK study by LKFN. The discussion concluded with LKFN and CZN agreeing they should meet, but the focus seemed to be the IBA and LKFN’s position that the new application was not part of it.

LKFN and CZN have had meetings on January 14 and November 28, 2014, August 15, 2016 and April 25, 2017 covering the pre-application, post-application and EA periods. In those meetings, there was no discussion of a TK study. The latter two meetings primarily discussed the IBA, the all season road and benefits.

To reiterate what we said at the Cultural Technical Session, CZN supports LKFN compiling their TK, to the extent they desire to do so. Government programs and funding is available for such an activity. We also note that a lot of relevant TK was compiled by the Dehcho Land Use Commission during the process of developing the Dehcho Land Use Plan.

GNWT

Harvest

Regarding Recommendation #4, we note that “the GNWT also recommends that Canadian Zinc commit to expanding existing environmental monitoring programs under the WMMP to include formal collection and reporting of harvest information by the environmental monitors”. CZN accepts this commitment on the basis that it was our intent that this function would be one of the activities the environmental monitors would be asked to undertake (Commitments, Table 2, no. 1 (modified)). We welcome discussion on the definition of “formal collection and reporting” during further WMMP review.

Risks of Collisions

Regarding GNWT’s Recommendation #5, we believe we are essentially in agreement that “in case wildlife occurrences become common in terms of location along the proposed road, the road Supervisor should formalize the caution zone with signage”. Further discussion during the regulatory phase would be useful to agree on the approach, including a definition of ‘common’, however we believe it will quickly become obvious where wildlife occurrences are common and where signage is needed. This information is not available currently.

Permafrost

As noted previously, CZN proposes to develop a permafrost monitoring plan after the required geotechnical and geophysical investigations and final geometric design work have been carried out. The reason for this is that it is not apparent what the monitoring requirements are until the necessary investigation work has been completed. The GNWT notes that “monitoring program requirements and details should be discussed and determined during the regulatory phase”. Given that it is our expectation that permits would be issued before the necessary investigations are undertaken, it will not be possible to consider monitoring program requirements and details during the regulatory phase in any depth, unless the GNWT is referring to the regulatory phase in broad terms and including permit issue and the post-permit fulfillment of conditions prior to construction. We would agree that permits should have conditions requiring appropriate permafrost monitoring plans, the pre-construction details of which would be developed and approved before construction (accepting that information collected during construction may be such that modification of the monitoring plans is warranted subsequently).

Boreal Caribou

We agree with the GNWT that although there are differences between the GNWT and CZN’s disturbance habitat calculations, the project does not cause the percentage of disturbed habitat to fall below the 65% undisturbed habitat threshold identified in the 2012 federal Recovery Strategy for the Woodland Caribou, Boreal population. However, we maintain that CZN’s estimate of disturbance of approximately 1700 ha is the procedurally appropriate number for the purposes of the Review Board’s consideration of effects because the winter road was previously assessed and permitted.

We also agree with the GNWT that “the project area falls within the edge of the boreal caribou range and local knowledge and limited aerial survey data suggests that densities are low”.

ECCC

Issue #1

CZN has not explicitly committed to addressing ECCC Recommendation 4 because it would require definition of “marginal”, which is subject to interpretation. As noted previously, considering that the difference geochemically between no significant acid rock drainage/metal leaching (ARD/ML) potential and marginal ARD/ML potential is not clear-cut, we propose to be guided by the recommendations of a professional geochemist. We do commit to using sources of borrow material for construction only if these are considered to pose a low risk to the environment, as determined by a professional geochemist (Commitments, Table 1, no. 125 (modified)).

Issue #2

CZN is in general agreement with the intent of the recommendations. Regarding point 4 however, we believe further discussion is required regarding the type of monitoring (e.g. visual

monitoring of sediment and erosion control measures to ensure they are correctly in-place and likely to be effective prior to the occurrence of significant runoff) and timing of it (before a runoff event, during or both).

Issue #4

Regarding Recommendations 2-4, CZN commits to including a description of a monitoring program, trigger or action levels and adaptive management plans in the Contaminant Loading Management Plan (CLMP), only we feel it is premature to describe these details at the EA stage (Commitments, Table 2, no. 7 (modified)). It is our expectation that a suitable CLMP will be subject to review and approval as a condition of permits.

Issue #5

For the information and update to the Board CZN implemented a field program May 24-30, 2017 deploying Acoustic Recording Units (ARU's) in cooperation with ECCC and Parks Canada (refer to Parks Canada Issue #4 below).

Issue #9

CZN is comfortable with confirming the absence of nesting avian species at risk prior to conducting disruptive activities, however, continuing this monitoring throughout activities seems unnecessary. ECCC has suggested that the absence of nesting avian species at risk should be confirmed following any breaks in disruptive activities, which CZN is comfortable with, on the understanding that there is agreement on what period of time is considered to be a break.

Issue #10

Please refer to our comments to the GNWT re "Boreal Caribou" above.

DFO

CZN appreciates the closing comments from DFO. We look forward to further discussions during the regulatory phase. At that time, it might be useful to further review our comments on DFO's technical report to ensure all of the information provided was accounted for, for example in connection with potential impacts on littoral habitat, since there is no specific mention of some of the information, or adjustment of previous recommendations, in the closing.

INDIGENOUS AND NORTHERN AFFAIRS CANADA

CZN is currently negotiating a Traditional Land Use Agreement (TLUA) with the NBDB. The Band is aware that, in order for the proposed all season road to be constructed across the Indian Affairs Branch (IAB) lands, the Band will need to relinquish their interest in that portion of those lands within the footprint of the road (see CZN's April 6, 2017 letter to the Board and copied to the NBDB). The Band has not indicated that they are opposed to relinquishing their interest. We believe they understand and agree that this will be necessary in order to build the road.

Indigenous and Northern Affairs Canada (INAC) are concerned that the Band has to date not made a commitment to relinquish their interest in the IAB lands crossed by the road. We note that, to our knowledge, the Band has not been asked to make such a commitment. However, we have no reason to believe they would not make one. Considering the Band's position, it would be logical to us to conclude the TLUA first, then we might expect the Band to issue a Band Council Resolution (BCR) regarding the IAB lands.

INAC is recommending that the Board consider a measure to require the Band to relinquish their interest in the portion of the IAB lands crossed by the road. CZN does not believe such a measure is necessary for INAC's purposes. If the Band does not issue the BCR, INAC would be unable to issue a lease or licence of occupation. That remains within INAC's control. In any event, we don't believe the Board could compel the Band to relinquish their interest. It would surely have to be voluntary. We believe compel the Band will relinquish their interest in due course, and we do not anticipate a need to relocate the road and river crossing to be entirely on territorial lands.

We have no issue with INAC reviewing proposed spill contingency and emergency response plans. The omission of INAC from the Undertaking 10 table entry was an oversight and an updated table is attached.

PARKS CANADA

Issue #2 Mountain Caribou

Parks Canada (PC) and CZN have a difference of opinion on the magnitude of potential adverse impacts to mountain caribou, and the resulting requirements for monitoring. CZN is not opposed to a reasonable, relevant monitoring program, developed and undertaken collaboratively with PC. However, we believe what PC has proposed, a systematic monitoring program including annual aerial surveys, has a low potential to produce useful information in connection with possible adaptive management (based on the professional opinions of Tetra Tech's wildlife biologists) and is more likely to produce data useful to PC in terms of tracking the mountain caribou population. We have, however, offered to provide logistical and financial support for such surveys.

While we will not repeat verbatim our comments on PC's technical report, brief comments on PC's closing comments are appropriate. We are not disputing that there are mountain caribou in the project area. It should be no surprise that observations of caribou calves are recorded in mine camp logs since caribou are known to frequent the ridges west of the Mine. It is also common knowledge that many caribou spend part of the year in the Prairie Creek valley, but the vast majority are located well to the north of the road alignment, by approximately 6 km. We agree that collar data indicates that there may be a small sedentary group in the Sundog Lake area, and it is clear that a few animals periodically cross the road. However, a 'few animals' does not constitute a population. Consequently, this is the reason Tetra Tech's professional wildlife biologists concluded that potential disturbance related effects are low.

PC noted that the main difference between CZN's and PC's kernel density maps is that group size was used to weight the data in CZN's maps. While CZN did weight the data this way, we submit the main difference is the scale of the maps. CZN's maps are focused on the project area and show that caribou concentrations occur to the west and north of the road. Scaling back on the map area too far can make it appear that caribou concentrations occur over a much broader area. This is not the case.

Consequently, we remain of the opinion that the project will not result in significant adverse impacts to mountain caribou, even without further monitoring. Nevertheless, we are amenable to conducting a reasonable and relevant monitoring program, in collaboration with PC, the details of which we can discuss with PC during the regulatory process when PC will be a regulator. For these reasons, we believe a measure is not necessary, and the Board should not require that CZN comply with PC's Recommendation 2 as written.

Issue #3 Collared Pika

PC is correct in that CZN has committed to conducting a Collared Pika survey that will demonstrate relative abundance (Commitments, Table 2, no. 25 (modified)). We will be discussing survey design with PC, and we have agreed to collaboratively conduct the survey in August 2017. As such, CZN has committed to PC's Recommendation 3.

The above noted survey is in addition to a survey conducted previously to determine presence/absence. On the basis of that survey, adjustments to the road alignment were made to avoid pika habitat, as much as possible, and commitments made to avoid sections of borrow sources identified as hosting pikas. This was the basis for Tetra Tech's conclusion that the potential for the project to result in significant adverse impacts to Collared Pika is low.

As noted previously, additional baseline data may be useful, but predicted effects are unlikely to change following additional baseline data collection. As such, Parks Canada's request that the additional baseline data be followed by an updated effects assessment is not justified. However, the resulting data from the proposed survey will be incorporated into adaptive management plans and may, in turn, result in further mitigation actions. This we commit to, but not PC's Recommendation 4 as written.

We are amenable to developing a suitable monitoring program, with input from PC, the details of which can be discussed during the regulatory phase when PC will be a regulator. We will accept this as a commitment, however we feel PC's Recommendation 5 is too broad in scope at this stage and should not be adopted.

Considering the commitments described above, and the absence of significant adverse impact potential, we believe measures for Collared Pika are not necessary.

Issue #4 Birds

Tetra Tech concluded that the potential for the project to result in significant adverse impacts on birds is low. PC contends that "direct habitat loss and loss of habitat effectiveness could have

a significant adverse impact on local populations of bird species and communities in the project area”. Tetra Tech assumed the noted bird species are present in their impact assessment, even though there is no evidence that they are. The all season road will result in an insignificant area of habitat loss and loss of habitat effectiveness considering the size of the region, even if the noted species are present.

CZN agreed to complete a pre-development survey in order to establish a baseline for future reference. We have initiated this survey already in conjunction with other work. Acoustic recording units (80) have been deployed along the road with input and assistance from PC and ECCC. The intention is to recover the units in August 2017. As such, PC’s proposed Recommendation 6 is now redundant. Similar to Collared Pika, the resulting data from the bird survey will be incorporated into adaptive management plans and may, in turn, result in further mitigation actions. This we commit to (Commitments, Table 1, no. 161 (modified)), but not PC’s Recommendation 7 as written. Also, as for Collared Pika, we are amenable to developing a suitable monitoring program, with input from PC, the details of which can be discussed during the regulatory phase when PC will be a regulator. We will accept this as a commitment, however we feel PC’s Recommendation 8 is too broad in scope at this stage and should not be adopted.

Considering the commitments described above, and the absence of significant adverse impact potential, we believe measures for birds are not necessary. We note that ECCC did not consider measures to be necessary.

Issue #5 Vegetation

Tetra Tech concluded that the potential for the project to result in significant adverse impacts on vegetation and rare plants is low. This was largely based on three prior surveys along the road alignment. However, CZN has committed to conduct a spring survey before development as a precaution considering the possible but low potential for the occurrence of early-flowering rare plants, not detected previously. This work is planned to be conducted collaboratively with PC in June 2017. As such, PC’s Recommendation 9 will be addressed.

Similar to Collared Pika and birds, the resulting data from the vegetation survey will be incorporated into adaptive management plans and may, in turn, result in further mitigation actions. This we commit to (Commitments, Table 1, no. 147 (modified)), but not PC’s Recommendation 10 as written.

Considering the commitments described above, and the absence of significant adverse impact potential, we believe measures for vegetation are not necessary. We note that the GNWT had no similar issues with respect to vegetation.

Issue #6 AIA

We agree with PC’s closing comments. We also note that, in the Public Hearing, PC agreed with CZN that the AIA can be completed “in the regulatory phase prior to construction” (Day 3, April 28, p. 77, lines 8-10).

Issue #8 Water Withdrawal

We remain of the opinion that water withdrawal from local lakes will have negligible effects on lake levels and therefore the aquatic environment because: a) the proposed amounts are very small; b) the lakes are continuously recharged annually from inflows and lake levels are controlled by the outflow elevations; c) the lakes would be completely recharged each winter and spring, pre-supposing there is lake volume to recharge which we believe is unlikely, so that cumulative effects are highly improbable; and, d) all of the lakes proposed to be used in the park are not accessible to migrating fish and likely do not host fish. However, parties are having difficulty accepting this evidence, and we see this potentially causing unnecessary delays or complications in future. For that reason, we will reluctantly agree to PC's Recommendations 14 and 15, and extend that agreement to lakes we propose to use outside the park (commitments, Table 2, no. 33). It is our expectation that monitoring of lake levels will quickly confirm no significant changes in response to water withdrawal, and the monitoring can then be suspended.

CZN committed to updating an existing Aquatic Effects Monitoring Plan (AEMP) to address possible responses to releases (sediment) and spills. We did not commit to including supposed effects from water withdrawal since we do not anticipate any. We also did not commit to developing a new Aquatic Effects Management and Monitoring Plan (AEMMP). Neither of these items was discussed in PC's technical report in connection with water withdrawal. We note that, in their technical report, PC agreed with CZN that the proposed annual extraction volumes are unlikely to have a significant impact on lake volumes. PC's concern is cumulative impacts year on year, which, as explained above, we believe are highly improbable.

Issue #9 Water Quality Monitoring

In our comments on technical reports, we indicated that CZN has no problem with developing a detailed program to monitor the short-term effects of construction on surface water quality. We provided some initial thoughts on the other details contained in PC's Recommendation 17, which we consider to be premature at this stage. In that regard, we have agreed to develop a suitable program to monitor the short-term effects of construction on surface water quality (Commitments, Table 2, nos. 5 and 6), the details of which will be discussed in the regulatory phase.

Regarding Recommendation 18, we noted that the realigned Sundog Creek should not require long-term monitoring for water quality since after the initial short-term adjustment period, realignment behaviour will be natural and the same as other parts of the creek. We proposed to monitor the realignment for long-term stability and hydraulic performance. Regarding the water quality monitoring of Sundog Creek, our concern is that Recommendation 18 requires long-term monitoring even though there may be no difference between upstream and downstream after a short period. We are amenable to continuing the short-term monitoring until such time as the data supports a conclusion that water quality is no longer being affected by the realignment (Commitments, Table 2, no. 34).

We anticipate that the proposals and comments we have made will effectively prevent significant adverse impacts on water quality, and thus measures are not required.

Similar to water withdrawal, we did not commit to developing a new AEMMP. This was not discussed in PC's technical report in connection with water quality monitoring. We agree that the monitoring should trigger adaptive management if thresholds or triggers are exceeded, however we expect those to be defined in the SECP and not a new AEMMP.

Issue #10 Macroinvertebrates

Hatfield Consultants concluded that the magnitude of temporary impacts to the benthic community from realigning Sundog Creek will be low, readily reversible and of low significance. This is based on the current low abundance of benthics, which PC agrees with, the relatively short stream length, the low productivity of the stream section compared to further downstream, and the low importance of benthic drift to downstream fish populations. Therefore, significant adverse impacts are not expected, and measures are not justified. We note that DFO did not have concerns regarding macroinvertebrates, or suggest measures. Hatfield further concluded that the utility of a benthic invertebrate study would be low and not cost effective.

While we disagree with PC's Recommendations 19 and 20, we agree with the habitat offset described in Recommendation 21, which we expect to be authorized by DFO. However, this does not require a measure.

Again, CZN did not commit to an AEMMP. An AEMMP is not mentioned in PC's technical report.

Issue #11 Grey Water and Sewage

CZN's qualification to treat grey water by simple filtration was to provide clarity regarding the treatment approach, not the disposal approach. We expect the effluent would be disposed of via a disposal field. Effluent from sewage treatment would be disposed of in a similar fashion. We consider "soak away" to be a more colloquial term for disposal field.

Issue #12 Spill Contingency

In PC's closing comments, PC again does not refer to our 2nd submission to the Board regarding Oboni's risk assessment (PR #407) in which we included a screening of Oboni's results and performed a revised risk appraisal. The conclusion of that appraisal was that further review is warranted, during detailed design, for additional mitigations regarding the road sections Km 12.3-17 and 25.2-28.7, with some consideration also of Km 53.5-57.4 (additional mitigations being potentially moderate widening and/or perimeter barriers). Further, we proposed an operational level risk assessment before operations commence.

Regarding road section Km 23.5-28.1 and the comments made in the Public Hearing, PC neglects to note the comments in PR #524, page 94, lines 4-9 which make it clear that the section from Km 23.3-25.2 (the record states ending at 26, but this was from memory and 25.2 is more accurate) is not considered to be high risk. We believe PR #407 is most definitive and the high risk section is Km 25.2-28.7.

Also in the Public Hearing, CZN discussed the formation of an independent technical review panel to recommend road design principles and improve the current status of risk assessment (PR #524, p. 243, line 21). Logically, the road design principles decided on would lower risks, specifically in those road sections currently assessed as high risk. Therefore, the risk assessment will be further updated in that process, and we have included that in the committed scope of the panel. Also logically, the Spill Contingency and Response Plan (SCRP) will be updated prior to construction to reflect the updated risk assessment and final road design, the latter part of which has already been committed to (Commitments, Table 2, no. 15 (modified)). We agree to modify the existing commitment to reflect that the SCRPs will be updated to account for the updated risk assessment. These commitments are consistent with PC's Recommendation 26, and a measure is not required.

Issue #13 Risk Assessment

As we noted in our comments on technical reports regarding a risk assessment for each phase of the project, CZN considered all phases in the risk assessments contained in the DAR and DAR Addendum. The Board decided to engage Oboni Riskope for a defined scope of work, which was not the same scope as defined in the Terms of Reference. The fact that Oboni did not specifically address the construction and closure phases should not lead to a conclusion that those phases have not been addressed in terms of risks. In fact, Oboni's reply to PC's questions in the Hearing makes it clear that they considered the highest risks to be associated with the "heavy traffic years". Therefore, it appears Oboni concluded it was redundant to consider the risks of the construction and closure phases.

It seems that PC's main point is that the design and operation of the road should be informed by an updated risk assessment. Our response to Issue #12 above makes it clear that this will occur. Therefore, PC's Recommendation 27 will be addressed, to the extent necessary, and no measure is required.

Regarding the timing of risk assessment, the progression of activities as we see them are permit issue, panel deliberations including update of the risk assessment, detailed design, road construction. We see no reason why a permit cannot be issued before the defined activities, on the expectation that the permit will contain conditions requiring the successful completion of the activities before construction commences.

Regarding the independent panel, we have further addressed the panel's mandate and role in our cover letter. PC is recommending a very broad and unnecessary panel scope. The subject at hand is road design principles in terms of risk. That should be the panel's focus without distraction. The proposed operating plans will be a panel consideration as any consideration of design requirements needs to understand what the road is to be used for. However, the road construction and closure phases, and closure and reclamation plans, need not be a panel concern since they do not pose significant risks. Therefore, we respectfully ask the Board to agree with our proposal for panel scope and mandate, as described in our cover letter, in the Report of EA. Since we have committed to such a panel, no measure is required.

Issues #14 and #15 Permafrost

The commitments table has been updated to include the information provided in our comments on technical reports (e.g. letter from Tetra Tech, PR #484, p.23) regarding the planned geotechnical and permafrost investigations and monitoring (Commitments, Table 1, nos. 128 and 129 (modified)). As such, PC's Recommendations 28-32 are addressed and no measures are necessary.

Regarding permafrost monitoring, we anticipate that data will start to be collected during and after the planned geotechnical investigations, and monitoring plans for construction and operation will be provided in the detailed design report(s). The plan will be reviewed and updated after construction.

Regarding a Permafrost Monitoring and Response Action Plan, we did commit to this (Commitments, Table 2, no. 16) and it has been added to the updated table of plans, attached.

Issue #16 Restoration

We have updated entry nos. 64 and 68 in the attached Commitments Table 1 to reflect revegetation by natural invasion supplemented with available local seed and cuttings.

Table 1- Commitments Table (June 5, 2017)

ID	Topic	Subtopic	EA Phase	Commitment	Reference
1	Access control	Check point location	DAR	The security check-point will be moved in summer to a location on the road west of the river crossing.	PR#55 p146
2	Access control	Non-mine related vehicles	DAR	Non-mine vehicles, including all-terrain vehicles (ATVs) and snowmobiles will be prohibited on site.	PR#55 p185
3	Access Control	Remote camera	Technical Analysis	CZN will consider remote camera use for periods when the (road) checkpoint is not manned. There will be times when traffic is not on the road, at night and during the seasonal spring and fall closure periods when the ice bridge over the Liard River is in either break-up or freeze-up. Trail cameras will be considered on a limited basis for these periods as a check on other road users and caribou occurrence.	PR#370 p5
4	Access control	Reporting	Technical Analysis	CanZinc will monitor and record non-mining traffic activity on the all-season road, including the establishment of a checkpoint, and report this information annually.	PR#256 p1
5	Access control	Signage	DAR	Signs will be posted advising road users that the land is the traditional land of the NDDDB, and a request that the road not be used and that no hunting should occur. Signs will also warn of the dangers posed by frequent, heavy mine traffic.	PR#55 p146
6	Air Quality	Dust management	DAR	The GNWT (1998) dust suppression guidelines will be implemented at the TTF and along portions of the road located in environments which are more prone to adverse effects from road dust accumulation (e.g. lakes, wetlands), as appropriate, to limit dust generation during the snow free months. Dust management will begin with road surfacing material which is coarse and minimally erodible, where practical. Where dust is problematic, watering will occur as and when required. Vehicles will adhere to speed limits on roads, which will help limit the re-suspension of particulate material.	PR#55 p240
7	Air Quality	Dust suppression	DAR	Dust suppression strategies (e.g., water or approved dust suppressant products) will be in accordance with the GNWT dust suppression guidelines.	PR#55 p256
8	Airstrip operations	Minimum flight altitudes	DAR	Maintain a minimum flight altitude of 600 m except during take-off and landings.	PR#55 p175
9	Airstrip operations	wildlife mitigations	DAR	Develop standard aircraft procedures for flying into and departing from the proposed airstrip to accommodate wildlife, if present on or near the airstrip.	PR#55 p175

ID	Topic	Subtopic	EA Phase	Commitment	Reference
10	Community Engagement	Engagement plan	DAR	Future engagement with aboriginal groups and government agencies will continue as described in the Engagement Plan.	PR#55 p159
11	Community well-being	Access to Nahanni Butte	DAR	CZN will restrict road crews from accessing Nahanni Butte (the only proximal community) by including this requirement in contracts for the work. The only exceptions would be if construction personnel are leaving or arriving at the Nahanni Butte airstrip, in which case they will be required to go directly to and from the airstrip only, and if personnel are invited by, and accompanied by, community members.	PR#100 p74
12	Concentrate and material transport	Diesel Fuel	Technical Analysis	Diesel fuel will be back-hauled by the concentrate trucks in dedicated tanks, 5,170 L. The tanks will be double-walled, with the capacity of the space between the walls being 110% of the inner tank, or approximately 5,700 L. The tanks will be puncture-resistant.	PR#355 p6
13	Concentrate and material transport	Sulphuric acid totes	DAR	Containers for sulphuric acid will be totes weighing approximately 1.4 tonnes.	PR#55 p190
14	Concentrate and material transport	Tracking	DAR	Measures for avoiding concentrate dust and potential tracking of concentrate off-site will be adopted (i.e. truck wheel-wash)	PR#55 p139
15	Concentrate and material transport	Transport method	Technical Analysis	CZN would either transport concentrates in bulk using the 'Convey Ore' system, similar to the Red Dog Mine approach, or in bags in a truck box with a lid.	PR#355 p4
16	Contractors	Full qualifications	DAR	CZN will endeavour to ensure that all service providers are fully qualified and responsible to undertake the tasks required prior to issuing contracts.	PR#55 p43
17	Contractors	Instruction and training	DAR	When hiring contractors, CZN will provide instruction and training, if necessary, to bind all contractors and sub-contractors to corporate policies.	PR#55 p51
18	Contractors	Terms and conditions	DAR	In order to ensure that its contractors and subcontractors honour and adhere to all commitments made, CZN will ensure, through written contracts, that all such parties are aware and comply with all the terms and conditions that are associated with such permits that are necessary for operations.	PR#55 p43
19	Cumulative effects monitoring	CIMP	DAR	Monitoring data will be compatible with the NWT Cumulative Impact Monitoring Program, where possible.	PR#55 p283
20	Earthquakes	Pilot vehicle inspection	DAR	If a significant seismic event occurs, it would be prudent for a pilot vehicle to inspect the road before trucks resume travelling on it.	PR#129 p76
21	Emergency response	Control points	DAR	A Control Point will be established near the mouth of Funeral Creek.	PR#55 p202

ID	Topic	Subtopic	EA Phase	Commitment	Reference
22	Emergency response	Control points	DAR	Control Points will be established on two Funeral Creek tributaries at their confluence with the main stem. Similar Control Points will also be established on Sundog Creek in two locations (one just above the main falls and one just before the creek flows onto the fluvial outwash plain), and downstream of the Polje Creek, Tetcela River and Grainger River crossings. An additional control point will be established at the toe of the Silent Hills on the west side since the road section above is considered to have a high risk of a spill.	PR#55 p29
28	Emergency response	Emergency equipment	Technical Analysis	We propose to acquire two bladders with a capacity of at least 5,000 L. One would be stationed with a pump at one of the Control Points on an upstream tributary to Funeral Creek. The other bladder would be stored with a pump on the trailer stationed at Cat Camp.	PR#282 p109
23	Emergency response	Emergency equipment	DAR	A silt or other form of curtain will be stored approximately mid-point between the Mine and Funeral Creek ready for deployment to reduce flow in part of Prairie Creek adjacent to a spill.	PR#55 p202
24	Emergency response	Emergency equipment	DAR	Equipment at the Control Points will include booms and absorbents in addition to material to create temporary dams, such as board weirs, sand bags and other inert materials that would be stored at the location. Shovels will also be left on site for use in making a dam also. A supply of soda ash will also be kept at Control Points to neutralize an acid spill.	PR#55 p203
26	Emergency response	Emergency equipment	DAR	A vacuum truck will be on stand-by at the Mine.	PR#55 p204
27	Emergency response	Emergency equipment	DAR	CZN has proposed to maintain spill equipment in portable trailers. We will ensure that these or other similar units are heli-portable.	PR#100 p61
29	Emergency response	Emergency protocols	DAR	The tractor/trailer units would provide emergency assistance if mechanical issues or adverse weather conditions occur. In addition, all trucks will have 24 hour communications with road operations and dispatch using either 2 way radio or GPS tracking devices.	PR#101 p45
30	Emergency response	Fire prevention training	DAR	Train staff in fire prevention protocols and emergency response procedures.	PR#55 p260
31	Emergency response	Incident management system	DAR	For operations, an incident management system will be used to respond to spills.	PR#55 p201

ID	Topic	Subtopic	EA Phase	Commitment	Reference
32	Emergency response	Materials management systems	DAR	Appropriate materials management systems will minimize the risk of accidental spills or leakage of concentrate, diesel fuel/ hydrocarbons, and other hazardous materials being shipped to the mine site. This includes ensuring hydrocarbon and chemicals that are hauled along the access road or stored at the TTF are in industry standard containers with appropriate spill containment and management measures in place.	PR#50 p31
33	Emergency response	Response teams	DAR	A response team with large equipment will be stationed at the Mine. Another response team will reside at Nahanni Butte.	PR#55 p201
34	Emergency response	Response teams	DAR	For the operating period, the spill response team (at the Mine) will consist of 6 personnel: 1 Supervisor, 1 Safety Watch, and 4 Responders, one of which will be a mechanic.	PR#55 p202
36	Emergency response	Spill kits	DAR	For operations, comprehensive spill kits will be maintained at the Mine site, Cat Camp, the Tetcela Transfer Facility, Grainger Gap, and the Liard River crossing.	PR#55 p203
35	Emergency response	Spill kits	DAR	Spill kits will be carried on vehicles with materials appropriate for the loads	PR#55 p203
37	Emergency response	Spill management	DAR	Staff will be trained on the existing spill management plan and procedures to quickly respond to an accidental spill. The plan will include provision for rapid deployment of cleanup crews and for containment and cleanup of spilled material and contaminated surfaces.	PR#55 p185
38	Emergency response	Spill monitoring program	DAR	In a spill related monitoring program, samples collected for chemistry and benthic community assemblage assessment should include at least one upstream sample (for reference purposes) and multiple downstream samples. All other endpoints would normally include an upstream and downstream sample only. Any spills to Funeral Creek should include an assessment of juvenile occupancy following methodologies developed by Neil Mochnatz, DFO. However, given some spawning bull trout also have to swim past the mine's discharge, it will be important to separate the different effects sources. Consequently, another upstream tributary to Prairie Creek known to host spawning/rearing habitat and previously characterized should be re-assessed concurrently with Funeral Creek. More detail will be provided in the AEMP.	PR#90
39	Emergency response	Spill response	DAR	Designated spill control points will occur at key locations along the road, and response materials will be stored at these locations. Trailers stocked with response equipment will also be parked at other locations so that responding crews can hook them up and move them to the spill location.	PR#55 p200
40	Emergency response	Spill response training	DAR	A maintenance crew will be working on the road somewhere between Km 40 and Km 170 (i.e. from Cat Camp to the Nahanni Butte Access Road) and will have spill response training.	PR#55 p201
41	Employment	Community	DAR	CZN is required to post available employment positions with local Bands, and suitable	PR#55 p147

ID	Topic	Subtopic	EA Phase	Commitment	Reference
		well-being		and available NDDDB members have priority. CZN has also committed to give preference to competitive and able consortia with local and northern content for procurement and business opportunities.	
42	Engagement	Ongoing engagement	DAR	CZN will continue to engage First Nations throughout the EA process.	PR#55 p159
43	Environmental monitoring	General	Technical Analysis	CanZinc will have local environmental monitors on the all-season road during periods of mine traffic.	PR#355 p16
44	Erosion and sediment control	Minimizing mobilization of sediment	Technical Analysis	CanZinc commits to implementing erosion and sediment control where construction has the potential to mobilize sediment and result in transport to surface water, and include specific plans for rapid response in the event of an intense precipitation event.	PR#246 p1
45	Fish and aquatic habitat, water quality	In-stream works	DAR	All in-stream works will be performed to avoid sensitive life stages of fish. In-stream work will not occur when fish are expected to be spawning. Also, instream work will be avoided if it is predicted that work will result in significant turbidity resulting in the smothering of downstream developing fish embryos. Existing investigations of fish-bearing crossings indicates that only the habitat in the Tetcela River Tributary and Tetcela Main crossing locations occur at a location where bottom substrate is a suitable size for spawning salmonids (i.e., Arctic grayling and whitefish).	PR#90 p13
46	Fish and aquatic habitat, water quality and quantity	Avoid disruption of spawning	DAR	Avoid disruption of the only known spawning location in the area (bull trout in Funeral Creek) during the spawning period (mid-August);	PR#55 p246
48	Fish and aquatic habitat, water quality and quantity	Blasting	Technical Analysis	At active blast sites during construction, the sites will be inspected during or immediately after rainfall to ensure sediment is either not being produced, or mitigation measures are effective. Confirmatory upstream and downstream turbidity readings will be taken to verify visual conclusions, if necessary. Depending on initial findings and results, a frequency of follow-up inspection will be decided on and implemented until the site is considered inherently stable.	PR#200 p8
47	Fish and aquatic habitat, water quality and quantity	Blasting	DAR	Blasting impacts on fish will be minimized by utilizing timing window, encouraging fish to move from the blast area, minimizing the required blast energy, and following DFO's operational guidance for blasting.	PR#90 p13

ID	Topic	Subtopic	EA Phase	Commitment	Reference
49	Fish and aquatic habitat, water quality and quantity	Crossings	DAR	All crossings will follow DFO's <i>Operational Statements</i> for creek crossings, including span structures and culverts.	PR#55 p244
50	Fish and aquatic habitat, water quality and quantity	Crossings	DAR	In-stream works and crossings will be avoided as much as possible.	PR#55 p244
51	Fish and aquatic habitat, water quality and quantity	Crossings	Technical Analysis	If temporary (stream crossing) structures are utilized over an extended period (> 3 months), the design flow will be based on a 10 year return period.	PR#282 p40
52	Fish and aquatic habitat, water quality and quantity	Drainage	DAR	A stable road bed will be constructed adjacent to creeks and runoff control will be provided for to minimize the dispersal of sediment during precipitation events;	PR#55 p246
53	Fish and aquatic habitat, water quality and quantity	Habitat loss offset	DAR	Replace any habitat losses to the satisfaction of DFO	PR#55 p246
54	Fish and aquatic habitat, water quality and quantity	Minimize disturbances	DAR	Disturbance of stream banks and riparian areas at stream crossings will be minimized. Temporary crossing structures will be removed to avoid blockage and erosion.	PR#55 p246
55	Fish and aquatic habitat, water quality and quantity	Overtopping monitoring parameters	Technical Analysis	CanZinc commits to implementing TSS/turbidity, pH, dissolved oxygen and conductivity monitoring upstream and downstream of Casket Creek during high water events if overtopping of the road surface is occurring, and at any other areas where overtopping of the road surface occurs.	PR#263 p3

ID	Topic	Subtopic	EA Phase	Commitment	Reference
56	Fish and aquatic habitat, water quality and quantity	Re-vegetation	DAR	Re-vegetation of riparian areas will be promoted to further reduce the potential for sedimentation.	PR#55 p246
57	Fish and aquatic habitat, water quality and quantity	Sundog Creek habitat loss	DAR	Fish habitat against the south bank will be lost, but would be replaced by comparable new habitat to the north. This work would be completed in the late fall when the floodplain is dry apart from isolated deep pools. Any pools would be subject to fish salvage before filling.	PR#55 p148
58	Fish and aquatic habitat, water quality and quantity	Sundog creek realignment morphology	Technical Analysis	Monitoring of the morphology of the new channel will occur to confirm that the new channel is providing habitat similar to the current channel. Monitoring will be conducted to ensure that the new channel is comparable to the existing channel. Monitoring will include field-based hydrological data collection (i.e., velocities and cross sectional profiles), supported by satellite or aerial imagery, when available. If velocities are too high, and higher than those predicted for the existing channel, CZN will make necessary adjustments to the channel during no flow periods. Once the stream has been diverted, bi-annual monitoring (during freshet and low flow) of the channel for the first two years will occur. Subsequently, monitoring will transition to monitoring every second year, or immediately after a 1 in 10 year event or greater.	PR#370 p257
59	General	Draft management plans	Technical Analysis	CZN will convert the draft management plans and designs from, or referred to, in this EA into final plans and final designs for construction and operation of the road, and follow through on the commitments and design details contained in those plans and designs.	PR#355 p1
60	General	Recommendations	Technical Analysis	All recommendations by consultants have been accepted by CanZinc and will be assumed as commitments.	PR#355
61	Heritage and cultural resources	Archeological Surveys	Technical Analysis	CZN will include local community members in pre-construction survey crews. A professional archeologist will ensure each crew has the necessary knowledge and information, provide direction and focus to the crews in the field, and undertake independent inspections and verification.	PR#355
62	Heritage and cultural resources	Road construction and maintenance plan	DAR	A brochure of photographs of heritage resources will be compiled and provided to contractors as part of the Road Construction and Maintenance Plan.	PR#55 p269
63	Nahanni National Park and Reserve	Best practices	DAR	Standard industry best practices will be adhered to during construction.	PR#55 p227

ID	Topic	Subtopic	EA Phase	Commitment	Reference
64	Reclamation	Bridges and crossings	DAR	During reclamation, bridges will be removed from stream crossings; abutments will be removed or pushed-back. Material will be pulled-back to recontour side-hill cuts. Erosion control measures will be installed as necessary. Restoration of disturbed areas will be promoted by stabilization measures and vegetation by natural invasion supplemented with available local seed and cuttings.	PR#29 p4
65	Reclamation	Disturbed areas	DAR	Once the road and crossings have been built, disturbed areas will be reclaimed by grading and providing runoff and sediment controls, as necessary.	PR#55 p245
66	Reclamation	Monitoring	DAR	The progress of reclamation in disturbed areas will be monitored.	PR#55 p246
67	Reclamation	Objective	Technical Analysis	After Mine closure, if the access road is also to be closed and reclaimed, CanZinc is committed to a reclamation goal of restoring pre-disturbance conditions, as much as possible, including the removal of structures no longer required, subject to the engagement and agreement of all parties.	PR#263 p5
68	Reclamation	Re-vegetation	Technical Analysis	Natural encroachment will be used as a re-vegetation strategy in disturbed areas, supplemented with available local seed and cuttings, to avoid the introduction of invasive species sometimes found in seed mixes.	PR#186 p3
69	Road design	Barge	Technical Analysis	A low draught vessel will be selected, big enough for at least one loaded tractor-trailer unit. Barge selection specifications will include provision for safe and easy loading/unloading and integration with the proposed ramps.	PR#371 p12
71	Road Design	Culverts	DAR	Careful culvert placement and sizing is especially important on slopes that already have significant existing slope instabilities and the potential for new instabilities.	PR#55 p33
72	Road Design	Culverts	DAR	In areas of switchbacks, any road location that receives a culvert on an upslope reach of a stream should also receive a culvert or culverts on the road sections downslope that re-cross the same stream, and water should not be allowed to flow off the ends of switchbacks into inappropriate areas.	PR#55 p33
73	Road design	Culverts	DAR	Careful placement of culverts even where there are no obvious stream channels will help reduce the likelihood of ponding water alongside the road embankment.	PR#55 p236
70	Road Design	Culverts	DAR	Culvert crossings will be designed to avoid creating water drops on the downstream side (i.e., "perched" culverts will be avoided).	PR#90 p15
75	Road design	Cutslopes	DAR	If cutslopes in thaw-sensitive terrain are unavoidable, a much greater need for vigilance in monitoring and maintenance is required.	PR#55 p236
74	Road Design	Cutslopes	DAR	Cutslopes in thaw-sensitive terrain should be avoided if at all possible. If cutslopes in thaw-sensitive terrain are unavoidable, it may be possible to protect some cutslopes with a drainage blanket to help mitigate the effects of thaw and meltwater, or design near-vertical cutslopes to allow the organic layer to be draped over the cutslope to shade and protect it.	PR#55 p236

ID	Topic	Subtopic	EA Phase	Commitment	Reference
76	Road design	Footprint minimization	DAR	Confine all season road development activities to the approved winter road corridor to the greatest extent feasible.	PR#55 p266
77	Road Design	Grades and slopes	DAR	All reasonable options have been considered to keep maximum grades at 8% or less (preferred). However given the steep mountainous terrain and passes from KP 6 to 30, there are a number of sections with a 10% maximum grade and one short section of 12%.	PR#59 p26
78	Road Design	Grades and slopes	DAR	The subgrade will be left to settle sufficiently to mitigate winter construction risks.	PR#59 p29
79	Road Design	Ground condition	DAR	Construction will be managed such that travel across the ground does not occur when it is in its most vulnerable state.	PR#55 p235
80	Road Design	Ground condition	DAR	Summer/fall subgrade construction is proposed to take place in non-thaw sensitive ground when the ground is seasonally more likely to be relatively dry. The benefit of summer/fall construction in terrain that is not thaw-sensitive is that the construction team will be able to see more clearly where the cross-drainage installations should be placed and backfill placement and compaction will be greatly improved.	PR#55 p235
81	Road design	line of sight	Technical Analysis	CanZinc commits to installing windrows, lumber, or other brush clearing material at intersections with other linear features to discourage access (and limit sightlines) to the road corridor by wildlife and humans.	PR#355 p12
83	Road Design	Permafrost	DAR	Embankment fill-only (overlanding) techniques are proposed for thaw-sensitive permafrost areas.	PR#55 p235
82	Road Design	Permafrost	DAR	To minimize impacts related to permafrost, the standard approach taken regarding the cut slope angle will be 1:1 with some variability depending on soil type and site conditions.	PR#59 p19
84	Road Design	Pull outs	Technical Analysis	CanZinc commits to providing a pullout at approximately KP 29-30 for chain-up/chain-off, and turn-offs at approximately 10 km intervals to allow trucks with trailers to turn around.	PR#263 p3
85	Road design	Steep terrain	DAR	Proper design and construction of the access road will occur, avoiding steep terrain and hairpin turns as much as possible.	PR#55 p244
86	Road Design	Stripping placement	Technical Analysis	CanZinc commits to not placing road strippings in riparian zones	PR#246 p2

ID	Topic	Subtopic	EA Phase	Commitment	Reference
87	Road Design	Sundog Creek	Technical Analysis	Construction of the Sundog re-alignment will occur in summer or fall/early winter when the creek has no surface water. All construction would be conducted continuously and completed within one season. Construction would start at the lower portion of the re-alignment and progress upstream. All proposed stream design characteristics would be constructed continuously to avoid repeated disturbance. If surface water is encountered, the sealed off bottom exit or end would restrict surface water from discharging to other channels. The water would filter through the natural gravels. The reconstructed channel within the natural streambed material would be washed with pressurized water to allow fine sediments to settle into the reconstructed porous rock stream bed, or collect in a sump at the downstream end of the excavation for subsequent removal. Water required for the washing process will be extracted from an adjacent, stable floodplain area. A small filter berm would remain in place until the upper portion is complete and existing channel is ready to be diverted. The re-alignment will be inspected by a qualified professional during the first freshet. In addition, it will be the responsibility of the Road Operations Manager (ROM) to complete formal inspections during spring runoff and after intense summer rainfalls. It is expected that less formal, casual inspections will be done on a regular basis to ensure continued stability of the re-alignment.	PR#282 p41
89	Road Design	Sundog Creek	Technical Analysis	The final (Sundog realignment) design will be developed to provide hydraulic/sediment capacity equivalent to the geometry of the existing channel, defined by its geometry, and to mimic the substrate characteristics of the existing channel.	PR#294 p61
90	Road design	Water drainage inspections	DAR	Regular inspections will help identify areas where surface water drainage provisions need to be changed or improved.	PR#55 p236
91	Road Design	Width	Technical Analysis	CanZinc commits to a minimum 4 m wide running surface width, and a 5 m wide running surface width where possible (the width would be no less than 4.9 m in the latter areas). There will be widenings at curves.	PR#263 p4
93	Road Maintenance	Bridge and culvert inspections	Technical Analysis	For Bridge and Major Culverts Inspection, Allnorth proposes: (1) (a) ensure that a qualified person such as a road maintenance supervisor carries out a visual inspection of each bridge or major culvert associated with the road at least once every year after the bridge or major culvert is constructed, and (b) make a record of the inspection. (2) (a) ensure that a qualified person under the direction of qualified Professional Engineer carries out a detailed inspection of each bridge or major culvert associated with the road, and (b) make a record of the inspection, (i) subject to subparagraph (ii), at least once every 3 years after the bridge or major culvert is constructed, or (ii) at such intervals as specified in writing by a professional engineer. The inspection and monitoring program will reflect the crossing risk rankings. Key to the monitoring will be the detection of any changes to channel positions and the potential for erosion with respect to the crossing	PR#200 p27

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				structures, and consideration of required adaptive management.	
94	Road Maintenance	Drainage inspection an monitoring plan	Technical Analysis	CanZinc will develop a suitable inspection and monitoring plan regarding all stream crossing structures, and drainage patterns along the road alignment to maintain natural drainage and to inform adaptive management actions (including location of equipment required for these management actions such as backhoes, steamers and erosion/sediment control devices).	PR#263 p2
95	Road Maintenance	General	DAR	Long term road performance would be continually assessed following high water events and changes made accordingly. Ditches will be cleaned as required and maintained, culverts will be cleaned out and restored to ensure full capacity. Additional cross drainage culverts may be installed if required. From time to time, some minor breakdown of the road subgrade may occur, and would be restored.	PR#101 p14
96	Road Maintenance	Inspections	DAR	During road construction, operations and reclamation, there will be regular inspections by supervisory, maintenance and environmental staff, as well as community monitors. Any evidence of impacts, or conditions that might lead to impacts, will be immediately brought to the attention of the transportation manager. Any obvious problems, such as sediment dispersal, will be rectified immediately by construction/maintenance crews	PR#55 p246
97	Road Maintenance	Maintenance plan	DAR	A short and long term road maintenance program would be developed at the detailed road design stage.	PR#55 p27
98	Road Maintenance	Ongoing monitoring	DAR	Following the construction of the road, ongoing monitoring of the road structure will occur. Regular maintenance will be applied which will include rebuilding/adding additional armouring to those sections deemed insufficient as required.	PR#178 p33
100	Road Safety	Design guidelines	Technical Analysis	CanZinc commits to adhering to road design standards in the B.C. Ministry of Forests, Lands and Natural Resources Operations Engineering Manual as much as possible, and explaining and justifying where these guidelines will not be met.	PR#263 p3
101	Road safety	Driver impairment	Technical Analysis	Provisions for checking on the condition of drivers before they start their shift will be included, specifically, are they sufficiently rested and not sick, as well as provision for driver relief during their journey if they do not feel fully able to drive safely for any reason. During orientation, all drivers will be warned about the dangers of distraction and not being alert. This will be reinforced in morning meetings prior to initiation of the days' transport activities. Drug and alcohol screening is a standard procedure for all employees and contractors, and will be rigorously enforced and monitored. Any suspicion of impairment noted in morning meetings prior to initiation of the days' transport activities will result in the driver being withdrawn from work that day and subject to testing.	PR#370 p39
102	Road safety	Driver orientation	DAR	Drivers will receive an orientation package describing the road and specific sections/conditions before driving the road for the first time, and they will be required to read it. Drivers will check in and out, and be in communication with control during the	PR#55 p202

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				journey.	
103	Road Safety	Engineering standards	Technical Analysis	At the detailed design stage, using the MOFLNR Engineering Manual standards, sections with restricted line of sight will be speed reduced accordingly and posted.	PR#364, Oboni IR#5
104	Road Safety	Management plans	Technical Analysis	Management plans developed for the winter road (See PR#55, Section 6.7) will be reviewed for use with the all season road to confirm applicability to summer conditions.	PR#355
105	Road safety	Mitigations	Technical Analysis	<p>During the detailed design phase and subsequent pre-operations planning, CZN proposes to consider the following additional mitigations: 1) Typical cab safety belts are designed to restrain occupants for forward collisions. Given the risk of an off-road excursion, which may lead to a rollover and sideways occupant motion, it is appropriate to consider additional operator restraint devices, and possibly modified seat-belt arrangements. We will also review other safeguards, such as a mechanism that prevents the operation of the unit if the seatbelt is not engaged. 2) Cargo safety, particularly anchoring, will be reviewed in detail. We will review options that stabilize the bases of items to be transported, as well as 'top-down' anchoring. The potential for forward and sideways energy will be considered. With respect to concentrate in bags, unless all concentrate is in bulk, we will look at a base design that will limit the opportunity for sideways, forward and backward movement, in addition to top straps to allow top-down forward and sideways anchoring. 3)For the road sections noted as requiring further review for additional mitigations, we propose to look into moderate widening (0.5-1 m) of the normal road width (5 m) in those locations considered to be specifically at risk of an off-road excursion. Widening should be feasible for the km sections 12.3-17 and 53.5-57.4. Widening of km 25.2-28.7 will be difficult because of the common occurrence of upslope rock cuts. Widening of this section in places may still be possible by steepening the downslope, for example by the use of gabions anchored onto underlying rock. CZN successfully used this approach to restore the road bed in several sections along Prairie Creek after the 2006 and 2007 floods. 4) The road sections to be reviewed for additional mitigations will be considered for perimeter barriers in locations where they are deemed necessary, which may or may not be the same locations selected for widening. Barriers could take the form of an earth berm if space is suitable, or narrower barriers such as cables or guardrails. 5) Following the completion of road construction, and before operations commence, an operational level risk assessment will be completed with the road team including supervisors, operators and maintenance staff. Additional risk mitigation measures will be considered</p>	PR#407 p9

ID	Topic	Subtopic	EA Phase	Commitment	Reference
109	Road Safety	Operations plan	Technical Analysis	The Road Operations Plan will be updated to incorporate GNWT Road Operation Guidelines, for review and approval by the regulator(s) prior to relevant operations.	PR#246 p2
106	Road Safety	Operations plan	Technical Analysis	Implement CZN's Road Operations Plan (see PR#135)	PR#355
107	Road Safety	Operations plan	Technical Analysis	The Road Operations Plan will define how vehicle speeds will be monitored and enforced.	PR#355, as per PR#192, PCA IR 16
108	Road Safety	Operations plan	Technical Analysis	The Road Operations Plan will be revised to abide by and enforce GNWT commercial truck loading restrictions, and adequately justify any variance from these allowances with respect to truck and trailer configurations.	PR#355, as per PR#192, PCA IR 16
111	Road safety	Speed limits	DAR	Suitable speed limits will be posted on the All Season Road.	PR#55 p183
112	Road safety	Systems to regulate road safety and performance	Technical Analysis	CZN will rely on the systems which have been established by the federal and provincial authorities to regulate the safety and performance of the commercial transport industry, such as the National Safety Code Registrations, to ensure requirements with respect to: driver qualifications and regular certification; hours of service operations; vehicle inspections (Daily and semi-annually); pre-trip assessments; and maintenance records and reporting. The status of an operator will be subject to: audits; suspensions if necessary; and removal of National Safety Code Registration if necessary. CZN is committed to ensuring the safe transportation of personnel and goods, and will adopt, at a minimum, and under the responsibility of a Road Operations Manager, standard industry operating procedures for all vehicles supporting the mine operation. These standards would include: daily tailboard meetings with operators to review any specific or unique road conditions which can impact the safe and efficient operation of the transportation fleet; weekly safety meetings of all personnel utilizing the road regularly; radio call procedures; daily pre and post trip inspections of all commercial vehicles, which would include brake checks, and inspection reports, completed by the operator; reporting procedures for all near misses and incidents and the appropriate actions to follow; and procedures for routine inspections of cargo and general truck conditions to be completed during the daily transportation cycle. CZN will ensure that all carriers (including its own) that are transporting dangerous goods will provide proof of Transportation of Dangerous Goods training and certification of the drivers. In addition, it will be confirmed that the operators of the unit possess appropriate TDG containment and response equipment. For the non-categorized dangerous good, CZN will ensure that all carriers are operating to the minimum standard of the National Safety Code Cargo Containment, Standard 10.	PR#370 p38

ID	Topic	Subtopic	EA Phase	Commitment	Reference
113	Road safety	Winter chains	DAR	A winter driving policy, requiring tire chains to be used on haul trucks in the mountains (Phase 1 KP 0-29) to increase traction when necessary, will be adopted.	PR#55 p183
114	Terrain, soil, permafrost and karst topography	Avalanche recommendati on follow-up	Technical Analysis	CZN will be following up on the recommendations in the (Alpine Solutions) report (re. avalanches) at the appropriate time in advance of winter road construction.	PR#178 p2
115	Terrain, soil, permafrost and karst topography	Avalanches	Technical Analysis	The avalanche assessment and map prepared previously for the road (PR#129) will be incorporated into an appropriate Road Operations Plan.	PR#355
116	Terrain, soil, permafrost and karst topography	Avalanches	Technical Analysis	CanZinc commits to considering avalanche risks in the design of bridges and crossings and the placement of construction camps, for review and approval by the regulator(s) prior to construction of each structure .	PR#246 p3
117	Terrain, soil, permafrost and karst topography	Best practices	DAR	Construction in accordance with best standard industry practices in relation to soil disturbance, hydrology maintenance and construction in permafrost areas will be employed.	PR#55 p267
120	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	DAR	If permafrost is a factor in the general area of a borrow pit, water should not be allowed to pond on it and create a surface thaw condition leading to permafrost degradation.	PR#59 p87
124	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	DAR	Some general guidelines for borrow sources are: minimize the surface area of the open cut; grade slopes to reduce slumping; grade material storage and working areas to promote drainage and avoid standing water; and, restore the borrow source when construction is completed by grading slopes to match the natural ground and drainage of the surrounding area, and replacing overburden.	PR#55 p33
118	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	Individual borrow source development and management plans will be prepared for each borrow source that will incorporate site-specific recommendations relating to permafrost, as necessary.	PR#351 p1

ID	Topic	Subtopic	EA Phase	Commitment	Reference
125	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	During detailed design, borrow sources will be sampled according to the guidance of a professional ARD geochemist. Any borrow with a positive identification of ARD/ML potential will not be used. The remaining borrows will be used only if these are considered to pose a low risk to the environment and subject to mitigation procedures that may be defined by a professional ARD/ML geochemist.	PR#200 p16
119	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	A "Detailed Borrow Site Plan and Design" (DBSPD) for each selected borrow location will be completed prior to construction.	PR#350 p1
121	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	DAR	If permafrost is present and cannot be avoided in the pit development area, mitigation plans must be in place for dealing with any thawing of slope materials, and for the control and filtration of any resulting melt-water.	PR#59 p87
122	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	Where permafrost is encountered in borrows, either the borrow will not be used, or it will be used subject to mitigation by a professional geotechnical engineer to avoid significant impacts in terms of development and reclamation.	PR#200 p17
123	Terrain, soil, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	CZN is committed to avoiding and minimizing exposing water tables to the surface. All borrow sources located in floodplains will not be excavated below the water table. Extracting or excavating ditch depths below normal flood plain level will be avoided. Borrow source investigation will be completed during the detailed design stage which would determine water table levels. A DBSPD will be completed on every selected borrow source which would include detailed, site specific extraction and reclamation plans, including borrow extraction within floodplains subject to water table influence. A minimum 50 m buffer will remain between the active portion of the floodplain (Q2) and the borrow source, or mitigation provided as necessary if this isn't possible (e.g. Sundog talus). During the detailed design stage, borrow sources which may be impacted by high water flows (Q100) will be guarded, if deemed necessary, by a berm elevated 1 m above the determined Q100 elevation. During detailed design, borrow pit stability, potential risk from active stream channel, and potential risk from high water flows will be reviewed and appropriate protection measures such as berms will be included in the DBSPD.	PR#370 p124

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126	Terrain, soil, permafrost and karst topography	Earthquakes	Technical Analysis	CanZinc will take into account the risk of earthquakes in the design and construction of permanent infrastructure and bridges, for review and approval by the regulator(s) prior to construction of permanent infrastructure and bridges.	PR#246 p2
127	Terrain, soil, permafrost and karst topography	Environmentally sensitive areas	DAR	Any borrow pits incorporating tall cut slopes or adjacent to environmentally sensitive areas will be monitored for any evidence of slope instability during any excavation operations.	PR#59 p79
128	Terrain, soil, permafrost and karst topography	Investigation and monitoring plan	Technical Analysis	CanZinc commits to developing a permafrost monitoring plan as a permit condition, an outline of which was provided on the Tetra Tech letter dated April 3, 2017 (PR #484, p.23) informed by a detailed investigation of permafrost along the road alignment.	PR#246 p2
129	Terrain, soil, permafrost and karst topography	Permafrost investigation	Technical Analysis	CZN will undertake a suitable site investigation program to further investigate permafrost issues during the detailed design process (see Tetra Tech, April 3, 2017), and will implement appropriate mitigations during road construction activities to address those issues.	PR#320 p11
130	Terrain, soil, permafrost and karst topography	Quarry guidelines	Technical Analysis	Where excavation of borrow below the road grade cannot be avoided, CanZinc commits to applying appropriate guidelines (i.e. quarry guidelines). These considerations will be described in the development plans for these borrow sources, for review and approval by the regulator(s) prior to borrow pit development.	PR#246 p1
131	Terrain, soil, permafrost and karst topography	Sediment influx to watercourses	Technical Analysis	The potential for sediment influx to watercourses will be considered as part of detailed terrain stability assessment.	PR#320 p25
132	Terrain, soil, permafrost and karst topography	Soil disturbance	DAR	For wet, ice rich, or permafrost sections, typical overland construction will include no disturbance of the natural ground layer and placing timber horizontally in a corduroy style to help support the road subgrade.	PR#59 p23
135	Terrain, soil, permafrost and karst topography	Stability monitoring	Technical Analysis	Areas at high-risk due to potential slope stability or ground stability issues will be monitored. A professional engineer will determine a monitoring frequency (minimum monthly) and specify the required qualifications of the inspector. Monitoring will be undertaken by local monitors under the guidance and instruction of an engineer, with inspection by the engineer on a pre-determined frequency. A major rainfall event or abnormally high spring thaw event is considered to be one that causes runoff sufficient to create erosive force, indicated by highly turbid water in local streams. A significant seismic event is considered to be one that is clearly felt either at the Mine or in neighbouring communities, and is recorded by the Geological Survey. After a significant	PR#370 p5

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				runoff or seismic event, all sections of the road will be checked by proximal staff before the 'all clear' is given for travel.	
136	Terrain, soil, permafrost and karst topography	Subsidence feature mapping	DAR	Subsidence features on the Ram Plateau between Km 59 and Km 84, within about 200 metres of the road, will be mapped. These features will be reviewed annually and any change in conditions documented.	PR#55 p225
137	Terrain, soil, permafrost and karst topography	Terrain stability assessment	Technical Analysis	CanZinc will complete a more in depth terrain stability assessment (including identification of risks and mitigations) with a focus on areas identified as unstable and potentially unstable in their terrain mapping, and will provide this information for review and approval by the regulator(s) prior to construction in those areas of focus.	PR#246 p3
138	Terrain, soil, permafrost and karst topography,	High risk area contingencies	Technical Analysis	Site-specific contingencies for high-risk areas are as follows: Carry out at least monthly visual inspections for areas designated high-risk due to potential slope stability or ground stability issues until seasonal baselines for behavior of the area are established; When the baselines are established, carry out regular visual inspections for areas designated high-risk due to potential slope stability or ground stability issues. A suggested schedule for inspection of those areas would include at least one inspection prior to spring freshet to confirm that culverts are free-draining, then monthly during the thaw season, and at least once during the winter for areas with hazards that exist also in winter (for example, for rock fall that is freeze/thaw-related); and, carry out inspections for high-risk areas within 24 hours of major rainfall events, abnormally high spring thaw events or significant seismic events, and/or prior to mine traffic travelling the road. "Where problems are detected, they would be repaired or corrected in a timely manner, and prioritized in accordance with the urgency of the problem.	PR#282 p2

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139	Terrain, soil, permafrost and karst topography, fish and aquatic habitat	Rockfall measures	Technical Analysis	Locations where rock fall measures are needed and could be successfully implemented will be chosen at the time of detailed design, taking into account the likely frequency and anticipated volumes of rock fall at a particular location, as well as the likely success of other measures that could be implemented in addition to or instead of physical solutions. For example, netting may be more useful on blind corners, whereas signage may be more appropriate at locations where sight distances are good in rock fall areas. Suitable protection solutions for existing out-dipping rock slopes along the route will be developed where necessary at the time of detailed design. Debris flow/flood locations will be specifically evaluated during detailed design to determine if some benefit would be realized with the use of a deflection berm.	PR#282 p217
140	Terrain, soils, permafrost and karst topography	Borrow source development and management plans	Technical Analysis	The development, working and restoration of borrow sources will be carefully planned and carried out to reduce or avoid negative effects including permafrost thaw and soil erosion.	PR#55 p236
141	Terrain, soils, permafrost and karst topography	National Parks Caving Directive	DAR	Parks Canada is preparing a National Parks Caving Directive which may have information of value in karst terrain, and will be consulted.	PR#129 p79
142	Vegetation	Clearing	DAR	Brush and debris from clearing the right of way will be windrowed adjacent to the right of way, with breaks every 100 m. Trees felled will be bucked or removed.	PR#2 p4
143	Vegetation	Invasive Species	Technical Analysis	Access and use of the road by unauthorized persons will be deterred to the extent possible because off-road vehicles could introduce invasive species. Road use monitoring is proposed at, or west of, the Liard River crossing on the all season access road.	PR#186 p44
145	Vegetation	Invasive species management plan	Technical Analysis	The Invasive Species Management Plan is adaptive and will evolve as the project evolves and invasive species are, or are not, detected. The four key principles are prevention, detection, control and restoration.	PR#186 p2
144	Vegetation	Invasive species management plan	DAR	An invasive species management plan will be developed and implemented to ideally prevent, or if necessary, control the establishment of invasive plant species in off-site vegetation communities adjacent to the roadway.	PR#55 p185
146	Vegetation	Invasive species mitigation	Technical Analysis	Re invasive species, highway trucks and/or trailers headed for the Mine will pass through a wheel-wash during non-frozen conditions and be cleaned of any debris before leaving the Liard River crossing.	PR#186 p44

ID	Topic	Subtopic	EA Phase	Commitment	Reference
147	Vegetation	Rare plant survey	Technical Analysis	An early (spring) rare plant survey will be completed prior to construction for the flowering periods of plant families such as Ranunculaceae (buttercups) and Rosaceae (rose), for the all season road project footprint. The resulting data from the vegetation survey will be incorporated into adaptive management plans and may result in further mitigation actions. A rare plant management plan will be developed as necessary.	PR#282 p4
149	Vegetation	Stockpile placement	Technical Analysis	Stockpiles will be placed on non-vegetated or sparsely vegetated areas to minimize disturbance to vegetation, where possible.	PR#355
150	Vehicle maintenance	Inspections for leaks	DAR	Vehicles will be properly maintained and inspected for leaks, and drip pans will be used for stationary equipment.	PR#55 p192
152	Water and sediment quality, vegetation, wildlife	Contaminant loading management plan	Technical Analysis	CanZinc commits to updating its contaminant loading management plan in consultation with ECCC and Parks, with approval required before concentrate haul commences.	PR#246 p2
151	Water and sediment quality, vegetation, wildlife	Contaminant loading management plan	DAR	Follow the existing draft Contaminant Loading Management Plan and soil sampling along the road bed both before and during haul operations.	PR#55 p184
153	Water quality and quantity	Peatland drainage	DAR	Natural drainage patterns along the haul road will be preserved to maintain the natural function and processes of peatland habitats adjacent to the haul road.	PR#55 p185
154	Water quality and quantity	Refuelling	DAR	Trucks and equipment will be refuelled away from any stream, lake, wetland or other water body, per industry standards.	PR#55 p267
155	Water quality and quantity	Water extraction volumes	Technical Analysis	Water extraction from lakes will be limited according to lake volume as follows: Mosquito and Km 70 1%; Km 115 and Km 121 5%; Km 139 and Km 141 2%. Withdrawal rates noted above are based on each summer season. Withdrawal volumes will be tracked either by using an in-line flow meter, or by recording the number of fills of tanks of known capacity. Records will be kept and can be provided at regular intervals along with other road monitoring data.	PR#355 p4
156	Water quality and quantity	Watercourse crossings	Technical Analysis	CanZinc commit to performing the geotechnical and hydrological investigations required prior to final design of the watercourse crossings	PR#200 p26

ID	Topic	Subtopic	EA Phase	Commitment	Reference
157	Water quality and quantity, aquatic habitat	Fuel	DAR	Fuel caches will be located on flat, stable terrain, or in a natural depression, away from slopes leading to water bodies, located above the Q100 high water mark, outside the defined riparian area of proximal bodies of water, will not be stored on the surface of frozen lakes or streams, will have secondary containment for stationary fuel containers with a capacity greater than 230 L, and the containment will be 10 percent greater than the capacity of the largest fuel container.	PR#59 p53
158	Water quality and quantity, aquatic habitat	Sediment control	Technical Analysis	Sediment control measures will be installed for any disturbed soils where there is a risk of sediment migration to surface water.	PR#246 p2
159	Water quality and quantity, aquatic habitat	Stockpile placement	Technical Analysis	CanZinc commits to placing any stockpiles of rock and coarse material 50 m from flowing watercourses, and soil or fine material at least 100 m from flowing watercourses. Where this is not possible (e.g. in tight canyons or valleys), CanZinc will implement enhanced erosion and sediment control measures to avoid impacts.	PR#246 p1
160	Wildlife	Barging	DAR	Cease barging activities if Wood Bison are observed crossing the river near the barge location.	PR#55 p255
161	Wildlife	Baseline wildlife surveys	Technical Analysis	Additional baseline wildlife surveys for forest and wetland birds are planned for the May to June window, with input from ECCC and Parks Canada. The resulting data will be incorporated into adaptive management plans and may result in further mitigation actions. A suitable operations phase monitoring program will be developed with input from Parks Canada. At the time of the baseline bird survey, additional waterfowl and cliff-nesting raptor surveys may be conducted concurrently, and the black bear habitat potential maps may be updated with any new relevant information.	PR#282 p3
163	Wildlife	Bear den surveys	Technical Analysis	Pre-clearing denning surveys identified for Grizzly Bears also extends to Black Bears. Environmental Monitors will survey for wildlife dens in favourable denning habitat (e.g., borrow sources) prior to clearing.	PR#186 p9
162	Wildlife	Bear den surveys	Technical Analysis	Survey crews will conduct ground-based reconnaissance den surveys from KP 170 to KP 36. These ground-based surveys will cover the entire 134 km (KP 36 to 170) along the proposed all season road. An aerial den survey will focus on the area along the proposed all-season road (KP 36 to 170) with: 1) moderate and high denning potential, 2) known den(s) identified during the ground-based surveys, and 3) proposed winter clearing (after October 1). Ground and aerial surveys will include areas overlapping with the previously developed winter road. The aerial survey will consist of flying evenly spaced transects, with a higher survey intensity in areas of previously identified dens.	PR#341 p4
164	Wildlife	Caribou	DAR	An alert system will be used to warn personnel of Woodland Caribou and other sensitive wildlife in the local area by relaying sighting information to vehicles/aircraft and equipment operators and on-site personnel.	PR#55 p184

ID	Topic	Subtopic	EA Phase	Commitment	Reference
165	Wildlife	Caribou	Technical Analysis	If caribou are reported on the road or within 500 m of it, traffic or activity will cease at least 500 m from (or at first observation of) the animal(s) and all headlights turned off until the animal moves off at least 100 m away from the road or 5 minutes after last visual. Once traffic resumes, speed reduced to half the posted speed limit, 30 km/hr, within 1 km of the sighting.	PR#186 p18
166	Wildlife	Caribou	Technical Analysis	If caribou are reported beyond 500 m of the road, traffic speeds are to be reduced to half the posted speed limit, 30 km/hr, within 1 km of the sighting.	PR#186 p19
167	Wildlife	Community engagement	DAR	The wildlife and wildlife habitat mitigation and monitoring plan will include annual engagement with members of the Naha Dehe Dene Band to monitor measureable parameters of effects.	PR#55 p184
168	Wildlife	Data sharing	DAR	The Dehcho Land Use Planning Committee (and others as requested) will be provided with the post-construction digital footprint of the all season access road and associated facilities to incorporate into ongoing cumulative effects monitoring across the Dehcho.	PR#55 p256
169	Wildlife	Den and nest avoidance	DAR	Project employees and contractors will avoid all known or suspected den and nest sites.	PR#55 p257
170	Wildlife	Education program	DAR	An education program of wildlife related policies and mitigation will be provided to all Project employees and contractors, including a bear awareness program to ensure employees and contractors are informed of bears and other potentially dangerous wildlife and the level of risk.	PR#55 p184
171	Wildlife	Fuel	DAR	Fuel storage facilities will meet industry standards for tank construction, location and spill containment.	PR#55 p183
172	Wildlife	Harlequin duck	Technical Analysis	Conduct any in-stream bridge construction work and in-stream Sundog re-alignment/armouring outside Harlequin duck occurrence (late April to mid-Sept) or when no flow. Should in-stream work be required during this time, the Environmental Monitor will first survey the area for the presence of Harlequin ducks within 500 m of the activity (both upstream and downstream) and in-stream work will cease if a Harlequin duck is present.	PR#186 p21
173	Wildlife	Harvesting	DAR	Prohibit hunting, trapping, harvesting, and fishing by site employees and contractors.	PR#55 p227
174	Wildlife	Measureable parameters of effects	DAR	Amend the existing draft Wildlife Mitigation and Monitoring Plan, as necessary, to include the monitoring of measureable parameters of effects.	PR#55 p256
175	Wildlife	Pets	DAR	Pets will be prohibited along the all season access road.	PR#55 p185

ID	Topic	Subtopic	EA Phase	Commitment	Reference
176	Wildlife	Pika	Technical Analysis	Within collared pika range and where talus is present, CZN commits to avoiding talus to the extent possible, and conducting presence/not detected collared pika surveys in all borrow sources selected for development and along the proposed all-season road alignment that disturbs talus. CZN commits to conducting pika surveys to determine their presence prior to development (e.g., road alignment, borrow sources) in pika habitat. Should pika's occupy a proposed borrow source or portion thereof, prior to development, a replacement borrow source or an unoccupied portion of the same source (as some sources are large) will be selected for use (after confirming that no pika's occur within a sufficient buffer distance identified by a biologist).	PR#341 p13
179	Wildlife	Pika	Technical Analysis	Additional mitigation, beyond that previously identified in the DAR (e.g., low truck volumes, reduced traffic speeds, dust suppression, response to accidental spills, prohibit littering) specific to collared pika are: prohibit the storage of snow, including along roadside snow banks, on or within 10 m of talus habitat (within pika range); prohibit the disturbance of talus habitat (within pika range) year round unless pre-disturbance presence/not detected surveys have been completed and pikas were determined to be not present; and if required, determine a sufficient buffer distance from which borrow construction can occur near active pika habitat, based on guidance from a biologist.	PR#370 p85
181	Wildlife	Policy	DAR	Wildlife will have the right-of-way, obligating drivers to stop (when safe to do so) for wildlife seen on or immediately adjacent to the road, to allow them to move away.	PR#55 p184
180	Wildlife	Policy	DAR	A no hunting policy will apply for all Project employees and contractors while working and/or at the Mine site.	PR#55 p183
183	Wildlife	Problem Bears	DAR	Implement a protocol for dealing with problem bears, with a designated chain of responsibilities for ensuring worker safety and efficient and speedy resolution of incidents.	PR#55 p257
184	Wildlife	Regulatory agency notification	DAR	The appropriate regulatory agencies (i.e., GNWT ENR and Parks Canada) will be contacted to receive additional direction regarding any new wildlife issues that arise.	PR#55 p258
187	Wildlife	Reporting	DAR	Wildlife sightings along the access road and airstrip will be reported and evaluated, and if a problem area is identified, corrective management options for traffic and Project-related activities will be considered.	PR#55 p227
186	Wildlife	Reporting	DAR	Report annual updates and results of the Wildlife Mitigation and Management Plan, Road Operations Plan, and inspections and enforcements.	PR#55 p215
188	Wildlife	Retarder Brakes	Technical Analysis	The use of engine retarders for braking will be discouraged but not prohibited since some road sections contain steeper portions, and drivers should retain the option to use any form of braking if necessary for safety.	PR#100 p47

ID	Topic	Subtopic	EA Phase	Commitment	Reference
189	Wildlife	Snow removal practices	DAR	Snow removal practices along the access road and airstrip will avoid high snow banks, so that wildlife can readily move off as vehicles/aircraft approach.	PR#55 p184
190	Wildlife	Technical advisory committee	DAR	Issues and considerations regarding wildlife populations and effects will be discussed during the Technical Advisory Committee (TAC) meetings proposed by CZN in EA0809-002. TAC meetings will include the all season road.	PR#55 p211
191	Wildlife	Trumpeter swans	DAR	Pumping water from ponds occupied by Trumpeter Swans is prohibited during nesting.	PR#55 p215
192	Wildlife	Use of explosives	Technical Analysis	Blasting is prohibited if caribou are observed within 1 km of the blast site until the animal moves out of the area.	PR#186 p17
193	Wildlife	Waste management plan	DAR	The Waste Management Plan will prohibit littering, purposely feeding wildlife, and storing attractants accessible to wildlife. All waste foods and human garbage will be incinerated consistent with current industry good management practices to minimize wildlife attraction to the local area. Adaptive management will be applied to waste management practices. If wildlife are found to be attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.	PR#55 p185
194	Wildlife	Waste removal	DAR	Solid waste will be organized and stored securely so that it does not attract wildlife, will be removed from the site progressively as the operation is under way, and will be incinerated using a proper manner of incineration.	PR#59 p44
195	Wildlife	Waste removal	DAR	Non-combustible solid waste will be removed from sites by the end of construction and operation.	PR#59 p44
196	Wildlife	Waste removal	DAR	Adaptive management will be applied to waste management practices. If wildlife are found to be attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.	PR#55 p185
197	Wildlife	Western toads	Technical Analysis	CanZinc commits to collaborating with GNWT to enable a breeding pond survey by local environmental monitors during the summer to detect the presence of Western toad in water bodies proximal to the road alignment between the Nahanni Butte access road and the Liard River. The survey will be conducted either before or after the early stage of construction (subgrade placement) to better understand the occurrence of Western toad in this area and potential need for mitigation during fall migration. If Western toad presence is confirmed in this area, the survey will be expanded progressively to other areas proximal to the road on the west side of the Liard River.	PR#263 p2

ID	Topic	Subtopic	EA Phase	Commitment	Reference
198	Wildlife	Wildlife monitoring and mitigation plan updates	DAR	The existing draft WMMP will be updated to include all season monitoring and species potentially affected by all season access road/ airstrip use. Additional considerations include: mortality thresholds for additional species at risk (e.g., Trumpeter Swan, Collared Pika), Moose, and Dall's Sheep; monitoring, evaluating, and reporting harvest pressure, particularly along the Nahanni Range portions of the outfitter zone located outside the NNPR boundary; and, educating and promoting First Nations voluntary reporting of harvests from along the all season access road. If excessive use of the road occurs by non-residents, and hunting pressures or safety concerns result, additional access control measures will need to be considered involving local communities and government agencies.	PR#55 p34
199	Wildlife	Wildlife sighting logs	DAR	Wildlife sighting logs are to be completed by all Project employees and contractors for wildlife sightings (e.g., Dall's Sheep, caribou, Wood Bison) with respect to species, location along the access road/ airstrip, numbers, and reaction to Project activity. If a problem area is identified, corrective measures will be considered.	PR#55 p184
200	Wildlife	Winter road management	DAR	The small portion of the winter road not used for all season access will be managed to prevent predator and non-Project related travel of the corridor, if necessary.	PR#55 p185
201	Wildlife	WMMP Revisions	Technical Analysis	The proposed mitigation measures noted in DAR Addendum, Appendix E, Appendix C will be integrated into a revised draft of the WMMP.	PR#355 p12
202	Wildlife	Yellow Rails	Technical Analysis	Re Yellow Rails, natural drainage patterns will be maintained throughout the boreal forest zone, by careful placement of culverts and regularly inspecting drainage measures to identify areas that do, or might unexpectedly, pond water. Follow best management practice (Environment Canada, 2009): <ul style="list-style-type: none"> • Avoid activities in areas while birds are present • Prevent loss and alteration of wetlands • Maintain year-round 100 m no-activity buffer from potential habitat • Avoid night-time activities (including light and noise) near breeding wetlands • No mowing of potential habitats when dry 	PR#186 p19
203	Wildlife mitigation and monitoring plan	Wildlife	DAR	ENR's Woodland Caribou Best Management Practices for Industrial and Commercial Activities (once developed) will be incorporated into the wildlife monitoring program, where feasible, to manage or mitigate habitat impacts and sensory disturbances on Woodland Caribou.	PR#55 p185

ID	Topic	Subtopic	EA Phase	Commitment	Reference
204	Wildlife, fish and aquatic habitat	Use of machinery	DAR	Machinery used in road building will arrive on site in a clean condition, free of any fluid leaks, invasive species and noxious weeds. Machinery will be operated outside of wetted channels in such a way as to minimize disturbance of banks and channel bed. Forging of fish-bearing streams will most likely not be required, but if needed, will be limited to once-over-and-back, with prior Inspector approval. Temporary crossing structures or at minimum, swamp mats, will be applied to protect banks and stream beds if rutting is likely to result during forging. Equipment will be washed, refueled or serviced away from streams and in such a way as to prevent deleterious substances from entering the water. Fuel and other materials for machinery will also be stored in such a way as to prevent any deleterious substances from entering the water.	PR#90 p14
205	Wildlife, vegetation, fish and aquatic habitat	Sanitary and grey water	DAR	Sanitary and grey water will either be collected in tanks for subsequent transfer to trucks for off-site disposal at suitable locations, or processed locally (sumps), meeting the required standards for effluent dispersal. Specific locations will have approved plans which meet the regulatory requirements and site specific conditions.	PR#59 p44
206	Wildlife, water quantity	Policy	DAR	Significant changes to water levels while pumping water from a known Beaver pond in the fall and winter periods will be avoided.	PR#55 p185

Table 2- New Commitments from Technical Report Response, Hearing and Closing

ID	Topic	Subtopic	EA Phase	Commitment	Reference
1	Wildlife	Harvesting	Tech Rpt response	CZN agrees to provide support to NBDB to develop a harvest monitoring program to track and report on patterns and levels of harvest associated with the road, and to include this in the WMMP.	
2	Wildlife	Caution Zones	Tech Rpt response	CZN will develop a more formal, detailed approach to identifying and communicating seasonal “wildlife caution zones. Road operations will be controlled using a Journey Management System (JMS). This system will include driver journey and incident logs which are compiled and wildlife sightings logged. Sightings will include the nature of the sighting and the location based on landmark and kilometre post (which will be sign-posted). The information will be noted by the driver at his next stop, and possibly by radio dispatch if animals are proximal to the road. Once a trend has emerged (which may occur over a few weeks), it will be discussed at pre-travel tail-gate meetings. Once an occurrence becomes common in terms of location, the road operations Supervisor will consider formalizing the caution zone with signage, although drivers will already be aware, and will have received instructions regarding caution. Road maintenance crews	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				and environmental monitors will also be on the road, and they will also record wildlife sightings and provide the records for collation.	
3	Wildlife	Boreal caribou	Tech Rpt response	CZN will revise its WMMP to incorporate Commitment #6 from the technical session.	
4	Water Quality	ARD/ML	Tech Rpt response	All representative units will be sampled at all potential borrow source locations in order to identify any acid rock drainage and/or metal leaching potential that would impact water quality. Testing will be completed using acid-base accounting and metal leaching test methods to characterize representative units.	
5	Water Quality	Sediment	Tech Rpt response	The SECP will be reviewed and finalized before commencing construction. Erosion and sediment control measures will be in place when constructing around fish-bearing waters. Appropriate setback distances from fish-bearing waters will be determined and implemented based on site conditions for the storage of potential TSS generating materials. Monitoring will be completed during construction periods, prior to spring freshet, and when rainfall events are forecast to ensure sediment and erosion control mitigation measures are effective.	
6	Water Quality	Sediment	Tech Rpt response	Comprehensive Project monitoring of TSS and turbidity will be completed and mitigation adjusted if needed.	
7	Concentrate and material transport	Dust	Tech Rpt response	Monitoring of annual soil, snow, dustfall, and ambient dust sampling will be included in the CLMP. This will include trigger or action levels and adaptive management plans	
8	Fish and aquatic habitat, water quality and quantity	Fish Passage	Tech Rpt response	<p>CZN will implement all available best management practices to avoid, mitigate, or offset serious harm, as defined in the Fisheries Act, as a result of water crossing construction, operation, and decommissioning. This includes, but is not limited to: appropriate design of water crossings to facilitate passage at both high and low flows; bank stabilization by protecting and restoring riparian vegetation; adhering to timing windows to avoid spawning, incubation, and hatch times for all species using the water courses, and the installation and maintenance of sediment and erosion control measures.</p> <p>An appropriate water crossing maintenance and monitoring plan will be in place to ensure that barriers to fish passage do not form over time as a result of crossing damage due to ice blockage, flooding or movement of debris, such as may occur at freshet.</p>	
9	Heritage and cultural resources	Archaeological Surveys	Tech Rpt response	The Terms of Reference for the proposed all season road AIA (PRD #379) will be developed in collaboration with, and approved by, Parks Canada. The AIA will incorporate systematic shovel testing as well as ground sleuthing in areas of enhanced archaeological potential based on: (1) elevated areas of archaeological potential identified in the GIS Potential Model Categories 1-4 outlined in the AOA and further	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				clarified in the TOR developed with Parks Canada; (2) areas of project impacts including borrow sources, water course crossings including bridge and culvert installation, borrow access roads, camps, staging areas, right of way and road realignments; and (3) incorporating traditional knowledge from Indigenous communities that may have knowledge of the project area including place names, traditional land use and harvesting in areas proximal to the footprint of an all season road.	
10	Heritage and cultural resources	Archaeological resource protection	Tech Rpt response	The Cultural Heritage Protection Plan and heritage resource booklet will incorporate the findings of the AOA and AIA. Parks Canada will have an opportunity to review the content of the Cultural Heritage Protection Plan. The Cultural Heritage Protection Plan and heritage resource booklet will be used to provide training and direction on the accidental recovery of heritage resources during the construction phase. Within the Cultural Heritage Protection Plan, mitigations associated with the accidental discovery of heritage resources in NNPR shall stipulate that all work is stopped and Parks Canada is contacted for advice prior to proceeding.	
11	Water Quality	Sediment	Tech Rpt response	CZN shall develop a detailed program to monitor the short-term effects of construction on surface water quality.	
12	Water Quality	Sediment	Tech Rpt response	CZN will develop a detailed long-term (i.e., multi-year) program to monitor water quality at a subset of road crossing sites (both upstream and downstream), at water bodies (e.g., lakes and wetlands) located adjacent to the road. This program will require a reduced sampling effort (i.e., frequency) compared to the short term program. Sampling intervals will be spring freshet and after significant summer storms.	
13	Water Quality	Grey Water	Tech Rpt response	<p>All grey water within NNPR will be managed through a septic system as outlined in the Yukon Government's Standards and Guidelines. This will include the simple filtration of grey water to remove any solid material prior to disposal into the environment.</p> <p>CZN will provide a grey water management plan for the development, management and decommissioning of all grey water septic systems within NNPR. This plan must be approved by Parks Canada prior to construction, and will include:</p> <ol style="list-style-type: none"> a. a design of the grey water septic system being proposed, b. the soil stratification for all proposed locations, c. the depth of the water table, d. the distance to nearest water course/ water body and potable water source. <p>All camps of a temporary nature (with a wastewater system that serves a non-permanent population) will have a closure plan submitted as part of preliminary design. The closure plan will detail how the treatment works will be decommissioned upon camp closure.</p>	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
14	Water Quality	Brown Water	Tech Rpt response	<p>If CZN chooses to treat brown water (sewage) for camps at km 65 and 87 within NNPR rather than at an approved off site location, a sewage management plan will be completed prior to construction for the development, management, decommissioning and closure of the proposed sewage treatment systems at each site. This plan will include:</p> <ul style="list-style-type: none"> a. a design of the sewage treatment system being proposed in accordance with accepted standards and guidelines, b. in the case of a septic system, a soil stratification for all proposed locations, c. the depth of the water table, d. the distance to nearest water course/ water body and potable water source. 	
15	Emergency Response	Spill plans	Tech Rpt response	<p>Spill Contingency and Response Plans will be informed by the updated road design, operation plans and risk assessment. They will address separate phases of the project, including: construction, operations, and closure. Each Spill Contingency and Response Plan is to be developed and approved prior to each project phase.</p>	
16	Permafrost	Monitoring	Tech Rpt response	<p>A draft Permafrost Monitoring and Response Action Plan will be completed after detailed design and before construction, with plan review and update within 12 months of the completion of construction.</p>	
17	Road Design	Permafrost	Tech Rpt response	<p>The detailed road design is subject to review and approval by Parks Canada for portions of the road within the NNPR prior to construction. The road design shall include:</p> <ul style="list-style-type: none"> • Design report, drawings and construction specifications that are signed and stamped by a professional engineer. • A road design informed by industry best practices, including, Transport Association of Canada (2010). Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions. May 2010. • A road design that considers the construction, operations and closure phases of the project. <p>Factual reports that document the site specific geotechnical and permafrost investigations and results utilized in the production of the road detailed design will be included.</p>	
18	Reclamation	Plans	Tech Rpt response	<p>CZN will provide a detailed reclamation plan by vegetation / terrain type to demonstrate that ground stabilization and revegetation will be implemented in a timely manner that meets industry accepted best practices. Ripping and roughening of surfaces will be included.</p> <p>A draft detailed reclamation plan, including monitoring plan, is subject to review and approval by Parks Canada prior to construction, with an update after construction.</p>	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				<p>The reclamation plan will include:</p> <ul style="list-style-type: none"> • Detailed information on the short term (beginning during construction and continuing until properly-timed revegetation) and long term (beginning with revegetation and continuing into the post-closure phase) methods and timelines for restoration, including how borrow sources in floodplains will be addressed to ensure that bermed areas are properly reclaimed, that water is prevented from ponding, and that sediment / deleterious substances are prevented from entering watercourses. • Methods and materials that are consistent with ecological restoration objectives • Monitoring plan to evaluate the effectiveness of these mitigation and reclamation measures including targets (ex. percent cover) thresholds for adaptive management, and strategies for implementing adaptive management. 	
19	Wildlife	Pika	Tech rpt Att. 1	CZN will update the WMMP to include a Collared Pika monitoring program in collaboration with Parks Canada and the GNWT to monitor potential effects associated with the proposed all-season road.	
20	Wildlife	Trumpeter Swans	Tech rpt Att. 1	<p>Frequent, long-term and large disturbances, multiple sources of disturbances, and noise emissions greater than 50 dB (or greater than 10 dB above ambient) will be avoided within 800 m of observed Trumpeter Swans.</p> <p>Mitigation and monitoring efforts will be focused in sections where the Project overlaps the Southeastern Mackenzie Mountain Key Migratory Habitat Site (NT Site 17).</p> <p>CZN will ensure mitigation and construction monitoring efforts will focus on areas where the Project overlaps key migratory bird habitat (including between KM 98 to 117), and where Trumpeter Swans are observed (including between KM 98 to 117).</p> <p>Construction activities (if critical for development, including crushing but excluding blasting) may occur within 800 m of observed Trumpeter Swans (from April 1 to September 30) with the assistance of a CZN Environmental Monitor.</p>	
21	Wildlife	Migratory birds	Tech rpt Att. 1	<p>All phases of the Project will be carried out in a manner that protects migratory birds and avoids harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests or eggs.</p> <p>A scientifically sound approach to determine the likelihood of nesting birds will be used in the event that clearing or disturbance cannot be scheduled outside of the nesting season. If necessary, the use of non-intrusive search methods (e.g., point counts) could be undertaken to conduct an area search, for evidence of nesting, prior to the</p>	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
				<p>commencement of clearing.</p> <p>If necessary, migratory bird surveys will be carried out by an avian specialist with experience with migratory birds and migratory bird behaviour indicative of nesting (e.g., singing birds, alarm calls, distraction displays, carrying nesting material or food).</p> <p>Results from all pre-clearing surveys will be reported in the annual wildlife monitoring report.</p> <p>Options such as avoiding, adapting, rescheduling or relocating activities, will be considered and implemented if there are indications of migratory bird nests where disturbance activities that have the potential to disturb or destroy nests are proposed.</p> <p>All disruptive activities in the nesting area will be halted if migratory bird nests containing eggs or young are discovered. An appropriate buffer zone (i.e., setback distance) will be determined and observed until the young have naturally and permanently left the vicinity of the nest. Buffer zones will be appropriate for the species and take into consideration the intensity of the disturbance and the surrounding habitat. Buffer zones will also be adjusted after assessing their effectiveness.</p> <p>A buffer zone for forest songbirds will be included in Appendix C of the WMMP.</p> <p>If required, ECCC will be contacted for advice and/or additional mitigation measures.</p> <p>All of the above recommendations will be incorporated into the next revision of the WMMP.</p>	
22	Wildlife	Species at Risk	Tech rpt Att. 1	<p>Section 2.3.2 of the Updated Draft WMMP will be revised to reflect that the general prohibitions for migratory birds and aquatic species listed on Schedule 1 apply wherever these species are found.</p> <p>Table 1 of the Updated Draft WMMP will be revised to reflect current status of species listed on Schedule 1 of SARA or assessed by COSEWIC. Table 1 will be revised and included as part of the annual monitoring reports to aid in remaining aware of status changes while minimizing the number of revisions to the WMMP. The Species at Risk Registry will be consulted on a regular basis to maintain the most current information, including new COSEWIC assessments and/or species added to Schedule 1 of SARA.</p> <p>If species at risk are encountered or affected by the Project, the primary mitigation measure will be avoidance. Contact with or disturbance to each species, its habitat, and/or its residence will be avoided.</p>	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
23	Wildlife	Avian Species at Risk	Tech rpt Att. 1	<p>ECCC will be consulted regarding migratory bird mitigation measures and advice for Project areas outside the Nahanni National Park Reserve.</p> <p>The absence of nesting avian species at risk (and other migratory birds) will be confirmed in borrow and gravel pits prior to commencing disruptive activities during the general nesting period (May 1 to August 20). If work commences, monitoring for the absence of nests at borrow and gravel pits will continue throughout activities.</p> <p>Staff and contractors will be made aware of the conservation status of all species at risk that could be encountered at the Project. Staff and contractors will also be made aware of the potential of species at risk to use anthropogenic habitats and structures for nesting, the reporting protocol and all appropriate mitigation measures.</p>	
24	Wildlife	Boreal caribou	Tech rpt Att. 1	CZN will consult with the GNWT regarding the adequacy of the proposed mitigation and monitoring measures for Boreal Caribou.	
25	Wildlife	Pika	Tech rpt Att. 1	CZN will include in its final WMMP the Collared Pika commitments outlined in its response to MVEIRB IR#5 (PR 320), and will conduct long-term monitoring of Collared Pika abundance and patch occupancy in talus habits within 300 m of the road, with input on study design from the GNWT and Parks Canada. The resulting data from surveys will be incorporated into adaptive management plans and may result in further mitigation actions.	
26	Permafrost	Investigation	Tech rpt Att. 2	Detailed geotechnical investigations will be undertaken, including geophysical surveys, to better define the locations and characteristics of permafrost soils. Detailed geotechnical/geophysical investigations are required for both the road and borrow/quarry sources. The potential of icing and drainage blockage along the road will be identified during detailed design. Transport Association of Canada (2010) Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions will be followed. A design for closure will be developed that allows CZN to walk away.	
27	Fish	Authorization	Tech rpt Att. 3	CZN will apply for a Fisheries Act Authorization (Paragraph 35(2)(b) Fisheries Act Authorization [Normal Circumstances]) which will include an offset plan and monitoring plan. The aquatic habitat (below the HWM) and under the planned footprint of the diversion berm will be included in habitat accounting.	
28	Fish	Habitat	Tech rpt Att. 3	CZN will implement natural channel design principles into the proposed constructed channel. CZN will also apply natural features (e.g., boulders) at regular intervals to mimic habitat currently available in the old channel, and ensure that the new channel provides similar flow capacity, velocities (throughout) and habitat as the current channel.	

ID	Topic	Subtopic	EA Phase	Commitment	Reference
29	Fish	Flows	Tech rpt Att. 4	Hydraulic modelling of the Sundog realignment will be refined during detailed design considering the hydraulic model results for the preliminary design as well as comments by others, and updated hydraulic model results will be provided. The final design will be subject to field modification to accommodate selective use and placement of larger size alluvium materials as may be encountered during construction.	
30	Fish	Habitat Offset	Tech rpt Att. 7	CZN will continue to work with DFO, Parks Canada and Aboriginal groups to identify suitable offsetting opportunities.	
31	Fish	Riparian Veg.	Tech rpt Att. 7	CZN will follow standard best management practices for the removal of riparian vegetation, where practical and feasible.	
32	Road	Design and Risk	Hearing	An independent technical review panel will be formed. The mandate of the panel would be to recommend road design principles. Improvements and/or updates to the existing risk assessments would be part of the panel's scope. The panel would be free to make recommendations regarding the proposed road operations and maintenance requirements to promote safety and reduced risk. Panel member selection will include a short list of potential candidates who are Professional Engineers, have worked on previous road projects in the North and are free from conflict with CZN's engineering team and Oboni Riskope. Three panel members will be selected and the scope and mandate for their work will be agreed with them, followed by the preparation of a report detailing the selection process and panel terms of reference. This report would be submitted to the Mackenzie Land and Water Board, the GNWT and Parks Canada for comment.	
33	Littoral Zone	Lake Levels	Closing	CZN will install water gauge stations at the lakes from which water will be withdrawn for dust control. CZN will create a monitoring program, with input from DFO and Parks Canada, based on the water gauge stations, specifying when lake level readings will be taken and outlining actions to be taken if recharge assumptions are not met.	
34	Water Quality	Sundog Creek	Closing	The TSS and turbidity of the Sundog Creek realignment will be monitored before and after realignment, until such time as the data supports a conclusion that water quality is no longer being affected by the realignment. The monitoring will may lead to adaptive management if thresholds or triggers are exceeded.	

May 18, 2017

Canadian Zinc Corporation
Suite 1710, 650 West Georgia Street
Vancouver, BC V6B 4N9

ISSUED FOR USE
FILE: 704-ENG.YARC03070-01
Via Email: david@canadianzinc.com

Attention: David Harpley
Vice President, Environmental & Permitting Affairs

Subject: Environment and Climate Change Canada Response to Undertaking 7
Proposed Prairie Creek All Season Road, NT

1.0 INTRODUCTION

During the Public Hearing, in response to a question from the Review Board's hydrotechnical consultant, Environment and Climate Change Canada (ECCC) opted to accept Undertaking 7 in order to respond. The undertaking was:

"Hydrological information for measuring peak flows is based on data from three regional stations; main and average flow conditions for the project area are based on data from one station located at Prairie Creek. ECCC to provide a position regarding whether those monitoring stations and data are sufficient to support sediment and erosion control planning for the entire road."

The response from ECCC was:

"ECCC notes that more data on flow conditions would likely be helpful for the design and implementation of the sediment and erosion control plan for the entire road. The details of the sediment and erosion control plan will be developed during the regulatory phase. Adaptive management and contingency measures will also be important aspects of the plan in order to ensure that sediment and erosion control measures are effective for varying flow conditions."

This letter has been prepared to comment on the undertaking and ECCC's response.

2.0 COMMENTS ON ECCC RESPONSE TO UNDERTAKING 7

Tetra Tech agrees with the substance of ECCC's position. With respect to the acquisition of additional flow data, the Board should be aware that Canadian Zinc paid for the re-activation of the Water Survey of Canada stream gauge station on Prairie Creek in 2013 and continues to pay for its ongoing operation. Canadian Zinc's draft sediment and erosion control plan, submitted to the Board during the hearing process, provides approaches for a wide range of flow conditions and is consistent with ECCC's expectation for adaptive management and contingency measures.

In Undertaking 7, there is an underlying question as to whether additional flow stations would be helpful in achieving ECCC's mandates for environmental protection. Our position on this point is that the existing flow stations are sufficient for estimation of design flows for the entire length of the road. As stated previously to the Board, both in person (Rozeboom) and in writing, we believe that the regional relationships used to develop design flows for a range of return periods have given results that are conservative (high), especially for the smaller basin sizes. With respect to the present undertaking, it is our opinion that flow data from additional stations would be of no value whatsoever for the design or implementation of sediment and erosion control measures, and hence additional flow stations are not warranted or necessary.

Because of the significant variation in hourly, daily, seasonal and annual flows, a new station would need to be operated for many years to obtain sufficient data to reliably estimate a 2-year flood, and for decades to reliably estimate a 100-year flood. As per guidance documentation from Fisheries and Oceans Canada, channel bankfull hydraulic capacity could be used as a proxy for a 2-year flow, should that be useful for design of sediment and erosion control measures.

It is our understanding that sediment and erosion control measures will primarily address local site grading and drainage basins that are too small to warrant engineering analyses and preliminary designs, as have been provided for fish-bearing crossings. Adaptive management within the sediment and erosion control plan is an appropriate means to respond to additional information or events which may be encountered during the construction and operation of the proposed All-Season Road.

3.0 LIMITATIONS

This report and its contents are intended for the sole use of Canadian Zinc Corporation and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Canadian Zinc Corporation, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user.

4.0 CLOSURE

We trust this report meets your present requirements. If you have any questions, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



Prepared by:
W.A. (Bill) Rozeboom, MBA, P.Eng.
Principal Specialist - Water Resources
Direct Line: 587.460.3611
Bill.Rozeboom@tetrattech.com

A handwritten signature in blue ink, appearing to read "Doug Johnston".

Reviewed by:
Doug Johnston, P.Eng. (Yukon)
Senior Hydrotechnical Engineer
Direct Line: 778.945.5808
Doug.Johnston@tetrattech.com

/cee

PERMIT TO PRACTICE TETRA TECH CANADA INC.	
Signature	
Date	May 18, 2017
PERMIT NUMBER: P 018	
NT/NU Association of Professional Engineers and Geoscientists	

Undertaking 10

Management or Monitoring Plan	Purpose	Project Phase	Review Agencies
Spill Contingency and Emergency Response	Preparation for/response to spills and emergencies	All	PC, INAC, EC, GNWT
Borrow Pits	Development and reclamation for each pit	Construction and operations	PC, EC, GNWT
Sediment and Erosion Control	Limit sediment production and protect water quality, including pre-construction, construction, operations and closure monitoring.	All	PC, EC, GNWT
Road Construction and Maintenance	How the road will be built and maintained, including crossing structures, terrain hazards and dust	Construction and operations	PC, EC, DFO, GNWT
Blasting	Handling and use of explosives	Construction	PC, NRCan, DFO
Invasive Species	Control and monitoring	All	PC, GNWT
Road Operations	How the road will be used and use controlled and monitored	Operations	PC, GNWT
Waste	Collection and disposal of solid waste	All	PC, EC, GNWT
Wildlife Mitigation*	Operating procedures, monitoring and adaptation, including access and harvest tracking	All	PC, EC, GNWT
Contaminant Loading	Monitoring of particulates, soil and vegetation	Operations	PC, EC, GNWT
Aquatic Effects	Assess water quality (sediment) and/or occupancy (Funeral Creek) following significant release or spill	Construction and operations	PC, DFO
Road Closure and Reclamation	Temporary and permanent closure/reclamation	Operations and closure	PC, EC, GNWT
Permafrost Monitoring and Response	Monitor permafrost and potential stability/runoff changes, identify response actions	All	PC, NRCan, GNWT

* Current name. Name may be changed and content modified (added to) to be consistent with the NWT Wildlife Act

PC = Parks Canada, EC = Environment and Climate Change Canada, DFO = Fisheries and Oceans Canada, NRCan = Natural Resources Canada, GNWT = Government of the NWT