

## REVIEW COMMENT TABLE

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## Prairie Creek All-Season Road Project DAR and DAR Addendum (MVEIRB)

## File(s):

**Proponent:** CanZinc Corporation**Reviewer Comments Due By:** Feb 12, 2016**Proponent Responses Due By:** Mar 11, 2016**Documents:** [DAR and DAR Addendum hyperlinked ToC](#) 1**Item For Review Distributed On** Dec 21 at 10:02 [Distribution List](#)

## Item Description

Canadian Zinc Corporation (CanZinc) submitted its Developers Assessment Report (DAR) to the Review Board on April 23rd, 2015. The Review Board conducted an adequacy review of the DAR and on presented CanZinc with requirements for further information so that parties could prepare meaningful and relevant information requests during the next phase of the environmental assessment in an Adequacy Review, released on May 22nd, 2015. CanZinc responded to these adequacy items with the submission of a DAR Addendum and supplementary materials, the last of which was recieved on December 4th, 2015.

The Review Board has reviewed all of the materials submitted by CanZinc to date and has determined that since the majority of required adequacy items have been provided by CanZinc, this environmental assessment can now proceed to the information request phase; however, the four items below remain inadequate and require additional information from CanZinc:

1. effects assessment and descnption for the Sundog Creek re-alignment
2. detailed characterization of permafrost and karst hazards from km 48-59
3. frequency of landslides and avalanches
4. description of terrain from km160-184

Full details on on these outstanding adequacy items are described in the Review Board's Reason for Decision on Adequacy of the Prairie Creek All-Season Access Road DAR located here:[http://reviewboard.ca/registry/project\\_detail.php?project\\_id=680&doc\\_stage=5](http://reviewboard.ca/registry/project_detail.php?project_id=680&doc_stage=5). These outstanding information requirements are due to the Review Board at least four weeks prior to the technical sessions.

Based on this conditional adequacy statement. the next steps in the environmental assessment of the Prairie Creek All-Season Road Project are the review of the DAR, DAR Addendum and supplementary materials by parties and the Review Board. Parties and the Review Board must put their information requests into the ORS system. The purpose of information requests is to give parties and the Review Board the information needed to help reach conclusions about potentially significant impacts of the development on the environment and people.

The timelines for the the next steps in this environmental assessment are as follows:

**February 12th 2016- deadline for parties and the Review Board submit information requests using the online review system (ORS)**

**February 19th, 2016- deadline CanZinc to submit remaining adequacy items**

**March 11th, 2016-deadline for CanZinc to submit responses to information requests**

**Timing of Technical Sessions is dependant on timely submission of outstanding adequacy items and responses to information requests**

Please contact Sachi De Souza or Kate Mansfield with any questions.

## General Reviewer Information

Guidance on the submission of information requests can be found in Appendix F of the Environmental Impact Assessment Guidelines 2004 in the attached link:


[http://www.reviewboard.ca/upload/ref\\_library/MVE%20EIA %20Guidelines 1195078754 pdf](http://www.reviewboard.ca/upload/ref_library/MVE%20EIA%20Guidelines%201195078754.pdf)




The Review Board is using the ORS and Excel spreadsheet format for information requests from parties and responses from CanZinc. The "topic" column contains your DAR reference, the "comment" column contains the preamble and rationale for your IR and the "recommendation" column contains your information request.

## Contact Information


Catherine Fairbairn 867 766-7054 Chuck Hubert 867-766-7052 Robyn Paddison (867)766-7062

## Comment Summary

CanZinc Corporation (Proponent)				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General File	<b>Comment</b>  Tetra Tech EBA Wildlife and Veg memo in response to:		


		MVEIRB (Kate) IR 16, 20, 22, 23, 32, 33		
		GNWT IR 6, 8		
		ECCC IR 1		
		PCA IR 9, 30 - 36, 40 - 45, 47 <b>Recommendation</b> PROPGENFILE		
2	General File	<b>Comment</b>  Hatfield memo in response to fish IRs from:  PCA IR 21, 25  MVEIRB IR 24, 28 <b>Recommendation</b>		
3	General File	<b>Comment</b>  All North road IR responses to:  GNWT IR 15, 17, 22, 26  PCA IR 4, 11, 13, 14, 15, 22, 23  Oboni IR 4 <b>Recommendation</b>		
6	General File	<b>Comment</b>  Tetrattech Risk Analysis - landslide hazards <b>Recommendation</b>		

## CPAWS - NT Chapter: Kris Brekke


ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	CPAWS-NWT Comments EA1415-01 DAR - Shannon Moore	<b>Comment</b>  CPAWS-NWT comments and recommendations in attachment <b>Recommendation</b> CPAWS-NWT comments and recommendations in attachment		
2	Appendix E - Wildlife and Vegetation Report: Section 6.9 Risk of Harvesting Pressure Pgs. 148 -154	<b>Comment</b> This section provides a number of ideas in consideration of restricting or mitigating non-aboriginal resident and non-resident hunting access along the proposed all-season road. Presently we think that a high degree of uncertainty exists when we consider if the proposed mitigations will in fact be enacted. Thus we think that the risk assessment described in Table 6-15: Project Effects on Predicted Harvesting Pressure as being Overall Significance Low is currently very hypothetical and presents only a best case scenario where impacts are minimal. It is stated on page 152, "CZN will be able to impose rules for its employees and contractors (e.g., no hunting or straying off the access road alignment) but does not have jurisdiction to impose rules on others." Thus until it is clear that all of the proposed mitigations to limit harvester access are in fact supported by the GNWT and backed with legislation, regulation, or other legal means such as through the Dehcho Land Use Plan we suggest that the test to determine overall significance considers that all harvesters will have access to the road and thus to adjacent public lands for hunting legally as per current regulations. This would provide a clear baseline to better assess overall significance. It is also important to point out that in other parts of the NWT and Yukon road access is available to the public where roads have been constructed to specifically support mining or other development projects. Consider the Tibbitt to Contwoyto ice road which significantly opened access to harvesting barren-ground caribou, and the Canol Road in the Yukon which provides harvester access to the Redstone mountain caribou herd in the NWT. In each case NWT residents travel long distances to access a harvesting opportunity, there is no reason yet to believe that this trend will cease to continue if the 40km Phase 2 section of the Prairie Creek Mine access road is upgraded. <b>Recommendation</b> Recommendation: Reconsider the rationale for determining the Overall Significance described in Table 6-15. Re-asses the overall significance considering precedence where public access for harvesting in the NWT is granted on roads developed to support mining and other development projects and also include in the re-assessment a baseline scenario where all harvesters have public access to the 40 km Phase 2 section of road and can hunt on adjacent public lands legally as per current regulations.	<b>May 5:</b> In the authors examples re mining roads with public access, no mentioned is made of access controls, as are proposed for the Prairie Creek road. We believe Tetra Tech EBA took these into account, and the fact that the Liard River barge will be private, in their determination of significance.	
3	DAR Section 11.5.1 Drainage and Hydrology & 11.5.2 Water Quality	<b>Comment</b> Hydrological mapping, including of ground water drainage patterns and flow through nearby karst formations has not been included. Hydrological mapping within the road and buffer areas; and including mapping of likely drainage patterns would assist in the management and mitigation of potential water drainage impacts during road construction and operation and would assist in response and mitigation of impacts in the event of potential spill. <b>Recommendation</b> Provide hydrological mapping of the area, including ground water and flow through nearby karst and highlight areas where drainage patterns likely occur.	<b>May 5:</b> This was provided in the DAR, section 4.3.3. Groundwater requires a gradient to flow. Groundwater flow gradients are nearly always a subdued reflection of topography and, therefore, surface flow patterns. The latter are well understood in the area.	

4	General Comment: Borrow Pits (DAR Addendum: Appendix D Evaluation of Potential Borrow Pits, DAR Addendum: Appendix H 100,000 Key Map of Prairie Creek Road Access Map)	<b>Comment</b> Vegetation and wildlife information has been gathered within the right of way of the road and its 50m buffer, however 45.34 ha have been identified as potential borrow sources and borrow pit access roads. 45 of the potential borrow pits identified lie within NNPR. How are impacts on vegetation, wildlife, and the ecological integrity of the borrow pit and surrounding area being evaluated? <b>Recommendation</b> Additional information should be gathered, either with more research or additional field study, to determine the impacts borrow pit development will have on vegetation, wildlife, and the overall ecological integrity of the surrounding area.	<b>May 5:</b> The vegetation and wildlife information available covers much more than the right of way of the road, and certainly is relevant to an area encompassing all of the proposed developments.
5	General Comment: Helipads (DAR Addendum: Appendix H 100,000 Key Map of Prairie Creek Road Access Map)	<b>Comment</b> Approximately 18 potential helipad sites have been identified within NNPR in the DAR. This will require clearing of vegetation and wildlife disruption within park boundaries. What mitigation measures will be in place to ensure that the ecological integrity of areas near helipad sites is maintained? <b>Recommendation</b> We recommend including an assessment of impacts on vegetation, wildlife, and the ecological integrity of the surrounding area from the development and continued use of helipad sites within NNPR.	<b>May 5:</b> The identified helipads already exist. Most required very little clearing. The pads will likely only be used during the detailed design period. Their use represents much less disturbance and activity, and therefore impacts, than the proposed road construction and operations. Other than standard helicopter use protocols and NNPR permit requirements, no other mitigation measures are deemed necessary.

## Dehcho First Nations: Carrie Breneman


ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	DFN's Letter - CZN All-season road project DAR- IRs	<b>Comment</b>  N/A <b>Recommendation</b> N/A		
2	Length of seasonal operation of the haul road and number of vehicles per day	<b>Comment</b> (Submitted after Due Date) Canadian Zinc Corporation provided information on construction and operation of the all-season road in the Developers Assessment Report (DAR) and in accompanying appendices of the DAR including Appendix 1 (Allnorth Consultants Report) and Appendix 7 (EBA Tetra Tech Report). DFN notes that within these reports there are differing descriptions given for the number of days that the haul road will be used for mine operations and the daily volume of vehicle traffic down the road. For example in CZN's DAR, on page 143, CZN states that "The Mine will produce ~120,000 tonnes of concentrate per annum when the Mine is producing at maximum capacity. Therefore, approximately 330 tonnes will be produced daily. A conservative estimate of truck payload capacity is 40 tonnes. This would translate into approximately 8 trips/day. However, this is increased to 9 trips/day to allow for approximately 10% of the time when travel does not occur due to road maintenance issues (rockfalls, avalanches, wash-outs) or poor conditions (white outs or intense rainfall)." In Appendix 1: Allnorth consultants report, page 5, states, "The Liard River crossing will apply seasonal constraints to the operation of the access road. Barge will could be operational from mid-May to early November and the winter ice bridge will be in place from late November to mid-April (however only offers full 60 tonne capacity from mid-January to late March). In addition, NWT restricts legal loads to 75% and/or 5,000 kg on Highway 7 during spring break up from late April to July. So it is expected barge will operate July 1 to late October. Combined, the constraints will leave approximately 225 calendar days per year for full scale concentrate hauling." In Appendix 7: EBA states "Concentrates would be hauled out of the Mine daily to travel the 184 km to the Liard Transfer Facility (LTF) near the Liard Highway. Travel will not occur during periods when crossings of the Liard River are not possible. At the Liard River crossing near Fort Simpson, the 10 year average (1998-2008) dates for ferry operation are May 13 to November 4, and for ice bridge operation November 28 to April 21. However, 60 tonne ice bridge crossings are only possible from January 15, and likely have to end sooner than April 21. Therefore, it is assumed that approximately 250 days would be available for hauling in an average year. Thus, to move 120,000 tonnes of concentrate using trucks with 30 tonne loads, 16 trips per day would be required. DFN assessed the information above using Allnorth consultants (Appendix 1) estimates which includes 40 tonnes loads and the assumption that when the mine is operational HWY 7 will still restrict legal loads to 5,000 kg from late April to July. When considering these constraints, the all-season road would be open during the following days: <ul style="list-style-type: none"> <li>• Barge operational from July 1 to October 31= 123 days</li> <li>• Winter road operational from mid-January to March 31 = 76 days</li> <li>• Total= 199 days</li> <li>• Allow for 10% of the time when travel does not occur = 179</li> </ul>	<b>May 5:</b> See our letter to the Board dated April 1, 2016. See our reply to Riskope IR1, point 5, as follows: a) We anticipate that 2 maintenance crews may be operating on the road at times, a Mine based 'western' crew and a Nahanni Butte-based 'eastern' crew. Each crew could consist of a grader, haul/dump truck and small supervisor truck, although most times it may only be a grader. A loader would be stationed in a borrow pit to provide material for maintenance. However, this loader, and one from the Mine, could be called into action in the unlikely event of an avalanche or slide blocking the road. Assume 2 vehicles on average. b) Crew changes will be by air, on average one flight per week. Weather delays will usually mean only flight delays. Occasionally, a flight may be diverted to Nahanni Butte, followed by personnel busing to the Mine. There may also be very occasional Mine tours via mini-bus. Assume an average of 1 trip/month. c) Road operations and road maintenance supervisors will make periodic inspection trips. There will also be environmental monitors. Assume an average of 1.5 vehicles. d) The vast majority of deliveries will be by back-haul on the concentrate trucks. There will be a very limited number of special deliveries, such as explosives. Assume 1 trip/quarter. e) The above numbers account for all road activities, either by staff or sub-contractors Hauling will take advantage of daylight as much as possible. Trucks may travel in convoy in winter, however in summer, they will be staggered to avoid a bottle-neck at the Liard River crossing.	

		<p>Using a truck payload capacity of 40 tonnes, 17 haul trucks per day one-way would be required. If DFN assumes a 30 tonnes payload capacity (as per Appendix 7), 20 trips one-way are required.</p> <p><b>Recommendation</b> DFN requests that: CZN provide an updated description of the number of operational days that the winter road and the barge will be in use. Also provide a minimum and maximum number of days that the winter road and barge will be operational. CZN provide an estimate of the number of haul vehicles, maintenance vehicles and other traffic for mine operations that will be travelling along the All-Season road. CZN provide an estimated schedule of when haul vehicles will be travelling along the road. CZN should also mention whether they plan for the vehicles to travel in a convoy or if they are spaced throughout the day.</p>	
3	Permafrost detection and quantitative permafrost analysis	<p><b>Comment (Submitted after Due Date)</b> In the DAR Tetra Tech EBA states, "Though most of the route has the potential to cross permafrost, not all of it is thaw-sensitive. Tetra Tech EBA estimated that about 73 km likely has at least some thaw-sensitive permafrost, and another 24 km may also have thaw-sensitive permafrost, but slope aspect or elevation makes it slightly less likely. Based on a qualitative risk assessment, Tetra Tech EBA estimated that about 7.2 km of the terrain along the proposed all-season route represents a high risk to the road route with respect to slope instabilities or other ground movements, and 54.9 km represents a moderate risk, out of a total of 174.1 km evaluated." In Tetra Tech EBA's Appendix it states "Based on the review of available information and the 2014 ground-truthing, it is anticipated that the permafrost in some sections of the route may contain layers or lenses of soil that have excess ground ice. The practical implication is that thawing with resulting settlement and ponding could occur in the subgrade along the toes of the road embankment, the numbers or areas of thaw-related slope failures could increase, thaw settlement beneath culverts could cause water flow to be blocked with potential accompanying slope stability issues, and settlements or potentially even failures of road grades could occur. Settlement and ponding are common along the toes of road embankments in warm permafrost, for example, along the reconstructed section of Yellowknife Highway 3 between Behchoko and Yellowknife, where there are also several road sections with relatively severe differential settlements. The nearby Liard Highway 7 has had significant issues and requires significant maintenance efforts, and is constructed in very similar terrain in terms of ground and permafrost conditions as much of the proposed route. Although it is recognized that the territorial highways have different operating and service life requirements as compared to a resource road, and they have not necessarily all experienced the same construction methods and conditions, they do offer some useful comparisons. Accordingly, potential issues with thaw-sensitive permafrost along the proposed Prairie Creek all-season road would be expected to become more frequent as the permafrost becomes warmer, and more likely to start gradually thawing. Therefore, the consequences of permafrost thaw can be potentially significant, and they are characterized as potentially "major" for structures supported by shallow or deep foundations within fine-grained permafrost with excess ice, but likely "minor" for structures supported on frost-stable granular soils or bedrock beneath the surficial sediments. Such structures would include bridges and culverts along the route in locations where permafrost is present. For road embankments, the consequences of permafrost thaw could be "major" where thaw settlement under culverts goes unnoticed for a long period of time potentially blocking natural water flow, and "minor" for road surfaces that can be readily re-levelled with more fill. These consequences can be mitigated by a reasonable inspection and maintenance schedule. For structures supported by foundations on or in thaw-sensitive soils, the site-specific permafrost sensitivity and associated consequences together results in a risk level "A" (high risk) as defined in CSA (2010). This level of risk warrants a quantitative analysis to evaluate the ground thermal regime expected to develop beneath the proposed structure over its lifetime. The initial step to proceed with this level of analysis would be to improve the site characterization by conducting a site investigation with boreholes deep enough to determine depths and thicknesses of permafrost. This type of analysis is also useful in optimizing embankment designs in road sections traversing permafrost. It is anticipated that major structures will require a site investigation to determine geotechnical design parameters in any case, irrespective of the anticipated absence or presence of permafrost."</p> <p><b>Recommendation</b> DFN requests that Tetra Tech EBA address the method they used to identify thaw sensitive permafrost along the proposed All-season access road and the accuracy of these methods for determining the extent and severity of the permafrost. DFN also requests that CZN address if the quantitative analysis to evaluate the ground thermal regime beneath major structures and embankment designs in road sections traversing permafrost has been completed. DFN requests that CZN address the types of mitigation measures that will be employed around major structures and embankment design in road for areas of the road that are overlaying permafrost.</p>	<p><b>May 5:</b> The methods to identify thaw sensitive permafrost include visual and remote terrain analysis, soil characterization, shovel tests and test pits, and auger/drill holes. All of these have been completed except the latter. Auger/drill holes will be completed as part of detailed design. Quantitative analysis to evaluate the ground thermal regime beneath major structures and embankment designs in road sections traversing permafrost will be completed during detailed design. See Tetra Tech EBA document attached to Board IR13.</p>
4	Haul Road Design Plan	<p><b>Comment (Submitted after Due Date)</b> Within the DAR, CZN provides a description of the design plan of the road which includes terrain and road grade but found a lack of detail regarding stopping distance and line of sight along the road. From Haul Road Design Guidelines (Tannant and Regensburg 2001): "Geometric elements</p>	<p><b>May 5:</b> See our reply to Riskope IR1, point 6, as follows: All sections of the road will have sign-posted speeds. Road operations will be managed using a</p>

		<p>of haul roads should be designed to provide safe, efficient travel at normal operating speeds. The ability of the vehicle operator to see ahead a distance within which he can stop the vehicle is a primary consideration. Vehicle stopping distance is one component that must be evaluated for each type of vehicle in the haulage fleet to allow the designer to establish horizontal and vertical road alignment. Associated with the vehicle stopping distance is the operator "sight distance". It is imperative that everywhere along the road alignment the sight distances be sufficient to enable a vehicle travelling at the posted speed to stop before reaching an obstruction or hazardous situation on the road ahead. On vertical curves, the sight distance is limited by the road surface at the crest. On horizontal curves, steep rock cuts, trees, structures, etc. limit sight distance. The distance measured from the driver's eye to the hazard ahead must always be equal to or greater than the distance required to safely stop the vehicle." As CZN cannot restrict non-company traffic along the haul road both vehicle stopping distance and sight distance are imperative to ensuring safe travel along the road. In addition, vehicle stopping distance and sight distance are also important for determining how able vehicles are to prevent collisions with animals along the roadway.</p> <p><b>Recommendation</b> DFN requests that CZN provide information on speed limits along the proposed Allseason access road and how CZN will enforce speed limits along the proposed All-season access road. DFN requests that CZN provide information on the vehicle stopping distance and sight distance along the proposed all-season road and how these relate to the proposed speed limits along the All-season road. Within the DAR, CZN states "Policy giving wildlife the right-of-way, which obligates the drivers to stop (when safe to do so) for all wildlife seen on or immediately adjacent to the road, to allow them to move away". DFN encourages the use of this mitigation measure. However, DFN would also like to see evidence that CZN is designing the road to discourage wildlife collisions. DFN requests that CZN provide a link between vehicle stopping distance, sight distance and speed limits along the proposed All-season road and mitigating collisions for animals along the roadway.</p>	<p>Journey Management System. This logs vehicles starting and ending trips, and in the case of concentrate trucks, trip progress (i.e. speeds, stops). We will know from monitoring whether vehicles are exceeding speeds. Supervisors and monitors on the road will also provide oversight. Stopping distances will not be significant because of the limited speeds. Speed limits and hazard warning signs will account for sight distances, especially any 'blind' corners. Note, haul and maintenance vehicles will be in radio communication to coordinate passing, and so will know about on-coming traffic in advance. The speed limits will be set by a qualified Road Operations Supervisor prior to commencement of haul operations. The setting of speed limits as described above will account for stopping distances and sightlines in terms of the potential for wildlife collisions also.</p>	
5	Permafrost and Geotextile fabric	<p><b>Comment (Submitted after Due Date)</b> For sections of the road overlaying permafrost "the natural ground layer would not be disturbed (no stripping), any right way timber and appropriate vegetation would be placed horizontally in a corduroy style in the road prism to help support the road subgrade. In some situations corduroy material will be capped with geotextile fabric" (page 14, Appendix 1).</p> <p><b>Recommendation</b> DFN requests that CZN provide a rationale for placing timber and vegetation to support the road subgrade rather than using geotextile fabric. DFN also requests that CZN elaborate on when corduroy material will be capped with geotextile fabric. DFN also requests that CZN address the quantity of vegetative needed for the corduroy and where this material will come from.</p>	<p><b>May 5:</b> See Allnorth document attached. Geotextile may be used in addition to corduroy in some sections particularly susceptible to settlement to provide extra rigidity and road bed support. Vegetation for corduroy will come from right-of-way clearing. The volume of the latter will be well in excess of corduroy needs. <b>May 6:</b>  Allnorth Report</p>	
6	Steep terrain and runaway lanes	<p><b>Comment (Submitted after Due Date)</b> 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 where 12% has been applied. Reducing the grade would change the road alignment significantly, adding additional length, cost, and environmental footprint.</p> <p><b>Recommendation</b> It is DFN's understanding that no runaway lanes will be present along the CZN's All-season access. DFN requests CZN address why no runaway lanes will be used along the All-season access road. DFN requests that CZN describe what the requirements or criteria are for runaway lanes along mining haul roads.</p>	<p><b>May 5:</b> See Allnorth document attached to DFN IR4.</p>	
7	Borrow sites and testing for ARD	<p><b>Comment (Submitted after Due Date)</b> On page 76, Allnorth Consultants states, "Many of these outcrops, where tested, indicate that the parent material is calcareous as well and they constitute an acid absorbing material, not an acid generating material. While this does not guarantee that there aren't any shale deposits to be found along the route with a high sulphide content, it does indicate a low likelihood of encountering acid generating shale's in the majority of borrow pits. All potential shale pits under consideration will have an initial acid rock evaluation carried out prior to being developed. If any source is found to be potentially acid generating, the use of that source will be either avoided, or if need be, it will be mitigated using industry best practices, including neutralizing any acid effects by layering it with the large quantity of carbonate rock material available near most locations."</p> <p><b>Recommendation</b> Acid rock drainage (ARD) and metal leaching (ML) developed as a result of road construction represents a number of technical, environmental, and social problems. Engineering impacts from ARD, the product of atmospheric oxidation of rock-forming sulfide minerals, including degradation of surface water quality, disintegration of construction materials, and structural damage of buildings, have been documented widely around the world. Due to the serious consequences of ARD and ML, DFN requests that CZN: Address how CZN will test for acid generating and metal leaching material in the borrow pits. Address how CZN will predict the likelihood of ARD occurring and determine the quantity of carbonate rock material needed to neutralize the acid generating material.</p>	<p><b>May 5:</b> See response to ECCC IR4, as follows: In the probing and sampling of borrow sources to date, there has been no indication of any potential for acid drainage or metal leaching. It should be recognized that the road crosses predominantly carbonate terrain with an abundance of neutralization capacity, and as such, the potential for ARD/ML is low. None of the areas investigated show evidence to the contrary e.g. pyrite, other sulphide metal or typical gangue mineral (e.g. quartz) presence, iron staining. However, detailed investigation and sampling of all borrow sources will occur during the detailed design phase. Representative samples will be selected from each borrow for acid-base testing. Depending on the results of these tests, more samples may be analysed, and for more tests, such as leaching tests, as necessary, under the guidance of a professional ARD geochemist. Any borrow with a positive identification of ARD/ML</p>	

			potential will not be used. Any borrow with marginal ARD/ML potential will either not be used, or used based on mitigation procedures defined by a professional ARD/ML geochemist.	
8	Section KP 90.5 to KP 94.5	<p><b>Comment (Submitted after Due Date)</b> From KP 90.5 to 94.5, Allnorth consultants describe an Interesting landscape with large "island like" dry humps covered with dense layer of mature, small diameter aspen, spruce, and jack pine; surrounded by a network of wet to very wet black spruce, and tamarack. The road will jump across these wet sections "island to island" utilizing the mixture of silt / fine sand material as borrow source for typical overland construction.</p> <p><b>Recommendation</b> DFN requests that CZN provide more detail regarding the construction through this section. Will the network of wet to very wet black spruce and tamarack need to be drained prior to construction in this area? Will the roadbed that traverses the very wet sections need to be built up higher to network from "island to island"?</p>	<p><b>May 5:</b> Allnorth means that the dry hump locations will be used as part of the road alignment. The humps will be removed for borrow in road construction, and the hump footprints will form solid bases for the road. The network of wet to very wet black spruce and tamarack will not need to be drained prior to construction. Borrow from the humps will be placed to displace the water and provide a firm footing. The roadbed that traverses the very wet sections will not need to be built up higher to network from island to island because the islands will be 'borrowed'.</p>	
9	Wolverine Pass	<p><b>Comment (Submitted after Due Date)</b> From KP 95.5 to KP 101, Allnorth consultants describe, "The location utilizes the winter route with some modifications to avoid stability concerns identified by the Geotechnical Engineer. The road climbs up from Fishtrap Creek valley bottom gaining over 300 m in elevation up to "Wolverine Pass". In general, the hillside is considered a geotechnical concern regarding slope / ground stability however the proposed location offers reasonably safe passage. The final construction approach taken will follow Geotechnical Engineer guidelines."</p> <p><b>Recommendation</b> Allnorth consultants note that there are geotechnical concerns regarding the slope and ground stability and also note that the construction approach will follow the Geotechnical Engineer guidelines. DFN requests that CZN detail how they will mitigate the slope and ground stability issues and reference the Geotechnical guidelines that they will be following.</p>	<p><b>May 5:</b> To a large extent, slope and ground stability issues have already been mitigated by virtue of terrain assessment and detailed ground-truthing of the proposed route. Further mitigation will be built into the road during detailed design based on geotechnical input, such as drainage structures and slope stability enhancement, as necessary. Re geotechnical engineer guidelines, Allnorth means directions and recommendations of a geotechnical engineer.</p>	
10	Sundog Creek Re-alignment	<p><b>Comment (Submitted after Due Date)</b> Within CZN's All-season Road DAR, CZN provides a description of the Sundog Creek realignment. CZN states "Sundog Creek in these locations has a large floodplain and the location of the active channels changes from year to year. It is possible that natural changes to flow over time would remove the current active channel along the cliff face. There are a number of old channels in this area. Our plan is to "train" the creek to flow in one of the old channels away from the south bank. Figure 6-2 shows the proposed new creek alignment after training. The fish habitat against the south bank will be lost, but would be replaced by comparable new habitat to the north. Deepening an old channel by excavation, and placing the excavated material in the existing channel would accomplish training. 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. In order to ensure the excavated channel remains open and utilized long-term, a series of very large (small car-size) boulders would be placed in the channel. Spring flows will scour around the boulders and create deep pools, re-creating the pools that exist on the south bank. The boulders should also ensure the trained creek stays in the channel. An additional benefit of placing large boulders here is that they would provide refuge habitat (back eddies). Figures 6-3 and 6-4 show oblique photos of these areas and where the new channels would be located relative to the current channels. This approach was discussed with a professional hydrologist, who confirmed that it is feasible." On page 246, CZN states, "Replace any habitat losses to the satisfaction of DFO".</p> <p><b>Recommendation</b> DFN is requesting that CZN provide more information on the fish habitat created in the Sundog Creek realignment including the design details of the fish habitat. Specifically, DFN would like more information on the size, general dimension and discharge and velocity of the water of the lost fish habitat. DFN would also like more information on the size, general dimension and discharge and velocity of the water of the created fish habitat. DFN would like more detailed information from CZN on what DFO's requirements are for habitat loss replacement including:</p> <ul style="list-style-type: none"> <li>• Design details required during construction of the new habitat</li> <li>• Hydrological parameters required by DFO</li> <li>• Fisheries monitoring during and post construction</li> <li>• Adaptive management strategies</li> </ul>	<p><b>May 5:</b> See our reply to the Reasons for Decision on Adequacy of the DAR dated April 12, 2016. We advise DFN to consult DFO directly regarding their requirements for habitat loss replacement. However, regarding the proposed creek re-alignment, design details and hydrologic parameters are provided in the above noted document.</p>	
11	Road Reclamation	<p><b>Comment (Submitted after Due Date)</b> On page 223 of the DAR, CZN states, "It is understood that the all season access road will be reclaimed within six years of the closure of the Prairie Creek Mine site. As part of the reclamation objectives for the project, it is anticipated that re-vegetation of the roadway, borrow sources and other disturbances associated with the development of the all season access road will occur primarily through encroachment of native species from surrounding vegetation communities."</p>	<p><b>May 5:</b> Evidence from the old winter road indicates that some sections will completely revegetate in 20-30 years, while others will take longer. Measures to limit use of the roadway after closure will be implemented during reclamation, including bridge and culvert removal</p>	



		<b>Recommendation</b> DFN requests that CZN explain how long they anticipate it will take for the road to become re-vegetated through the encroachment of native species from surrounding vegetation communities. DFN also requests that CZN explain how long it will take for the road to become impassable.	(which necessitates overlying roadbed removal). The installation of strategic 'tank' traps can also be considered, as necessary.	
12	Snow Drifting	<b>Comment (Submitted after Due Date)</b> On page 236, CZN states, "In areas where snow drifting proves to be an issue along the road, strategies to reduce snow drifting can be examined, designed and installed. It should be recognized that permafrost thaw is unlikely to be prevented, but it may be possible to mitigate the effects of thaw and settlement (TAC 2010)." <b>Recommendation</b> How specifically will CZN identify where snow drifting proves to be an issue along the road? What strategies is CZN considering to use to reduce snow drifting?	<b>May 5:</b> See the attached Tetra Tech EBA reply attached to GNWT IR27.	
13	Cutslopes in Thaw-sensitive Terrain	<b>Comment (Submitted after Due Date)</b> On page 236, CZN states, "Cutslopes in thaw-sensitive terrain should be avoided if at all possible. If cutslopes in thaw-sensitive terrain are unavoidable, mitigative solutions are limited and are accompanied by a much greater need for vigilance in monitoring and maintenance to avoid the types of situations described in Section 7.1.1 above. Depending on the site characteristics, it may be possible to protect some cutslopes with a drainage blanket to help mitigate the effects of thaw and meltwater (TAC 2010), or design near-vertical cutslopes to allow the organic layer to be draped over the cutslope to shade and protect it (INAC 2010a). However, these possibilities are not considered to be universal solutions." <b>Recommendation</b> Has CZN assessed whether or not cutslopes are required in thaw-sensitive terrain? What specific mitigation measures will CZN employ for cutslopes in thaw-sensitive terrain?	<b>May 5:</b> The objective is to try to have fill-only embankments in potentially thaw-sensitive terrain. However, there are a few sections where cut-slopes cannot be avoided. Between KP 90.6 and KP 94.2 (where up to 30% of the terrain may be subject to creep in permafrost), the road will pass through "islands" with some cuts, and there is a possibility of permafrost presence. Also, there is a possibility of a few cut locations on the west side of the Silent Hills, although the route was chosen to avoid cutting, and with an expectation of filling rather than cutting. On this slope, SLI did not find obvious frozen soils, just "cold" soils. However, the possibility of permafrost on this slope cannot be discounted. Regarding mitigations if cut-slopes occur, typical examples were noted in the Tetra Tech EBA geotechnical report. Mitigations will need to be site-specific according to the needs identified at the time of detailed design. Transportation Association of Canada (TAC, 2010) provides some good guidelines.	
14	Culverts in permafrost areas where there are no obvious stream channels	<b>Comment (Submitted after Due Date)</b> On page 236, CZN states, "Careful placement of culverts even where there are no obvious stream channels will help reduce the likelihood of ponding water alongside the road embankment. Permeable embankments may also be an option in some locations, particularly in areas of ice-rich permafrost, and these can be supplemented with an overlying culvert to pass spring flows (TAC, 2010). It is anticipated that regular inspections of drainage measures after installation will help to identify areas that might unexpectedly pond water, and corrective actions can be taken. The same applies to flowing surface water, and regular inspections will help identify areas where surface water drainage provisions need to be changed or improved." <b>Recommendation</b> Has CZN assessed whether additional culverts are needed to reduce ponding water alongside the road embankment?	<b>May 5:</b> This is an activity to be completed during detailed design.	
15	Hanging culverts	<b>Comment (Submitted after Due Date)</b> Healthy aquatic habitats and ecosystem functions require habitat connectivity. Hanging culverts act as a barrier to habitat connectivity by altering the flow of water and blocking the movement of fish and other aquatic organisms. Hanging culverts can prevent fish from reaching key areas of their habitat (such as spawning or feeding grounds), which results in lower fish populations, less species diversity and lower genetic diversity to keep populations healthy. The effects of hanging culverts can extend beyond fish species. Many other species such as birds, water shrews and minks feed on and rely upon abundant fish and/or aquatic insects populations. In a study published in 2008 (Park et al 2008), 50% of the culverts surveyed (in four watersheds within Alberta) were hanging and the occurrence of a hanging culvert was positively and significantly related to culvert age and reach slope. <b>Recommendation</b> Has CZN considered mitigation measures to reduce the likelihood of hanging culverts along the proposed Allseason road?	<b>May 5:</b> Culverts to be placed in small streams that are potentially fish-bearing will be partly submerged in the stream bed in order to provide a natural substrate through the culvert. In the unlikely event that the culvert starts to 'hang', it will be removed and re-installed.	
16	Culverts in permafrost areas	<b>Comment (Submitted after Due Date)</b> From INAC Northern Land Use Guidelines: In permafrost terrain, warm air circulating culverts during summer may lead to thawing of permafrost in the roadbed and ground instability. To prevent thawing of permafrost, insulation can be placed around culverts during installation or flexible covers can be placed on the ends of large culverts to reduce circulation of warm air. <b>Recommendation</b> DFN requests that CZN address how they will address warm air circulating in culverts during the summer which may lead to thawing of permafrost in the road bed and ground instability.	<b>May 5:</b> See document attached. <b>May 5:</b>  Response to DFN IR15	
17	Maintenance over	<b>Comment (Submitted after Due Date)</b> In a recent study from the Yukon	<b>May 5:</b> Road maintenance and	

	permafrost sections	Government, public highway maintenance costs were up to 10 times higher in sections of the highway with underlying permafrost than in non-permafrost areas. DFN acknowledges that public highways have different construction and maintenance requirements compared to mining haul roads. However, the need for increased monitoring and maintenance on portions of public roads with underlying permafrost provides a useful comparison to the CZN All-season road. <b>Recommendation</b> DFN requests that CZN provide information on the additional highway monitoring and maintenance may be required for the sections of the road with underlying permafrost.	monitoring is always on an as needed basis. Regarding permafrost, these requirements will be minimized by virtue of the road design and the incorporation of corduroy, and also by the construction plan to allow subgrade to settle before placing the top layer. Nevertheless, maintenance and monitoring is inevitable and will be undertaken as required.	
18	Dust Suppression	<b>Comment (Submitted after Due Date)</b> On page 243, CZN states water "Withdrawal may be necessary for dust suppression". On page 245, CZN states "Water withdrawal will be required for dust suppression and potentially for potable water during construction". <b>Recommendation</b> DFN requests that CZN clarify whether water withdrawal is required for dust suppression and what water sources CZN is proposed to use.	<b>May 5:</b> Water withdrawal may be required for dust suppression. Re water withdrawal, see DAR Addendum, section 4.11.	
19	Avalanche Control	<b>Comment (Submitted after Due Date)</b> Within the DAR, CZN mentions that there are avalanche risks along the proposed All-season road. <b>Recommendation</b> DFN requests CZN provide information on avalanche monitoring along the proposed All-season road during the winter months including where avalanche monitoring will occur and how CZN will determine if there is a risk of avalanches. DFN also requests that CZN provide information on what avalanche controls are being considered.	<b>May 5:</b> See our reply to the Reasons for Decision on Adequacy of the DAR dated April 12, 2016. As noted, CZN will be following the recommendations in the avalanche consultants' report, and this will include monitoring. We believe it is premature to consider controls. Note, the highest risk areas will be avoided with the proposed Sundog re-alignment between Km 24-29.	
20	Private road through Dehcho Land Claims Settlement	<b>Comment (Submitted after Due Date)</b> In the DAR, CZN states, "The premise would be that a no shooting corridor on the Prairie Creek road would deter hunting because vehicles would have to travel off-road beyond the 1 km corridor. However, there are some considerations. First, ENR maintain that the corridor would need to apply to all people, aboriginal and non-aboriginal, although a Band on the Ingraham Trail disputed this based on infringement of aboriginal rights. Second, the GNWT would have to agree to, and provide the necessary resources for, enforcement. We believe that NDDB members could be co-opted to assist with the enforcement, given that they will be manning the check-point, and staffing environmental monitoring of the road based on a previously agreed commitment by CZN. We have discussed this initiative with the Bands and government departments, and believe it is feasible. Currently, some NDDB members, the acting Chief and Council of LKFN, and Industry, Tourism and Investment (ITI) are in support. Engagement is continuing. Another initiative CZN is interested in is having the land (around the road) designated as private as part of a Dehcho land claims settlement. The road would then be private and could be legally gated. CZN would have a road use agreement with the NDDB or DCFN. This is the model adopted by Fortune Minerals for access to their Nico project in the Tlicho. The difficulty of this initiative is that the schedule of land claims settlement cannot be determined, although we understand progress is being made and there is optimism that a settlement may occur soon." <b>Recommendation</b> It is DFN's opinion that the land claims settlement will not be concluded during the schedule of environmental assessment process for CZN's All-season Road. As a result, we do not believe that having the land around the road designated as private would be an effective mitigation measure and should not be considered in the Environmental Assessment Process. DFN recommends that CZN consider the road cameras to monitor and quantify how many people using the road other than CZN employees or contractors.	<b>May 5:</b> We are inclined to agree that Dehcho land claims settlement is unlikely to be concluded during the schedule of the EA process. However, we do not agree that having the land around the road designated as private would not be an effective mitigation measure. A private road designation would allow access restrictions to unauthorized users legally. If the Board approves the project, there will be a permitting phase, and once financing is in place, a period of design and construction before operations commence. It is conceivable that land claims could be settled during that period. In summer, it would be difficult to access the interior other than by using the road. The proposed check-point will monitor road use. Motion-triggered cameras could be considered if there is suspected to be by-pass of the check-point.	
21	Socio-economic Description	<b>Comment (Submitted after Due Date)</b> On page 118, CZN provides a socio-economic description with data from 2011. <b>Recommendation</b> If updated information is available, DFN requests that CZN update the socio-economic description with more recent data.	<b>May 5:</b> See our replies to Board IR's 39 and 40, as follows: The 2015 numbers present essentially the same picture as in past years. Population data are much the same e.g. Nahanni Butte, 97 residents in 2014, 94 in 2015. Data on traditional activities is still from 2013. Newer data is not available. Labour force data for 2015 are an update since 2009. Participation, unemployment and employment rates, respectively, are slightly different e.g. Nahanni Butte (50 vs 53.3, 13 vs 18.4, 44.6 vs 43.5) and Fort Simpson (68.9 vs 72.9, 12.2 vs 10.5, 60.5 vs 65.3). Therefore, assumptions made in the DAR do not change. Re 2014 aboriginal educational attainment in the NWT, total population has increased since 2006 (16,837 vs 14,465), numbers attending high school but not obtaining a diploma are about 10% less (7,195 vs 7,920), however	



			numbers obtaining at least a diploma show a marked increase (9,195 vs 6,545). In Nahanni Butte, % with high school diploma in 2014 dropped markedly to 15.5, while % increased significantly in Fort Simpson to 73.5. Fundamentally, these numbers do not alter previous assumptions, which are that: Fort Simpson host the largest available labour pool and are more likely to benefit from Mine operations in terms of jobs than other communities; and, focussed training is required to maximize job potential in Nahanni Butte.	
22	Mineral Licks	<p><b>Comment (Submitted after Due Date)</b> From page 210, CZN states "Northern Mountain Caribou, Moose, Dall's Sheep, and Mountain Goats travel several kilometres to reach mineral licks. During this time, they may encounter the proposed all season access road, as mineral licks are known within 11 km of the Mine site, Phase 1 KP 10, Phase 2 KP 151-157, the Nahanni Access Road, and along the Liard Highway. No mineral licks are known near the proposed airstrip. Dall's Sheep, particularly ewe groups (with lambs and yearlings) commonly utilize mineral licks from June to early October; however, they are also known to habituate to human activities since they are consistently observed at the Prairie Creek Mine site. Since the traffic volumes are low, the all season access road is not considered a barrier to movements."</p> <p><b>Recommendation</b> DFN requests that CZN provide more information regarding the distance from mineral licks at KP 10 and KP 151-157 to the All-season access road. DFN also requests that CZN provide more information on proposed mitigation measures for salt licks adjacent to the All-season access road. If these mineral licks are adjacent to the road and animals are found there frequently, CZN should consider warning signs and posting reduced speed limits along these sections to prevent collisions with wildlife.</p>	<p><b>May 5:</b> As noted, the KP10 lick is 11 km north, which is 5 valleys away. KP 151 is 10 km east of a lick north of the Liard River. The road is a few 100 m from three mineral licks near KP 157, the junction with the Nahanni Access road. If animals are found anywhere close to the road frequently, we will consider warning signs and posting reduced speed limits to minimize the potential for collisions with wildlife.</p>	
23	Wildlife Collisions	<p><b>Comment (Submitted after Due Date)</b> Within the DAR, CZN states "Traffic during construction, operation, and closure phases pose a low risk to wildlife. Across the NWT, vehicle collisions do not pose a major threat to Boreal Caribou (Species at Risk Committee 2012). Only "very small numbers" of accidental mortality from vehicle collisions have been reported across NWT to date (Species at Risk Committee 2012). The risk of wildlife-vehicle collisions is low due to suitably slow speed limits and low traffic volumes on the road."</p> <p><b>Recommendation</b> DFN requests that CZN address what is considered a "low number" of wildlife-vehicle collisions on the All-season road. What is considered a moderate or high number of wildlife-vehicle collisions? Will CZN have a method to keep track of vehicle collisions along the proposed All-Season Road? If wildlife-vehicle collisions are exceeding a moderate amount, what adaptive management could be employed to reduce collisions?</p>	<p><b>May 5:</b> Regarding wildlife-vehicle collisions, the request is asking for a qualitative assessment of severity. This depends on the animal and nature of the collision, for example, did it result in a mortality. However, we would suggest that a low number of collisions per season would be one, moderate 2, and high 3. All incidents occurring along the road will be tracked and recorded. If any wildlife-vehicle collisions occur, we will immediately reconsider signage and speed limits for that section. Collisions should not occur because of the vehicle speeds, sight-lines and short stopping distances.</p>	
24	Wildlife Mitigation and Monitoring Plan and Controlled Road Use Plan	<p><b>Comment (Submitted after Due Date)</b> CZN states that potential wildlife impacts will also be mitigated by use of the Wildlife Mitigation and Monitoring Plan. On page 215, CZN also states that potential impacts on wildlife will be mitigated by use of "Strict use of CZN's Controlled Road Use Plan"</p> <p><b>Recommendation</b> DFN notes that the Wildlife Mitigation and Monitoring Plan is from 2011 and only considers the winter road and not the All-season road. DFN requests that CZN provide an update of the Wildlife Mitigation and Monitoring Plan as soon as possible. DFN requests that CZN provide an update on the Controlled Road Use Plan.</p>	<p><b>May 5:</b> Tetra Tech EBA provided proposed modifications to the WMMP in their report in the DAR Addendum, Appendix E, section 10. Monitoring plans will be reviewed and updated during the permitting process or as conditions of issued permits. The Controlled Road Use Plan has been superceded by the Road Operations Plan, but there is more relevant wildlife-related detail in the WMMP.</p>	
25	Grizzly Bears and the All-Season Access Road	<p><b>Comment (Submitted after Due Date)</b> On page 214, CZN states "CZN's recorded anecdotal sightings suggest the numbers of grizzlies in the immediate area is low (as expected for species with large home ranges), and those present are currently not perturbed by the road."</p> <p><b>Recommendation</b> DFN requests that CZN address: What is meant by immediate area? How frequently does CZN traverse the 182.4 km road in the spring/summer months when bears may be present? And how frequently have CZN staff members seen bears when they have traversed the road? What habitat and food is present for bears along the road? Were other signs of bears such as scat or rub trees present along the road? DFN also notes CZN's comment that "bears present may not be perturbed by the road". The road currently has very limited traffic compared to when it will be upgraded to an All-season road.</p>	<p><b>May 5:</b> The immediate area is the Prairie Creek valley several kms upstream and downstream of the Mine. CZN's traverses of the 182.4 km road in the spring/summer months varies according to needs. We would not consider it to be frequent, but from 2004 to 2015, we have undertaken approximately a dozen different surveys, varying in length from a few days to 2-3 weeks. There have been 2 grizzly sightings, one near Km 23, and one near Km 39. Cranberries are common in vegetated areas in the mountain valleys, especially Prairie Creek, adjacent to the</p>	

			road and further upslope. Bear scat is occasionally noted on the road along Prairie and Funeral Creeks.	
26	Mountain Goat and Dall's Sheep distribution change due to land use development	<p><b>Comment</b> (Submitted after Due Date) On page 214, CZN states "Like Mountain Goats, Dall's Sheep are generally reluctant to move from their mountain black and therefore their distribution across the landscape changes little over time as a results of land use development".</p> <p><b>Recommendation</b> DFN requests that CZN provide evidence or cite studies that conclude that Mountain Goats and Dall Sheep are not affected by road development or vehicle traffic.</p>	<p><b>May 5:</b> Mountain goats may occur south of the Mine nearer the South Nahanni River, but they have never been seen proximal to the road corridor. Dall sheep are common on the slopes adjacent to the Mine, and their behavior and numbers have remained the same through periods of high activity, including vehicle traffic associated with exploration drilling and road repairs.</p>	
27	Rock Blasting	<p><b>Comment</b> (Submitted after Due Date) Within the DAR, CZN mentions that it will be using explosives to blast rock along sections of the road. For example, on page 245, CZN states, "Blasting will need to be completed at the three Sundog crossings, although only one is fish-bearing (Km 28.3)."</p> <p><b>Recommendation</b> DFN requests that CZN detail on a map where the explosives will be used along the road alignment and the quantity of explosives that will be used. DFN also requests that CZN provide information on the distance between the blasting sites and any mineral licks or wildlife attractants. DFN requests that CZN detail any sensitive habitat or time periods (calving periods or bird migrations) that CZN is considering when using explosives. In the case of Sundog creek, how will CZN avoid fish and fish habitat when using explosives? What is CZN's protocol to "check" for wildlife in the follow-out area of the blasting?</p>	<p><b>May 5:</b> Maps are provided in the DAR, Appendix 1, Appendix I. Blasting will occur along Sundog Creek at KP23.4, KP25.3, from KP28 to 29, and at KP36.7 and 37. The quantity of explosives to be used will be small since the volume of rock to be removed is not substantial. Mineral lick locations were described in IR21 above, and are distant from the blasting sites. No wildlife attractants are known in upper Sundog where the blasting will occur. Vegetation is sparse in the locations. The blasting will be conducted in the summer/fall period. No sensitive habitats have been defined proximal to the blasting sites, other than Sundog Creek which hosts grayling at KP28 to 37. Regarding Sundog Creek and blasting, see our reply to DFO IR8, as follows: a. Blasting will be done in dry conditions outside of the spring period. Regarding blasting in proximity to fish-bearing streams, of the 4 locations previously noted, the Grainger location will no longer require blasting if the alternate road alignment from Grainger Gap to Wolverine Pass is adopted. However, a blasting location in Sundog (Km 28-29) was added. This location and the lower Sundog location at Km 36.7-37 are proximal to potentially fish-bearing reaches. b. If fish could be present and there is potential for blasting to contravene DFO's Measures to Avoid Harm or result in instantaneous pressure changes &gt;50kPa, a survey for fish presence in the area will be made, and if necessary, fish will be relocated. As noted in the Hatfield memo, Appendix 10 of the DAR, long stretches of Sundog Creek are usually dry in summer and fall, and fish presence is restricted to a limited number of pools. These fish would be relocated to other, deeper pools in the area, if necessary. DFN will need to explain what they mean by "follow-out". The blasts will be low in intensity and only sufficient to break-up the rock to be removed. Normal practice is to ensure the area is clear of people and wildlife before a blast is fired.</p>	
28	Sensitive Wildlife Alert System	<p><b>Comment</b> (Submitted after Due Date) CZN states, "An alert system 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;</p> <p><b>Recommendation</b> DFN requests that CZN provide more detail regarding the alert system that will be used to warn personnel of Woodland Caribou, i.e. will information be relayed over the radio or some other form of communication. DFN requests that CZN detail what other wildlife is considered "sensitive". If Woodland Caribou or other sensitive wildlife are found to be close to the road, what types of mitigative measures will CZN use. For example, if wildlife are found in areas adjacent to the road, will reduced speed limits be imposed?</p>	<p><b>May 5:</b> Radio communications will be employed for all road and air transport operations. Wildlife sightings proximal to the road or airstrip will be relayed to warn personnel and other users. Other sensitive wildlife would include grizzlies and Dall sheep, although in the context of possible collisions, moose also. This is detailed in the WMMP e.g. wildlife has the right-of-way; vehicles are required to stop and</p>	



			wait for wildlife proximal to the road to move away.	
29	Invasive Species Management	<p><b>Comment</b> (Submitted after Due Date) On page 32, CZN provides a commitment to the "Development and implementation of an invasive species management plan to ideally prevent, or if necessary, control the establishment of invasive plant species in off-site vegetation communities adjacent to the roadway."</p> <p><b>Recommendation</b> DFN requests that CZN provide detail on what specific mitigation measures will be used to control invasive species along the proposed All-season road.</p>	<b>May 5:</b> See our reply to Board IR18 and the Tetra Tech EBA document attached to PCA IR47 (wildlife veg. replies, Appendix B).	
<b>GNWT - Lands: Veronique D'Amours Gauthier</b>				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
31	General File	<p><b>Comment</b>  Government of Northwest Territories information requests cover letter.</p> <p><b>Recommendation</b></p>		
32	General File	<p><b>Comment</b>  Government of the Northwest Territories' responses to the Mackenzie Valley Environmental Impact Review Board's information requests 42 to 45 - cover letter and attachments.</p> <p><b>Recommendation</b> GENERALFILE</p>		
1	GNWT IR 1: Archaeological Site Protection Terms of Reference Sections 5.2.3 (pg. 20) and 7.3.10 (pg. 32); Developer's Assessment Report (DAR) Sections 5.3 (pg. 126-128) and 11.9.3 (pg. 268-269)	<p><b>Comment</b></p> <p>The GNWT is responsible for the management of archaeological sites for all areas of the All Season Road Project located outside the boundary of the Nahanni National Park Reserve (NNPR).</p> <p>The GNWT recognizes that Canadian Zinc (CZN) has conducted two archaeological impact assessments (AIA) relevant to the All Season Road Project. An AIA of the existing winter road cutline in the vicinities of Grainger Gap and Wolverine Pass was done in 2009 (this AIA also included an additional area in NNPR). An AIA of the Front Range Alternative winter road route was done in 2012. The study area for this AIA encompassed an area of 30 m on either side of the proposed centerline of the 56.2 km long Front Range Alternative. No archaeological sites were found by these AIAs.</p> <p>The footprint of the All Season Road Project is more extensive than the areas assessed in the 2009 and 2012 AIAs. It now includes borrow sources and borrow access roads, various camps, staging areas, and other supporting facilities, new land disturbance associated with installation of bridges and culverts, widening of the road, and road re-alignments.</p> <p>Section 5.2.3 of the Terms of Reference (Cultural and Heritage Resources, item 4) requests information on the heritage resource potential of areas of new land disturbance. Beyond a few general statements about the project area as a whole, this information is absent from the DAR. Without information on the heritage potential of specific project components requiring land disturbance, and archaeological impact assessments of areas with elevated heritage potential, it is not possible to assess impacts to archaeological sites by the All Season Road Project.</p> <p><b>Recommendation</b> The GNWT requests that the developer submit an Archaeological Overview Assessment (AOA) detailing the heritage potential of all project components requiring new land disturbance (excluding areas examined by the AIAs in 2009 and 2012). The AOA should provide recommendations and a schedule for completing AIAs of areas of elevated heritage potential in advance of new land disturbance.</p>	<p><b>May 5:</b> See document attached. <b>May 5:</b>  Response to GNWT IR1 <b>May 10:</b>  Archaeology AIA 2013 <b>May 10:</b>  Archaeology Report 2009</p>	
3	GNWT IR2: DAR addendum Appendix E - 7.7 Effects from Invasive Vegetation Species – Page 188	<p><b>Comment</b> DAR Appendix E identifies a higher risk of invasive plant species introduction when there is summer hauling from the Liard Highway to the mine. The DAR includes acknowledgement that prevention is the most effective management approach for reducing that risk and the authors recommend that CZN develop an invasive species management plan with appropriate stakeholders prior to development of Phase 2. The adoption of such a plan is the basis upon which no residual effect identified, however, further information on the content and process for developing this plan is required. For instance, Section 7.7 indicates they are recommending that there will be a wheel washing station at the mine site, however, that does little to prevent the introduction of invasive from trucks travelling from BC up to the mine. Having washing stations at both ends of the access road would be the more prudent approach, along with a clear monitoring program to detect</p>	<b>May 5:</b> 1. Yes. 2. Yes, in summer. 3. and 4. See Tetra Tech EBA wildlife veg. replies document attached to GNWT IR6, Appendix B..	

		<p>possible introductions at regular intervals during the project life. GNWT suggests that such a plan could be included as part of the Wildlife Mitigation and Monitoring Plan.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Is CZN committing to developing an invasive species prevention and management plan?</li> <li>2. Will CZN consider a washing station for trucks heading up to the mine at the junction with the Liard HWY?</li> <li>3. How will CZN monitor for potential introductions?</li> <li>4. Please provide a conceptual draft of such a plan along with the proposed process for its finalization.</li> </ol>		
4	GNWT IR 3: DAR Appendix E - p. 254. Additional mitigation and monitoring in the Wildlife Mitigation and Monitoring Plan	<p><b>Comment</b></p> <p>The new <i>Wildlife Act</i> (NWT) came into force in 2014 making the completion of wildlife management and monitoring plans (WMMP) a requirement for operators of industrial projects likely to: 1) result in a significant disturbance to big game or other prescribed wildlife; 2) substantially alter, damage or destroy habitat; 3) pose a threat of serious harm to wildlife or habitat; or 4) significantly contribute to cumulative impacts on a large number of big game or other prescribed wildlife, or on habitat.</p> <p>The Act requires that a WMMP must include a) a description of potential disturbance and harm to wildlife and habitat, b) a description of the required measures for the mitigation of potential impacts, c) the process for monitoring impacts and assessing whether mitigation measures are effective and d) other prescribed requirements.</p> <p>GNWT acknowledges that the WMMP provided under the MVLWB LUP# MV2012F0007 in April 2012 captures mitigation and monitoring activities related to the mine and the winter road construction and operation and that it captures CZN's response to commitments made under the Prairie Creek Mine EA. Throughout DAR Appendix E 9 (e.g. pg. 100, 110-111), including table provided in its Appendix C, additional mitigations including speed limits, timing windows, setback distances, dust mitigations etc. specific to the construction and operation of the upgraded road are identified. To fully evaluate the extent to which the WMMP will satisfy the requirements of the <i>Wildlife Act</i>, GNWT requires a conceptual WMMP that includes proposed mitigation for the all-weather road.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Has CZN committed and agreed to include the mitigation measures outlined in TETRA TECH EBA's wildlife and vegetation report into a revised WMMP for the project?</li> <li>2. Please update the WMMP submitted in April 2013 under MVLWB LUP# MV2012F0007 to include the full suite of additional mitigations and monitoring described in Appendix E. Please submit this updated plan in time for review prior to the Technical Session.</li> </ol>	<p><b>May 5:</b> 1. CZN is in agreement with the monitoring proposals outlined in Section 10 of the Tetra Tech EBA report in Appendix E of the DAR Addendum, including compliance with the new NWT Wildlife Act. 2. We refer to the understanding with the Review Board that management plans will either be provided in draft, or the framework and mitigations for such plans provided. The former was provided as the WMMP, and the latter is contained in the Tetra Tech EBA report. We will not be updating the WMMP at this stage. We believe this is an exercise to be completed as a condition of a land use permit.</p>	
6	GNWT IR 4: DAR addendum Appendix E - Sections 4.3.2, 6.3, 6.5, and elsewhere with respect to linear disturbance densities in Boreal Woodland Caribou habitat	<p><b>Comment</b> Several locations in DAR Appendix E reference linear feature density thresholds and minimum patch size requirements for boreal caribou that are outlined in the draft Dehcho Land Use Plan to inform the assessment of habitat loss, fragmentation and loss of habitat effectiveness, but does not reference the habitat disturbance – population trend relationship developed by Environment Canada that is the basis for the definition of critical habitat for boreal caribou in the national Recovery Strategy. The Recovery Strategy identifies critical habitat for boreal caribou as a minimum of 65 percent of undisturbed habitat within its range in the NWT. Disturbance includes anthropogenic features plus a 500 m buffer and fire disturbance less than 40 years old. The GNWT is developing range plans to demonstrate how critical habitat will be maintained over the long-term. The GNWT requires spatial data on project footprints to keep track of the amount of disturbance within the NWT boreal caribou range (e.g. monitor cumulative effects) and to inform the development of range management plans for this species.</p> <p><b>Recommendation</b> Please provide an updated shape file to the registry of the access road that includes the most recent changes to the alignment based on recommendations from engagement with communities and Parks Canada.</p>	<p><b>May 5:</b> A shapefile of the proposed all season road alignment is provided in the attached zip file. The decompressed files will need to be loaded into a GIS program, such Arc GIS. <b>May 5:</b>  Response to GNWT IR4</p>	
7	GNWT IR 5: Traffic Volumes DAR	<p><b>Comment</b> DAR Appendix E provides traffic level estimates during construction and operation for the proposed all-weather road that appear to only account for</p>	<p><b>May 5:</b> Refer to our reply to Oboni IR1, point 5, as follows: a) We anticipate that 2</p>	

	addendum Appendix E - Section 5.0 Project Interactions and Effects Categories	<p>concentrate shipping activities. The estimates do not appear to include traffic related to other CZN activities including materials supply, fuel trucks, staff transport, road maintenance, monitoring activities etc. Given evidence presented from the literature on page 106 that caribou can avoid even "low-use" roads, a more realistic picture of Project related vehicle passes is necessary to fully evaluate the effects of traffic levels on wildlife and wildlife habitat.</p> <p><b>Recommendation</b> Please provide traffic level estimates that include all types of project related traffic, not just concentrate shipping trucks.</p>	<p>maintenance crews may be operating on the road at times, a Mine based 'western' crew and a Nahanni Butte-based 'eastern' crew. Each crew could consist of a grader, haul/dump truck and small supervisor truck, although most times it may only be a grader. A loader would be stationed in a borrow pit to provide material for maintenance. However, this loader, and one from the Mine, could be called into action in the unlikely event of an avalanche or slide blocking the road. Assume 2 vehicles on average. b) Crew changes will be by air, on average one flight per week. Weather delays will usually mean only flight delays. Occasionally, a flight may be diverted to Nahanni Butte, followed by personnel busing to the Mine. There may also be very occasional Mine tours via mini-bus. Assume an average of 1 trip/month. c) Road operations and road maintenance supervisors will make periodic inspection trips. There will also be environmental monitors. Assume an average of 1.5 vehicles. d) The vast majority of deliveries will be by back-haul on the concentrate trucks. There will be a very limited number of special deliveries, such as explosives. Assume 1 trip/quarter. e) The above numbers account for all road activities, either by staff or sub-contractors. Note, materials and fuel will be taken to the Mine on the back-haul of the concentrate trucks.</p>	
8	GNWT IR 6: DAR addendum Appendix E Table 7-2 and Section 4.3.18 re: Western Toad	<p><b>Comment</b> Table 7-2 of Appendix E lists Western Toad as a species at risk not selected for assessment. In December 2015, the NWT Conference of Management Authorities added Western Toad to the NWT List of Species at Risk as a Threatened species. CZN should be advised that Section 76 and 77 of the <i>Species at Risk Act</i> (NWT) requires the Minister of Environment and Natural Resources to make a submission to the body responsible for assessing the potential impacts of a proposed development, or for considering a land use permit or water licence application, respecting the potential impacts of the proposed development, permit or licence application on a NWT-listed or pre-listed species or its habitat. NWT-listed species are those that are on the NWT List of Species at Risk. Pre-listed species are those that have been assessed by the NWT Species at Risk Committee (SARC) but have not yet been added to the NWT List of Species at Risk.</p> <p><b>Recommendation</b> GNWT recommends that CZN consult <a href="http://www.nwtspeciesatrisk.ca/SpeciesAtRisk">http://www.nwtspeciesatrisk.ca/SpeciesAtRisk</a> for further information on the status assessment and reasons for listing Western Toad. GNWT requests that CZN provide an assessment of potential impacts to Western Toad from construction and operation of the access road, and identify mitigation and monitoring measures to minimize or avoid any potential impacts.</p>	<b>May 5:</b> See Tetra Tech EBA Wildlife and Vegetation memo attached as a general file	
9	GNWT IR 7: DAR addendum Appendix E- Mitigation of collision risk and disturbance to wildlife, references throughout the document but summarized in Draft Wildlife Mitigation and Monitoring Plan submitted as part of MVLWB LUP# MV2012F0007 Sections 5.6.1 and 6.0.	<p><b>Comment</b> Driver awareness of potential wildlife presence along the road, use of signage and implementation of speed limits are key mitigations to minimize wildlife collisions and disturbance to wildlife. The draft Wildlife Monitoring and Mitigation Plan submitted under MVLWB LUP# MV2012F0007 in April 2012 includes the commitment from the mine EA (REA page 97) that states "A signage system will be employed along the access road to inform vehicle operators of vehicle/wildlife conflict areas." Also, "lower maximum speeds may be posted in the vicinity of sensitive wildlife areas such as high probability of occupancy by caribou and known crossing locations identified during the winter aerial surveys and ongoing monitoring program."</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please provide a map of the identified wildlife sensitive areas and areas of high collision risk (e.g. crossing locations or other high use areas) along and within 2 km of the access road with reference to specific mitigations that are in place or proposed for those locations (i.e. location of signage, speed limits, targeted areas for snow bank height management etc.).</li> <li>2. Please provide a map of spring/summer wildlife sensitive areas and areas of high collision risk along and within 2 km of the proposed all season road and identify the specific mitigations that are proposed to be implemented at</li> </ol>	<b>May 5:</b> 1. There are no identified wildlife sensitive areas proximal to the road, or known high collision risk locations. The information available is suitable for general guidance to drivers, and for contributing to selection of appropriate speed limits by road section by the Road Operations Supervisor. Relevant information is explained here. A 'map' would lack information and would not be useful at this stage. In terms of road sections relevant to the GNWT's jurisdiction, Km 0-17 (Mine to high pass) is considered to be peripheral mountain caribou range, and in summer, grizzly bear range. Drivers would be warned re possible presence of these animals. The road parallels major streams over this section, so animals are not likely to cross. However, from Km 15 east, the differential between valley bottom and peaks is much	


		those locations (i.e. locations of signs, speed limits changes, targeted dust suppression etc.).	less, and would be considered a potential caribou crossing zone. From Km 102 to the highway, moose could be encountered anywhere on this section, especially in the fall. Boreal caribou may be present in the lowlands, but have not been seen to date. Buffalo may be present near and east of the Liard River. 2. Explained in 1. above. Spring calving of Dall sheep occurs east of the Mine, south of the road to the high pass, and possibly in the Nahanni Range. However, the animals remain at high elevations and are unlikely to cross the road. As site-specific information is covered on wildlife sightings and crossings along the road during operations, signage and speed limits will be adjusted as necessary. Dust suppression applies to the whole road.	
10	GNWT IR 8: DAR addendum Appendix E - Section 6.7.2 Risks to Harvested Wildlife from Non-Harvest Mortality; Section 7.4 - Effects on Wildlife Species Abundance and Occurrence; Appendix C (within Appendix E) - Summary of Potential Project Sources and Effects Mitigation page 1.	<p><b>Comment</b> DAR Appendix E states that during clearing and construction, the risk of mortality to harvested wildlife is most significant at natal den sites, and specifically mentions natal dens of wolverine and marten, and beavers overwintering in their lodges. Denning black bears may also occur throughout much of the area along the access road and could be susceptible to disturbance or mortality within their dens during clearing of vegetation and road construction along the existing alignment, construction of new alignments, development of borrow sources and associated access roads. Section 7.3 (pg. 174) of Appendix E states that CZN will conduct pre-clearing denning surveys for Grizzly Bear in favourable denning habitat, but makes no mention of conducting similar denning surveys for black bear. Page 1 of Appendix C (within appendix E) states that the den reconnaissance surveys will include wolverine, grey wolf and grizzly bear, but again there is no mention of black bears. Subject to Section 52 of the <i>Wildlife Act</i> damage or destruction of a den, beaver dam or lodge, muskrat push-up or hibernaculum is prohibited unless authorized by a licence or permit to do so.</p> <p><b>Recommendation</b> Please describe mitigation measures that will be implemented to identify and avoid damage or destruction of black bear dens during construction, operation and closure of the all-weather access road, and associated borrow pits and their access roads.</p>	<b>May 5:</b> See Tetra Tech EBA Wildlife and Vegetation document attached as a general file.	
11	GNWT IR 9: DAR addendum Appendix E - Section 8.6.1 - Risk of Project-Related Mortality - Waste Management and mortality risk for wildlife due to attraction to waste products.; CZN Waste Management Plan (2011 and 2012) - Section 3.1 Domestic Waste; DAR Addendum Section 20.5.	<p><b>Comment</b> Page 224 of Appendix E states that the Waste Management Plan will need to be updated to incorporate year-round operations, storage, discharge and transport of products. It also states that no additional waste products or significant volumes of waste will be produced beyond those estimated for the approved mine and winter road. Section 2.1 of the existing waste management plan for the mine and winter road estimated there would be about 21 people occupying the construction camps, Tetcela Transfer Facility( TTF), and Liard Transfer Facility (LTF) on a 24/hr. basis. DAR Addendum Section 20.5 estimates that during construction of the all season road there could be a labour force of approximate 80 people. This is roughly 4 times as many people as estimated in the original waste management plan. It is thus unclear how CZN can assume that the volumes of waste generated from the project will not change beyond those originally predicted for the winter road. GNWT also notes that the existing waste management plan contains no detail on how wastes will be stored to ensure that they are inaccessible to wildlife. It is unclear where wastes stored at the LTF will be disposed of. Is the plan to transport these wastes to the mine site for disposal? If so, will waste storage facilities at the LTF be adequate to store wastes during the periods when the ice bridge and barge are not in operation.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please provide an updated draft Waste Management Plan that includes updated waste volumes for temporary construction camps, the LTF and the TTF, and describes the specific measures that will be taken to ensure that camp wastes are stored in a manner that reduces the potential for human-wildlife interactions and mortality of wildlife resulting from defense of life and property.</li> <li>2. Please describe the waste management procedures that will be implemented at the LTF. If the wastes from the LTF will be transported to the mine site for disposal, describe how waste will be stored or disposed of during the period when the ice bridge and barge are not operational.</li> </ol>	<b>May 5:</b> 1. A draft Waste Management Plan was prepared in April 2012 in connection with our application for new winter road LUP MV2012F0007. This plan was also accepted as part of our application for all season road permits in April 2014. The plan would be updated for use in connection with the all season road as a condition of a LUP. The volumes of waste expected to be generated from construction camps is greater than envisaged in the draft plan. However, the management will be the same, and the larger volumes are inconsequential. We have proposed that sewage will either be disposed of in sumps, or taken to the Mine. LTF operations in summer and winter will be less than winter only operations. Therefore, waste volumes will be similar or less. All wastes will be managed appropriately considering wildlife attraction. The road construction contractor will be used to operating in the north and minimizing such issues. 2. Waste management procedures for the LTF are detailed in the above-noted plan. When the road is not operational, the LTF will be closed.	
12	GNWT IR 10: Appendix D-Section 4.1 Air Quality and Emissions Monitoring and	<b>Comment</b> GNWT acknowledges that Section 4.1 in the Air Quality Supplemental Information document outlines potential changes to the mine's overall AQEMMP, such as the provision of an equipment database to track BATEA efforts, modified SO2 monitoring, and revised adaptive management threshold values. GNWT notes that air quality regulations for the NWT are currently in development and scheduled		



	Management Plan (AQEMMP) Potential Changes	to be published next year. These air regulations are anticipated to address those components outlined by the Developer in section 4.1. <b>Recommendation</b> No requests at this time.		
13	GNWT IR 11: DAR Section 6.3.6 - Access Control - no-shooting corridor	<b>Comment</b>  In regards to CZN's proposal that a 'No Shooting Corridor' be established along the proposed All-Season Road, GNWT would like to note the correspondence from the Premier's office to CZN in August 2015 (attached), which states that this solution would negatively infringe other Aboriginal harvesters who assert harvesting rights in that area. In addition, as the road is a private undertaking to increase the viability of the mine, the GNWT cannot assist in designating a 'No Shooting Corridor'. The GNWT encourages CZN to engage in consultation and public engagement with potentially negatively affected parties on this issue. Therefore, this cannot be enforced by ENR personnel, as suggested in DAR's Section 6.3.6. <b>Recommendation</b> No requests at this time.		
14	GNWT IR 12: DAR Addendum Section 4.11 Water Withdrawal Amounts	<b>Comment</b>  It is unclear throughout the DAR as to the precise amounts of water required for the construction and maintenance of the all-season road and how these amounts differ from the amounts currently approved under the existing water licence for the winter road.  Clarification should be provided on the new amounts and whether they are required solely for construction or for road maintenance (dust control). <b>Recommendation</b>  1. GNWT requests clarification regarding the additional annual water use that is required beyond that which has been previously approved. 2. GNWT requests additional detail regarding any fluctuations in water use over the life of the road (i.e. culvert installation is a one-time event, dust control may be permanent and potable water requirements may vary or be eliminated after the road is completed).	<b>May 5:</b> 1. This information is provided on pages 40 and 41 of the DAR Addendum. The construction and operations water requirements are small relative to the defined water sources and permitted volumes. For construction, the estimate is approx. 86 m3/day (22 m3 potable, 60 m3 dust control, culverts minimal) For operations, 280 m3/day would be used for dust control if 70 km were all watered the same day, which is unlikely. Therefore, no change to the currently permitted volume of 275 m3/day is expected to be needed (note, during construction, water use for winter road construction and dust control will not overlap). 2. Construction and operations water use is detailed in the DAR Addendum.	
15	GNWT IR 13: DAR Addendum Section 14.2 Sundog Creek Alignment	<b>Comment</b> Section 14.2 states that a portion of Sundog Creek will be realigned/diverted into a paleochannel of the creek. It is unclear if this channel is currently capable of accommodating the flows from Sundog Creek and how the existing substrate will react to the reintroduction of flows. <b>Recommendation</b> GNWT recognizes that MVEIRB has determined that the information provided on Sundog Creek to date is inadequate, and that MVEIRB has asked the developer to provide additional information by February 19. GNWT looks forward to reviewing this information. In the meantime, GNWT makes the following requests:  1. GNWT requests additional information on the status of the proposed channel into which Sundog Creek will be diverted to ensure it has sufficient capacity and appropriate physical characteristics to accommodate flows (i.e. slope, substrate size and type, channel volume and grade, anticipated flow rate, bank area, etc.). This information is required to determine erosion potential within the channel as well as resulting erosion of the natural channel upstream and downstream of this reach. 2. GNWT requests information on how the diversion will be constructed and proposed mitigation for impacts to Sundog Creek during the diversion construction activities. 3. GNWT requests information on how the diversion will be armoured to ensure the channel does not shift back to its current alignment after freshet or during flood events.	<b>May 5:</b>  1., 2. and 3. This information was provided in the Tetra Tech report dated March 17, 2016 submitted with our 2nd Adequacy response. Also, note that the location of the proposed creek re-alignment is not territorial land.	
16	GNWT IR 14: DAR Addendum Table 14-2 Effects Summary - Rankings	<b>Comment</b> Table 14-2 is entitled "Effects Summary - Water and Sediment Quality" and contains various impact elements which are given ranking (low, moderate, high) in the following categories: significance, uncertainty, magnitude, reversibility and likelihood. It is unclear how these rankings were determined for each category. <b>Recommendation</b> GNWT requests additional supporting information regarding how rankings were calculated in Table 14-2 of the DAR addendum for each category.	<b>May 5:</b> The ranking of the significance of a release in terms of effects was based on the nature of the substance and the location. A spill could be significant in terms of water quality impact, sediment releases less so, unless a major release occurs in Funeral Creek where bull trout spawn. Similar considerations apply to ranking magnitude of effects. All releases were considered highly reversible due to the likely short duration of effect, except for a spill, depending on the substance. Over the Mine's life, the likelihood of a spill and sediment release occurring at some time leading to effects is considered moderate. However, such events could be	

			considered more or less likely, hence the moderate uncertainty.	
17	GNWT IR 15: DAR Addendum - Appendix A Section 2.2 Road surface to bridge elevations	<p><b>Comment</b></p> <p>Section 2.2 of the Allnorth Report (Appendix A of the DAR Addendum) includes detailed information on various watercourses along the road and potential crossing structures and mitigation. Of note, multiple crossings (e.g. Casket Creek) include a measure to construct the final road elevation significantly lower than bridge elevation to ensure high water levels are not significantly backed-up (or dammed), allowing excess water to free flow over the road surface. The report notes that this approach would provide an outlet for excess water flow, reducing overall water velocity and pressure and minimizing its potential to damage road structure and bridge foundations.</p> <p>While this may be true, it is unclear how the road surface will be protected in the event that the high water levels breach the road. GNWT is concerned that large scale erosion events may occur from the road surface during these circumstances.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. GNWT requests additional information on measures to control sediment during high water events from road surfaces should road elevations at various crossings be constructed significantly lower than bridge elevations.</li> <li>2. GNWT requests information on the proposed road protection measures that would be implemented to avoid road washout each year that extreme high water and flows occur. Please explain why the road would not act as a spillway and be subject to massive erosion and require frequent maintenance/reconstruction activities.</li> </ol>	<b>May 5:</b> See Allnorth document attached.	
18	GNWT IR 16: DAR Addendum - Appendix A Section 2.2 Final design option selection	<p><b>Comment</b> In relation to various crossings outlined with the Allnorth Report, there has been no final decision made regarding the final crossing structure, e.g. Sundog Tributary KP 20.3 - 29.4m clear-span or multiple large culverts, Sundog tributary KP 43.3 - 24.2 m clear span or large culverts, etc. It is unclear when final decision will be made regarding crossing structures.</p> <p><b>Recommendation</b> GNWT requests clarification on timelines regarding final decisions on watercourse crossings as potential impacts are different during construction, and following construction, based on the crossing structure selected (i.e. flow restrictions, downstream erosion from improperly sized culverts, washouts, etc.). GNWT requests this decision to be made prior to the end of the EA.</p>	<b>May 5:</b> A final decision regarding crossing structure selection will be made during the detailed design phase. For the purpose of impact assessment, it can be assumed that culverts will be used for the crossings. Both crossings are of non-fish bearing streams, and both are on federal land.	
19	GNWT IR 17: DAR Addendum - Appendix A Section 2.2 Barge Landings	<p><b>Comment</b> In regards to the proposed barge landing on the Liard River, it is noted that large coarse angular rock will be used and capped with 3" minus coarse rock surface material. It is unclear how this relates to expected flows and velocities in the Liard River in terms of the potential movement and re-suspension of material.</p> <p><b>Recommendation</b> GNWT requests clarification on the relationship between the proposed construction material for the Liard River barge landing and the hydrological characteristics of the river as it relates to the stability and maintenance requirements for the barge landing.</p>	<b>May 5:</b> See Allnorth document attached to GNWT IR17.	
20	GNWT IR: 18 DAR Addendum - Appendix A Section 2.2 Sundog Creek Borrow Source	<p><b>Comment</b> It is noted that a borrow source will be located near the Sundog tributary crossing at KP 39.8. It is unclear if this will be a new disturbance within the floodplain of the tributary or if the developer is proposing to source material from within the channel, i.e. gravel bar.</p> <p><b>Recommendation</b> GNWT recognizes that MVEIRB has determined that the information provided on Sundog Creek to date is inadequate, and that MVEIRB has asked the developer to provide additional information by February 19. GNWT looks forward to reviewing this information.</p> <ol style="list-style-type: none"> <li>1. GNWT requests additional information related to the borrow source located at KP 39.8.</li> <li>2. GNWT requests information regarding the removal of gravel bar material from within the channel, and associated mitigation of erosion and sedimentation, if this is the proposed source of some aggregate material.</li> </ol>	<b>May 5:</b> Again, the location in question is federal land. 1. The borrow source at KP 39.8 is located on part of the old floodplain that is now stabilized and above the HWM. 2. The borrow source is not in the active channel. Nevertheless, a buffer would be maintained between the borrow and the channel, and precautions taken to limit sediment release from the borrow.	
21	GNWT IR 19: DAR Addendum - Appendix A DAR Section 6.4 Sundog Creek Realignment	<p><b>Comment</b> There are various references to a realignment of Sundog Creek within the DAR addendum. Although the original DAR includes a narrative description of various activities related to the realignment, precise details surrounding the construction, operation and closure of this realignment is unclear.</p> <p><b>Recommendation</b> GNWT recognizes that MVEIRB has determined that the information provided on Sundog Creek to date is inadequate, and that MVEIRB has asked the developer to provide additional information by February 19. GNWT looks forward to reviewing this information. GNWT requests additional details on the</p>	<b>May 5:</b> A hydrotechnical assessment of the proposed realignment reach has been conducted and is described in a March 17, 2016 letter report prepared by Tetra Tech EBA for CZN, titled, "Sundog Creek Realignment Reach, KP 35-38, Hydrotechnical Assessment." That report presents a preliminary design for the	

		location, construction, design, operation and closure of the Sundog Creek realignment.	proposed re-alignment including channel dimensions, extent and location of the realignment, and water levels and velocities for 2-year and 100-year peak flow scenarios. The realignment reach has been limited to a segment where the existing channel is quasi-stable, and where an historic alternate channel exists which, upon re-activation, is expected to be similarly stable. The study identified that in other segments where the less stable conditions exist, that the road embankment should be armoured with conventional engineered bank protection measures. With respect to a closure plan, which the report does not address, CZN proposes that the re-aligned channel segment reach be abandoned in place as this would have the least environmental impact. This will allow the future shape and position of the channels within the Sundog Creek floodplain to be determined by natural processes.	
22	GNWT IR 20: DAR Addendum - Appendix A, Appendix B - Preliminary Major Stream Crossing Designs	<p><b>Comment</b> Appendix B of the Allnorth report includes details on crossing locations and design specifications for several of the proposed watercourse crossings however the appendix is not inclusive of all crossings along the proposed route.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. GNWT requests clarification on the absence of design specifications for several proposed watercourse crossings.</li> <li>2. GNWT requests clarification on the absence of site assessments and impacts at these proposed watercourse crossings.</li> <li>3. GNWT requests the developer provide a timeline for providing this information for this environmental assessment. GNWT requires this information to be provided prior to the end of the EA.</li> </ol>	<p><b>May 5:</b> 1. All watercourse crossings were listed in the Allnorth report included in the DAR as Appendix 1, Table 10 for major crossings and Table 11 for minor crossings. Designs for all major crossings were provided in Appendix B of the Allnorth report. Minor crossing design concepts (for culverts) were provided in Appendix C. Three generic culvert designs were developed with differing culvert size. The specific generic design relevant to each minor crossing is listed in Table 11. In the DAR Addendum, revised designs were provided for many of the major crossings, as well as the minor crossing design concept. These can be found in Appendix A, Appendix B. Two new major crossings were included that are located on the preferred alternate alignment between Wolverine Pass and Grainger Gap, at Km 111.7 and 118.1. In the Allnorth report attached to GNWT IR15, Appendix E contains updated Tables 10 and 11 lists of major and minor crossings and Appendix F provides a preliminary design for a new major crossing at Km 28.6. Note, the major crossing at Km 118.1 was moved to Km 119. 2. All major crossings and many of the minor crossings were the subject of site assessments on the ground. The remaining minor crossings were assessed based on low elevation aerial viewing from a helicopter. All crossings were assessed in terms of impacts.</p>	
23	GNWT IR 21: DAR Addendum - Appendix A, Appendix C - Operational Management Plans - Borrow Pit Water Management	<p><b>Comment</b> Appendix C of the Allnorth report notes that water will be directed from borrow pits and discharge into forested areas. There is little information regarding the potential quality of this water (e.g. metals, TSS, pH, etc.) and proposed sampling or monitoring programs for water prior to release.</p> <p><b>Recommendation</b> GNWT requests additional information related to water management within the borrow pits, including any proposed sampling or monitoring programs that may be implemented.</p>	<p><b>May 5:</b> Specific water management plans and monitoring requirements will be developed for each borrow as part of a Borrow Pit Development Plan (BPDP). Any discharge proposed from a pit will be subject to prior assessment regarding the potential to enter and impact surface water, and monitoring considered as appropriate. TSS is the main concern. Metals would only be present in the total form due to TSS, and hence do not require monitoring. pH will be neutral to alkaline owing to the terrain. Note, we expect all BPDP's will be subject to regulatory approval prior to development.</p>	
24	GNWT IR 22: DAR	<b>Comment</b>	<b>May 5:</b> See Allnorth document attached	

	Addendum - Appendix A Sediment and Erosion Control Plan	<p>The draft Erosion and Sediment Control Plan mentions "Special Erosion Protection Areas" that will be identified in the final road location and design. However, details about these special erosion sensitive areas and protection measures are required during the environmental assessment to determine if the proposed road will cause significant adverse effects.</p> <p>At this point in time it is unclear how the currently proposed road design and route are linked to Erosion and Sediment Control Plan which is a key measure to reduce the potential for significant adverse effects from the road.</p> <p><b>Recommendation</b> GNWT requests specific information regarding the relationship between the Erosion and Sediment Control Plan and decisions made regarding the final road location and design and "Special Erosion Protection Areas."</p>	to GNWT IR17.	
25	GNWT IR 23: DAR - Section 9.4 Risk and consequence by road section	<p><b>Comment</b> Section 9.4 of the original DAR outlines the risk and consequence by road section however it is specific to potential spills. Specific detail related to risks associated with road construction activities at specific sections appears to be lacking.</p> <p><b>Recommendation</b> GNWT requests detailed information regarding the location of the road alignment and construction methods as they relate to proximity to watercourses (i.e. sections where the road runs parallel to a watercourse).</p>	<p><b>May 5:</b> With respect to territorial land, from Km 0 to 17, the road parallels Prairie, Fast and Funeral Creeks, but the road is already built over this section, and armoured where necessary. All that remains is to install more culverts to pass runoff from upslope, and widen in places on the upslope side. From Km 123 to 126 the road parallels Grainger River main stem. However, this is part of the old winter route on easy construction solid flat ground where the road is still ~40 m from the river at its closest point. From Km 164 to 174, the road parallels the Liard River, but is more than 100 m from the river in forest.</p>	
26	GNWT IR 24: DAR Addendum - Appendix F Permafrost	<p><b>Comment</b> Page 5 of Appendix F of the DAR Addendum notes that permafrost mapping is also being carried out in conjunction with the terrain stability mapping in the areas indicated as "high risk" in the geotechnical report. Similarly, on Page 13, it is noted that <i>"terrain stability mapping is taking place in the areas indicated as "high-risk" in the geotechnical report. In conjunction with that work, mapping of active permafrost terrain is being undertaken so, upon completion of the mapping, it may be possible to identify areas considered to be at higher risk from thaw settlement. Site-specific contingencies for areas at high risk of permafrost thaw and subsidence may include fill-only embankments and "corduroy" log support."</i> The timing of the completion of this mapping and how it relates to erosion and sediment mitigation planning is unclear.</p> <p><b>Recommendation</b> GNWT requests clarification on timelines related to the completion of permafrost mapping and details on how this information will be incorporated into related management plans.</p>	<p><b>May 5:</b> A Terrain Mapping Summary report was completed by Tetra Tech EBA on December 3, 2015, and is posted on the Registry. Additional mapping of the Km 159-184 road section was reported in CZN's April 12 response to the Board's Reasons for Decision on Adequacy, item 4. Refer to our responses to Board IR's 2, 5 and 13 for more information and comments regarding mitigation. As noted in the geotechnical report, further investigation of areas of potentially instability will be completed during the detailed design phase, following which specific management plans will be updated, as necessary.</p>	
27	GNWT IR 25: DAR Addendum - Appendix F Permafrost	<p><b>Comment</b> Page 10 of Appendix F discusses the process whereby the draining of water or flows into a location where it does not normally flow can become a trigger for thermal erosion. While there is some detail regarding streams that may be susceptible such as Fishtrap Creek and south of Grainger Gap, information should be investigated related to the Sundog Creek realignment that may be susceptible to thermal erosion as a result of redirected flows.</p> <p><b>Recommendation</b> GNWT requests additional information on the potential for thermal erosion in areas of stream realignment related to the road construction.</p>	<p><b>May 5:</b> The Sundog Creek re-alignment is on federal land. The re-alignment involves coarse gravel to cobble size material in which permafrost is highly unlikely to occur.</p>	
28	GNWT IR 26: DAR Addendum - Appendix F Permafrost	<p><b>Comment</b> Using corduroy (i.e. logs laid side-by-side) is identified as a potential mitigation for bridging soft wet areas, including areas that may be starting to thaw. It is not clear whether this would be implemented as a short or long term mitigation, and how well this method would stand up to the weight of the trucks that would be used to haul concentrate from the mine-site.</p> <p><b>Recommendation</b> GNWT recommends CZN clarify whether corduroy would be used a primary mitigation method, and provide examples of locations where this method has been used effectively on a heavy traffic road.</p>	<p><b>May 5:</b> See Allnorth document attached to GNWT IR17.</p>	
29	GNWT IR 27: DAR Addendum - Appendix F Permafrost	<p><b>Comment</b> Collection of snow along the sides of the road is identified as potentially resulting in warmer ground temperatures, which could lead to thawing permafrost and ponding of water along the toe of the road embankment. This effect has been identified on several highways in the NWT and Yukon (e.g. Dempster Highway, Alaska Highway). Mitigation methods to minimize the accumulation of snow and potential impacts to permafrost are not identified.</p> <p><b>Recommendation</b></p>	<p><b>May 5:</b> See Tetra Tech EBA document attached. <b>May 5:</b>  Response to GNWT IR27 Tetra Tech</p>	

		<ol style="list-style-type: none"> <li>1. GNWT recommends that CZN identify mitigation methods that could be implemented to reduce snow accumulation adjacent to the road.</li> <li>2. GNWT recommends that CZN identifies areas that are likely susceptible to permafrost degradation due to snow accumulation, and incorporate mitigation methods into the design.</li> </ol>		
30	GNWT IR 28: DAR Addendum - 4.11 Water withdrawal	<p><b>Comment</b> This section states that the water withdrawal volume for the Cat Camp will be 5,750 m<sup>3</sup>. Following, the report states that <i>"The proposed extraction volume of 5,750 m<sup>3</sup> is very small compared to the volume of groundwater in alluvial storage, and would have no effects."</i> No detail is provided on how this conclusion was reached.</p> <p><b>Recommendation</b> GNWT requests clarification on how calculation has been made to determine that the amount of water to be withdrawn would have no effects on groundwater in alluvial storage.</p>	<p><b>May 5:</b> The alluvial aquifer in the Sundog main stem upstream of Cat Camp is approximately 10 km long, and on average about 100 m wide. For an average saturated thickness of 5 m and effective porosity of 20%, the volume of groundwater in storage is 1 million m<sup>3</sup>. Hence, 5,750 m<sup>3</sup> is insignificant.</p>	

## Gov of Canada: Sarah Robertson

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	GoC - NPMO - IR Submission	<p><b>Comment</b>  Submission cover letter and federal contact list.</p> <p><b>Recommendation</b></p>		
2	GoC - PCA #1 Scope of Development - Construction Phases and Schedule	<p><b>Comment</b> <b>Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Scope of Development-Construction Phases and Schedule <b>References:</b> DAR Section 6.5 Construction Phases and Schedule, p 152 <b>TOR Section:</b> 3.1 <b>Comment:</b> Further to the review Board's request for clarification on the preferred scenario for road construction Parks Canada would also like clarification to better understand the proposed construction phases and schedule of the project. It is reasonable to conclude after reading the DAR and DAR Addendum that the development description of phase 1 and 2 could follow a sequential order in terms of timing, that is, phase 1 could be constructed prior to phase 2 (see DAR section 6.3.2). However, the DAR frequently suggests that the construction of phase 1 and 2 together is the most likely scenario and, in this case, road construction would begin at the Liard highway moving west towards the mine over a period of 3 years (see Table 6-4 page 153 of the DAR). In this scenario the TTF is not required (see section 6.3.1. page 139 of the DAR). Alternately, construction of phase 1 on its own and not phase 2 has been suggested by the proponent during the community scoping sessions the week of June 09, 2014. Slide #8 from the proponent's power point presentation on the public registry suggests that financing for phase 2 may be difficult given the potential high costs associated with challenging and soft ground conditions. In this phase 1 only scenario, the TTF would be relocated and increased in size from its permitted winter road use. The DAR also indicates that the mine construction and the initial years of mine operations would be based on a winter road (see section 6.5 page 152). The current development description is very broad in scope and gives a poor indication of sequence, order or feasibility of construction and operation activities. The DAR and DAR Addendum imply that road construction could potentially include any combination of the following scenarios: 1. Construct a winter road on the phase 1 and 2 alignment and operate for 1-3 years to develop the mine and construct the all season road; 2. Construct phase 1, with a winter road from TTF to LTF in lieu of the phase 2 all season road; 3. Construct phase 1 and with a winter road from TTF to LTF, constructing phase 2 all season road subject to available financial support and collaboration with other parties; or 4. Construct phase 1 and phase 2 with no requirement for the TTF. These proposed development scenarios offer a significant range in both sequence and scale of activities. Examples include but are not limited to significantly different requirements for aggregate, methods of concentrate hauling and handling, and impacts to wildlife and vegetation, etc. Given the range of proposed options and lack of clarity regarding sequence and probability of activities, a degree of uncertainty remains which may impact the overall effects assessment. A clear and consistent development description would greatly reduce these risks and facilitate an effective impact assessment.</p> <p><b>Recommendation</b> Revise the development description to provide a clear and consistent option for the proposed project. Include evidence that would support the most preferable and likely option.</p>	<p><b>May 5:</b> PCA is correct that, at the outset, CZN envisioned developing the all season road in two phases. For this reason, the two phase development approach was incorporated into the Terms of Reference (TOR). During the preparation of the DAR, while other project-related activities were on-going (underground drilling, mineral reserve update, preliminary feasibility study update), it became clear that a full all season road built at the outset of the project made the most sense from a development, cost and financial perspective. As a result, we provided the most logical approach and schedule for all season road construction, starting in the east and working progressively west i.e. abandoning the phased (1 and 2) approach, although the construction will occur in stages. However, in order to comply with the TOR, we have also had to explain our approach to develop Phase 1 and 2 separately, including expansion of the TTF to support Phase 1, even though it is now not our intention to develop the road in this fashion. A clear and consistent all season road development description and schedule was provided in the DAR Addendum, Appendix A, Table 4. This describes construction from the east, supported by a winter road which also allows construction material to be taken into the Mine for on-site construction. The Mine and Mill can be commissioned in approximately 2 years, while it will take up to 3 years to fully build the all season road. This is because detailed investigation and design work is needed on the road initially, again best supported by a winter road for drill rig access, followed by placement of road sub-grade, a period of settlement, followed by top surface construction. We disagree that the defined schedule "gives a poor indication of sequence, order or feasibility of construction and operation activities". To be clear, it is our intention to build the all season road as one project (i.e. not in phases), and not to build and operate the TTF, although this location may or may not be used as a road maintenance yard. It does not make sense to build Phase 1 only because this model does not get</p>	

			mineral concentrates to market in a timely and consistent manner, which is necessary due to rail transport and market acceptance limitations, and for financial reasons. It is true that full road development requires a greater capital outlay initially. However, this is more than compensated for by the higher revenue and reduced costs (e.g. for supplies) during operations.	
3	GoC - PCA #2 Road Construction	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Construction <b>References:</b> DAR Addendum, Appendix A-All North Road Engineering Report, Section 2.9, Table 4, DAR Addendum, Appendix E-Tetra Tech Wildlife/Veg Report, Section 2.2, DAR Addendum, Appendix E-Tetra Tech Wildlife/Veg Report, Page 119 <b>TOR Section:</b> 6.1, 6.3 <b>Comment:</b> The road construction schedule in Table 4 of the DAR Addendum Appendix A outlines the construction schedule for both the winter and all season roads. This format makes it difficult to differentiate which work is associated with which project. Section 2.2 of Appendix E of the DAR Addendum outlines a construction approach where CZN would have crews "working day and night to complete construction in a year". This approach is not consistent with what is outlined in Appendix A of the DAR Addendum. In addition, Appendix E of the DAR Addendum (page 119) outline that CZN will "Concentrate construction activities temporally and spatially by adopting a sequential development strategy" as a mitigation approach for construction. A number of potential impact associated with the construction phase of this proposed project are directly linked to the timing in which the activities will occur. As a result, it is very important that the construction schedule be clearly outlined.</p> <p><b>Recommendation</b> Provide a clear schedule and approach for road construction of the proposed project. If winter road construction is to be done at the same time, clarify in the schedule which information relates to the winter road and which relates to the proposed project.</p>	<p><b>May 5:</b> The Allnorth schedule is the definitive "clear schedule and approach for road construction". As explained in our reply to PCA IR1, a winter road will be built each year. It will be built adjacent to the all season road footprint and within the same right-of-way, to support all season road and Mine construction. Hence, the information in the schedule relates to both winter road and all season road construction, and the two are clearly defined. The all season road alignment will become the winter road alignment. It does not make sense to develop 2 alignments. However, there are 2 locations where 2 alignments may be developed: Km 24-29 where the alignment is to be moved to the south side of Sundog Creek (the new alignment requires rock blasting and two bridges later in the construction period, therefore the original, grand-fathered winter road alignment on the north side will be used initially); and, Km 90-95 where the new alignment crosses a series of low hills whereas the original winter alignment provides for easy winter road construction with minimal clearance required.</p>	
4	GoC - PCA #3 Road Construction - Vegetation Clearing	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Construction -Vegetation Clearing <b>References:</b> DAR Addendum, Appendix A-All North Road Engineering Report, Section 2.9, Table 4 <b>TOR Section:</b> 6.1, 7.3.9 <b>Comment:</b> The current winter road right of way has not been operational since the early 1980's. As a result, the entire length of this right of way will need a significant amount of clearing due to vegetation regrowth to facilitate the construction of an all season road. In addition, there have been a number of re-alignments suggested which do not follow the original winter road right of way. Table 4 of the All North Road Engineering Report indicates that there will be "minimal right of way clearing from Grainger Gap to the mine". This statement does not reflect Parks Canada's understanding of the level of clearing that will need to be done for the proposed project.</p> <p><b>Recommendation</b> Clarify what is meant by "minimal right of way clearing" in Table 4 of the All North Road Engineering Report</p>	<p><b>May 5:</b> In Year 1, only a winter 'tote' road is needed to access the Mine and transport construction supplies in. Full right-of-way (ROW) clearing is not needed for this. A better description of the clearing would be 'partial' rather than 'minimal' for the tote road, although there are sections where very little or no clearing at all will be required (e.g. Ram Plateau, Sundog Creek). The reference to 'minimal' was not intended to infer that ROW clearing will be minimal for the fully developed all season road. Certainly there are sections that will require considerable clearing (e.g. Silent Hills).</p>	
5	GoC - PCA #4 Road Construction - Temporary Crossings	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Construction-temporary crossings <b>References:</b> DAR Addendum, Appendix A-All North Road Engineering Report, Appendix C (Road Construction and Maintenance Plan) <b>TOR Section:</b> 6.1, 6.2, 6.3, 7.3.5, 7.3.7 <b>Comment:</b> The Road Construction and Maintenance Plan indicates that "temporary crossings may be utilized to maintain the construction schedule..." however there are no details on these temporary crossings.</p> <p><b>Recommendation</b> Provide information on all proposed temporary crossings including, but not limited to: location, size, type of crossing, materials used, timing, duration, potential impacts and reclamation</p>	<p><b>May 5:</b> See Allnorth document attached.</p> <p><b>May 6:</b>  Allnorth Report</p>	
6	GoC - PCA #5 Tetcela Transfer Facility-Location and Assessment	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Tetcela Transfer Facility-Location and Assessment <b>References:</b> DAR Executive Summary, p 8, DAR Development Description, Section 6.2, p 138, DAR Concentrate Containment, Section 6.3.1, p 139, DAR Tetcela Transfer Facility, Section 6.3.2, p 142, 143, <b>TOR section:</b> 3.1 <b>Comment:</b> The Environmental Assessment for the winter road (EA 0809-002) included the development of the Tetcela Transfer Facility (TTF) at km 84, subject to conditions of land use permit #Parks2012-L001 issued by Parks Canada. The storage of up to 75,000 tonnes of concentrate at TTF in EA 0809-002 was identified for the winter only, with use beginning in December and ending in March with all concentrate hauled out prior to the closure of the winter road.</p>	<p><b>May 5:</b> 1. No. Refer to our reply to PCA IR1. We propose to build the full all season road as one project and not build the TTF in either location. 2. For the purpose of compliance with the TOR, a TTF was provided for at Km 86, and is 2 km from the facility approved for the winter road. 3. The baseline information for the Km 84 TTF is the same as that required for the Km 86 TTF. The 2 km</p>	



		<p>Section 6.2 of the DAR states that the TTF will be located at Km 86 to coincide with a realignment of the road onto firmer ground and that the proposed new location is relatively flat, distant from water courses and closer to borrow sources. In many locations throughout the DAR and DAR Addendum the TTF at Km 86 is referred to as "approved" but needing enlargement by 2 ha, for example DAR Addendum Appendix E tables 2-1 and 5-1 and sections 2.4.2, 5.0 and 6.4. In one specific location (DAR Addendum Appendix E section 6.7.2) it is indicated that "the construction and operation of the transfer facilities and camps are approved under the winter road and are not further assessed herein". Within the effects assessment for Nahanni National Park Reserve in section 7.0 of DAR Addendum Appendix E (page 157) it is outlined that the effects associated with clearing of the transfer facilities has been permitted with the exception of a 2 ha expansion for the footprint of TTF. Parks Canada would like to note that the TTF that was assessed in Environmental Assessment 0809-002 for the winter road was located at Km 84 and assessed for winter use only. Should this location change, the entire facility will need to be assessed for potential impacts in the new location with particular emphasis on increased amount of concentrate storage and all season use. Section 6.3.1 of the DAR page 139 states "If phase 2 of the road is built subsequently, or at the same time as phase 1 which is more likely, concentrates would be hauled directly to the LTF without the re-handling or storage at the TTF". In this more likely scenario there will be no requirement for the TTF as a handling or storage facility. Clarification is needed.</p> <p><b>Recommendation</b> Provide the following information: 1. If the All Season Road is approved, is it the proponent's intent to build two Tetcela Transfer Facilities, the one that is approved at Km 84 for the winter road, and the proposed facility at Km 86 for the All Season Road? 2. Clarify in the assessment that the proposed TTF at Km 86 is not an approved facility as it is being proposed in a different location than what is currently permitted. 3. Provide baseline information on vegetation assemblages (including rare vegetation and invasive species), wildlife presence and habitat including species at risk, fish and fish habitat, distance to the nearest water source, hydrology, soil characteristics and underlying geology, and potential for cultural resources for the proposed TTF at Km 86. 4. Complete an impact assessment for the newly proposed location and expanded seasons of use for the TTF at Km 86 using the baseline information outlined above. 5. Provide detailed information to clarify activities at the proposed TTF in all potential road construction scenarios i.e. Phase 1 only and Phase 1 and 2 together. Include aggregate requirements, sources and standards for ARD testing, fuel storage requirements, camp requirements, and haul schedule. Also describe the potential for contaminant loading and dispersal. 6. Describe any geotechnical or environmental constraints which may impact the proposed TTF at Km 86.</p>	<p>distance difference in very similar terrain in terms of wildlife habitat and vegetation is inconsequential. Neither location is proximal to water sources or fish habitat. 4. See our reply to PCA IR9. 5. The TTF would only be used with the Phase 1 road year-round, and in the absence of the Phase 2 road. However, as explained, we propose to develop the whole road and not develop a TTF. A TTF description was provided in section 6.3.2 of the DAR, and includes activities, fuel storage and camp requirements. Haul schedule is discussed in section 6.3.3. A TTF layout was provided in the DAR Addendum, Appendix A, Appendix G. The footprint is estimated at 3.66 ha. For a 30 cm gravel base, this equates to 10,980 m<sup>3</sup> of borrow, well within the volume of nearby defined aggregate sources (e.g. BP86a 13,500 m<sup>3</sup>, and BP86b 37,900 m<sup>3</sup>). See our reply to ECCC IR4 re ARD potential. Bagged concentrate would be off-loaded and loaded into/from the storage shed without the truck entering the shed. Any spilled material, for example from a ripped bag, would be completely recovered, and the ripped bag re-bagged. The potential for contaminant dispersal from the TTF would be minimal. 6. Geotechnical considerations were accounted for in the chosen location of the TTF on stable terrain (see Tetra Tech EBA mapping report, Dec. 3, 2015). The facility was moved from Km 84 along with the road to take advantage of drier and firmer ground. There are no environmental constraints as the site is not proximal to watercourses.</p>	
7	GoC - PCA #6 Tetcela Transfer Facility and Transport Containment	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Tetcela Transfer Facility and Transport Containment <b>References:</b> DAR, Section 6.1 Project Rational, p 137, Section 6.3.1 Concentrate Containment, p 139, Section 6.3.2 Tetcela Transfer Facility, p 142, Appendix 1 Section 3 Transportation Approach and Truck Configuration, p 3-6, Section 3.1 Tetcela Transfer Facility, p 6 <b>TOR Section:</b> 3.1 <b>Comment:</b> The DAR for EA 1415-001 states that TTF will become the main concentrate storage location with concentrate stored at that location from the closure of the winter road to the opening of the winter road in the following winter. In order to accommodate additional concentrate storage, the footprint of TTF will be larger, and includes the expansion of storage buildings and the installation of a dry storage shed. Further, Canadian Zinc has previously committed (EA 0809-002) to the bulk hauling of concentrate in sealed bulk bags which could be offloaded at a transfer facility for temporary storage. In the current DAR (1415-001) CZN has indicated that some smelters do not accept bagged concentrates. Canadian Zinc has proposed the use of containerized bulk transport using sealed haul trailers to smelters which do not accept bagged concentrate.</p> <p><b>Recommendation</b> Provide the following information: 1. Confirm that the method of concentrate storage at TTF will be in sealed bulk sacks only and that no off loading or reloading of bulk concentrate from containerized trailers will occur. 2. Provide a schedule for use of TTF including volume and timing of concentrate stored. 3. Outline if concentrate will continue to be stored at TTF if Phase 2 of the all season road is completed 4. Outline when concentrate storage facilities will be decommissioned at TTF</p>	<p><b>May 5:</b> 1. The method of concentrate storage at the TTF, if used, will be in sealed bags. There will be no off loading or reloading of bulk concentrate from containerized trailers. 2. The TTF would be used year-round, receiving concentrate during the non-winter period, and shipping concentrate out in the winter period. Only lead concentrate would be in bags. Annual lead concentrate production would be in the range 30,000-80,000 tonnes, but only up to 9 months production would be stored at the TTF as the full road would be open for the 3 month winter period and bags would not be off-loaded at the TTF during that time. 3. Concentrate will not be stored at the TTF if the Phase 2 road is built. 4. If concentrate storage sheds are erected at the TTF, and the Phase 2 road is built subsequently, the sheds would be decommissioned soon after road completion, unless one, or a portion of one, is retained to support road operations/maintenance.</p>	
8	GoC - PCA #7 Tetcela Transfer Facility Fuel Storage	<p><b>Comment To:</b> Canadian Zinc Corporation <b>Subject:</b> Tetcela Transfer Facility Fuel Storage <b>References:</b> DAR Section 6.3.2-Tetcela Transfer Facility, P 143, DAR Addendum Appendix E, Section 2.4.2 Tetcela Transfer Facility, p 10 <b>TOR Section:</b> 3.1 <b>Comment:</b> Section 6.3.2 of the DAR states that a truck fuelling station will be developed at TTF with a volume of 12,000L. The DAR Addendum, Appendix E section 2.4.3 –states that the volume of fuel storage at the TTF will be 10,000 L. The volume of fuel to be stored on site is important for understanding the risk of a spill or fire.</p> <p><b>Recommendation</b> Clarify the proposed volume of fuel to be stored at TTF.</p>	<p><b>May 5:</b> If the TTF is built, a truck fuelling station with a 12,000 L storage tank would be installed.</p>	

9	GoC - PCA #8 Camps	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Camps <b>References:</b> DAR Section 6.0 Project Description Table 6-1: Project Components and Activities, Box 10, p 140, Table 6-2 Equipment Requirements, p 141, Section 6.5 Construction Phases, p 152, Section 11.5.2 Water Quality, p 243, Section 11.10 Location of Camps point 5, p 270, Appendix 1 Section 4.8.1 Camps, Staging areas and Support facilities, p 43, Table 9 Summary of Potential Camp and Laydown Areas, p 43, DAR Addendum Appendix E Section 2.2, page 18 <b>TOR section:</b> 6.1 <b>Comment:</b> Construction camps have the potential for significant impacts on both natural and cultural resources depending on a number of factors such as method of establishment, location, volume and location of water use and methods of waste disposal. In order to predict the potential for impacts from these facilities and provide mitigations measures, the appropriate level of information must be detailed in the assessment. Section 11.10 of the DAR (page 270) states that camps will be located approximately every 20 km along the road. The DAR Appendix 1 (page 43) states that seven camp locations have been identified, then lists nine potential locations for camps. Appendix 1 of the DAR (page 43) then states that camps will be located based on the construction schedule and the suitability of sites. Further, Appendix E of the DAR Addendum (p 18) states "To facilitate road construction and minimize travel, a temporary camp will be established near the location of construction. As construction progresses, the camp would be moved closer." These statements create confusion around the number and locations of temporary camps proposed for the project. Long term camps are proposed for Cat Camp, TTF and Grainger Gap to support road maintenance, as outlined in section 11.10 of the DAR (page 270). Appendix E of the DAR Addendum (page 18) describes the camps as consisting of "accommodation trailers, a kitchen/diner, a diesel-fed generator with a storage tank up to a capacity of 4,500 litres, a double-chamber garbage incinerator plus an ash bin, and a sewage lagoon or pit". It is outlined that each proposed camp would accommodate approximately 50 people and be contained within 3 ha. The DAR Addendum (page 40) provides an estimate on water consumption for a construction camp operating for 3 month in the winter. This information does not reflect the use of the camps in an all season road scenario.</p> <p><b>Recommendation</b> 1. For all temporary camps operating outside the winter season and long term camps provide: - location, including the proposed schedule for use - a detailed description of camp facilities including footprint - location and volume of water with drawl and use - number of people occupying camp - volume and location of fuel storage - sewage and waste containment and disposal methods 2. Provide information on plans for the reclamation of all camps including sumps</p>	<p><b>May 5:</b> 1. Construction camp locations in the NNPR were described in the DAR, Appendix 1, p. 43. To re-iterate, they are proposed at Km's 23.2, 40, 65 and 87.5. The locations are also shown on the maps in Appendix 1, Appendix I. The Km 23.2 and 40 are previously disturbed areas. The 65 and 87.5 camps will likely be located within the adjacent borrow pits. The camps will be used sequentially as work progresses west, in winter and summer. More than one camp may be in operation at any given time. Camp facilities will consist of accommodation trailers, a kitchen/diner, a diesel-fed generator with a storage tank up to a capacity of 4,500 litres, a double-chamber garbage incinerator plus an ash bin, and a sewage tank or sump. In addition, fuel for the construction fleet will be stored in tanks. For example, Rowe's Construction uses 2 double-walled enviro-tanks for diesel with 90,000 L capacity each, as well as a smaller 20,000 L enviro-tank split between diesel and gas. All camps will have a footprint up to 3 ha, and accommodate up to 50 people. There will be no sewage sump at camps Km 23.3 and 40 due to proximity to a watercourse. The construction fleet storage tanks will also not be stored at these camps for the same reason. Storage locations suitably distant from watercourses will be chosen. The camps at Km 65 and 87.5 are not proximal to watercourses. Sewage collected in tanks will be periodically removed for treatment, either at the Mine or an approved facility off-site. Based on water use of 270 L/day/person, a 50 man camp would consume 13.5 m3/day. Water withdrawal locations were described in section 4.11 of the DAR Addendum. For the Km 23.2 camp, water may be sourced from Sundog Creek which is not fish-bearing at this location, and no more than 10% of the flow would be drawn. Solid waste will be stored in animal-proof containers, and any not incinerated on-site, will be periodically removed for disposal at an approved facility. 2. The camps at Km 40 and 87.5 will be retained for operations to support road maintenance. These camps will be much scaled-down from the construction camps, consisting of only a few trailers. The camp location at Km 23.2 is already disturbed and has a gravel surface similar to the surrounding area, requiring very little reclamation. The camp at Km 65 will be reclaimed along with the borrow pit, unless the pit is retained for borrow use in road maintenance.</p>
10	GoC - PCA #9 Camps	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Camps <b>References:</b> DAR Section 6.0 Project Description, Table 6-1: Project Components and Activities, Box 10, p 140, Table 6-2 Equipment Requirements, p 141, Section 6.5 Construction Phases, p 152, Section 8.4 Temporary Camps, p 169, Section 11.5.2 Water Quality, p 243, Benefits to the Community, p 270, Appendix 1 Section 4.8.1 Camps, Staging areas and Support facilities, p 43, Table 9 Summary of Potential Camp and Laydown Areas, p 43, DAR Addendum Appendix E Section 2.0 Project Description Table 2-1: Project Development Phases at a Glance, p 3, Section 2.2, p 18 <b>TOR section:</b> 6.1 <b>Comment:</b> Appendix E of the DAR Addendum (Table 2-1: Project Development Phases at a Glance (page 3)) excludes the assessment of camps, laydown and staging areas indicating that these areas were previously assessed. Appendix E (page 18) of the DAR Addendum states "Temporary camp locations will be sited inside borrow sources and existing disturbance areas, as much as possible,</p>	<p><b>May 5:</b> 1. Refer to the Tetra Tech Wildlife Vegetation response document attached. 2. Geotechnical constraints relate to ground firmness to support trailers. A site would not be used if the ground is not sufficiently firm. Environmental constraints relate mainly to fuel storage and sewage. These are addressed in the Tetra Tech report. Also, see our reply to PCA IR28.</p>

		<p>and are approved under the winter road." Parks Canada notes that winter camps which were approved in the previous EA were permitted for operation only during the winter, with all trailers removed by March 31. Section 6.5 of the DAR (pages 152-153) indicate that construction will occur in fall, winter and summer. In addition, operation of the road will occur through all seasons. Impact assessment for the all season use of both short term and long term construction camps is required.</p> <p><b>Recommendation</b> 1. Conduct an impact assessment for all temporary and long term construction camps associated with the project. The assessment must consider the all season use of these areas. 2. Describe any geotechnical or environmental constraints which may impact the proposed camps.</p>		
11	GoC - PCA #10 Comprehensive Map of the Project	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Comprehensive Map of the Project <b>Reference:</b> DAR Appendix 2, Section 2.2, DAR Appendix 1, Section 2 <b>TOR Section:</b> 6.1 <b>Comment:</b> It is recognized that Canadian Zinc has provided detailed maps of the road alignment and associated activities throughout the process. In addition, CZN provided high resolution LIDAR maps to Parks Canada which document the route initially proposed for the all season road. However, currently there is no comprehensive map showing the full right of way alignment (+/- 50m) of the proposed all season road in relation to the locations of borrow sources, water sources and water crossings, associated access roads and trails as well as laydown/storage areas and construction camps. In addition, route realignments have been proposed and it is unclear in the DAR which alignment will be used. Appendix 2 of the DAR, Section 2.2 describes the general all-season road route as a living alignment, meaning that as more data becomes available, the route will change such that the alignment takes advantage of the most competent and least sensitive ground available along the general alignment. From documentation in Section 2 of Appendix 1, and reiterated in TetraTech EBA's report, it is understood that the current alignment is intended to be within +/- 50m of the finished route. It is therefore Parks Canada's understanding that the "living alignment" will fall within +/- 50m of the center line of the proposed all season road right of way. With a lack of clarity on the final route alignment, and information regarding the geographic scope of the project distributed throughout a number of documents, it is difficult to determine the exact location of the proposed all season road and associated activities. In the DAR a geographic scope of assessment is provided for each valued component, based on the location of the project. As a result, the location of the project is essential in the assessment of impacts. A comprehensive map, or series of maps all at the same scale which outlines the road alignment and all associated activities, would be beneficial to understand the overall magnitude of the project. This map would also aid in the assessment of project impacts and potential cumulative effects from the various activities about the road.</p> <p><b>Recommendation</b> CZN to provide an overall map, or series of overall site maps at the same scale, for the road alignment showing, but not limited to, the following: 1. Road right of way (the road surface centre line, width of the road surface, and clearing width), including most recent revisions, realignments, and delineation of estimated corridor width(s) at an accuracy of +/-50m as proposed in the DAR. 2. Locations of water crossings, borrow sources and water sources including locations of access trails and access roads to borrow sources and water sources. 3. Location of temporary and long term construction camps and laydown/ storage areas along the alignment. 4. The current permitted winter road corridor.</p>	<p><b>May 5:</b> A comprehensive series of maps was provided in the DAR, Appendix 1, Appendix I. This shows the proposed all season road alignment. Some minor adjustments to the alignment have been made following terrain mapping. A revised version of the Appendix I maps has been generated and is appended to the Allnorth report attached. As noted by Allnorth and Tetra Tech EBA, some further, minor alignment alterations can be expected as a result of detailed site investigation and design post-EA. It is not reasonable to expect the final alignment to be precisely located at this point in the process. However, the alignment location is sufficiently well known to allow an assessment of effects. Minor, later adjustments will be inconsequential in terms of this assessment. 1. We have stated that the road right-of-way (ROW) width will be normally up to 20 m for suitable sight-lines, narrower in sections that are open and do not need to be cleared, and wider up to 35-40 m where cuts are required on slopes. The alignment shown on the maps is the proposed centre-line. This may vary slightly during detailed design, but the corridor ROW width will remain the same. Road location and corridor are different but related items. 2. Water crossings and borrow sources are shown on the Appendix I maps. The locations of water sources and access roads have not changed from the winter road. These were provided to PCA on November 19, 2012. 3. Camp locations are shown on the Appendix I maps. 4. The revised maps show where the permitted winter road alignment departs from the proposed all season road alignment. In general, the proposed all season road follows the winter alignment, with exceptions. We do not propose to develop two alignments, although as noted in our reply to PCA IR2, two winter road sections will be used during construction, Km 24-29 where the all season alignment is to be moved to the south side of Sundog Creek, and Km 90-95. These two winter alignments are visible on the Appendix I maps.</p>	
12	GoC - PCA #11 Borrow Sources-number and type	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Borrow Sources-number and type <b>Reference:</b> DAR Appendix 2 and Appendix 1 Section 7, DAR Appendix D of Appendix 1, DAR Addendum Section 4, and DAR Addendum, Appendix A and F, Parks Canada Management Directive 2.4.7 Sand, Gravel, and Other Earth Material: Excavation and Site Rehabilitation. May 1989,, Transport Association of Canada (2010). Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions. May 2010 <b>TOR Section:</b> 6.1 <b>Comment:</b> Section 7 in Appendix 1 of the DAR, Appendix D of Appendix 1 of the DAR and Section 4 of the DAR Addendum note a total of 74 potential borrow sources, 49 of which are planned to be developed. Additionally, Appendix 1 and 2 of DAR, and Appendix A and F of DAR Addendum describe the results of preliminary investigations for these sources. Table 14 of Appendix A</p>	<p><b>May 5:</b> See Allnorth document attached to PCA IR4.</p>	

		<p>provides a good compilation but, for some locations, it remains unclear which borrow sources: 1. have already been developed (if any) 2. are proposed to either be developed or only used as contingency sources for the construction and maintenance of the all-season road 3. might alternatively be defined as road cuts and/or landscape borrows (i.e. within the road corridor and/or widened corridor) 4. are offset from the nominal road corridor, and 5. are intended to be longer term gravel pits Best practice guidelines (Transportation Association of Canada, 2010) state that the development of a new borrow source should only occur when existing sources cannot provide sufficient quantities for the proposed project, or do not satisfy the project requirements. Additionally, it is considered best practice by TAC (2010) to minimize the visual and the environmental impact of borrow site operation by operating fewer but larger borrow sources compared to a larger number of smaller sources, even if it involves slightly longer hauling distances. With respect to development and operation of a borrow site within the NPPR, Parks Canada Management Directive 2.4.7 (Management Directive 2.4.7. Sand, Gravel, and Other Earth Material: Excavation and Site Rehabilitation. May 1989.) is applicable, particularly for sources outside of the road corridor. With better definitions provided on the type of material source at each location, appropriate guidelines and assessment tools can then be applied to each particular site.</p> <p><b>Recommendation</b> 2. update the Borrow Pit Summary Table and include for each site the material source type as defined above.</p>	
13	GoC - PCA #12 Borrow Sources- Development and Management	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Borrow Sources-Development and Management <b>Reference:</b> DAR Appendix 1, DAR Addendum Appendix A, Indian and Northern Affairs Canada (2009) Northern Land Use Guidelines: Pits and Quarries, Price, W.A. (2009) Prediction manual for drainage chemistry from sulphidic geological materials. Mine Environment Neutral Drainage Report 1.20.1. <b>TOR Section:</b> 6.1 <b>Comment:</b> Appendix 1 of the DAR discusses borrow source development and management, and Appendix A of the DAR Addendum provides a draft borrow pit management plan. At this time, CZN has not provided site-specific quarry and borrow source management plans, but rather a global management plan for all quarries and borrow sources. It is recognized that detailed site specific plans will be provided closer to detailed design, however, the overall management plan should highlight what must be included in these site specific plans. Upon comparing the draft borrow pit management plan to the Northern Land Use Guidelines for Pits and Quarries (INAC, 2009), the following items of uncertainty and/or deficiencies were noted with regards to the management and mitigation strategies for the proposed borrows sources. Acid Rock Drainage: CZN has not proposed any monitoring for Acid Rock Drainage (ARD). CZN has stated that there is a low potential for ARD in the region due to the abundance of carbonate rocks, and the calcareous parent material of most mudstones. CZN also stated that testing of material suspected of being potentially acid generating (PAG) or high sulphur shale will occur at each borrow source that these materials are encountered. It is recognized that the likelihood of ARD from these rock types could be low, however without geochemical and mineralogical analysis of the borrow source material, it is not possible to definitively say ARD will not occur. Specific to this geological setting, the following are examples that reinforce this position: Iron carbonate minerals (e.g., siderite, ankerite) do not contribute to neutralization potential (Price, W.A. (2009). ; CZN has noted many mudstones interlayered with carbonate rocks, and although often calcareous, may be host to sulphide minerals such as pyrite. - CZN has stated that potentially acid generating (PAG) material encountered in the borrow sources may be stockpiled before being redeposited into the borrow pit during reclamation. No descriptions of water quality monitoring of runoff from these stockpiles was provided. - CZN has stated that PAG material will either not be used, or used as subgrade, where it will be encapsulated by other material to mitigate against oxidation, or covered with carbonate material to provide a source of neutralization. Additionally, CZN has stated that any PAG material encountered and not used in construction, will be stockpiled separately and placed into the bottom of the borrow source pit during reclamation. Both the long term and short term effects of this practice are not well known based on the information provided in the DAR materials. Permafrost: CZN has indicated that each borrow source will be evaluated for permafrost and ground ice during a detailed borrow site plan and design, however monitoring for permafrost and ground ice has not been proposed. Further, CZN has stated that borrow sources with significant ground ice/permafrost will only be used if there is no other reasonable source available. This raises concerns regarding the long-lasting effects to the delicate ground thermal regime if permafrost is allowed to degrade, and when present, the effects to the surrounding terrain if massive ground ice was allowed to melt. Reclamation: Constructing and operating borrow and gravel pits will result in small-scale disturbance of soils and loss of vegetation. When use of borrow pits and gravel pits has ended, disturbed areas will need to be reclaimed to remove any residual environmental effects. Given low rates of re-establishment through natural re-vegetation processes, active restoration practices are required in addition to re-establishing flow paths. By contrast, CZN has proposed using passive natural re-vegetation, with roughening of and scarifying compacted surfaces to promote natural re-vegetation.</p>	<p><b>May 5:</b> 1. Agreed. 2. From our reply to ECCC IR4: In the probing and sampling of borrow sources to date, there has been no indication of any potential for acid drainage or metal leaching. It should be recognized that the road crosses predominantly carbonate terrain with an abundance of neutralization capacity, and as such, the potential for ARD/ML is low. None of the areas investigated show evidence to the contrary e.g. pyrite, other sulphide metal or typical gangue mineral (e.g. quartz) presence, iron staining. However, detailed investigation and sampling of all borrow sources will occur during the detailed design phase. Representative samples will be selected from each borrow for acid-base testing. Depending on the results of these tests, more samples may be analysed, and for more tests, such as leaching tests, as necessary, under the guidance of a professional ARD geochemist. Any borrow with a positive identification of ARD/ML potential will not be used. Any borrow with marginal ARD/ML potential will either not be used, or used based on mitigation procedures defined by a professional ARD/ML geochemist.. Sampling requirements will be determined under the guidance of a professional ARD/ML geochemist at the time of detailed investigation and design prior to construction. 3. Should ARD/ML potential be encountered, most likely the borrow won't be used. If material will be borrowed that has marginal ARD/ML potential, procedures for use will be defined by the professional ARD/ML geochemist to avoid significant impacts, and this may include monitoring, as necessary. 4. Where permafrost is encountered in borrows, again either the borrow will not be used, or if it is, borrow pit development, monitoring and ultimate reclamation will follow guidance provided by a professional geotechnical engineer to avoid significant impacts. It should be noted that sand to gravel size material is preferred for borrow, and these materials are not conducive for permafrost development. 5. Reclamation of borrows will commence soon after they are no</p>

		<p><b>Recommendation</b> 1. Commitment from CZN that site specific borrow source management plans be developed in accordance with the INAC Northern Land Use Guidelines for Pits and Quarries (INAC, 2009), as well as the Borrow Pit Management and Reclamation Plan proposed. 2. CZN commit to geochemical and mineralogical (including acid base accounting) sampling for all borrow sources and provide the sampling protocol including timing and frequency. 3. If CZN chooses to use and stockpile acid rock generating materials during road construction, they shall describe and deploy measures to: i) minimise acidification of surface waters and shallow ground waters within and adjacent to areas where these materials are stockpiled and used in road construction, ii) constrain and treat acidified waters if they are created from the use of acid generating materials, iii) mitigate environmental effects of acidification of surfaces water and shallow ground water on biota, and iv) monitor potential effects of acid generating materials on surface waters and shallow ground waters. The monitoring design shall identify the overall sampling design (e.g., before-after-control-impact), the spatial extent and frequency of sampling, and the variables that will be measured. 4. For any sites with permafrost/ice rich conditions, CZN shall include in their proposed DBSPD the monitoring of permafrost degradation. CZN is requested to further detail the methods to mitigate degradation during operation and the methods to manage and remediate such conditions during closure and reclamation of the borrow source. 5. Identify and deploy active restoration measures to ensure rapid re-vegetation of borrow pits and gravel pits 6. Identify a monitoring design to document success of active reclamation measures in borrow pits and gravel pits.</p>	<p>longer needed, guided by the approved borrow pit reclamation plans. 6. Monitoring requirements for borrows will vary on a site-specific basis. Consideration will be given to this during development of the individual borrow pit development plans.</p>	
14	GoC - PCA #13 Conceptual Design	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Conceptual Design <b>Reference:</b> DAR Appendix 1,2,5,8&amp;9, DAR Addendum Appendix A, DAR Section 6.4, DAR Appendix 1 Section 4.3, DAR Addendum Appendix A, C, F , British Columbia Ministry of Forests (2003). Karst Management Handbook for British Columbia. ISBN 0-7726-4922-7. May 2003, INAC (2010). Northern Land Use Guidelines – Access: Road and Trails. January 2010. Indian and Northern Affairs Canada (2009) Northern Land Use Guidelines: Pits and Quarries, Mackenzie Valley Environmental Impact Review Board, (2015a). Developer's Assessment Report DAR Adequacy Review. May 22, 2015. Mackenzie Valley Environmental Impact Review Board (2015c). Reasons for Decision on the Adequacy of the DAR – Prairie Creek All Season Road Project – EA1415-01. December 21, 2015, Transport Association of Canada (2010). Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions. May 2010 <b>TOR Section:</b> 6.1, 6.2 <b>Comment:</b> Conceptual Design: At this time, CZN (2015a, 2015c) has provided conceptual designs for the roadway embankments and water crossings within Appendix 1 of the DAR, and Appendix A of the DAR Addendum, totalling approximately 20.5km or 11% of the total route. It is understood that geometric details will be provided during a later design stage of the project, however such information is germane to assessing the overall performance and safety of the road and likelihood and risks due to spills, accidents and malfunctions. The provision of current plan and profile drawings, however preliminary they may be, would facilitate such assessments. Typical roadway cross sections are a useful tool in preliminary engineering for determining adequacy for the design vehicle, generating quantity-take-offs, assessing roadside drainage accommodation, and determining the required road corridor width. While preliminary cross sections have been provided (Appendix 1A, Sec. 4.2.1), they are missing the proposed road grade height (i.e. vertical distance from shoulder to ditch). Similarly, the 'Non-Typical' cross section provided for the section along Sundog Creek does not include the road embankment height, nor does it display the high water elevations for various return periods vis-a-vis the embankment sideslope. The MVEIRB Reasons for Decision on the Adequacy of the DAR correctly identifies additional information to be provided that would aid in assessing the stability, safety, and overall integrity of the proposed roadway adjacent to, and within, the Sundog Creek bed and shoreline. Appendix 2 of the DAR gives mitigation strategies listed in TAC (2010) and from INAC (2009, 2010) to avoid or reduce adverse environmental effects due to road construction and borrow acquisition in the North. It is mentioned that the Karst Management Handbook may be particularly useful in parts of the route that traverse on or close to karst terrain (BCMF 2003) . Section 8.1.3 also gives recommendations for mitigation strategies for construction timing and embankment design to protect thermal regimes. Appendix 2 indicates that Tetra Tech EBA visited representative locations, totaling under 50% of the route, but makes reference to the need for further geotechnical investigation: Section 6.0 (re: structure foundations and embankments traversing permafrost), Section 7.3.2 (re: crossings of thermokarst or ice-rich soils), Section 8.1.1 (drilling for geotechnical investigation along the alignment and in borrow sources). The investigation noted in Section 8.1.1 is proposed to be conducted at the time of construction, and the timing of other investigations noted is unclear. Waiting for geotechnical confirmation of soil and subsurface conditions until the time of construction could result in required deviations from design, and from an alignment that may have been conditionally accepted.</p> <p><b>Recommendation</b> Conceptual Design: 1. CZN to provide their preliminary plan and profile drawings including horizontal curves, road widths and grades, and along with</p>	<p><b>May 5:</b> 1. See Allnorth document attached to PCA IR4. 2. See CZN's Reasons for Decision on Adequacy reply and the Allnorth document attached. 3. CZN has already made this commitment.</p>	

		updated and annotated typical cross sections. 2. Commitment from CZN that they will provide the items listed by the MVEIRB in Sec.5.1 of the Reasons for Decision on the Adequacy of the DAR as well as the applicable road cross section(s) that will apply at stations adjacent to or within the Sundog Creek bed and shore, complete with watercourse high water marks (e.g. Q10 and Q100) relative to the roadway embankment. 3. CZN to commit to performing the further studies and detailed geotechnical investigations noted along the alignment to better define the permafrost and geotechnical conditions, and generate proposed management strategies, prior to final design.	
15	GoC - PCA #14 Design and Construction Standards	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Design and Construction Standards <b>Reference:</b> DAR Appendix 1,2,5,8&amp;9, DAR Addendum Appendix A, DAR Section 6.4, DAR Appendix 1 Section 4.3, DAR Addendum Appendix A, C, F , British Columbia Ministry of Forests (2003). Karst Management Handbook for British Columbia. ISBN 0-7726-4922-7. May 2003, INAC (2010). Northern Land Use Guidelines – Access: Road and Trails. January 2010. Indian and Northern Affairs Canada (2009) Northern Land Use Guidelines: Pits and Quarries, Mackenzie Valley Environmental Impact Review Board, (2015a). Developer's Assessment Report DAR Adequacy Review. May 22, 2015. Mackenzie Valley Environmental Impact Review Board (2015c). Reasons for Decision on the Adequacy of the DAR – Prairie Creek All Season Road Project – EA1415-01. December 21, 2015, Transport Association of Canada (2010). Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions. May 2010 <b>TOR Section:</b> 6.1, 6.2 <b>Comment:</b> Design Standards: Section 6.4 of the DAR states that the proposed all-season road will not have runaway lanes or safety railings. It is stated that during the winter road permitting, it was determined by CZN's consultant that the road grades are not steep enough to require runaway lanes, and that the grades have either been reduced or maintained by Allnorth for the design of the proposed all-season road. Likewise, it is stated that safety railings would be ineffective at stopping trucks from leaving the road surface, and are therefore unnecessary given the low vehicle volumes and vehicle speeds. This determination may not be conclusive at this point, since road design geometrics are not yet provided. Section 4.3 in DAR Appendix 1 describes the road design specifications, including a 5 m wide running surface, and a primary 40 km/hr design speed. Throughout the submissions there are references to the BC Forest Road Engineering Guidebook and/or the BC Forest Service Engineering Manual. Review of these reference documents has identified discrepancies between their stipulated standards and those proposed by CZN including, but not necessarily limited to, the following: Design Parameter: Min. Curve Radius (40km/hr design speed) BC Forest Road Engineering Guidebook: 65 m CZN DAR: 40 m Design Parameter: Road Surface Width on Curves (Lowbed Vehicles) BC Forest Road Engineering Guidebook: 90m R curve: 5.3m 60m R curve: 5.8 m 45m R curve: 6.0 m CZN DAR: 5.0 m Design Parameter: Road Turnout Lane Width BC Forest Road Engineering Guidebook: 4 m CZN DAR: 3 m Design Parameter: Turnout Frequency (spacing) BC Forest Road Engineering Guidebook: Intervisible and often three or more per kilometre CZN DAR: 1 to 3 per kilometre <b>Recommendation</b> Design Standards: 1. CZN to name the governing roadway design and construction standards and provide justification for any deviations to those established standards. This shall include a commentary on the considerations that dictate the selection of standards (design vehicle, speed limit, estimated traffic volume). 2. Commitment from CZN that there will be a review and justification for the inclusion or omission of safety railings and runaway lanes based upon actual geometrics at the time of detailed design.</p>	<p><b>May 5:</b> 1. See Allnorth document attached to PCA IR4. 2. All aspects of road design will be reviewed during detailed design. <b>May 6:</b>  Allnorth Report</p>
16	GoC - PCA #15 Watercourse Crossings	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Watercourse Crossings <b>Reference:</b> DAR Appendix 1,2,5,8&amp;9, DAR Addendum Appendix A, DAR Section 6.4, DAR Appendix 1 Section 4.3, DAR Addendum Appendix A, C, F , British Columbia Ministry of Forests (2003). Karst Management Handbook for British Columbia. ISBN 0-7726-4922-7. May 2003, INAC (2010). Northern Land Use Guidelines – Access: Road and Trails. January 2010. Indian and Northern Affairs Canada (2009) Northern Land Use Guidelines: Pits and Quarries, Mackenzie Valley Environmental Impact Review Board, (2015a). Developer's Assessment Report DAR Adequacy Review. May 22, 2015. Mackenzie Valley Environmental Impact Review Board (2015c). Reasons for Decision on the Adequacy of the DAR – Prairie Creek All Season Road Project – EA1415-01. December 21, 2015, Transport Association of Canada (2010). Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions. May 2010 <b>TOR Section:</b> 6.1, 6.2 <b>Comment:</b> Water Crossings: Hydrological investigations have been performed for major water crossings, however these would be required for all water crossings during the detailed design phase. Appendix 2, 5, 8 &amp; 9 of DAR, Appendix A, C, F of DAR Addendum give the details of the water crossings and background information to date. The 'General Placement Plans' for the major crossings are well presented but lacking sufficient detail to assess the safety of the stream crossings, for example they do not include all the relevant roadway approach geometric data (e.g. approaching road grades and horizontal curve radii). In addition, the preliminary plans display some shallow footings within the streambed and these would be at risk to undermining and destabilization due to scour. Section 6.0 of</p>	<p><b>May 5:</b> 1. See Allnorth document attached to PCA IR4. 2. CZN has already made this commitment.</p>



		<p>Appendix 2 notes that major structures will require geotechnical investigation to determine design parameters. Once the General Placement Plans are finalized, it is expected that superstructure and substructure details would then follow at the design stage and will be based upon geotechnical investigation and detailed site surveys.</p> <p><b>Recommendation</b> Watercourse Crossings: 1. That CZN revise its General Placement Plans to display the approach road horizontal and vertical geometrics in order to properly assess the safety of the crossing and the potential need for barriers. 2. CZN to commit to performing the geotechnical and hydrologic investigation required prior to final design of the watercourse crossings.</p>		
17	GoC - PCA #16 Road Operations Standards	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Operations Standards <b>Reference:</b> DAR Addendum, Appendix A Section 2.4 and 2.6, DAR Section 6.3.4, Appendix A-Road Operations Plan Section 7 and 5.1, Road Construction and Maintenance Plan, PWGSC Bridge Inspection Manual (2010), Parks Canada Bridge Maintenance and Inspection Manual (2008), Alberta Transportation Bridge Inspection &amp; Maintenance System (v3.1, 2008) <b>TOR Section:</b> 6.1, 6.2</p> <p><b>Comment:</b> Roadway Operations: Section 2.4 of Appendix A indicates use of the Super B tractor/trailer combination and further states: "All vehicles, in particular commercial vehicles, operating on public roads must be in compliance with all federal, provincial, and territorial DOT laws. The tractor and trailer configurations proposed for this haul are no exception" The published load tolerances from GNWT Department of Transportation stipulate a maximum 63.5 tonnes for B – Train Truck and Trailer Combinations. In comparison, Section 6.3.4 of the DAR notes that the net payload of concentrate transport trucks will be 40 – 50 tonnes, based upon a GVW of 60 – 70 tonnes. There is no justification provided for proposed loadings above the GNWT standard, nor is there a methodology noted for the measurement and control of vehicular loading (e.g. truck weigh scales and bills of lading). Section 7 of the Road Operations Plan (ROP) notes that all users must obey all posted speed limits and signage. This is indeed a key element in transport accident and spill prevention and mitigation for wildlife collisions. Other than signage, there are no controls or enforcement measures proposed. Sections 2.6 of Appendix A also depends on vehicle speed compliance to support the proposed omission of safety railings.</p> <p><b>Recommendation</b> Roadway Operations: 1. That CZN revise their ROP with a commitment to abiding by and enforcing GNWT commercial truck loading restrictions, or adequately justify variance from these allowances with respect to truck and trailer configurations and braking abilities, operator training, and roadway geometrics. 2. That CZN revise their ROP with a clarification on how they plan to monitor the roadway to enforce the vehicle speeds.</p>	<p><b>May 5:</b> 1. CZN has no objection to revising the ROP with a commitment 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. We propose to make these revisions at a later date prior to operations. 2. CZN does not object to revising the ROP with a clarification on the plan to monitor the roadway to enforce vehicle speeds. Our reply to Oboni IR1, point 6 re monitoring details was as follows: All sections of the road will have sign-posted speeds. Road operations will be managed using a Journey Management System. This logs vehicles starting and ending trips, and in the case of concentrate trucks, trip progress (i.e. speeds, stops). We will know from monitoring whether vehicles are exceeding speeds. Supervisors and monitors on the road will also provide oversight.</p>	
18	GoC - PCA #17 Road Maintenance Standards	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Maintenance Standards <b>Reference:</b> DAR Addendum, Appendix A Section 2.4 and 2.6, DAR Section 6.3.4, Appendix A-Road Operations Plan Section 7 and 5.1, Road Construction and Maintenance Plan, PWGSC Bridge Inspection Manual (2010), Parks Canada Bridge Maintenance and Inspection Manual (2008), Alberta Transportation Bridge Inspection &amp; Maintenance System (v3.1, 2008) <b>TOR Section:</b> 6.1, 6.2 <b>Comment:</b> Roadway Maintenance: Section 5.1 of the Road Operations Plan contained in Appendix A notes: "It is expected that a sufficient fleet of graders will be located at strategic locations along the route to maintain the road surface to ensure efficient, safe transport of materials to and from the mine site." There is no suggested number of graders provided, nor any proposed locations to station them. No mention is made of loaders and dump trucks which are typically deployed to clear avalanche and landslide debris from roadways. The number and dispatch locations for maintenance operators and equipment, as well as the equipment types will determine the response time and provide an indication of the level of surface maintenance that will be provided. Maintenance standards and response times to clear debris or to address a rough, rutted, or potholed roadway have a direct impact on roadway safety and spill risk/mitigation for product transport. Stream crossings in particular are higher risk areas regarding roadway failure, safety, and spill risk. The Road Construction and Maintenance Plan (RCMP) and the Road Operations Plan (ROP), Appendix A, both appropriately identify monitoring of all stream crossings, and the inspection and maintenance of major bridge crossings as components of the maintenance program (RCMP 7.1.1 &amp; 7.1.2, ROP 5.1.1. &amp; 5.1.2.). There are no standards proposed or referenced regarding the types and frequencies of bridge inspections, nor the qualifications of the bridge inspectors. Several recognized bridge inspection and maintenance standards are in place and could be referenced, including: the PWGSC Bridge Inspection Manual (2010), Parks Canada Bridge Maintenance and Inspection Manual (2008), Alberta Transportation Bridge Inspection &amp; Maintenance System (v3.1, 2008).</p> <p><b>Recommendation</b> Roadway Maintenance: 1. That CZN amend their RCMP to provide a more detailed proposal on their roadway maintenance fleet, staff, and station locations or, alternatively, provide the target maintenance response times that will in turn dictate the fleet and staff complement required for operations. 2. CZN to provide the bridge and major culvert inspection and maintenance standards that will be applied. These standards will address inspection types, frequencies, and inspector qualifications.</p>	<p><b>May 5:</b> 1. From our reply to Oboni IR1, point 5a: We anticipate that 2 maintenance crews may be operating on the road at times, a Mine based 'western' crew and a Nahanni Butte-based 'eastern' crew. Each crew could consist of a grader, haul/dump truck and small supervisor truck, although most times it may only be a grader. A loader would be stationed in a borrow pit to provide material for maintenance. However, this loader, and one from the Mine, could be called into action in the unlikely event of an avalanche or slide blocking the road. Assume 2 vehicles on average. Station locations will depend on the locations of road maintenance needs, and would include active camp and borrow source locations. For the record, we have no intention of allowing delays regarding the clearance of any debris, or a rough, rutted, or potholed roadway since this will impact on transportation efficiency, safety and/or vehicle wear/damage. The RCMP will be amended for operations. 2. The typical standard that Allnorth uses is based on the BC Oil and Gas Activities Act. For Bridge and Major Culverts Inspection, Allnorth proposes: (1) A road permit holder must (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</p>	

			inspection. (2) A road permit holder must (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.	
19	GoC - PCA #18 Spill Risk and Spill Management	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Spill Risk and Spill Management <b>Reference:</b> DAR Appendix 2 Section 7, DAR Section 9, DAR Addendum Section 7, DAR Addendum Appendix C of Appendix A <b>TOR Section:</b> 6.1, 7.2.2 <b>Comment:</b> Risk and Spill Management: A qualitative geohazard risk assessment was performed in Appendix 2 of the DAR. The risk assessment can be found in Section 7 of that report, and Table 7.2.2-1. Based on the assessment, it was estimated that 7.6 km and 76.7 km out of 174.1 km analyzed were considered "high risk" and "moderate risk" to the road, respectively. TetraTech EBA further states that "...Table 7.2.2-1 is not a direct assessment of spill risk, but we anticipate that it will assist CZN in assessing the spill risk due to environmental factors along the route." Several mitigative measures and site-specific contingencies are proposed to help reduce or manage risks and/or residual effects. These are proposed for either road design or as roadway maintenance items. A risk assessment of potential accidents and malfunctions was presented in Section 9 of the DAR, and was updated based on the Adequacy Review, and presented subsequently in Section 7 of the DAR Addendum. However, per (Mackenzie Valley Environmental Impact Review Board (2015c). Reasons for Decision on the Adequacy of the DAR – Prairie Creek All Season Road Project – EA1415-01. December 21, 2015.) , the revised risk assessment still did not address the adequacy review requirements. More specifically, it was stated that it lacks considerations for the effects of weather, human error, contamination of soil, aerial dispersal associated with spills, as well as spills at transfer facilities. In addition, it was stated that it does not account for components or systems failures. In addition, the likelihood or frequency of certain geohazards was not adequately quantified, including a reference avalanche report that is missing from the DAR (Alpine Solutions Alpine Services (2012). Avalanche Hazard Maps, Drawings 1 to 6, Index Map at 1:75,000 scale, Hazard Maps at 1:20,000 scale. Prepared for Canadian Zinc Corporation. May 2012.) . Finally, in the event of the spill, the risk assessment in CZN does not describe what the effect to the environment would be from a spilled material. A complete review of this topic is not possible with the critical piece (the risk assessment) not completed by CZN. A map of the risks along the alignment is given in Appendix 2 of the DAR, however that risk map has not been updated to reflect the realignments noted in TetraTech EBA (2015). CZN has provided discussion regarding spills in Section 9 of the DAR, and Section 7.1 of the DAR Addendum. Additionally, a Road Construction and Maintenance Plan, and Road Operations Plan that discusses spills is given in Appendix C of Appendix A of the DAR Addendum. However, a Spill Contingency Plan has not been developed for the all-season road project. CZN provides general discussion regarding response time, spill equipment, and response to specific spills in Section 9.5 of the DAR, covering the three most significant potential contaminants if released to the environment: concentrates, fuel, and sulphuric acid. However, CZN does not discuss the following for all three potential contaminants: - The volume of contaminant spilled in a reasonable scenario (e.g., one truckload or container of concentrate, fuel, or acid) - The volume of contaminant spilled in a worst-case scenario (e.g., multiple truckloads or containers of concentrate, fuel, or acid) - The cleanup procedure for each potential contaminant in each terrain encountered along the road (e.g., mountains, floodplain/alluvial, karst, forest, wetland/muskeg), during both winter and summer. - An inventory list of the primary equipment that will be used in each cleanup procedure for the above scenarios, including location and response time. CZN also discusses control points for streams in Section 9.5 of the DAR and Table 7-4 of the DAR Addendum provides a general analysis of accessibility. In this discussion, CZN acknowledges that some locations may be difficult to access with the equipment required for cleanup. CZN does not provide a map showing locations along the road where topography may restrict the access of spill response equipment proposed for cleanup in the scenarios above. Additionally, CZN does not provide alternative cleanup procedures for each location and each contaminant where the proposed spill response equipment is unable to access.</p> <p><b>Recommendation</b> Risk and Spill Management 1. Provide the 2012 Alpine Solutions Alpine Services Avalanche Hazard Report. 2. Provide the updated risk assessment required by the December 2015 Reasons for Decision on the Adequacy of the DAR report. 3. Provide an updated geohazard risk map which includes the proposed realignments noted in the December 2015 Terrain Mapping Report from TetraTech EBA. 4. Develop a Spill Contingency Plan that adheres to the requirements set forth in the INAC (2007) Guidelines for Spill Contingency Planning. 5. Provide additional</p>	<p><b>May 5:</b> 1. This was provided with our response to the Reasons for Decision on Adequacy. 2. As noted in the Reasons for Decision, the Board has hired an independent consultant for this. 3. The Tetra Tech EBA document attached is a revised assessment of hazard risks by road section, and incorporates the recent alignment changes. . 4. A draft Spill Contingency Plan has been provided (see DAR Addendum, section 4.17). This will be updated for operations, and will include the additional details regarding response plans (e.g. section 9.5 of the DAR), and other changes in consideration of review comments from regulators. 5. Refer to the DAR Addendum, section 7.1. In our opinion, the geohazard assessment relates to risks to the road, both short term and long term, with large differences in magnitude and frequency. This assessment, in isolation, is not considered to be a suitable base for determining road sections at elevated risk in terms of spills or spill response. In Table 7-1 in the DAR Addendum, we integrated road alignment considerations (grade, alignment) with those geohazard factors considered relevant to spill risk to generate spill likelihoods. In the NNPR, high likelihood was ranked for Km 96-102, and moderate likelihood for Km's 23-40 and 54-60. However, in terms of consequence (Table 7-2), high rankings were assigned to Km's 24-40 and 87-96, with moderate rankings for 17-24, 54-87 and 96-102. In our opinion, spill response plans need to be suitable to all sections of the road, but specifically need to address difficult areas of spill response, such as where the road is above and separated from a watercourse. Section 9.5.2 of the DAR discusses spill response preparedness, and specifically addresses the elevated consequence road sections. To address the difficult response areas where the road is above a watercourse, we proposed spill control points on key streams. At these locations, response equipment will be stored so that a response can be implemented quickly by personnel arriving on foot, since some locations are inaccessible by road vehicle. Other mitigation and clean-up would be highly spill and site specific. We believe the information referenced above is a suitable framework for a spill response plan. Should PCA have specific advice as to how this plan could be improved, we would welcome it and would consider incorporating it into the revised plan. 6. Section 9.5.2 of the DAR considered worst-case spills of concentrate, diesel</p>	

		details regarding spill response, mitigation, and cleanup for areas along the route alignment that were deemed as high and medium risk for the geohazard assessment presented in Appendix 2 of the DAR. 6. Provide additional details regarding cleanup procedures and equipment required in a reasonable and worst-case spill scenario for concentrate, fuel, and acid, in each terrain-type encountered along the road during both winter and summer conditions.	and acid. Spill responses according to season are discussed in the above-noted draft spill response plan. This plan also provides a list of spill response equipment. The location and nature of the equipment is with consideration of terrain type, as well as slope and proximity to watercourses. Again, if PCA believes there is a specific deficiency in our plans, we would be pleased to receive comments. <b>May 5:</b>  Response to PC IR18 - Tetra Tech	
20	GoC - PCA #19 Road Maintenance- Dust Suppression	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Road Maintenance- Dust Suppression <b>References:</b> DAR Section 11.3.3 Mitigation p 240, DAR Appendix A, Appendix C Section 7.1.1 Summer/Fall Operations, p 9, GNWT. Guideline for Dust Suppression. 1998. <b>TOR Section:</b> 6.1, 6.2 <b>Comment:</b> The DAR proposes to follow the GNWT Dust Suppression Guidelines (1998) to limit dust generation during snow free months, but does not identify how this guideline will be implemented. Subsequently the DAR Addendum Appendix A, Appendix C p 9 states dust suppression will be achieved through spot watering. These statements create ambiguity on the proposed methods of dust suppression. <b>Recommendation</b> Clarify the proposed methods for dust suppression identifying which methods will be used in which locations.	<b>May 5:</b> As stated by Allnorth, spot watering will be the method of dust suppression using a tanker truck. The road top surface will be composed of gravel in all sections. Dust suppression may be required for any and all sections.	
21	GoC - PCA #20 Fish- Impacts of rock blasting on fish populations	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Impacts of rock blasting on fish populations <b>References:</b> DAR Executive Summary, p 10, Appendix 1 – Proposed Prairie Creek Mine Access Road, p 1 <b>TOR Section:</b> 6.1, 7.3.7 <b>Comment:</b> Blasting of rock adjacent to streams has the potential to negatively affect fish populations by altering fish behaviours that influence fish growth, time to reproduction (i.e age at maturity) and survival. Blasting can also result in fracturing of bed rock materials that can have unforeseen effects on flow of water, including shallow groundwater and surface flow, and can also leave residues from blasting on quarry or borrow material that could enter shallow surface ground water and surface waters. <b>Recommendation</b> 2a. Identify measures that will be taken to ensure that blasting does not alter surface flow and flow within the shallow ground water. 2b. Identify the sampling design that will be deployed to quantify potential effects of blasting on surface and shallow ground water flow, including the experimental design (e.g., before-after control impact, or control impact designs) and details of sampling intensity and frequency and the variables that will be measured. 3a. Identify measures that will be taken to ensure that potentially sediment-rich flow that could be created during blasting does not enter surfaces waters adjacent to blasting sites. 3b. Identify the sampling design that will be deployed to quantify potential effects of blasting on sediment levels in surface waters adjacent to blasting sites, including the experimental design (e.g., before-after control impact, or control impact designs) and details of sampling intensity and frequency and the variables that will be measured.	<b>May 5:</b> 2a. At the two locations in upper Sundog that require blasting to provide approaches for bridges, the rock to be removed is exposed, massive dolostone with very little porosity. This rock cannot be considered to be a groundwater host due to its properties and its location well above the bed of the stream. As such, the removal of the rock will have no effect on surface or subsurface water, certainly it is very unlikely that blasting would have any significant effect in stream baseflow. Further, fish are not present at the two locations. Blasting will also be required to allow a revised road alignment between Km's 28 and 29, and downstream near Cat Camp. At both locations, similarly massive rock will be removed to allow the road footprint to be above and out of the floodplain. Near Cat Camp, extensive talus is adjacent to and above the massive rock, and this material is porous, allowing infiltration and passage of precipitation. Therefore, no measures to ensure blasting does not alter flow are necessary. 2b. See 2a. No sampling is necessary. 3a. Blasting will be conducted in non-spring dry conditions. The blast site will be isolated with silt fence. The fence will remain until road bed material has been placed to stabilize any fine material. Fence may be redeployed downslope from the blast site after road bed placement, as necessary. 3b. Blast 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.	
22	GoC - PCA #21 Fish- Potential negative effects of highway traffic noise on fish	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Potential negative effects of highway traffic noise on fish <b>References:</b> DAR Section 11.4.2 Fish, p 241 <b>TOR Section:</b> 6.1, 7.3.4, 7.3.7 <b>Comment:</b> Use of the all season road will result in appreciable highway vehicle traffic that has the potential to negatively affect fish due to noise. In section 11.4.2 the proponent states that "Many fish have a threshold of 50 to 70 dB. Several species have been reported to be	<b>May 5:</b> See Hatfield document attached. <b>May 5:</b>  Response to PC !R21 - Hatfield	

		<p>adversely affected by sound levels of &gt; 180 dB for two hours or less". The proponent also stated that "A few studies have found a response to noise" and later concluded that "The above information indicates that no effects on eggs or fry from noise louder than trucks". The overall assessment of potential effects of noise from highway traffic on fish is incomplete, is not well supported by scientific studies, does not identify areas of uncertainty, and does not include assessments of effects on fish species that are known to inhabit streams that will be crossed by the all season road.</p> <p><b>Recommendation 1.</b> The information evaluating potential negative effects of noise on fish needs to be defined in terms of the specific vehicles that will use the road and the noise levels that these specific vehicles, or classes of vehicles, will produce. 2. Using GIS tools and best available noise thresholds, calculate: i) lengths of the road where noise thresholds have the potential to affect fish and ii) total area of stream habitats that may be impacted by road traffic noise. 3. Define noise effect thresholds along the all season road including those adjacent to bridges and culverts. 4. Define potential effects of roads on fish to include those potentially resulting from vibrations of the road surfaces especially those adjacent to bridges and culverts. 5. Evaluate if road noise thresholds could be reduced by reducing traffic speeds. 6. Identify if measures will be taken to quantify potential effects of road traffic noise on fish populations and if so, outline what experimental design will be used to assess these potential negative effects (e.g., a before-after, control impact design to assess impacts).</p>		
23	GoC - PCA #22 Fish-Identification of specific road crossing structures	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Identification of specific road crossing structures <b>References:</b> DAR Appendix 1, Table 10, p 49-55, DAR Addendum, Appendix A <b>TOR Section:</b> 6.1, 7.3.7 <b>Comment:</b> The construction of the all season road requires installation of numerous culverts and bridges. The ability to assess environmental risks associated with installation of these stream crossing structures (e.g., culverts versus span bridges) requires: i) identifying the specific crossing structure type that will be deployed and ii) detailed descriptions of how each crossing structure will be installed. An assessment of the potential impacts of installation of crossings on aquatic habitats and biota that inhabit them, requires detailed descriptions of land clearing practices, measures that will be adopted to minimize disruption of soils and where possible maintain intact riparian vegetation, soil stockpiling, and to establish approaches and abutments. In the majority of cases, the DAR identifies the crossing structure in terms of whether a bridge (e.g., clear span bridge) or a culvert will be installed. Table 10 in Appendix 1 of the DAR identifies crossing types for all stream crossings. However, an additional level of detail describing crossing types and dimensions is required to: i) more fully evaluate environmental risks and ii) the extent that the chosen structure and installation methods are appropriate. In several instances, the proponent has also indicated that the crossing location may include installation of a clear span bridge or multiple large culverts (e.g., crossing structures at KP 20.3, KP 43.4). Additionally, Table 10 identifies the use of "large diameter" culverts (e.g., KP 95.0) but does not specifically identify the culvert diameter. In its current form, these deficiencies preclude the ability to fully assess environmental effects of installation of specific structures on fish and fish habitats along the all season road.</p> <p><b>Recommendation 1.</b> Provide details of clear span bridges including length, abutment and approach types, surface materials and bridge cleaning practices and specific standards that will be used to install bridges. 2. Fully describe culvert types (e.g., open arch, closed circular) and dimensions (e.g., diameter) and specific standards that will be used to install culverts. 3. Identify the specific stream crossing structure for all stream crossings by eliminating the use of crossing structure alternatives for example where "either a clear span bridge or large diameter culvert will be installed" (e.g., KP 20.3 and KP 43.4). 4. Identify: a) specific engineering practices related to land clearing, b) measures that will be adopted to minimize disruption of soils and where possible maintain intact riparian vegetation, c) soil stockpiling practices, and d) standards to establish approaches and abutments. 5. Identify specific engineering measures that will be taken during installation of culverts to ensure that they do not restrict fish passage in river systems where fish are known to be present or are likely to be present. This shall include ensuring that culverts do not pose barriers to fish movement that could result, for example, from a) water velocities within the culvert that exceed fish swimming capabilities (i.e, velocity barriers to fish movement) or b) where substantive differences in water level at the entrance and exit of the culvert relative to the water surfaces of the stream could preclude entrance into the culvert (i.e., a blocked culvert entrance or a hanging culvert).</p>	May 5: See Allnorth document attached to PCA IR4.	
24	GoC - PCA #23 Fish-Use of staging areas to support the installation of bridges	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Use of staging areas to support the installation of bridges <b>References:</b> DAR, Appendix 1, Section 6.1 Major Streams, p 48 <b>TOR Section:</b> 6.1, 6.2, 7.3.5, 7.3.7 <b>Comment:</b> The installation of bridges along the all season road requires the creation of staging areas (50 x 50 m). As stated in the DAR, in the vast majority of cases, these areas will be located in close proximity to the bridge, outside of the defined current riparian zone, utilizing the natural landscape and terrain. The DAR also states that these areas will be located within local disturbed areas, if available. The specific number of staging areas that are expected to be located on previously non disturbed</p>	May 5: See Allnorth document attached to PCA IR4.	

		<p>sites is not specifically identified. This lack of detail precludes calculating the total disturbance footprint at sites located adjacent to stream crossings and the magnitude of restoration prescriptions that are required.</p> <p><b>Recommendation 1.</b> For all crossings where bridges are the prescribed crossing structure, identify the number and combined areas of land that will be disturbed. 2. Identify specific restoration prescriptions that will be applied at all sites where there was previously intact land (i.e., previously undisturbed sites) and at all sites where staging areas will be created on previously disturbed areas.</p>	
25	GoC - PCA #24 Fish-Road dust control measures	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Road dust control measures <b>References:</b> DAR Section 11.3 Air Quality, p 237-240, Appendix 1, Section 4.8.4 Water Use, p 48 <b>TOR Section:</b> 6.1, 6.2, 7.3.3, 7.3.5, 7.3.7 <b>Comment:</b> The construction of the all season road will require dust control measures that requires the withdrawal of water from local water bodies. Additionally, water will also be used during road construction. In its current form, the DAR does not fully describe several aspects of withdrawal of water from surface water sources for dust control measures and road construction. Assessing the environmental effects of water withdrawals requires knowledge of the: i) volume of the water source, ii) its recharge rate (e.g., the flow rate of flowing water bodies and recharge of standing water bodies) iii) the timing and volume of water that will be removed, and iv) how water bodies will be accessed to ensure minimal effects on riparian zones and the water body.</p> <p><b>Recommendation 2.</b> For each flowing water body (i.e., streams and rivers) used as a water source identify: a) when water will be abstracted, b) discharge rate of the water body when water will be abstracted, and c) the volume of water that will be abstracted. 3. For each standing water body (i.e., wetlands and lakes) used as water source identify: a) when water will be abstracted, b) the volume of water body when water will be abstracted, and c) the volume of water that will be abstracted, and d) recharge rates of the water body. 4. Identify measures that will be taken to ensure that application of water to roads for dust control and road construction does not result in introduction of sediment-laden water to riparian zones and to stream channels.</p>	<p><b>May 5:</b> 2. a) Open water season. b) We have stated that flow measurements would be taken at the time of extraction, and well below a maximum of 10% of instantaneous flow would be extracted. c) See b) above. 3. a) Year-round. b) Water sources were quantified previously. See our Nov. 19, 2012 submission to PCA for the winter road LUP. c) No more than 10% of lake volume. d) Recharge rates in winter may be minimal. Recharge rates in summer are likely to be significant and well above the 10% volume given the net positive precipitation. 4. Water addition will be via a spray only sufficient to wet the surface, not enough to promote runoff. Only the top surface will be sprayed, not the road slopes.</p>
26	GoC - PCA #25 Fish-Fish Habitat and Stream Realignment	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Fish Habitat and Stream Realignment <b>References:</b> DAR Section 6.2 Alternatives, p. 137, 138, Section 6.4 Road Design Considerations, p. 148, 10.9.3 Fish p. 225, Section 11.6.1 Road Construction p. 244, 245, Section 11.6.3 Mitigation, p 246, 247 <b>TOR Section:</b> 6.1, 6.2, 7.3.5, 7.3.7 <b>Comment:</b> Realignment of the river channel from existing stream channels to new areas within floodplain that were recently dry will result in short term losses in the quality of fish habitats. These reductions in habitat quality for fish arise primarily from two factors. Firstly, lower habitat quality arises as new stream channels initially support lower abundances of benthic macroinvertebrates that serve as important food sources for fish. Secondly, areas of the floodplain that receive new flow will be more physically unstable for a period of time until the stream channel stabilizes. Taken together, reduced food availability for fish and unstable stream channels will likely persist for up to three years as the stream channels are colonized by benthic macroinvertebrates from upstream non-disturbed areas and as the channel stabilizes and more closely approximates upstream, non-disturbed areas that have received water for extended periods. Short-term reductions in the quality of fish habitats requires compensation measures. The DAR (See 10.9.3) states that: i) a portion of Sundog Creek will need to be realigned away from the south bank of the floodplain to allow for road construction ii) similar habitat will be created towards the centre of the floodplain, and concludes that, habitat area will be maintained. By contrast, the DAR does not acknowledge that the quality of the newly created stream habitat will be lower, at least for a short period of time, than that which was destroyed. The current DAR does not identify the occurrence of short-term losses in fish habitat due to stream realignment nor does it include calculations on how these reductions in habitat losses could be mitigated.</p> <p><b>Recommendation 1.</b> Quantify the areas that the all season road will occupy within floodplains within the Geographic scope of the project. 2. Based on knowledge of colonization dynamics of benthos from previously denuded reaches of streams identify the length of time required for benthic macroinvertebrates communities to resemble natural communities. 3. Using information from Requests 1 and 2 (above) develop a fish habitat compensation plan to mitigate short-term reductions in the quality of fish habitats due to realignment of stream reaches in floodplains habitats. 4. Develop practices to minimize mortality of fish during the period when flow from the existing stream channel is diverted to its new location within the floodplain. This should include evaluations of measures to: i) physically relocate fish that may be stranded in the old channel to the new channel, ii) to reduce mass movement of the new river bed and sediment releases from the new channel when it receives flow for the first time, and iii) monitoring efforts to document increases in suspended sediment levels during flow diversion.</p>	<p><b>May 5:</b> See our reply attached. <b>May 5:</b>  Response to PC IR25</p>
27	GoC - PCA #26 Fish-Fish Habitat and Road Realignment	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Fish Habitat and Road Realignment <b>References:</b> DAR, Section 6.2 Alternatives, p 137-138, Section 6.4 Road Design Considerations, p 148, Section 10.9.3 Fish, p 225, Section 11.6.1 Road Construction, p 245, 246, Section 11.6.3 Mitigation, p 246, 247</p>	<p><b>May 5:</b> 1. We consider floodplain 'habitat' to be that which occurs below the ordinary high water mark. See our replies to PCA IR25 for the footprint of the road</p>

		<p><b>TOR Section:</b> 6.1, 6.2, 7.3.5, 7.3.7 <b>Comment:</b> The majority of larger streams within the geographic scope of the DAR occur as moderately narrow areas of flowing water (3 to 15 m in wetted width during the summer and fall) and are located within broad and typically braided floodplains comprised of rocks and gravels. In many cases floodplains are particularly wide that extend from the base of adjacent mountain ranges. While the majority of larger streams comprise only a small portion of the broad floodplains, the location of the stream is highly variable among years and the stream channel where flow is present can move appreciable distance between years. The width of the stream channel is also appreciably larger in the spring due to spring runoff. Because of ecological linkages and exchanges of materials (e.g., nutrients, water) from the floodplain to the actively flowing stream channel, the entire floodplain and its riparian vegetation, is considered to be fish habitat. Establishment of sections of the all season road within or immediately adjacent to floodplains (e.g., Sundog Creek [DAR 10.9.3]) will result in loss of fish habitat as these areas are no longer available for the stream to occupy. Indeed, the DAR identifies the need to stabilize reaches of the all season road with extensive areas of rip rap and other engineering methods to ensure that the road is not susceptible to erosion should the stream channel naturally move towards the section of the road within the floodplains. Establishment of sections of the all season road within the floodplain or immediately adjacent to it, will result in moderate-term losses in the quantity of fish habitats. Reduction in the availability of fish habitat would occur minimally over the period of the mine operations (identified as being 14 years [DAR Section 3.2]) plus a two year closure period (DAR Section 3.2). Potential losses in fish habitat due to the presence of sections of the existing winter road within floodplains are likely negligible as road use is minimal and constrained to the winter months, the road is narrow, includes many sections support vegetation, and are accompanied with minimal levels of armouring that would constrain material exchanges between the floodplain and the flowing stream. By contrast, potential longer-term reductions in the quantity of fish habitats due to construction of the all season road within floodplains habitats requires fish habitat compensation measures. The current DAR does not identify the occurrence of moderate-term losses in fish habitat due to construction of sections of the all season road within or immediately adjacent to the river floodplains. Consequently, it does not include calculations on how these reductions in habitat losses could be mitigated.</p> <p><b>Recommendation</b> 1. Quantify the areas of the all season road that will be constructed in floodplain habitats (i.e., quantify loss of floodplain habitats). 2. Using information from Request 1 (above) develop a fish habitat compensation plan to mitigate longer-term reductions in the quality of fish habitats due to construction of the all season road in floodplains habitats.</p>	<p>encroaching on this habitat. Note, with reference to lower Sundog Creek, while it is true that watercourses can alter pathways and widths from year to year, there are substantial portions of old floodplain that have stabilized and are beginning to host, or already host, vegetation. However, the floodplain areas, and adjacent slopes, are substantially lacking in nutrients. There is no reference to the Hatfield report in the DAR Addendum, Appendix C, section 16.5. This says that "The removal of any riparian vegetation adjacent to Sundog for the road should have little effect on fish or other aquatic life". The section also provides a quantification of vegetated riparian area loss. 2. As noted in the reply above, we await DFO's determination re habitat loss or gain, but our answer to 1. indicates that, in our opinion, compensation for riparian habitat loss isn't necessary because it will have little effect.</p>	
28	GoC - PCA #27 Fish-Potential reductions in the quality of fish habitat associated with training of stream channels	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fish-Potential reductions in the quality of fish habitat associated with training of stream channels <b>References:</b> DAR Section 11.5.1 Drainage and Hydrology, p 242, Section 11.3 Air Quality, p 240 <b>TOR Section:</b> 7.3.5, 7.3.7 <b>Comment:</b> Construction of the all season road includes efforts to reduce the probability that sections of roads within or immediately adjacent to river flood plains are eroded by high flows or changes in the stream channel. The proponent proposes to reduce risk associated with destruction of roads by "training" of river beds. As stated in the DAR, training is defined as activities that deepen old channels by excavation accompanied with placement of excavated materials in an existing channel. Deposition of excavated materials into existing stream channels results in short-term reductions in the quality of fish habitat due to: i) increases in levels of fine suspended materials (primarily silts and sands), ii) reduction in water clarity that likely reduce fish feeding, and general mechanical disturbances that likely result in fish moving out of habitats that were used prior to deposition of excavated materials. The DAR does not assess temporary reductions in the quality of fish habitat accompanied with "training".</p> <p><b>Recommendation</b> 1. Quantify short-term losses in fish habitat due to stream channel training within the geographic Scope of the DAR. 2. Based on information identified in Request 1 above, identify habitat compensation measures to offset short-term reductions in fish habitat due to stream channel training.</p>	<p><b>May 5:</b> 1. To re-align Sundog Creek over a 1400 m length, an existing old channel will be deepened by excavation. The excavated material will be used as sub-base for the road. The finished road will encapsulate this material with a top surface of gravel and a suitably armoured slope. No fines will be discharged to the existing channel. As noted in our reply to DFO IR5, sediment production in the re-aligned channel is not expected to be significant. It should also be noted that the stream section in question is considered run and riffle habitat, there are no pools. In fact, the section is usually dry outside of the spring period. The potential for significant impacts to migrating fish is low. 2. No significant reduction in habitat is expected.</p>	
29	GoC - PCA #28 Water quality - Use of soak-away sumps	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Water quality - Use of soak-away sumps <b>Reference:</b> DAR 11.5 (pages 242-244), DAR Addendum Section 4.17 (Page 44), Indian and Northern Affairs Canada. Northern Land Use Guidelines, Camps and Other Support Facilities. 2010, p 23. <b>TOR Section:</b> 6.1, 7.3.5, 7.3.7 <b>Comment:</b> Release of grey and brown water associated with construction camps has the potential to affect local surface water and shallow ground waters. The DAR states that brown and grey water associated with construction camps will be managed by either temporary storage and subsequent removal for treatment in plant at the Mine or elsewhere, or disposal in a soak-away sump located so that contaminants dissipate before reaching a water body. The ability to assess, and if required mitigate, potential effects of using soak-away sumps requires detailed description of soak away sumps. In its current form, the DAR does not describe in sufficient detail the potential use of soak-away sumps to dispose of grey and brown water. More recently, the DAR Addendum stated that: "... we have proposed to manage sewage from all season road construction camps by disposal in</p>	<p><b>May 5:</b> 1. See our reply to PCA IR8. 2. Tetra Tech EBA recommend bleach and lime addition. 3. In the NNPR, camps with sumps are proposed for Km 65 and Km 87.5. In both cases, the locations are sufficiently distant (&gt;150 m) to not pose a risk to surface water or shallow groundwater migrating and discharging at a very slow rate to surface water. 4. This is not considered to be necessary. 5. No effects on surface water quality are expected. 6. An initial investigation (hole dug) will be made to determine if suitable sump criteria exist i.e. soil isn't clay, no shallow water-table, adequate percolation.</p>	



		<p>sumps (soak-away) where such camps are not proximal to receiving water and where there is little risk of sewage discharge to such water". PCA agrees with locating soak-away sumps at sites not proximal to water receiving waters. However, the DAR and DAR Addendum does not describe how sites deemed to be "not proximal" to receiving waters will be identified and this lack of information precludes an assessment of potential environmental effects and risks. The location of soak-away sumps needs to be carefully evaluated so that they do not contribute deleterious substances to both surface waters and shallow ground waters. A simple rule of thumb, for example stating that they will be located at a specific distance from surface waters is also not sufficient to allow for an assessment of environmental risks. It should also be noted that the use of sumps is only appropriate for small camps while for larger camps on site treatment or removal is required (INAC Guidelines for Camps and Associated Facilities, 2010).</p> <p><b>Recommendation</b> Recognising that the use of sumps is only appropriate for small camps, if Canadian Zinc decides to use soak-away sumps to dispose of grey and brown water, PCA requests the following: 1. Describe the likely chemical composition of water that will be discharged, anticipated discharge volumes expressed as daily, weekly, or if appropriate, monthly loadings 2. Indicate if chemical treatments will be applied to grey and brown camp water before it is discharged to soak-away sumps 3. Identify the specific physical criteria that will be used to select locations for soak-away sumps that will ensure that they pose minimal risk to shallow ground water and surfaces waters 4. Provide details of a water quality monitoring program designed to document that the use of soak-away sumps is not adversely affecting surface water and shallow ground waters 5. Identify the water quality effect thresholds that will be used to determine if discharge of grey and brown water is likely to affect aquatic life 6. Provide designs for all soak-away sumps, their use and maintenance.</p>	<p>If any of the criteria are not met, a sump will not be operated and sewage will be collected in a tank. This information would be provided to the Inspector at the time of camp development for prior approval. A sump in use that lacks capacity or plugs will be filled and either another sump dug or a storage tank used.</p>	
30	GoC - PCA #29 Water quality - Monitoring	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Water quality - Monitoring <b>Reference:</b> DAR Section 11.0, DAR Addendum, Section 14.0, Appendix A. <b>TOR Section:</b> 7.3.5, 7.3.7, 11 <b>Comment:</b> Installation of crossing structures (e.g., culverts and bridges) and construction of the road will likely result in reductions in water quality. The DAR Addendum states that standard construction practices, for example utilizing silt fences, settling ponds and water diversion will be applied and that CZN will apply standard approaches and mitigation measures during construction. We agree with the application of these practices but suggest that applying these practices will minimize but not eliminate reductions in water quality at crossing installation sites. While the reductions will likely be modest and short-lived, the submission by CZN does not present a detailed description of how potential changes in water quality will be monitored: i) during installation of culverts and bridges (including modification of crossing approaches and abutments), and ii) more broadly in water bodies located adjacent to the road. In fact, the existing submission (s) do not identify the specific details of a water monitoring program that will be deployed during construction. Consequently, the number of sites located upstream of the installation and the number of sites downstream of the installation that will be monitored are not identified. Moreover, the frequency that sites will be monitored during construction and then across longer time frames post construction, is also not explicitly identified. Lastly, while the DAR identifies monitoring of turbidity and total suspended sediments during construction, it does not include the monitoring of other important water physico-chemicals variables such as water pH, dissolved oxygen and conductivity. In its current form, the proposed water quality monitoring by CZN is limited in scope in comparison to other all season roads in the Northwest Territories (e.g., water quality monitoring required at watercourse crossings along the Inuvik to Tuktoyaktuk Highway).</p> <p><b>Recommendation</b> 1. Provide a detailed program to monitor the short-term effects of the construction of stream crossings on surface water quality. This shall include: a) the overall study design (e.g., before-after-control-impact, or control impact designs), b) number and location of upstream reference sites and downstream (e.g., near-field and far-field) potentially exposed sites, c) frequency of sampling during stable flow and immediately following precipitation events in the summer and fall, and d) the specific variables that are to be measured. In addition to measuring water turbidity and total suspended solids, CZN shall also monitor: concentrations of dissolved oxygen, conductivity and pH. The duration and spatial intensity of this short-term monitoring program shall be determined by the results that it produces, but minimally shall extend for several months following construction. 2. Provide a detailed long-term (i.e., multi-year) program to monitor water quality at a subset of road crossing sites (both upstream and downstream) and at water bodies (e.g., lakes and wetlands) located adjacent to the road. This program will comprise reduced levels of sampling (i.e., frequency) compared to that described for the short-term monitoring (described above). CZN shall describe: a) the overall study design (e.g., before-after-control-impact, or control impact designs), b) number and location of upstream reference and downstream potentially exposed sites, c) frequency of sampling during stable flow and immediately following precipitation events, d) specific variables that will be measured. In addition to measuring water turbidity and total suspended solids, CZN shall also monitor: concentrations of dissolved oxygen, conductivity and pH.</p>	<p><b>May 5:</b> 1. Refer to the Sediment and Erosion Control Plan in the DAR Addendum, Appendix A, Appendix C. Study design is site-specific, and needs to be determined for each location prior to construction, but not at this stage. We suggest a minimum of two upstream and downstream reference points. We reject the notion that variables other than turbidity and TSS require monitoring since the other variables noted are highly unlikely to be significantly altered. 2. We would anticipate that this exercise would more suitably be undertaken as a condition of a land use permit.</p>	

31	GoC - PCA #30 Wildlife- Baseline information for assessment of impacts on wildlife	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- Baseline information for assessment of impacts on wildlife <b>References:</b> DAR Addendum, Appendix E- Vegetation and Wildlife &amp; Wildlife Habitat, Section 4.2 - Baseline Field Surveys, p 15 <b>TOR Section:</b> 5.1.6 <b>Comment:</b> Page 15 of the DAR Addendum, Appendix E asserts that "Adequate baseline vegetation, wildlife and wildlife habitat information have been collected to date. Previous field studies adequately describe baseline conditions, including species at risk, and were available in developing the assessment." However, there is no standard by which this is measured. No information is provided on the number of field days for these studies, for example, the Chillborne (2007) report is based on one helicopter flight along the proposed road route, and several of the cited studies are 20, 30 or more years old. Of 21 species at risk considered in the report, there are specific project area studies on caribou only. No studies were undertaken on waterfowl or forest birds in the project area. Better information is required to properly assess potential impacts on wildlife species.</p> <p><b>Recommendation</b> To acquire adequate baseline information for assessment, provide the following: 1. Bird surveys to determine composition of the breeding bird community, including occurrence of listed species such as Common Nighthawk &amp; Olive-sided Flycatcher (Threatened), Rusty Blackbird and others (potential for Canada Warbler). Timing window is mid June to early July; automated acoustic recorders can be used to help reduce field work requirements. 2. Waterfowl surveys (ducks &amp; swans), Horned Grebe and Yellow Rail surveys in Fishtrap Creek and other suitable wetlands. Timing window is mid June to early July for Grebes &amp; Yellow Rails; waterfowl surveys could happen into Aug / Sep for post-breeding congregations, staging areas. 3. Collared Pika inventory in suitable habitat (e.g. km 0-40, 125-140); preferred timing window is mid July to end of August or early September 4. Surveys for Beaver habitat; timing window is any time in the snow-free period (active lodge surveys)</p>	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
32	GoC - PCA #31 Wildlife-Geographic Scope of assessment	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Geographic Scope of assessment <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife &amp; Wildlife Habitat, Section 4.3 - Wildlife Species at Risk, p 16-48, Section 4.4 Other Wildlife and Wildlife Traditionally Harvested p 48-61, Section 4.5 Vegetation p 61-76 <b>TOR Section:</b> 3.3 <b>Comment:</b> Page 16 of the DAR Addendum, Appendix E asserts that "The focus of this assessment is the biological status of species at a territorial level...". The TOR for this project assessment indicates the geographic scope for Species at Risk and Wildlife and Wildlife Habitat (including birds) (Table 2, p 11) to be "Defined... as an area large enough to assess potential impacts at a <b>local population</b> level..." . Local population effects are important, and could be significant long before detection at a territorial level.</p> <p><b>Recommendation</b> Provide assessments in sections 4.3, 4.4, 4.5 at a local population level.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
33	GoC - PCA #32 Wildlife-Assessment of project impacts on Northern Mountain Caribou	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Assessment of project impacts on Northern Mountain Caribou <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife &amp; Wildlife Habitat, Section 4.3.3 - Northern Mountain Caribou, p 23, 24&amp;25, Section 7.3 - Effects on Wildlife Species and Abundance, Northern Mountain Caribou, p 167 and Section 7.4-Effects on Wildlife Habitat Fragmentation and Barriers to Movement, p 179. <b>TOR Section:</b> 5.1.6, 7.2.1, 7.2.3 <b>Comment:</b> Within the assessment of impact of the project on Northern Mountain Caribou the report repeatedly states that the project area is "outside the defined species range", citing a website map source (ENR 2014c). This is incorrect, outdated information. Wildlife studies in the project area, albeit limited, consistently report caribou in the project area. Information from hunting outfitters, park staff observations, remote camera images, and recent satellite collar information confirm significant numbers of caribou in the project area and their presence year round. The report also states on page 24 that the project area is "well outside known calving and wintering areas" for caribou; however, on page 25 there is reference to multiple observations of caribou calves in the camp logs, including one calf reported as early as 01 June. The conclusion in DAR Addendum, Appendix E that potential disturbance related effects on Northern Mountain Caribou are low is inconsistent with information provided. Section 7.3 cites several references stating that caribou avoid roads, and active roads to a greater extent than inactive ones (up to 35 km avoidance for Dempster Hwy). Caribou are known to be in the project area year-round, so construction and use of an all-season road is reasonably expected to have a greater impact than a winter road.</p> <p><b>Recommendation</b> Provide an assessment of project impacts on Northern Mountain Caribou using updated accurate range and seasonal use information (significant, year round use of the project area) and reported impacts of active roads.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
34	GoC - PCA #33 Wildlife-beaver	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-beaver <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife &amp; Wildlife Habitat, S 6.6 - Effects on dispersal and local movements, Beaver, p 119. <b>TOR Section:</b> 5.1.6, 7.3.8 <b>Comment:</b> In the assessment of impacts, DAR Addendum, Appendix E acknowledges possible interaction with dispersing beavers, but only at Tetcela &amp; Fishtrap areas. Although these are likely interaction areas, dispersing beavers could occur in the vicinity of almost any creek crossing. An all-season road</p>	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	

		will have significantly more impact than a winter road, especially in wetland areas. The magnitude and frequency of project effects (Table 6-6) should likely be ranked higher. Also, potential changes to drainage patterns resulting from construction activities could impact beaver habitat, and behaviour. There is potential to attract them to areas of concentrated water flows (culverts), and thereby impact movements, impair habitat effectiveness, and raise potential for road mortality. <b>Recommendation</b> Provide an assessment of project impacts on beaver in the context of the proposed project.	
35	GoC - PCA #34 Subject: Wildlife-Species at Risk	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Species at Risk <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, Section 7.1 - Selection of Valued Components, p 161. <b>TOR section:</b> 5.1.4, 7.3.6 <b>Comment:</b> DAR Addendum, Appendix E, Table 7-2 outlines the rationale for the Species at Risk not selected for assessment. A number of incorrect assumptions are stated in this table as well as in the associated sections of the report. For example, Parks Canada has the following information on Harlequin Ducks and Yellow Rail that is not reflected in the report: 1. Harlequin Duck; there are observations from Prairie Creek tributaries, and in Sundog Creek. 2. Yellow Rail; there are records from both within Nahanni National Park Reserve, and elsewhere in the Dehcho Region. <b>Recommendation</b> Correct the inaccurate statements regarding Harlequin Ducks and Yellow Rail and reconsider if these species are suitable for inclusion in the assessment. If these species are not included in the assessment, provide a rationale for exclusion.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.
36	GoC - PCA #35 Wildlife- Monitoring of Forest Birds	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- Monitoring of Forest Birds <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, Section 7.1 - Selection of Valued Components, p 161. <b>TOR section:</b> 5.1.4, 7.3.6 <b>Comment:</b> The DAR Addendum, Appendix E Table 7.2 (p 161) refers to the Common Nighthawk species as 'Representative of Forest Birds monitored by Parks Canada'; presumably this statement implies that its status is adequately represented by PCA bird monitoring? The PCA monitoring protocol assesses diurnal, passerine, forest-nesting species, whereas this bird is a nocturnal, non-passerine, open-nesting species. <b>Recommendation</b> Correct the inaccurate statement regarding Common Nighthawk and reconsider if it is suitable for inclusion in the assessment. If common nighthawk is not included in the assessment, provide a rationale for exclusion.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.
37	GoC - PCA #36 Subject: Wildlife-species assessments	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-species assessments <b>References:</b> DAR Addendum, App 7. Vegetation and Wildlife & Wildlife Habitat, S 7.1 - Selection of Valued Components, p 161. <b>TOR section:</b> 5.14, 7.3.6 <b>Comment:</b> The DAR Addendum, Appendix E Table 7.2 (p 161) includes notes that no NWT population information is available (for example for Common Nighthawk, and others) to develop the assessment. However, population information is not used in any apparent meaningful manner in other species assessments, so the relevance of this comment is unclear. <b>Recommendation</b> Clarify how population information for the NWT is used in developing the assessment of impacts on species.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.
38	GoC - PCA #37 Subject: Wildlife-Trumpeter Swan	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Trumpeter Swan <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, Section 7.2 - Effects on Wildlife Species and Abundance, Trumpeter Swan, p 162-165. <b>TOR section:</b> 7.3.5, 7.3.8 <b>Comment:</b> The effects assessment in the DAR Addendum, Appendix E, Section 7.2 does not consider the potential for all-season road construction to affect drainage patterns, and therefore cause indirect habitat loss or change (e.g. Fishtrap Creek, Tetcela River drainages). The assumption that "swans can easily relocate to adjacent available areas" (p. 176) is not a valid mitigation, or reason to conclude impacts will not be significant. Disruption to drainage patterns could also affect waterfowl, grebes, rails and wetland-dependent passerines (e.g. Rusty Blackbird). <b>Recommendation</b> Provide an impact assessment on Trumpeter Swan, waterfowl, Grebes, Rails and wetland-dependent passerines which includes the consideration of indirect habitat loss due to disruption to drainage patterns from the proposed project.	<b>May 5:</b> The premise for this request is that the road will negatively impact drainage in locations where Trumpeter Swan or other water birds may be present. This is not the case. The road crosses a small wetland section upstream of Mosquito Lake. A culvert will ensure drainage from the wetland to the lake will not be impacted. The road crosses a major Tetcela tributary and the main stem, with thick tree cover at both locations. No significant alterations to drainage to the streams will occur. The road crosses the upper section of the Fishtrap wetland system perpendicular to the flow, parallel to runoff. Flow will be maintained via a culvert or culverts, with no changes to drainage into the wetland. Consequently, in the absence of impacts to drainage from road construction in these areas, there will be no impacts to water birds.
39	GoC - PCA #38 Subject: Wildlife-Grizzly Bears	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Grizzly Bears <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, Section 7.3 - Effects on Wildlife Species and Abundance, Grizzly Bear, p 171 and Section 7.4-Effects on Wildlife Habitat Fragmentation and Barriers to Movement p 177, 182, 184, Weaver, J.L. 2006. Big Animals and Small Parks: Implications of Wildlife Distributions and Movements for the Expansion of Nahanni National Park Reserve. Wildlife Conservation Society Canada Conservation	<b>May 5:</b> Seeing 6 bears in one day at the Mine is a possibility, but it would be a very rare occurrence, and only during spring movement up valley. The norm is 1-3 bears occasionally. Certainly, we have not seen the evidence that would support the projections contained in the Weaver

		Report No. 1. Toronto, Ontario. <b>TOR section:</b> 5.1.6, 7.3.8 <b>Comment:</b> Information provided in the DAR Addendum, Appendix E on grizzly bears is inconsistent with other reports; page 171 cites anecdotal reports of "a half dozen each year", whereas mine employees have told Parks Canada staff of seeing up to six bears in a single day. The Weaver (2006) report referred to identifies the Prairie Creek area as high density grizzly bear habitat. If bears avoid roads with >10 vehicles per day (as cited), and the project proposes 30+ trucks per day, potential for impact is high, and much greater than a winter road. In the evaluation of effects (Table 7-7) the magnitude, duration, frequency and certainty could all be considered high. <b>Recommendation</b> Provide an impact assessment on Grizzly Bear with the appropriate densities of the species in the project area. This assessment should also consider waste management at construction camps as a potential impact on bears.	report. An appropriate impact assessment for grizzly bears was completed based on a correct expectation of traffic numbers and density of species. Refer to the attached Tetra Tech EBA document re the effects of camps.	
40	GoC - PCA #39 Subject: Wildlife- Black Bears	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-Black Bears <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, Section 7.12 - Long-term Changes to Nahanni National Park Reserve - Wildlife and Vegetation, p 198. <b>TOR section:</b> 5.1.6, 7.3.8 <b>Comment:</b> The DAR Addendum, Appendix E page 198 states that "Black Bear effects are addressed by the assessment of Grizzly Bears." However, in the various sections referring to grizzlies, there is often a distinction about bears with ranges in the Mackenzie Mountains (presumably meaning km 0 - 39?) vs farther east. Also, there are multiple references to theoretical all-season use of km 0-33 prior to all-season road construction, resulting in less increase in bear impacts from the current proposal. These assumptions are not relevant to impacts on Black Bears. <b>Recommendation</b> Re-evaluate the potential impacts of the project on Black Bears as noted.	<b>May 5:</b> Black bears have never been seen in any areas proximal to the road inside the NNPR. Therefore, there will be zero effects. Presence of black bears is a human encounter safety issue, which can be adequately mitigated by standard, suitable waste management practices, employee awareness and training, all of which are part of existing Mine management plans and will be part of road management plans.	
41	GoC - PCA #40 Subject: Wildlife- significance of effects	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife-significance of effects <b>References:</b> DAR Addendum, Appendix E- Vegetation and Wildlife & Wildlife Habitat, Section 6.0 - Effects Assessment - Traditional Harvesting p. 82 <b>TOR section:</b> 7.3.6, 7.3.8 <b>Comment:</b> A number of the summary tables in DAR Addendum, Appendix E, Section 6.0 show multiple (majority) criteria ranked as Moderate and/or High, yet the overall significance is considered Low, e.g. Tables 6-3, 6-4, 6-5, 6-6, 6-7, 6-11, 6-15. <b>Recommendation</b> Re-evaluate the significance in the section 6.0 summary tables (6-3, 6-4, 6-5, 6-6, 6-7, 6-11, and 6-15) as there should likely be several higher overall rankings (i.e. Moderate or High). Provided the methodology/criteria used in determining the overall ranking.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
42	GoC - PCA #41 Subject: Wildlife- significance of effects on NNPR	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- significance of effects on NNPR <b>References:</b> DAR Addendum, Appendix E Vegetation and Wildlife & Wildlife Habitat, S 7.0 - Effects Assessment - Nahanni National Park Reserve p. 157 <b>TOR section:</b> 7.2.3, 7.3.6, 7.3.8 <b>Comment:</b> A number of the summary tables in DAR Addendum, Appendix E, Section 7.0 show multiple (majority) criteria ranked as Moderate and/or High, yet the overall significance is considered Low, e.g. Tables 7-6, 6-7, 6-8, 6-10, 6-12. <b>Recommendation</b> Re-evaluate the significance in the section 7.0 summary tables (7-6, 7-7, 7-8, 7-10, and 7-12) as there should likely be several higher overall rankings (i.e. Moderate or High). Provided the methodology/criteria used in determining the overall ranking.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
43	GoC - PCA #42 Subject: Wildlife- significance of effects on Valued Ecosystem Components	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- Significance of Effects <b>References:</b> DAR Addendum, Appendix E- Vegetation and Wildlife & Wildlife Habitat, Section 8.2 - Effects of Habitat Loss and Fragmentation, p 206-208 and Section 8.3 p. 212 <b>TOR section:</b> 7.3.6 <b>Comment:</b> A number of the summary tables in DAR Addendum, Appendix E, Section 8.0 show multiple (majority) criteria ranked as Moderate and/or High, yet the overall significance is considered Low <b>Recommendation</b> Re-evaluate the significance in the section 8.0 summary tables (8-5, 8-6, and 8-7) as there should likely be several higher overall rankings (i.e. Moderate or High). Provided the methodology/criteria used in determining the overall ranking.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
44	GoC - PCA #43 Subject: Wildlife- Significance of Effects	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- Significance of Effects <b>References:</b> DAR Addendum, Appendix E- Vegetation and Wildlife & Wildlife Habitat, Section 8.2 - Effects of Habitat Loss and Fragmentation, p 206-208 and Section 8.3 p. 212 <b>TOR section:</b> 7.3.6 <b>Comment:</b> The DAR Addendum, Appendix E Section 8.2 and 8.3 claim that both Common Nighthawk and Olive-sided Flycatcher will be positively affected by clearing; this is based on papers reporting species' responses to selective logging or slash-burning. Construction and use of a haul road is not the same as selective logging, and may not have the same impacts. <b>Recommendation</b> Clarify if there are literature reports of road construction having positive impacts on populations of Common Nighthawk and/or Olive-sided Flycatcher. If not, revise effects assessment accordingly.	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	
45	GoC - PCA #44 Subject: Wildlife-	<b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Wildlife- Valued ecosystem components <b>References:</b> DAR Addendum, Appendix E-	<b>May 5:</b> See Tetra Tech EBA document attached to PCA IR9.	

	Valued ecosystem components	<p>Vegetation and Wildlife &amp; Wildlife Habitat, Section 8.1 - Selection of Valued Components, p 201. <b>TOR section:</b> 4.1, 5.1.6. <b>Comment:</b> The DAR Addendum, Appendix E Section 8.1 refers to the exclusion of three species in table 8.2 (p 202); there are in fact eight species listed in the table. Criteria used to exclude these species are insufficient, considering these are all SARA or COSEWIC listed species potentially occurring in the project area. For example: 1. Bats are known to occur near the proposed road; although the project may not impact hibernacula, impacts to roosting or feeding habitat, and prey sources, should be considered. 2. Grebes, rails and blackbirds are indeed wetland species, and although the road routing intends to avoid open water ponds by 100m where possible, an all-season road could fragment habitats and drainage changes could impact habitat effectiveness. 3. Peregrine Falcon has been recorded numerous times in NNPR, including near the southwest edge of the Ram Plateau, not far from the proposed road. Sections of the proposed road along Funeral and Sundog Creeks, and Grainger Gap to Nahanni Butte, do pass in close proximity to cliff habitats. 4. Low traffic speed is cited as a mitigation for impacts on Western Toads; this is likely not an effective measure for such a small, slow-moving species. Low traffic volumes could help, but impacts are still possible, especially during dispersal seasons in the southern end of the proposed road where it is most likely to overlap with toad range.</p> <p><b>Recommendation</b> Include the eight listed species in Table 8-2 in the effects assessment.</p>		
46	GoC - PCA #45 Subject: Vegetation-Baseline description of vegetation assemblages	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Vegetation-Baseline description of vegetation assemblages <b>References:</b> DAR Section 4.7.2-Vegetation Cover Description, p 114, DAR Section 4.7.3-Plant Species at Risk, p 114-118, DAR Section 10.4- Effects on Vegetation Species Distribution and Abundance, p 216-217, Cameron, Emily A. (2015). Ecosystem recovery after the abandonment of a winter access road in Nahanni National Park Reserve, NWT. Ecological impacts of roads in Canada's north, p 34-58. <b>TOR Section:</b> 5.1.7, 7.3.9 <b>Comment:</b> Vegetation work from the early 1980s (Beak 1981) is relied upon extensively in the DAR's description of current vegetation assemblages; these surveys were limited and are now out of date. Vegetation mapping concluded that 12 vegetation communities are encountered along the access road, yet this was based on a total of 14 transects. This is nearly 1 transect per community which is clearly insufficient; more sampling would have likely yielded more and better defined vegetation assemblages, and would have offered some description of rare plant species and assemblages. Additionally, since the original surveys in 1981, natural and climate-change related processes (e.g. fires, shrub encroachment) may have significantly altered the composition and distribution of vegetation communities. Cameron et al (2015) identified changes in plant communities and hydrology along the winter road. In addition to evidence that vegetation communities have been altered and despite statements that the 1981 classification is still valid, no assessment of this has been made in the DAR. The use of remotely sensed EOSD map units to describe vegetation on sections of the all-season road that were not mapped by Beak (1981) is also an inadequate substitute for comprehensive field surveys. Currently, vegetation surveys have not been done for undisturbed areas within the right of way as well as areas to be cleared for road facilities (camps, borrow pits etc). No information on rare, valued, protected or designated plant assemblages has been provided in the DAR (TOR section 5.1.7 item 3), except for the Polje bypass realignment, which was surveyed and classified as burned and having no rare plant assemblages (EBA 2010). No assessment of plant community and rare plant potential was used to target areas of higher potential, or stratify surveys to obtain coverage of various community types across the study area. Surveys were of limited duration and were not repeated within or between growing seasons to achieve optimal levels of detection, using best practices for vegetation and rare plant surveys (ex. Alberta Native Plant Council. 2012. Guidelines for Rare Vascular Plant Surveys in Alberta, available on-line at <a href="http://www.anpc.ab.ca/content/resources.php">http://www.anpc.ab.ca/content/resources.php</a>). No quantitative vegetation surveys have been conducted, thus no assessment of the abundance of rare plants as required in the TOR (section 5.1.7 item 4) has been conducted.</p> <p><b>Recommendation</b> 1. Conduct detailed field vegetation surveys to update and refine the vegetation classification (Beak 1981), with appropriate replication of samples in all vegetation assemblages and distribution throughout the study area. 2. Conduct additional rare plant surveys using best practices to optimize detection of rare species (ie. search pattern, survey timing and repetition, etc), and ensures coverage of all vegetation assemblages, with survey locations distributed across the study area, or justification for the concentration of survey effort in areas of high rare plant potential. 3. Provide an assessment of project impacts on vegetation, broken down by habitat type, taking into account the best available information of ecological trajectories of terrain types ie. Cameron (2015) and up to date baseline information.</p>	May 5: See Tetra Tech EBA document attached to PCA IR9.	
47	GoC - PCA #46 Subject: Vegetation-Operational Management Plans, Reclamation	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Vegetation-Operational Management Plans, Reclamation <b>References:</b> DAR Addendum, Appendix A Section 2.14-Closure Plans and Timing, p 52-55, Appendix A: Appendix C Section 11-Reclamation, page 5-6, DAR Section 4.7.1-Conditions Prior to Development, p 114, DAR Section 10.8-Effects on the ability of Habitat to Recover, p</p>	May 5: See attached document. May 5:  Response to PC IR46	

		<p>223, Cameron, Emily A. (2015). Ecosystem recovery after the abandonment of a winter access road in Nahanni National Park Reserve, NWT. Ecological impacts of roads in Canada's north, p 34-58. <b>TOR Section:</b> 5.1.7, 7.2.3, 7.3.9 <b>Comment:</b> Section 2.14 in Appendix A of the DAR Addendum states that reclamation will be achieved through natural revegetation and that original drainage patterns will be re-established as much as possible, with the goal of enabling the disturbed area "to return to productive use in the context of the surrounding area". Cameron et al (2015) demonstrated that a) natural re-vegetation has had limited success in returning the winter access road to a pre-disturbance context consistent with the surrounding area. The outcomes of natural revegetation were highly variable by terrain type, and were likely influenced by construction practices. Natural revegetation has been very limited along sections of the road in the alpine. b) Permafrost degradation associated with the road construction altered the hydrology of the roadbed and surrounding area. Changes to drainage patterns and the ecological feedbacks that are initiated have permanently changed drainage patterns in black spruce muskeg, ie. restoring drainage patterns is not possible in some terrain types and will result in significant ecosystem changes. Section 10.8 of the DAR states that "the all season access road will be reclaimed within six years of the closure of the Prairie Creek Mine site", yet processes of revegetation along the winter access road have been ongoing for 30 years and some terrain types have not produced an ecosystem of comparable structure and function as the surrounding area (Cameron 2015). There is a high likelihood of permafrost degradation along the all season road in areas with ice-rich permafrost, which is challenging to mitigate, and the ecological impacts are likely to be persistent as is documented by Cameron et al, yet in the DAR the significance of effects on the ability of habitat to recover is expected to be low, with no residual effects.</p> <p><b>Recommendation</b> 1. Provide details on predicted reclamation outcomes by terrain type based on the current conditions of the winter access road and surrounding areas to accurately characterize impacts to ecosystems in the study area. 2. Provide tailored reclamation strategies and techniques for each terrain type to meet the reclamation goal ("to return to productive use in the context of the surrounding area") and Parks Canada Principles and Guidelines for Ecological Restoration. Active reclamation may be necessary in certain vegetation types, and the benefits and detrimental effects should be described.</p>		
48	GoC - PCA #47 Subject: Vegetation-Invasive Species	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Vegetation-Invasive Species <b>References:</b> DAR 10.6-Effects from Invasive Vegetation, p 218-219 <b>TOR Section:</b> TOR 7.3.9 <b>Comment:</b> The effects assessment in section 10.6 of the DAR states that there is a risk of introduction of invasive species during summer construction during phase 2 but does not address any risks associated with operational traffic. The assessment concludes that the significance of effects will be low if appropriate mitigation strategies (ex. wheel washing) are used.</p> <p><b>Recommendation</b> Re-evaluate the effects assessment for invasive plants considering additional information such as species which are likely to be introduced into the study area through operational traffic. Describe risks associated with their establishment, and the effectiveness of proposed measures (ex. wheel washing) that will be taken to prevent their introduction and control.</p>	<b>May 5:</b> See Tetra Tech EBA wildlife veg. document attached to PCA IR9, Appendix B.	
49	GoC - PCA #48 Subject: Fire	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Fire <b>References:</b> DAR Section 11.8.3-Effects from Fire p260 <b>TOR section:</b> 4.1 , 7.3.9, 8 <b>Comment:</b> The proponent has indicated that fire risks can be avoided through fire prevention measures and emergency response procedures, but has not provided any further information to explain what fire prevention techniques would be used or what emergency response procedures would be implemented.</p> <p><b>Recommendation</b> Provide information about specific fire prevention measures or techniques that would be implemented to protect values at risk and the scope and scale of emergency response procedures. Include information about roles and responsibilities of the company and contractors. Include potential mitigations or monitoring that may be used to protect permafrost following a major fire near the road or facilities.</p>	<b>May 5:</b> Fire prevention measures will include standard procedures to avoid sources of ignition, such as cigarette butts, camp fires, flammable liquids. During construction, attention will be paid to suitable cleared vegetation management in order to minimize the potential for subsequent combustion. PCA is aware that fires occur every summer from lightening strikes. The focus is on not exacerbating the fire risk, and responding to fires when they occur in terms of personnel and equipment safety. This means early warning from CZN monitors and maintenance crews to management and to all road users and oversight personnel (e.g. check point), and the cessation of traffic in affected areas if necessary. Regarding permafrost, as noted above, fires will occur naturally. The concern would be that a fire causes thaw which could trigger ground instability i.e. settlement or slumping. Therefore, following a fire near the road, inspections should place a greater focus on evaluating the potential for road instability. Follow-up actions will depend on observations and	

			consultations with a geotechnical engineer.	
50	GoC - PCA #49 Subject: Effects from Fire	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Effects from Fire <b>References:</b> Section 11.8.3-Effects from fire p 260 <b>TOR section:</b> 7.3.1, 7.3.9, 8 <b>Comment:</b> The proponent has indicated that by applying basic mitigation measures the extent, magnitude, duration and frequency of fire related effects are low or reversible. However, there are many factors driving changing fire behaviours in the boreal ecosystem. Variable weather patterns and extreme events are trends that have been starting fire season earlier in spring and pushing later into the fall. Fires on the boreal landscape are burning with increased intensity, size and ground depth over a longer burning period. Fires are burning through traditionally wetter forest cover and overwintering subterranean fires are becoming common in the boreal forest. In addition, project related operations may also have an impact on the risk of fire and ability to respond. Water withdrawals for road operations may reduce availability of potential water sources for fire suppression and debris piles from road clearing may act as large fuel sources if not managed appropriately.</p> <p><b>Recommendation</b> Describe the potential effects that climate change, the road/facilities and activities may have on fire potential, and alternately how changing fire regimes may impact the stability or safety of the road and its facilities. Examples to consider are climate change events such as severe drought which may provide conditions where typically moist spruce bog/fens may burn. Include a summary of the impacts fire may have on permafrost from the EBA technical reports with sufficient details about construction, operation and closure.</p>	<p><b>May 5:</b> Climate change and unusually dry summers could lead to greater fire incidence. Road activities are not expected to. Greater fire incidence will necessitate a greater monitoring requirement in susceptible areas, and potentially a need to plan for more lost hauling days due to fires (i.e. maximize hauling in the early summer in the expectation of lost days later). Note that the presence of the road is in itself a fire mitigation since the cleared right-of-way will act as a fire stop. This was the case for a burn on the Ram Plateau which stopped at the winter road alignment. As noted by Tetra Tech EBA, "Fires tend to trigger thermal erosion when the organic layer is burned hot enough or deep enough to change its insulating properties. As well, the terrain loses its normal shade cover for many years if all the trees are burned.". Fires have the potential to acceptrete thaw. However, mitigation for thaw susceptible soils is provided in Tetra Tech EBA's geotechnical report, DAR Appendix 2, section 8.1.3. If a significant fire occurs near the road after the detailed design investigation but before construction, and has the potential to alter the assumed construction conditions, reconsideration of the appropriate construction techniques may be necessary. For the operations period, see our reply to PCA IR48 above. After road closure, risks from fires will be minimal because all cuts in potentially unstable soils will have been removed by material pull-back and resloping.</p>	
51	GoC - PCA #50 Subject: Cultural and Heritage Resource Assessments	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Cultural and Heritage Resource Assessments <b>References:</b> DAR Sections 5.3-Cultural and Heritage Resources, p 126-128, Section 11.9-Cultural and Heritage Resources, p 268-269. Prager, Gabriella. Prairie Creek Mine Access Road Archaeological Investigations 2009. <b>TOR Section:</b> 5.2.3 , 7.3.10 <b>Comment:</b> The TOR (section 5.2.3) called for a description of existing archaeological and historic sites and resources, burial sites, culturally important sites and heritage resource potential. There is insufficient existing base-line data to provide an overview of cultural and heritage resources from this area. To date, there was one archaeological impact assessment done for the winter road within NNPR (Prager 2009) which was limited in scope and did not cover the expanded footprint of the all season road including the proposed right of way, associated infrastructure and construction activities. The 2009 Prager Assessment was only at three locations identified by the Nahanni Butte Dene Band including Grainger Gap, wolverine Pass and the crossing of the Tetcela River. Ground reconnaissance (survey) was conducted at Wolverine Pass and Tetcela River with shovel testing also conducted at Tetcela River, while only a helicopter fly-over was conducted for Wovlerine Pass. No archaeological sites were identified. Prager (2009) notes in her report that the archaeological assessment is limited as only a small portion of the winter road was examined and the assessment was focused on winter use only. Prager (2009) states that realignment of the road or a change to an all season road would require additional archeological assessment. Further, during the consultation done in 2009 to collect traditional knowledge, elders from Nahanni Butte that hold traditional knowledge (TK) related to the winter road were not available. A TK Study was not completed for the Acho Dene Koe First Nation during earlier reviews.</p> <p><b>Recommendation</b> 1. Conduct an archaeological overview assessment (AOA) for the road corridor, road realignments, borrow pits or aggregate source area locations, stream crossings, access roads/trails to borrow sites, staging areas, camps and other areas where there will be ground impact. The AOA must incorporate traditional knowledge along with other tools, such as predictive modeling, for identifying the potential of archaeological resources. Following the AOA, complete archaeological impact assessments (AIA) for those locations identified as having medium to high potential for archaeological sites in the AOA. The AIA must include surface reconnaissance and testing. 2. Elders that hold knowledge of this area should be</p>	<p><b>May 5:</b> 1. Prager (2009) concluded the potential for heritage resource occurrence is low. Golder (2013) had similar results after an AIA of the Front Range alignment. The Prager AIA was focussed on locations noted as the highest potential from the extensive TK study performed by Cross Currents Associates. As noted in the DAR, CZN has had further engagement with Nahanni Elders, who confirmed camp sites were likely at random locations. Therefore, the agreed approach is to develop a heritage 'brochure' for all road investigation and construction personnel. See our reply to Board IR41. It makes no sense to undertake further AIA's. We have already investigated high potential locations. A more practical approach is to arm those who will be on the ground for all developments with knowledge of heritage resources and to watch out for them. See our meeting record with the NBDB dated March 21, 2016, and NBDB's letter to the Board dated April 19, 2016. NBDB agree that a practical approach is for NBDB members to be included in field route flagging and investigation teams. 2. The extensive TK and consultations were incorporated into the previous AIA's. Elders were present at January 2015 discussions re potenital heritage locations, and agreed on the 'brochure' approach. Refer to NBDB's April 19 letter.</p>	



		consulted for the all season use and disturbance related to the project. The results of the traditional knowledge studies should be incorporated into the archaeological AOA and AIA where possible.		
52	GoC - PCA #51 Subject: Cultural and Heritage Resource Assessments	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Canadian Zinc Corporation <b>Subject:</b> Cultural and Heritage Resource Assessments <b>References:</b> DAR sections 5.3-Cultural and Heritage Resources, p 126-128, Section 11.9-Cultural and Heritage Resources, p 268-269. Prager, Gabriella. Prairie Creek Mine Access Road Archaeological Investigations 2009. <b>TOR Section:</b> 7.3.10 <b>Comment:</b> In the DAR Section 11.9.3 Archaeological Sites (page 269) Canadian Zinc proposes the development of a brochure to give to contractors as a part of the Construction, Operation and Maintenance Plan. The DAR (page 269) further states "The advice would be that if anything is discovered that resembles the items in the brochure, work is to avoid disturbing the items until the relevant authorities have been notified and decisions made." The protection of cultural resources is a core responsibility for Parks Canada and as such we support the development of tools such as a cultural resource identification brochure as a component of a cultural resource protection plan. However, the protection of heritage resources will be facilitated by a stop work order and follow-up process for how to proceed with the accidental discovery of heritage resources during construction.</p> <p><b>Recommendation</b> Develop a Cultural Resource Protection Plan. Within this plan, mitigations associated with the accidental discovery of heritage resources in NNPR must include that all work is stopped and Parks Canada is contacted for advice prior to proceeding. Information from the AIA and AOA should be used in the development of any products used to educate the contractor regarding cultural resources.</p>	<b>May 5:</b> We have no problem including the mitigations noted in the heritage 'brochure' as a condition of a land use permit. We do not foresee that an AIA or AOA is needed or useful to do this.	
53	GoC - PCA #52 Subject: Responsibility and Authority	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Mackenzie Valley Environmental Impact Review Board <b>Subject:</b> Responsibility and Authority <b>References:</b> DAR Addendum Appendix A-All North Road Engineering Report Appendix C for example (Page 2 of the Borrow Pit Management and Reclamation Plan, Page 2 of the Sediment and Erosion control Plan, Page 2 of Road Construction and Maintenance Plan, Page 2 of Road Operations Plan) <b>TOR Section:</b> 6.1 <b>Comment:</b> It is outlined in a number of the management plans that Canadian Zinc will have final ownership of the road and supporting infrastructure. Land use permits and water licences authorize the construction and use of the road, but they would not grant exclusive land use rights or ownership to the proponent. Parks Canada would like to clarify that there will be no disposition of park lands for this project and Parks Canada will remain the land owner. In specific and limited circumstances Parks Canada would provide assurances for long term land use, without disposing of interest in land, through a Licence of Occupation. Parks Canada and Canadian Zinc have held discussions about a Licence of Occupation for the winter road and these discussions are ongoing. Parks Canada would not own permitted facilities constructed in the park such as temporary camps or the TTF, but will continue to own the land.</p> <p><b>Recommendation</b> Parks Canada requests that the public record reflect that all lands within NNPR that are occupied for this project are owned by Parks Canada.</p>		
54	GoC - PCA #53 Subject: Access Control and Hunting	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Mackenzie Valley Environmental Impact Review Board <b>Subject:</b> Access Control and Hunting <b>References:</b> DAR Addendum, Appendix E page 175 <b>TOR Section:</b> 5.1.6, 7.2.1 <b>Comment:</b> Appendix E page 175 of the DAR Addendum outlines mitigations for hunting pressures along the road such as restricting motorized access of the general public, including all non-project related and non-aboriginal travel, in NNPR and the use of National Park regulations to prohibit residents, non-residents, and non-resident aliens from hunting inside the park. For safety reasons and the protection of park resources, all travel on a road in NNPR will require a permit. Parks Canada will consider the potential for non-mine related traffic in the park. However it is important to note that the park boundary is a considerable distance from the Liard Highway where non-mine related traffic would first access the Prairie Creek road. Therefore we must work closely with the proponent, GNWT and community of Nahanni Butte to determine the feasibility and safety of park visitation on the proposed all season road. As a clarification, there is no hunting in NNPR by non-Aboriginal people. Aboriginal persons in pursuit of traditional renewable resource harvesting activities in the park would not require permits for these activities.</p> <p><b>Recommendation</b> 1. Parks Canada recommends that access control be discussed further amongst multiple parties. Hunting activities on the road outside the park is an issue more appropriately addressed by the GNWT and Nahanni Butte. 2. Parks Canada requests the public record reflect that there is no hunting in NNPR by non-Aboriginal people. Aboriginal persons in pursuit of traditional renewable resource harvesting activities in the park do not require permits for these activities.</p>		
55	GoC - PCA #54 Subject: Harvesting and Hunting in NNPR	<p><b>Comment Source:</b> Parks Canada Agency <b>To:</b> Mackenzie Valley Environmental Impact Review Board <b>Subject:</b> Harvesting and Hunting in NNPR <b>References:</b> DAR Addendum, Appendix E page 149 <b>TOR Section:</b> 5.1.6, 7.2.1 <b>Comment:</b> The DAR Addendum Appendix E page 149 indicates that "Non-resident harvests remain within designated outfitting zones, and prohibited within the original boundaries of the NNPR. Only those holding a NWT General Hunting Licence (primarily Aboriginal</p>		





		<p>subsistence harvesters) are permitted to harvest inside the original park boundaries..." Parks Canada would like to clarify that outfitted hunting has ceased in the expansion area. Aboriginal persons in pursuit of traditional renewable resource harvesting activities do not require permits to carry on traditional renewable resource harvesting activities in NNPR.</p> <p><b>Recommendation</b> Parks Canada requests that the public record reflect that outfitter hunting in the NNPR (including the expansion area) has ceased and is no longer permitted.</p>		
56	GoC - DFO #1 Cover Letter	<p><b>Comment</b> See attached letter.</p> <p><b>Recommendation</b></p>		
57	GoC - DFO #2 Information Requests	<p><b>Comment</b> See attached.</p> <p><b>Recommendation</b></p>		
58	GoC - DFO #3 1a-b Watercourse Crossings – Road Km Names. DAR Main Report, Table 4-2, Table 4-10, Appendices 1A, 3, 4, and 9; DAR Addendum and Appendices A and C	<p><b>Comment</b> Fisheries and Oceans Canada notes that in various documents, generated at with dates, in both the DAR and DAR Addendum, different road km are assigned to watercourse crossings. Fisheries and Oceans Canada understands that road alignments evolve over time and that differences among documents are therefore difficult to avoid completely. While in many cases, the watercourse crossing can still be identified and cross-referenced with only small differences in road km number (e.g., a crossing of Sundog Creek at 28.8 or 28.9 road km), others are less clear. For example, focusing on fish-bearing streams, the Casket Creek Crossing identified in the DAR Main Report Table 4-2 as road km 6.1 is also identified in DAR Appendix 1A as 6.2 road km, with a separate, non-fish-bearing road crossing listed as 6.1 road km that does not appear in Table 4-2. Two crossings of the Polje Creek system (mainstem and tributary) that are in close succession are listed as 53.6 and 53.65 road km in Table 4-2, but Table 4-10 lists them as 53.5 and 53.6, Appendix 1A actually lists three crossings in the same portion of the road at 53.6, 53.65 and 53.7 road km, Appendix 4 and 9 identify a crossing at 53.5 road km, and Appendix 1 and 3 of the DAR Addendum refer to either one crossing at 53.7 road km or two at 53.5 and 53.6 road km. Table 4-10 in the DAR Main Report lists a crossing of a Liard tributary at 151.3 road km that does not appear in Table 4-2. Appendix 1A of the DAR lists additional crossings of the Grainger River at 126.4 and 126.5 road km that do not appear in Table 4-2. Appendix 3 of the DAR Addendum indicates that a crossing at road km 63.6 at the inlet to Mosquito Lake may provide some habitat to fish, but Table 4-2 of the DAR Main Report identifies this crossing as having no fish.</p> <p><b>Recommendation</b> 1a Please provide a finalized table of all watercourse crossings, including the road km to be used throughout the Environmental Assessment process to uniquely identify each crossing, the water body crossed, its fish-bearing status (Y/N/?) and the type of crossing (major = bridge, minor = culvert(s), or barge) to be constructed at each location. For fish-bearing status, please differentiate between positive designations determined by the Developer, versus positive designations known by historical records. For crossings at streams considered to be non-fish-bearing, please identify the reason (i.e., downstream barrier to fish passage, no channel, etc.) 1b For each of the specific examples identified above (i.e., crossings at 6.1/6.2 road km, the crossings near 53 road km, and the crossings that either do not appear in Table 4-2 at all, or may have been mistakenly classified according to fish-bearing status), please clarify the discrepancies identified by Fisheries and Oceans Canada.</p>	<p><b>May 5:</b> 1a. Please refer to Table DFO 1-1 attached for the requested information. Km markers are based on April 2015 maps contained in DAR Appendix 1B, Appendix I, and also shown on revised maps in the Allnorth report attached. Note, the markers reflect the currently proposed alignment. 1b. Re Casket Creek, the main stem at Km 6.1 is on the south side of the floodplain. There is a small tributary that enters the floodplain from the north and then drains west intermittantly at Km 61.5 (see DAR Addendum, Table 2). Re Polje Creek, there are indeed 3 crossings in quick succession, Km 53.4 is a swale with little channel definition, Km 53.5 is a well defined braided channel off the main stem, and Km 53.55 is the main stem (see DAR Addendum, Appendix A, Table 2). The crossing Km 151.3 in Table 4-10 (initial alignment) was listed in Table 4-2 (subsequent alignment) as Km 150.8. DAR Appendix 1A listed crossings based on aerial photography, with the intent of defining the locations of engineering structures. Table 4-10 was generated for environmental application after the July helicopter reconnaissance by an aquatic biologist. Note, many streams identified by aerial photography were in fact not defined channels. Mosquito Lake is part of the closed system draining to the Poljes, which have no surface outlet. If the lake contains fish, they are residents. The small (~1 foot) inlet stream emanates from a wetland and flows into the lake through thick aquatic vegetation. The crossing habitat is thus poor, unlikely to host fish, if in fact they reside in the lake at all. <b>May 5:</b> Response to DFO IR03</p>	
59	GoC - DFO #4 2A-B Project Footprint Uncertainty – Water Crossings including Liard River Barge Crossing DAR Main Report, p. 245-6, and Appendix 1A, p. 61-4 (with sub-Appendix B); DAR Addendum, Appendix A and C	<p><b>Comment</b> The Developer notes on p. 246 of the DAR Main Report that any habitat losses will be replaced to the satisfaction of DFO as a requirement of the Fisheries Act. Across various documents presented in the DAR and DAR Addendum, approximately 19—23 water crossings, including the Liard River Barge Crossing, affect fish-bearing or suspected fish-bearing watercourses. DAR Appendix 1A and DAR Addendum Appendix A both indicate that there are 10 clear-span bridges to be constructed or enlarged that will require bank stabilization and rock armouring at one or both approaches. It is not clear from sub-Appendix B how much, if any, of this armouring extends below the high water mark for any crossing. The Liard River Barge Crossing will require the construction of rock ramps that will extend below the high water mark (Appendix 1A, p. 61), and possible dredging (DAR Main Report, p. 245) although this now appears unlikely (DAR Addendum, App. C, p. 16). The remainder of crossings will consist of culverts, backfill and armouring that will extend, to some extent, below the high water mark of various fish-bearing streams (Appendix 1A, p. 64 and sub-Appendix B).</p> <p><b>Recommendation</b> 2a For each of the fish-bearing water crossings to be provided in a table in response to IR 1 above, please indicate the estimated Project footprint below the high water mark, in square meters. To assist Fisheries and Oceans Canada in our review, the footprint should ideally be in two categories. Habitat loss attributed to infilling (rock-armouring and bank stabilization, ramps or bridge</p>	<p><b>May 5:</b> 2a. Please refer to Table DFO 2-1 attached. 2b. Dredging in the Liard River is not required. <b>May 5:</b> Response to DFO IR04</p>	

		abutments if applicable) should be classified separately from habitat alteration (culverts – the area in the bottom portion of the culvert to be refilled with natural substrates once the culvert has been embedded, and dredging; i.e., where habitat remains accessible to fish after construction). 2b Please confirm that dredging in the Liard River is no longer required.	
60	GoC - DFO #5 3a-b Project Footprint Uncertainty – Watercourses Parallel to Road DAR Main Report, p. 193-4; DAR Addendum p. 66-7	<p><b>Comment</b> Section 9.4 of the DAR Main Report (p. 193) and Table 9-2 (p. 194) indicate that a number of road sections appear to be immediately adjacent to watercourses such as Prairie Creek, Fast Creek and Sundog Creek (i.e., within 1-2 m). On p. 148, the Developer indicates that at km 35.1, the road will need heavy armour for protection from the adjacent Sundog Creek. On p. 245, the Developer notes that the road may be widened for the Prairie Creek and Funeral Creek portions where the road already exists, but that “no important [fish] habitat will be lost due to the road, other than in lower Sundog.” In the DAR Addendum, the Developer notes that “road construction and operations pose risks regarding sediment production and water quality impact” but that apart from Prairie Creek and Funeral Creek, “the remainder of the road is generally not proximal to watercourses except at crossings” (p. 66-67). It is not clear from these descriptions whether there will be infilling or other works associated with construction, including the operation of machinery, staging areas, and/or installation of sediment and erosion control structures occurring below the high water mark of any fish-bearing stream sections that are not associated with a water crossing along the entire length of the proposed all-weather access road.</p> <p><b>Recommendation</b> 3a Please indicate the location and project footprint, in square meters, of any infilling (road widening, rock armouring, etc.) below the high water mark resulting from the Project in areas where the road runs parallel to a fish-bearing watercourse (i.e., not associated with a water crossing). This information should be accompanied by a habitat assessment in areas subjected to any infilling (including habitat type and quality, fish species). 3b Please identify any overlap with areas previously impacted by infilling of 1225 square meters of fish habitat and Prairie Creek and Funeral Creek, associated with the Developer’s Fisheries Act Authorization SC04006.</p>	<p><b>May 5:</b> 3a. No infilling along Prairie, Fast and Funeral Creeks is planned. Any road widening will occur on the opposite side. Road sections requiring protection were armoured previously. The road parallels Sundog Creek over the section Km 17-40. Three crossings of the main stem between Km 23-29 were proposed, but the Km 29 crossing is problematic, therefore we propose to keep the road on the south bank between Km 28-29, which will eliminate 2 main stem crossings. Thereafter, the road mostly traverses old floodplain terrain until Cat Camp at Km 40. The road footprint encroaches on ground below the high water mark over the section Km 33-38.1. Details of this encroachment are provided in the Allnorth memorandum dated March 18, 2016 which was provided to the Board as part of our second Adequacy response. Allnorth estimated the total area of encroachment to be 16,090 m<sup>2</sup>, with 9,749 m<sup>2</sup> of this area being utilized during normal, seasonal flow conditions. A habitat assessment by Hatfield Consultants can be found in Appendix 10 of the DAR. Pool habitat exists along limited portions of the southern bank at Km 36.7, 37 and 37.7. The remainder of the habitat is run and riffle. The Km 37.7 pool habitat will be altered (moved north) to accommodate the road. The other pool habitat will not be affected since the road will be above the HWM. 3b. There is no overlap with areas previously infilled associated with SC04006.</p>
61	GoC - DFO #6 4a-b Project Footprint Uncertainty – Sundog Stream Realignment DAR Main Report, p. 148, Figures 6-2, 6-3	<p><b>Comment</b> The footprint (size and extent) of the proposed Sundog Stream Realignment is not clear. The DAR Main Report states (p. 148) that “from Km 36 to 36.3, 37 to 37.2, and 37.7 to 37.9, the channel is against the bank and will need to be realigned.” This text might suggest that approximately 700 m of Sundog Creek is proposed to be realigned, in three sections. However, Figures 6-2 and 6-3 of the DAR Main Report indicate that the alignment is more extensive, affecting several kilometers of Sundog Creek in area of 37-39 road km. The DAR Addendum (section 7.6) states that “the intent during construction would be to create the shape of the existing channel” but that the “dimensions of the new channel will depend on flows, but would be comparable to the old channel.” Surveyed references for excavations are not planned to be obtained until further site investigation and detailed designs are generated by the Developer.</p> <p><b>Recommendation</b> 4a Please provide the project footprint of the Sundog Stream Realignment. This should include the affected length of Sundog Creek, the type and quantity of habitat loss expected due to infilling (all portions of the existing Sundog Creek section that will be infilled, in square meters), as well as the type and quantity of habitat gain to be obtained in the excavated Stream Realignment (in square meters, as well as the dimensions and depth profile of the Realignment). 4b Fisheries and Oceans Canada agrees with the Developer that the absolute shape of the Stream Realignment will evolve over time in a dynamic system. Therefore, please provide the estimated footprint, depth profile and dimensions of the Realignment at time of initial construction (or the range in which these dimensions may vary, for the purposes of assessment), as well as comparable data, assessments or predictions for the dimensions of the channel post-construction once scour has occurred along the south bank.</p>	<p><b>May 5:</b> 4a. The footprint and other details of the Sundog Creek re-alignment are provided in the Tetra Tech EBA letter report dated March 17, 2016 which was provided to the Board as part of our second Adequacy response. The re-alignment design contemplates utilization of a revised channel 1,600 m long and 20 m wide, for a total habitat area of 32,000 m<sup>2</sup>. The nature of the habitat is indicated in the Hatfield document referred to in the reply to DFO IR3, and is run and riffle habitat, comparable to the adjacent habitat in the existing main channel. Habitat loss due to infilling in order to build the road over this section is included in the Allnorth estimate discussed in DFO IR3. 4b. The estimated footprint, depth profile and dimensions of the re-alignment at time of initial construction are provided in the Tetra Tech report. Channel dimensions post-construction are expected to remain similar to construction since large, intact rock is not present in the re-alignment and will not be added (stream alignment training using boulders has been abandoned), although the new channel may alter its shape naturally.</p>
62	GoC - DFO #7 5a-c Hydrology – Sundog Stream Realignment DAR Main Report, p.	<p><b>Comment</b> The Developer has suggested that the proposed Sundog Stream Realignment will not alter the hydrology of Sundog Creek. Concerns have been expressed that the Realignment “may result in a change to the surface area for flow to be conveyed, and in turn, the volumetric flow rate.... The surface area for flow and</p>	<p><b>May 5:</b> 5a. A hydrological assessment is provided in the Tetra Tech report referred to in DFO IR4. There will be no armour in the creek re-alignment. Where armour is</p>

242, DAR Addendum p. 65	<p>flow rate is always determined by recent climate conditions and runoff. Channel realignment will not alter that" (DAR Addendum, p. 65). However, Fisheries and Oceans Canada notes that without a more complete hydrological description of the proposed Sundog Creek Realignment, including the dimensions of the newly-constructed channel as well as the existing portion of the creek to be infilled, and estimates of how the channel shape, size and velocity will evolve over time given that it is to be armoured along one bank, potentially repeatedly as armour is lost in the alluvium (DAR Addendum, p. 62), the Developer's position cannot be verified. There is also the potential for concerns regarding the stability of the proposed Realignment in a highly dynamic system. As noted in the DAR Main Report (p. 242), "the channels [in the braided Sundog Creek] change from year to year naturally."</p> <p><b>Recommendation</b> 5a Please provide a hydrological assessment of the proposed Sundog Creek Realignment, indicating the frequency with which repairs to armouring along the south bank are expected to be necessary, and how often additional work below the high water mark will be required to maintain channel stability over the life of the project. References to other completed projects for comparison can also be provided as examples, if the Developer is aware of similar successful realignments. 5b Please provide information on how total suspended solids (TSS) in Sundog Creek due to realignment activities, which may settle on downstream fish habitat, will be managed. 5c Please provide information as to whether the Realignment will result in the increased stranding of Arctic Grayling or Slimy Sculpin compared to baseline conditions. This may occur if large amounts of pool habitat in the Realignment are expected to be created by excavation or maintained/encouraged by the placement of boulders, which generate scour, or if there is a reduction in the expected number of days of flow per year in the Sundog Creek system.</p>	<p>to be placed to protect the berm diverting flow into the re-alignment, and the road structure in other locations, it will be designed to be self-launching to minimize the potential for future work below the HWM. Where armouring is proposed, it will be engineered to withstand anticipated 100-year flood water levels and velocities and to avoid the need for recurring maintenance. Re-alignment will be limited to a segment where the existing channel is quasi-stable, and where an historic alternate channel exists which, upon re-activation, is expected to be similarly stable. We are not aware of re-alignment examples similar to what is proposed for Sundog Creek. However, please note that on the advice of our river engineering consultants, the re-alignment is now limited to a reach where favourable conditions exist for a successful outcome in terms of creating an alternative flow path that is reasonably stable and not require constant maintenance. We propose to monitor the re-alignment for sediment accumulation, which could lead to an avulsion towards the original alignment. If necessary, accumulated sediment would be removed to prevent this, and this would be done at a time when no flow is occurring, usually in late summer/fall. 5b. The work will be scheduled for late summer/fall conditions when the reach is expected to be dry, based on site visits and historic aerial photos. Excavation of the re-aligned channel into the existing alluvial deposits may encounter subsurface water, but this will not have a surface outlet while construction is in progress. The substrate of the re-alignment consists of coarse gravel to cobble size material. When channels naturally avulse, there would be a period of adjustment of the bedload in the new channel. The same adjustment is anticipated with the re-aligned channel. When water levels rise in the alluvium in spring, flow will occur first in the alluvium, and fines will be carried into interstitial spaces between coarser material. As surface flow commences in the re-aligned channel, some finer material may be mobilized and then re-deposited after a short distance within coarser material. Re-suspension may occur as flows increase, but then such flows will likely already be turbid from bedload suspension upstream. Hence, the TSS increase over natural conditions is not expected to be significant. Large tracts of run and riffle habitat are common downstream, with limited pool habitat about 1 km away near Cat Camp where grayling may over-winter. Any TSS generated from the re-alignment over and above natural conditions is expected to settle before the pool habitat. 5c. Pool habitat will not be deliberately created in the creek re-alignment (large boulders will not be added). Where pool habitat is modified elsewhere (at Km 37.7 for example), similar pool habitat will be maintained (in terms of depth, flow velocity and days of flow), so there will be no net change in stranding potential compared to baseline.</p>
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63	GoC - DFO #8 6a-b Project Design – Sundog Stream Realignment DAR Main Report, p. 148, DAR Addendum p. 62	<p><b>Comment</b> The Developer has changed the high-level design concept of the Sundog Stream Realignment from a series of large boulders, placed to increase scour and maintain the realigned channel in its new position (DAR Main Report, p. 148), to instead armour the south bank of the realignment (DAR Addendum, p. 62). This change was made partly for logistical reasons and partly because of the risk of flow diversion to the south, closer to the road. Fisheries and Oceans Canada notes that the Arctic Grayling migrate within Sundog Creek (DAR Main Report, p. 99) and two assessed locations within the proposed realignment area may provide rearing and/or spawning habitat for either Arctic Grayling or Slimy Sculpin (DAR Addendum, Appendix C, Attachment A, p. 5-6).</p> <p><b>Recommendation</b> 6a Please clarify whether any boulders will still be placed in the channel bed, apart from armouring, along the length of the proposed Realignment channel, in order to facilitate scour and pool formation in locations that are not along the armoured south bank. 6b Please provide information on the risk that continuous scouring along the south bank of the proposed armoured Stream Realignment may create a deeper, narrower and potentially higher-velocity channel than intended, which may form a velocity barrier to fish passage for Arctic Grayling moving up Sundog Creek to spawn.</p>	<p><b>May 5:</b> 6a. Boulder placement is no longer proposed to facilitate scour and pool formation. 6b. Armouring is not proposed along the re-aligned channel. Where the road alignment will encroach into the existing channel in segments where re-alignment is no longer proposed, velocity impacts will be minimized by excavation of the channel bank opposite from the road to retain the existing geometry. This condition occurs in areas where the channel is active and the opposite bank typically consists of exposed (unvegetated) alluvial gravel and cobble materials. Channel hydraulic capacity adjacent to armoured sections will be maintained in terms of depth, flow velocity and days of flow, such that there is no net change with respect to fish passage.</p>	
64	GoC - DFO #9 7 Dust Deposition in Watercourses DAR Main Report, p. 239- 240	<p><b>Comment</b> The Developer states that “The primary dust-related effects... are anticipated to occur within about 10 m of the main development” and “effects on waterbodies from dust are expected to be minimal. The road is proximal to or crosses many stream, but the limited amount of dust will be carried in flowing water and settle as sediment, adding only a small increment to the bed load” (DAR Main Report, p. 239-40).</p> <p><b>Recommendation</b> 7 Please provide the predicted dust deposition rates (e.g., in mg/dm<sup>2</sup>/day), the affected water bodies and the areas of the affected water bodies located within 10 m of the road that may be subject to dust deposition, and the incremental addition of dust to the total suspended solids (TSS) load of water courses as a result of construction, operation and decommissioning of the all-weather access road.</p>	<p><b>May 5:</b> See Golder Associates document attached. <b>May 5:</b>  Response to DFO IR09 - Golder</p>	
65	GoC - DFO #10 8a-c Blasting DAR Addendum Appendix C Attachment A (p. 11)	<p><b>Comment</b> The Developer states that “blasting will only occur in four locations, three in Sundog Creek and one in Grainger River. Two of the Sundog locations are not fish-bearing. The other, and the Grainger location, host grayling, a spring spawner. Blasting will not occur in the spring” (DAR Addendum, App. C p. 11). Further on, the Developer indicates that mitigation for blasting will also including “encouraging fish to move from the blast area.”</p> <p><b>Recommendation</b> 8a Please clarify the times of year when blasting will be used. 8b Please clarify how fish will be removed or excluded from blast areas, the time of year at which this will occur, and for what period of time fish will be excluded from access to fish habitat. 8c Please clarify that blasting near fish-bearing watercourses will adhere to Fisheries and Ocean Canada’s Measures to Avoid Harm available on our website (<a href="http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html">http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html</a>). Please also note that it is recommended that blasting not result in instantaneous pressure changes of &gt; 50 kPa in areas of fish habitat to avoid negative impacts to fish and fish habitat, including adult fish.</p>	<p><b>May 5:</b> 8a. Blasting will be done in dry conditions outside of the spring period. Regarding blasting in proximity to fish-bearing streams, of the 4 locations previously noted, the Grainger location will no longer require blasting if the alternate road alignment from Grainger Gap to Wolverine Pass is adopted. However, a blasting location in Sundog (Km 28-29) was added. This location and the lower Sundog location at Km 36.7-37 are proximal to potentially fish-bearing reaches. 8b. If fish could be present and there is potential for blasting to contravene DFO’s Measures to Avoid Harm or result in instantaneous pressure changes &gt;50kPa, a survey for fish presence in the area will be made, and if necessary, fish will be relocated. As noted in the Hatfield memo, Appendix 10 of the DAR, long stretches of Sundog Creek are usually dry in summer and fall, and fish presence is restricted to a limited number of pools. These fish would be relocated to other, deeper pools in the area, if necessary. 8c. Answered in 8b.</p>	
66	GoC - ECCC #1 Appendix E - Vegetation and Wildlife & Wildlife Habitat - DAR Sections (Sept 2015)	<p><b>Comment</b> Subsection 79 (2) of the Species at Risk Act (SARA), states that during an assessment of the environmental effects of a project, the adverse effects of the project on the listed wildlife species and its critical habitat must be identified, that measures are taken to avoid or lessen those effects, and that the effects be monitored. This subsection applies to all species listed on Schedule 1 of SARA. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans. As a matter of best practice, Environment and Climate Change Canada (ECCC) suggests that species under consideration for listing on SARA, including those designated as “at risk” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), be considered during a project assessment in a manner similar to listed species. Common Nighthawks are legally listed as threatened under SARA, and Bank and Barn swallows have been identified as threatened by COSEWIC. These avian species at risk, known to commonly breed in the project area, may nest in anthropogenic habitats including borrow pits, quarries and buildings. These species may be susceptible to disturbance or nest loss</p>	<p><b>May 10:</b>  Tetra Tech EBA Wildlife and Vegetation responses Response to ECCC IR#1 on pag 9</p>	

		<p>by on-going activities during construction and operation phases. The Proponent has identified this as a potential impact in the DAR but did not assess the impact, identify mitigation measures or monitoring to address requirements under S.79(2) of the Species at Risk Act (SARA).</p> <p><b>Recommendation</b> To help address requirements under S.79(2) of SARA, it is requested that the Canadian Zinc Corporation (the Proponent) provide an assessment of the potential impacts to avian species at risk using anthropogenic habitats during the construction and operations phase. The Proponent is also asked to provide measures that will be taken to avoid or lessen potential impacts and monitoring measures.</p>		
67	GoC - ECCC #2 Appendix E - Vegetation and Wildlife & Wildlife Habitat - DAR Sections (Sept 2015) 7.1.7 Other Wildlife and Wildlife Habitat Mitigation and BMPs.	<p><b>Comment</b> The Proponent proposes to have wildlife observations reported by staff and contractors, as well as reporting of dangerous wildlife encounters. There is no specific reference to recording and reporting of wildlife mortalities during project activities. Recording and reporting of wildlife mortalities allows for mitigation measures to be developed and implemented to reduce the likelihood of further mortalities.</p> <p><b>Recommendation</b> It is requested that the Proponent confirm if project-related mortalities will be recorded and how they will be reported to responsible wildlife management authorities.</p>	<b>May 5:</b> CZN's existing Wildlife Mitigation and Monitoring Plan outlines procedures for monitoring and reporting of wildlife encounters. Recording encounters and notifying the Road Operations Supervisor are important so that adaptive mitigation can be applied, such as modifying speed limits for certain road sections and posting warning signs. For a project-related wildlife mortality, the appropriate jurisdiction (i.e. either GNWT ENR or Parks Canada) will be immediately notified. This is a standing procedure for current operations whether the mortality is project-related or not.	
68	GoC - ECCC #3 Sediment and Erosion Control Management Plan DAR Section 11.1.4	<p><b>Comment</b> The Proponent indicates several sediment and erosion control practices that will be included in road construction, however, they defer development of an actual sediment and erosion control plan to be undertaken at a later date. It is important to have a plan in place to indicate that potential effects to water bodies from sedimentation and erosion are mitigable.</p> <p><b>Recommendation</b> It is requested that the Proponent provide a sediment and erosion control management plan.</p>	<b>May 5:</b> A draft Sediment and Erosion Control Plan was provided in the DAR Addendum, Appendix A, Appendix C. It is envisaged that this plan will be the subject of detailed review and finalization as a condition of Land Use Permits prior to construction.	
69	GoC - ECCC #4 Borrow Sources Appendix 1D	<p><b>Comment</b> In Appendix 1D the proponent evaluates a number of potential borrow sources along the proposed all season road to be used for construction material. The evaluation provided focuses mostly on the suitability of the rock as a construction material and minimally on the suitability of the rock for use with regards to potential metal leaching (ML) and acid rock drainage (ARD). No analyses are provided from the proposed borrow sources to test for the potential for ML/ARD. Characterization of the borrow materials using static and kinetic tests should be completed to determine ML/ARD potential. If the potential to generate ML/ARD is identified that borrow area should be avoided for use as construction material.</p> <p><b>Recommendation</b> It is requested that the Proponent provide any information on static or kinetic testing completed on borrow source rock for metal leaching/acid rock drainage potential.</p>	<b>May 5:</b> In the probing and sampling of borrow sources to date, there has been no indication of any potential for acid drainage or metal leaching. It should be recognized that the road crosses predominantly carbonate terrain with an abundance of neutralization capacity, and as such, the potential for ARD/ML is low. None of the areas investigated show evidence to the contrary e.g. pyrite, other sulphide metal or typical gangue mineral (e.g. quartz) presence, iron staining. However, detailed investigation and sampling of all borrow sources will occur during the detailed design phase. Representative samples will be selected from each borrow for acid-base testing. Depending on the results of these tests, more samples may be analysed, and for more tests, such as leaching tests, as necessary, under the guidance of a professional ARD geochemist. Any borrow with a positive identification of ARD/ML potential will not be used. Any borrow with marginal ARD/ML potential will either not be used, or used based on mitigation procedures defined by a professional ARD/ML geochemist.	
70	GoC - ECCC #5 Borrow Source Locations DAR Section 4.1.2 – Surficial Materials, Soils, Borrow and Permafrost Appendix 1D	<p><b>Comment</b> It is identified in the Developer's Assessment Report (DAR) that 74 borrow pits will be used in the construction of the all-season road (49 required and 25 back-up). In contrast, Appendix 1D includes evaluations of 59 borrow sources, which does not account for all 74 borrow pits mentioned in the DAR. With regards to all borrow sources, there is no mention of considerations of minimum setback distances from water bodies. Setback distances of borrow pits from water bodies should be identified to prevent potential environmental impacts to water quality, fish, and fish habitat from dustfall deposition (increasing Total Suspended Solids (TSS)) and runoff containing blasting reagent residues.</p> <p><b>Recommendation</b> a) It is requested that the Proponent identify minimum setback distances of borrow pits from water bodies and provide details on mitigation measures to prevent introduction of TSS or blasting reagent residues to water</p>	<b>May 5:</b> a) We agree it is sound practice to have a setback from waterbodies. We propose a recommended setback of 30 m, but we also recommend that the actual setback be determined based on site specific requirements. Borrows typically source granular material, which are porous and will allow subsurface flow, albeit at a slow rate. Therefore, consideration needs to be given to the location of the borrow with respect to proximity to a waterbody and potential seepage flow directions. We also	

		bodies. b) It is requested that the Proponent provide monitoring plans for run off and seepage where the borrow pits are in close proximity to major water crossings.	recommend that the 30 m requirement not be an inflexible rule, since some borrows may need to be closer than 30 m. For example, the talus slopes adjacent to Sundog Creek represent substantial sources of good borrow. Blasting would not be required, and the coarse material will have little fines. In addition, Sundog Creek is often dry. Therefore, we recommend that setbacks be determined on a case by case basis, with additional mitigation if within 30 m of a waterbody, as necessary. b) Monitoring requirements should also be considered on a case by case basis. In the absence of blasting and surface discharge from a borrow, there would be little justification for monitoring. If there are no residues from blasting (as is the case with stick-type explosives), monitoring would also not be needed. Only if a borrow is proximal to a waterbody, and either there will be a surface discharge or explosives with residues will be used, should monitoring be considered.	
71	GoC - ECCC #6 In-stream Work DAR Section 6.5 Construction Phases and Schedule Appendix 1 Table 6	<p><b>Comment</b> The Proponent identifies the optimum season for road construction as summer or early fall when conditions are generally dry. There is no indication of the preferred timing for construction of water crossings. ECCC notes that to the extent possible, water crossings should be completed in the absence of flow or in low flow conditions in order to reduce potential impacts from sedimentation, erosion, and blasting reagents.</p> <p><b>Recommendation</b> It is requested that the Proponent describe, for any crossing that are to be constructed during the open water period, how Total Suspended Solid (TSS) related effects will be characterized, prevented and mitigated.</p>	<b>May 5:</b> Refer to the DAR, Appendix 1, section 6.4, and to the DAR Addendum, Appendix A, Table 4 (construction schedule) and to Appendix C, Sediment and Erosion Control Plan.	
72	GoC - ECCC #7 Liard River Crossing DAR Section 11.6 – Fish and Aquatic Habitat	<p><b>Comment</b> It is indicated in the Developer's Assessment Report (DAR) that "dredging of streams will not be required, with the possible exception of Liard River. A barge is proposed with ramps at river banks, so material is likely to be placed rather than dredged." ECCC notes that dredging has the potential to increase Total Suspended Solids (TSS) in the water column, impacting water quality, fish, and fish habitat. To the extent possible, dredging should be avoided and alternative methods used.</p> <p><b>Recommendation</b> It is requested that the Proponent clarify the instream work for the Liard River crossing and identify mitigation measures for ramp construction and for dredging.</p>	<b>May 5:</b> Work at the Liard River crossing will include barge ramp construction and no dredging. The barge ramps will be constructed at times of low flow and low water levels. The Liard River is a notoriously turbid stream, however standard construction practices will be employed regarding material placement and runoff controls for ramp construction. The ramps will be capped with erosion-resistant gravel and the ramp sides will be armoured.	
73	GoC - NRCAN #1 Permafrost - Developer's Assessment Report (Apr 2015), All Season Road Project Prairie Creek Mine – Vol. 1,2,3 including Appendix 1, 2, 3,4,8 Developer's Assessment Report Addendum (Sep 2015) - including Appendix A, B, D, E, F Reasons for Decision on the Adequacy of the Developer's As	<p><b>Comment</b> NRCAN reviewed the Developer's Assessment Report (DAR), the DAR Addendum and supporting documentation, to determine if any further information is required to complete the technical review. In particular, the permafrost and terrain aspects of the project were reviewed, including the presentation and analysis of baseline information and incorporation of these physical environmental components into the impact assessment. NRCAN concludes that adequate information has been provided in the DAR and its addendum (along with the DAR for the approved Prairie Creek Mine Project) to understand the data utilized and the analysis conducted to reach the conclusions with respect to environmental impacts.</p> <p><b>Recommendation</b> NRCAN requires no additional information to enable a technical review of the DAR. NRCAN notes that the Mackenzie Valley Review Board, in its reasons for decision on adequacy, has made additional requests to the Developer for information that will be relevant to NRCAN's review of the permafrost and terrain aspects of the Project.</p>		
74	GoC Responses to MVEIRB IRs	<p><b>Comment</b>  Government of Canada responses to MVEIRB information requests (#46 - 48) are included in the attached. Responses are included from Parks Canada Agency and Environment and Climate Change Canada.</p> <p><b>Recommendation</b> See attached.</p>		
75	GoC Responses to MVEIRB IRs Additional Information - ECCC SARA Recovery Strategy Woodland	<p><b>Comment</b>  Environment and Climate Change Canada - <i>Species at Risk Act</i> Recovery Strategy Series - Recovery Strategy for the Woodland Caribou (<i>Rangifer tarandus caribou</i>), Boreal Population, in Canada</p> <p><b>Recommendation</b> See attached report.</p>		

	Caribou, Boreal Population			
Mackenzie Valley Environmental Impact Review Board: Kate Mansfield				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	Information to parties and the developer regarding MVEIRB Information Requests	<p><b>Comment</b> The Review Board is issuing a series of information requests to the Developer, the GNWT, Environment and Climate Change Canada and Parks Canada. Information requests are directed to these parties as follows:</p> <ul style="list-style-type: none"> <li>• IRs 2-41: Canadian Zinc</li> <li>• IRs 42-45: GNWT</li> <li>• IR 46: Environment and Climate Change Canada</li> <li>• IRs 47-48: Parks Canada</li> </ul> <p><b>Recommendation</b> No recommendations; for information purposes only.</p>		
2	Characterization of permafrost; Project description and potential accidents and malfunctions	<p><b>Comment</b> The developer described that permafrost is possible and observed in some sections along the alignment. However, it is not clear that the full set of permafrost sub-classes were used in the terrain mapping. Six subclasses are included in Table 6.3 of Howes and Kenk but only one subclass is indicated in the legend of the mapping. Partly because of this and because the Rutter and Boydell, 1981 mapping does not show the spatial extent of permafrost, the complete extent of permafrost and permafrost processes cannot be determined from the polygon mapping. For example: (i) At Km 56, the thermokarst symbol is shown on the map but the presence of permafrost and this process are both not highlighted in the polygon mapping letters (ii) At WP 30 and also on Figure A08: at KP 047.5 Km, there is a thermokarst symbol but the terrain unit letter for thermokarst (t or e) is not used (iii) At KP 122 Km, permafrost and thermokarst features were identified in the previous mapping but don't seem to be reflected in the terrain mapping. (iv) At KP 92.5 Km, there are ponds that have been previously identified as thermokarst ponds but are not highlighted as such in the mapping (v) According to Table 6.3-1, three realignments were proposed between KP 105 km and KP 109 km to avoid areas of permafrost creep; however, the areas of permafrost creep (solifluction?) in these areas do not seem to be shown in the mapping. (vi) At KP 134 Km, a thermokarst pond is described in the text but is not mapped as such (vii) At KP 141 to 144 Km, the Rutter and Boydell, 1981 mapping shows permafrost features around the lakes but this is not incorporated into the polygon mapping. (viii) At KP 118.5 Km, permafrost is described in the text but does not appear to be included in the polygon mapping. Clarification on the mapping characterizations is required to understand the nature and extent of permafrost at the site. This information is needed to understand the environmental setting for the project, the potential effects of the project on the environment, and the potential risks to the road as a result of permafrost.</p> <p><b>Recommendation</b> Please update the terrain stability mapping to accurately reflect all of the observations made along the alignment related to permafrost and permafrost features. For example, it should be inclusive of all of the information currently presented on the record. The terrain stability mapping should clearly depict the permafrost distribution along the alignment.</p>	<p><b>May 5:</b> See Tetra Tech EBA document attached. <b>May 10:</b>  Response to MVEIRB IR#2</p>	
3	Topography-slope angle and aspect; Project description and potential accidents and malfunctions; Appendix F of DAR addendum	<p><b>Comment</b> Maps depicting the slope angle and aspect were provided in Appendix F of the DAR Addendum but detailed descriptions were not included. In addition, the effect of the slope aspect on permafrost was not described. This information is needed to understand the environmental setting for the project, the potential effects of the project on the environment, and the potential risks to the road.</p> <p><b>Recommendation</b> Please provide detailed descriptions of the slope aspect and angle and describe what the effects to permafrost along the alignment are predicted to be.</p>	<p><b>May 5:</b> Consideration of slope angle and slope aspect was included in the baseline road section descriptions in Section 5 of the geotechnical report, Appendix 2 of the DAR. TSM and slope angle/aspect mapping did not alter our interpretation of effects on permafrost, and the consequent recommendations regarding road alignment and construction approach. Therefore, the requested work has been completed, to the extent necessary for this stage of the project, given that more site-specific review will occur during the detailed investigation and design phase.</p>	
4	Water - Channel crossings; Project description; water quality and quantity; potential accidents and malfunctions. DAR Appendices F, 1 and 2; DAR Addendum	<p><b>Comment</b> The developer was requested to describe channels including channel crossing and realignments. Additional information related channel stability is needed. The purpose of channel stability mapping for major stream crossings is to: - Inform the selection of crossing locations (i.e. to confirm that the crossing locations have been nailed down) based on predicted effects of the Environment on the Project. -Support qualitative predictions of the types of effects of the Project on the Environment (e.g. floodplain and channel constrictions, restrictions to overland flow, channel aggradation and scour, directing of channel avulsions along road</p>	<p><b>May 5:</b>  Response to RB IR04 and IR07 <b>May 10:</b>  Response to MVEIRB IR #4, MVEIRB #7</p>	

	Appendix F; Tetra Tech Terrain Mapping Report	<p>alignment).</p> <p><b>Recommendation</b> Please provide the following:</p> <ol style="list-style-type: none"> <li>1. An updated list of the major crossings including the alternative alignment between KP103 Km and KP124 Km. The list should also include all the alluvial fan crossings.</li> <li>2. For each crossing, the following should be provided: <ol style="list-style-type: none"> <li>1. Descriptions of the physical environmental setting, including channel and floodplain dimensions, bedload transport activity, channel stability, overbank flooding, and avulsion history.</li> <li>2. Support for the above from site photographs and historical air photo interpretation and mapping.</li> <li>3. Descriptions of the crossing structure and the approach segments of the road with respect to channel and floodplain constriction.</li> <li>4. Descriptions of the alternative crossing locations that were considered, and how this particular site was selected.</li> <li>5. Descriptions of the potential effects of the environment on the crossing, with respect to channel avulsion, bed material aggradation, or excessive bedload transport through the crossing.</li> <li>6. Descriptions of the potential effects of the crossing on the environment, with respect to constriction of channel/floodplain width, the alteration of bedload/debris transport and bed material accumulation, and the direction of channel avulsions down the road alignment.</li> </ol> </li> <li>3. A description of any channel avulsion hazards that may affect the road that are not directly associated to channel crossing structures (e.g. km 30.6)</li> </ol>		
5	Project description and terrain mapping; Tetra Tech Terrain Mapping Report	<p><b>Comment</b> It is implied that there are no areas of 'potentially unstable' or 'unstable' terrain in the areas covered by the Rutter and Boydell, 1981 mapping. However, this is considered unlikely to be the case based on the existing evidence. For example, the earlier work undertaken by Tetra Tech highlighted debris slides and tension cracks downslope from KP 84 Km to KP 85 Km, but this area is not mapped as 'potentially unstable' or 'unstable'. At KP 157 Km, tension cracks were mapped in the area but the area upslope of the "unstable" terrain was not identified as an area of potentially unstable.</p> <p><b>Recommendation</b> Please explain how it was determined that no "unstable" or "potentially unstable" areas were present in the section of mapping supported solely by Rutter and Boydell, 1981. If updates are required to the classification of any areas currently identified as stable in the Terrain Stability Mapping Report, please provide updated figures.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to Board IR2. <b>May 10:</b>  Response to MVEIRB #5	
6	Project description and effects of potential accidents and malfunctions; Tetra Tech Terrain Mapping Report	<p><b>Comment</b> In the Terrain Mapping Report submitted in response to the adequacy review, Tetra Tech stated that additional mitigations will be needed in certain high risk and moderate risk areas. The specific options for mitigations were not provided. For the Review Board to understand the likelihood of a significant adverse impact from the project it needs to understand what mitigations are possible to minimize any potential impacts during the environmental assessment.</p> <p><b>Recommendation</b> Please describe what mitigations would likely be implemented to address risks from geohazards in the high risk and moderate risk areas defined in the Terrain Mapping Report. The descriptions should include a list of the possible mitigations, why each mitigation would be appropriate and under what conditions each would be implemented.</p>	<b>May 5:</b> This information was also already provided in the DAR, Appendix 2, Section 8.1.3, and to a lesser extent in the DAR Addendum and TSM report. The first approach is to avoid potentially problematic areas, and that is what the proposed road alignment adjustments seek to do. Again, a more site-specific review will occur during the detailed investigation and design phase, when site-specific mitigations, such as wider or thicker fill, will be considered further, if necessary..	
7	Project description, water quality and quantity; Tetra Tech Terrain Mapping Report	<p><b>Comment</b> The erosion risks to the road from meander bends is not always discussed (e.g. km 3.6 and the Liard River floodplain). This information is needed to understand the environmental setting for the project, the potential effects of the project on the environment, and the potential risks to the road.</p> <p><b>Recommendation</b> Please describe the erosion risks at meander bends that may affect the road.</p>	<b>May 5:</b> See document attached to Board IR4. <b>May 10:</b>  Response to MVEIRB IR#7	
8	Project description Appendix A of DAR Addendum (All North), DAR Addendum section 3	<p><b>Comment</b> The temporal scope defined in the DAR uses a two year construction period, a 14 year mine operating period, a two year closure period, and a 5 year post-closure period. The alternatives assessment uses an 11 year mine life. Appendix A of the DAR Addendum from All North describes it taking 3 years for the road to be fully operational.</p> <p><b>Recommendation</b> Please confirm the expected construction, operations, closure and post-closure schedule for the mine and the all season road.</p>	<b>May 5:</b> During this EA, on-going analysis has changed the expected project schedule somewhat, and the recent update of the Mine's preliminary feasibility study has also. We currently envisage a 2 year Mine construction period, 3 year all season road construction period, and a 17 year mine life. The closure and post-closure periods remain the same.	
9	Assessment of alternatives; DAR Addendum section 3	<p><b>Comment</b> The alternative analysis cited the net present value results in the cost-benefit analysis. It would be beneficial to understand the assumptions and details of the cost-benefit analysis to understand how the selected alternative was chosen</p> <p><b>Recommendation</b> Please explain:</p>	<b>May 5:</b> See attached document. <b>May 5:</b>  Response to RB IR09	




		<ol style="list-style-type: none"> <li>1. Why a discount rate of 10% was chosen.</li> <li>2. What the effect of the discount rate on the relative rankings is</li> <li>3. In addition, please provide a more detailed summary spreadsheet or table of the calculations.</li> </ol>		
10	Assessment of alternatives, DAR Addendum section 3	<p><b>Comment</b> The alternatives assessment in the DAR Addendum contains subjective or speculative statements like "others likely agree" that reduce confidence in the assessment.</p> <p><b>Recommendation</b> Please provide detailed evidence to clarify subjective statements used in the alternatives assessment.</p>	<p><b>May 5:</b> The full context leading to this request is "Some local aboriginals perceive that an all season road, including some limited blasting for bridge abutments and approaches, will mean a greater impact on the land compared to a winter road. However, others likely agree with CZN's belief that use of an all season road through the mountains will be inherently safer than only winter use, and that as a result, the risk of accidents and spills will be less." This discussion is provided to justify a component score. The multiple accounts analysis is somewhat subjective by definition, and based on an opinion. We think some latitude is reasonable.</p>	
11	Project description; DAR section 6.3.3	<p><b>Comment</b> On pg 144 of the DAR, the truck travel time along the road is listed at 13 hours. Although routine breaks are accounted for in this consideration, prolonged rests (for example, due to inclement weather or in the event of temporary road closures) are not.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. If drivers have to stop along the all season road, where will they rest?</li> <li>2. Have possible rest locations been accounted for in the road design?</li> <li>3. Does a 13 hour work day bring truck drivers close to their maximum daily work time? If so, what safety precautions will be available to drivers approaching this maximum, or in exceedance of the maximum in the event of temporary road closures or inclement weather?</li> </ol>	<p><b>May 5:</b>  Response to MVEIRB IR #11</p>	
12	DAR p22-23 List of Acronyms	<p><b>Comment</b> In the DAR and DAR Addendum a number of acronyms are used such as the RCRP. The explanation/definition for some acronyms is not provided which makes it challenging for the reader.</p> <p><b>Recommendation</b> Please update and complete the list of acronyms used in the DAR and DAR Addendum and their associated definitions.</p>	<p><b>May 5:</b>  Response to MVEIRB IR #12 - see updated list attached</p>	
13	Water crossings and effects of permafrost thaw; DAR section 12	<p><b>Comment</b> Section 12 of the DAR (PR#55) states that the impacts of permafrost thaw to infrastructure may be major and potentially significant and could be mitigated.</p> <p><b>Recommendation</b> Please list are the potential mitigation options for impacts of permafrost thaw at crossings and along the road.</p>	<p><b>May 5:</b>  Response to MVEIRB IR #13 See Terta Tech EBA document attached.</p>	
14	Project description; Tetra Tech Terrain Mapping Report	<p><b>Comment</b> The Terrain Mapping Report outlines a number of new proposed realignments. It is important to understand if and how these realignments may change the effects assessment of valued components conducted for the alignment originally described in the DAR.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Given the proposed realignments described in the Terrain Mapping report, does the construction schedule change?</li> <li>2. Do any of the proposed re-aligned sections have construction timing constraints? If so, what are they?</li> <li>3. Please describe any changes to the effects assessment for valued components given the proposed re-alignments.</li> </ol>	<p><b>May 5:</b> 1. No, the construction schedule remains the same. 2. None of the proposed re-alignments from TSM have time constraints any different from the originally proposed road locations. 3. All of the proposed re-alignments are minor adjustments to the route, in both nature and distance compared to the original location, to avoid identified terrain issues, to the extent possible. None have any significance in terms of the assessed effects related to water, fish, wildlife, vegetation or emissions. Effects of the road on the environment, and of the environment on the road are reduced. The re-alignments avoid or reduce the influence of terrain issues. Consequently, spills risks are also reduced for the re-aligned sections. The only exception in terms of all of the re-alignments being minor is the section at Km 39-43. A more significant alignment change is required here in terms of distance. There are 2 options (see maps in the Tetra Tech report). One option consists of a traverse part way up the major Sundog tributary at Km 39. This would move the tributary crossing upstream to a more confined</p>	

			location, and because of the grade, the location may not host fish. However, grades may also render this alignment impractical. The 2nd option is a deviation further to the south of the winter route. This option is more likely to be adopted. Neither option would result in effects any worse than those already assessed. Option 1 would result in less risks from channel/floodplain effects because the Km 39 crossing at Cat Camp would be replaced by the crossing upstream. Also, Tetra Tech EBA has produced an updated risk assessment of landslide hazards, attached to PCA IR18. This builds on the Magnitude and Frequency Analysis of Landslide Hazards that was submitted with our reply to the RfD on Adequacy.	
15	Nahanni National Park Reserve; Access Management; ToR 7.2.3; DAR Section 8.3 p165-166, 10 and Appendix 7 Section 6; DAR Addendum Appendix E; Section 6.9 and Appendix C p3.	<p><b>Comment</b> In its DAR, CanZinc proposes to mitigate project-related wildlife disturbances by implementing an updated Controlled Road Use Plan (DAR p165). The Wolverine Mine in Yukon has an access road with a lease and controlled access. On pg. 152 CanZinc discusses the possibility of a private road designation for the all-season road as part of the Dehcho land claim settlement. Page 271 of the DAR Volume 1, CanZinc states that "the road could facilitate significantly increased tourism especially in the area of the Nahanni National Park Reserve crossed by the road" and "Road access would make tourism into the region more affordable". In addition, the developer notes that the road increases the potential for mineral and oil and gas potential.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. A Controlled Road Use Plan was developed for the winter road (in 2007). Describe what mitigations from that plan are relevant to the proposed project, which mitigations need to be updated given the proposed change to an all season road, and what new mitigations would be needed for the proposed project.</li> <li>2. Given the proposed change from a winter road to an all season road, is a checkpoint staffed by NDDB members still the proposed mitigation for road access control? What additional responsibilities will be required of the checkpoint staff for an all season road as opposed to a winter road, such as: hours that the checkpoint will be staffed, and access deterrence techniques to be used by staff at the checkpoint. In addition, describe who the "residents" are that would be allowed to pass on the ferry and along road and who the "non-residents" are that would be discouraged from passing along the road (DAR Addendum, Appendix E, and Appendix C p3).</li> <li>3. Describe access control along the all season road during a temporary closure (e.g. 3, 5 and 10 year scenarios) of the mine for economic reasons. How will access be controlled during these periods of time? How long would a temporary closure have to be before the all season road is decommissioned permanently?</li> <li>4. How will the developer prohibit use of recreational off-road vehicles (ATV's, snowmobiles) along the proposed all season road (Appendix C p3)?</li> <li>5. Will CanZinc's proposed methods to restrict access to the all season road differ from the winter road? If so, please describe how CanZinc seeks to restrict "non-resident" access along the road while at the same time presenting this new all season access as a benefit for tourism and exploration for minerals and oil and gas.</li> <li>6. Please summarize discussions that CanZinc has had with Parks Canada on the use and management of the proposed Prairie Creek all season access road.</li> </ol>	<p><b>May 5:</b> 1. The Controlled Road Use Plan has been superseded by the Road Operations Plan, a draft of which was provided in the DAR Addendum, Appendix A, Appendix C specific to the all season road. The plan covers proper signage for hazards and speeds, and access control. More mitigations are contained in the Wildlife Mitigation and Monitoring Plan (WMMP), such as wildlife having the right-of-way, stopping to let wildlife move away, and signage for crossing locations, once these are known. Tetra Tech EBA proposed modifications to the WMMP in their report in the DAR Addendum, Appendix E. 2. Yes, in addition to the private barge on the Liard River. Check-point responsibilities will be the same. The check-point will be staffed during daylight hours when access to the road west of the Liard River is possible, and at all other times when access by unauthorized people might occur. Check-point operators will inform any unauthorized people that road use poses risks because of Mine traffic use, and that the area is traditional NDDB lands and their use of it is not desired. "Residents" are those people residing in Nahanni Butte. "Non-residents" are all other people. 3. In the event of temporary mine closure (e.g. 3, 5 and 10 year scenarios), the check-point would not be operated, but other access deterrants would be considered, such as bridge deck removal, and installation of 'tank' traps. The length of a temporary closure that would trigger permanently decommissioning the all season road would depend on the circumstances at the time, such as mineral reserves remaining, economic value and projected mine life. 4. Access by ATV's would be deterred in the same way as vehicle traffic. We are aware that ATV's could potentially by-pass the check-point. We propose to locate the check-point in a boggy area that would make it difficult to by-pass. This would not deter snowmobiles, but they would not be deterred from using the already permitted winter road, except at the check-point. 5. Yes. The all season road will include a barge crossing of the Liard River which will not be available to non-residents. If the NDDB are interested in pursuing tourism or allowing other resource</p>	

			development, CZN will accommodate their wishes, such as allowing barge use and coordinating road use. 6. CZN and PCA have not had substantive discussions on road use/management to date. However, we have indicated to PCA that the all season road could be used to promote NNPR tourism, and that we would be amenable to joint road use.	
16	Species at Risk; Boreal Caribou Recovery Strategy; DAR Addendum 4.3.2, Table 6-5 of DAR Addendum Appendix E	<p><b>Comment</b> Boreal caribou are a species at risk in the NWT. Boreal caribou are present along the eastern portion of the Prairie Creek all season access road. The effects on boreal caribou are predicted to be adverse, moderate in magnitude, geographical extent and reversibility, and high in duration, frequency and certainty. It is unclear, however, what the actual effect of these impacts on Boreal caribou abundance and distribution will be.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Are the recommendations in the Boreal Caribou Recovery Strategy (2012) reflected in the design and effects assessment of this project? If so, how? If not, why not?</li> <li>2. Quantify the predicted impacts on Boreal caribou population and distribution as a result of the construction, operation and closure of the Prairie Creek all season access road.</li> </ol>	<p><b>May 5:</b> 1. See Tetra Tech EBA Wildlife Vegetation response document attached. 2. As noted by Tetra Tech EBA, with a 500 m buffer around the total project footprint, the project area represents only 0.0006% of the overall boreal caribou population's critical habitat, relatively insignificant. We refer to the information from the GNWT posted on the Registry on March 18, 2016 regarding the basis for boreal range determination. Note that "the range boundary appears to be determined based on a combination of the western edge of the Taiga Plains ecoregion and a ~30 km buffer around boreal caribou collar locations and sightings". Therefore, official boreal caribou range only covers a portion of the proposed access road by virtue of the buffer zone. The map attached to the information indicates locations of sightings and collar data, all of which are east of the access road. Advice from Nic Larter, ENR regional wildlife biologist is that boreal caribou are regularly seen to the north near Matou Creek, south of Antoine Lake, and south of Nahanni Butte, south of the Liard Highway. In the GNWT email, they also advise that "based on information provided by Nahanni Butte at recent boreal caribou range planning meetings the area around the southern portion of the access road may support low densities of boreal caribou". Considering all of this information as a whole leads to a conclusion that the proposed project is not likely to have a significant impact on boreal caribou population and abundance. <b>May 5:</b> Attachment <b>May 10:</b> Response to MVEIRB IR #16</p>	
17	Vegetation Baseline contaminant levels in plants along road route; DAR Addendum 4.5.10	<p><b>Comment</b> There are many examples of contamination of vegetation along industrial haul roads/transportation corridors transporting base metals. These include lead and zinc mines at Red Dog and Pine Point. In order to determine potential impacts to vegetation from hauling of lead and zinc concentrate along the proposed all season access road, a baseline vegetation survey is required. An assessment of the effects to vegetation from lead and zinc concentrate was not completed as part of the winter road assessment and is necessary for the all season road assessment.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please provide a timeframe prior to road construction when a baseline vegetation survey for potential contaminants of concern will occur.</li> <li>2. Please describe the survey methodology for this baseline vegetation study.</li> <li>3. Please describe a monitoring plan for loading of potential contaminants of concern in vegetation along the proposed road route.</li> </ol>	<p><b>May 5:</b> 1. The requirement for vegetation monitoring is linked to concentrate transport on the all season road. Therefore, a baseline survey need only be completed prior to this, not prior to road construction. 2. and 3. We believe it would be appropriate to request this information as a condition of land use permits, which would also require it to be approved before concentrate haulage. The information is not considered to have any material influence on the assessment of effects during this EA.</p>	
18	Vegetation – Invasive species; ToR 7.3.9 Item 2; DAR 11.8.8, p265; DAR Addendum 8.78, Appendix E, (Appendix C p3)	<p><b>Comment</b> Section 8.7.8 of the DAR Addendum indicates that CanZinc will develop an invasive species management plan prior to construction of the proposed road. DAR Addendum, Appendix E (Appendix C p3) mentions the existing Contaminant Loading Management Plan for the approved winter road.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please submit a conceptual framework for an invasive species management plan for discussion during the technical sessions. Describe adaptive</li> </ol>	<p><b>May 5:</b> 1. During the Adequacy Review, it was agreed that, for management plans, CZN would provide either a draft plan or the key mitigation/monitoring steps to be included in a future plan. The latter was provided by Tetra Tech EBA in their letter dated September 11, 2015. Additional comments are provided in our reply to</p>	

		<p>management options to prevent the spread of invasive species in the conceptual framework.</p> <p>2. A Contaminant Loading Management Plan was developed for the winter road. Describe what mitigations from that plan are relevant, which mitigations need to be updated given the proposed change to an all season road, and what new mitigations would be needed for proposed project.</p>	<p>Parks IR47. 2. This was provided in the DAR Addendum, Appendix D, section 4.2. Other than name changes, no other changes are considered necessary.</p>	
19	Effects Assessment-Traditional Harvesting DAR Section 7.2.1	<p><b>Comment</b> The DAR (Appendix 7, p83) indicates that the measureable parameter for Project-related disturbances is "the number of direct human encounters with dangerous wildlife, number of reports of possible wildlife attraction and habituation to the Project, and overall Project and non-Project related traffic". It is unclear to the Review Board how any of these metrics would effectively measure disturbances including, for example, avoidance or altered movement. With the listed metrics, CanZinc risks misinterpreting avoidance or altered movement for effective mitigation of impacts.</p> <p><b>Recommendation</b> Please either describe in detail how these measureable parameters would effectively capture potential effects to harvested species due to avoidance or altered movement, or provide alternate parameters that CanZinc will measure to adequately quantify these responses.</p>	<p><b>May 5:</b> The DAR is referenced whereas the Vegetation and Wildlife &amp; Wildlife Habitat assessment report was updated in the DAR Addendum, and further describes how measurable parameters are used to monitor effects. The updated report continues to outline these same measurable parameters for multiple potential effects. These measurable parameters are to be used in combination with the wildlife monitoring programs (outlined in Section 10.0 of the Wildlife and Wildlife Habitat, Vegetation report). Traffic volumes, road users, waste management issues (site attraction), and other measurable parameters, together with the reconnaissance surveys identified in the draft Wildlife Mitigation and Monitoring Plan, can form a better understanding of Project-related effects and can more easily identify where adaptive management strategies are needed for specific Project-related activities.</p>	
20	Effects Assessment-Traditional Harvesting DAR Section 7.2.1	<p><b>Comment</b> The DAR (Appendix 7, pp82-83) suggests that wildlife may be disturbed by project activities with energetic consequences to their health and survivability. It then describes the likelihood of these effects on wildlife, considering only a "small number of individual harvest animals [that] may be expected to be present in the vicinity of the all season access road and associated infrastructure year round". This assessment appears to omit the disturbance and energetic effects on wildlife that are either migratory or have a habitat range that is only partially within the vicinity of the all season access road.</p> <p><b>Recommendation</b> Please describe the anticipated impacts on all harvested species from disturbance and displacement caused by the project. This description will include but is not limited to a discussion on impacts to migratory species or those whose habitat range is only partially (either temporally or geographically) within the vicinity of the all season access road.</p>	<p><b>May 5:</b> See Tetra Tech EBA document attached to Board IR16.</p>	
21	Effects Assessment-Traditional Harvesting DAR Section 7.2.1	<p><b>Comment</b> The DAR (p86) identifies that commitments made during the environmental assessment for the winter road, including washing trucks, careful handling of concentrates and monitoring of road bed sediment concentrations are sufficient to avoid potential effects to harvested wildlife as a result of contamination. The Review Board wishes to highlight that monitoring, while important and worthwhile, is not in and of itself mitigation. Monitoring can only serve to aid mitigation if it leads to concrete action upon determining that an adverse trend is occurring. Moreover, CanZinc states on DAR p89 that "since no residual effects are anticipated, and the natural levels of heavy metals are known to occur in harvestable species at varying concentrations across the north, no measurable parameter for Project-related effects to the consumption quality of harvest species is proposed". This implies that results from the proposed monitoring (of sediment concentrations) would not be linked to (a) further monitoring for effects to harvested species or (b) action to limit these potential effects. Additionally, since no direct or indirect measurements of contamination to harvested species are proposed, CanZinc has no way of verifying if EA predictions are true.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please identify additional mitigative actions that could be taken if monitoring results from road bed sediments indicate that contamination is occurring as a result of road operations.</li> <li>2. Describe direct or indirect ways of verifying EA predictions that road activities do not lead to increasing contaminant levels in harvested species near the project site.</li> </ol>	<p><b>May 5:</b> 1. If monitoring results from road bed sediments indicate that contamination is occurring as a result of road operations, this will prompt investigation as to why this is occurring. It will suggest that there has been a failure in the concentrate load-out process, i.e. trucks are externally clean, including tires, and no concentrate is being lost en route from the containers/covered bags. The nature of the monitoring results should be indicative. For example, if it is a tracking issue, concentrations should be highest near the Mine. If it is a truck box loss issue, elevated concentrations should occur randomly along the route. Investigations will continue until the source of loss is defined and corrected. 2. The pathways for increasing contaminant levels in harvested species are assumed to be via soil and/or vegetation. CZN has proposed to monitor these. If no increases are detected in soil and vegetation, a pathway to harvested species would not exist. Therefore, this monitoring would verify EA predictions. The point Tetra Tech EBA was making is that metals levels are already elevated in some species, that these vary across the north, and that practically, it would be difficult to</p>	


			undertake meaningful direct monitoring of harvested species metals levels. ENR have a tissue monitoring program whereby harvesters provide samples, but this doesn't always occur, and if it did, it may not be relevant to the road corridor.	
22	Assessment Methodology DAR Appendix 7, Section 3	<p><b>Comment</b> In describing its effects assessment methodology for a number of valued components including species at risk, wildlife and vegetation, CanZinc defines the thresholds that delineate low, moderate and high criteria of effects (e.g. duration, geographic extent, magnitude, etc.) (Table 3-1). It also defines low, moderate and high levels of overall significance (Table 3-2). However, it does not describe how these two levels of assessment are related to each other. For example, Table 6-4 "Project Effects on Predicted Habitat Fragmentation and Movement", identifies the level of effect (low, moderate or high) for each of the effect criteria for a number of species. Despite there being many more moderate and high rated effects than low for individual species, the overall significance was characterized as low. It is unclear to the Review Board what methodology was used to derive overall significance from effects on individual species. It is also unclear if and how this methodology was used consistently among effects assessments.</p> <p><b>Recommendation</b> Describe the methodology that connects the individual species effects assessments with the overall significance determination for each assessment in Section 6 of Appendix 7. Confirm that a consistent methodology to derive overall significance was used for each effects assessment in this section.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to Board IR16.	
23	Assessment Methodology DAR Appendix 7, Section 3	<p><b>Comment</b> There is a lack of clarity and consistency regarding whether or not the assessment tables in Section 6 of Appendix 7 are representative of residual effects (i.e. after mitigation is applied) or unmitigated effects. For example, the preamble to Table 6-4 clearly indicates that the effects listed are predicted based on "adherence to the [proposed] mitigation" (Appendix 7 p103). In comparison, the preamble to Table 6-5 chronologically follows potential mitigation measures, but simply states that "predicted effects ...are summarized in Table 6-5". The former example, therefore, clearly points to residual effects while the latter is unclear. The assessment methodology described on p 14 of Appendix 7 says that for effects that are determined to have moderate or high overall significance, "specific management measures or plans are necessary" and "future study or monitoring is necessary to supplement the baseline data, and to be used for refining a management strategy and planning", respectively. Therefore, if the effects tables in Section 6 of Appendix 7 represent residual effects, then all of the effects that are identified as having either moderate or high levels of overall significance require additional mitigation or monitoring to reduce them to a low significance level.</p> <p><b>Recommendation</b> Please clearly identify if the effects assessment tables in Section 6 of Appendix 7 are representative of residual or unmitigated effects. If they represent residual effects, please outline what additional mitigative actions can and will be taken in order to reduce any moderate or high significance effects down to a level of low significance.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to Board IR16.	
24	DAR Section 4.5 Fish and Aquatic Habitat	<p><b>Comment</b> ToR Section 5.1.5.4 requires the developer to describe habitat requirements for each life stage. While section 5.4 of the DAR describes in rough terms some life stage requirements for some species (for example, that mountain whitefish spawn in Prairie Creek, or that bull trout and mountain whitefish are fall spawners while arctic grayling are spring spawners), no other information on life cycles or other species was located by the Review Board. The DAR Addendum concordance table indicated that this information may be found in DAR Addendum, Appendix C: Section 15.2, Appendix B, Section1, and Attachment A however this section was not locatable.</p> <p><b>Recommendation</b> Please clearly identify where additional information on habitat requirements for each life stage of fish species can be found in the materials provided by CanZinc to date. If it has not been described, please provide the information as requested in the Terms of Reference.</p>	<p><b>May 5:</b> See Hatfield document attached.</p> <p><b>May 5:</b>  Attachment</p>	
25	Fisheries and aquatics ToR section 5.1.5.5	<p><b>Comment</b> ToR Section 5.1.5.5 requires CanZinc to describe local and regional abundance, distribution and use of habitat types including aquatic and riparian vegetation. DAR Addendum, Appendix C, Attachment A noted "good habitat cover provided by large woody debris", that "the creek will likely have the same species at the Tetcela River since there were no observed obstructions to fish movement" and that Dillon (2005) had observed arctic grayling juveniles holding in a side channel pool. Conversely, information provided in Attachment B for this location indicates that no fish had been documented in this stream. Additionally, this table indicates that the habitat present at this crossing is "not unique" despite it being the only crossing described that featured possible spawning, migrating and rearing habitat.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please confirm which fish species have been identified at the Tetcela River Crossing at km 87.2 and during which months.</li> <li>2. Please also clarify why this location was not classified as having unique habitat, despite it being the only site assessed that featured possible</li> </ol>	<p><b>May 5:</b> 1. The only fish confirmed by sighting at the 87.2 crossing is Arctic grayling. However, as noted in Attachment A, there is no obstruction to movement from the main channel, therefore it is reasonable to assume that the same species found in the main stem, by season, would also be present at 87.2 in the same seasons. As such, Attachments A and B are consistent. 2. The author means that the habitat is not unique to the crossing location only. Similar habitat exists upstream and downstream.</p>	


		spawning, rearing and migrating habitat.		
26	Fisheries and aquatics ToR Section 5.1.5.6	<p><b>Comment</b> CanZinc was required to describe existing baseline contaminant concentrations in harvested fish species that may change as a result of the all season road and as available. In its response (DAR Addendum, Appendix C, Attachment C), CanZinc provided a data table of select fish tissue concentrations from several past studies dating back to 1981. While this data is appreciated, it is not useful for determining background condition averages or ranges. This information is required in order to assess the magnitude and significance of future potential impacts. It is also essential in order to verify EA predictions.</p> <p><b>Recommendation</b> Please provide summaries of the data provided in DAR Addendum Appendix C Attachment C. Include a description of statistically appropriate central tendency, trends, and range of concentrations by species and location. This information is conducive to presentation in graphical format.</p>	<p><b>May 5:</b> In the opinion of our fisheries biologist, the utility of fish tissue information is low for the road. The road is not a single continuous discharge point (i.e. effluent), and therefore it shouldn't be treated as one. Gathering a large amount of baseline tissue concentration data will be very expensive and provide little benefit. The probability of a significant impact as a result of a spill or natural erosion is very small. Concentrate is in a form that is not readily bioavailable, and any spill would be cleaned up. Metals would not be expected to build-up in the tissues of fish. A spill of diesel would also not lead to build up in tissues. Therefore, we see no point in providing the requested information. Further, other than for Prairie Creek, the data (for Tetcela River) is insufficient to calculate summary statistics.</p>	
27	Fisheries and aquatics ToR Section 5.1.5.7	<p><b>Comment</b> CanZinc was required to describe any known issues with respect to health of harvested fish species. Specifically, a discussion of parasites, disease and condition was required. In its response (DAR Addendum, Appendix C, Attachment D), CanZinc provided a data table of select fish health indicators (including sex, fork length, weight and condition) from several past studies dating back to 1981. While this data is appreciated, it is not useful for determining background condition averages or ranges, or for understanding growth patterns for species present in the Prairie Creek Area. This information is required in order to assess the magnitude and significance of future potential impacts. It is also essential in order to verify EA predictions. Moreover, some specific information requested in the ToR (e.g. parasites and diseases) were not included.</p> <p><b>Recommendation</b> Please provide summaries of the data provided in DAR Addendum Appendix C Attachment D. Include a description of statistically appropriate central tendency, trends, and range of health factor by species and location. This information is conducive to presentation in graphical format. Please also include a discussion of existing levels of parasites, disease and condition. If this data are not available, please describe how and when it will be collected</p>	<p><b>May 5:</b> Similar to tissue data, our fisheries biologist believes there is little utility in fish health data. The EA requirements for an all-season road should not have to meet the requirements of a continuous discharge. Being able to use the baseline data in a meaningful way to assess potential effects is also unlikely. Since the metals in concentrate are not readily bioavailable, measurable effects on fish health are unlikely. In short, fish health indices have very little utility in the assessment of potential effects, and therefore there is no point in providing the requested information. Also, the available fish health data is limited.</p>	
28	Fisheries and aquatics DAR Addendum, App C, App B, Section 9 and Attachment D DAR Addendum, App C, and Attachment E	<p><b>Comment</b> The information provided in the DAR and supplementary materials mostly provide baseline data on fish health metrics from past studies. The discussion of effects is limited to two bullet points broadly describing that significant soil erosion or spill of material may affect fish health through changes to physiology, behaviour or through effects to lower trophic levels respectively. The effects assessment matrix in DAR Addendum, App C, and Attachment E, however, only includes pathways of effects that may impact fish populations and not fish health. Moreover, the effects assessment matrix does not include site specific effects or potential effects at particularly sensitive locations (for example, standing ponds of water in fish bearing rivers during low flow conditions).</p> <p><b>Recommendation</b> Please describe all potential effects pathways of impacts of the road on fish health. Examples of pathways not currently considered include, but are not limited to, the effects increased sedimentation on survival and emergence and development rates of fish larvae and eggs, gill damage, stress response, reduced resistance to disease and feeding rates and the potential chronic and acute effects of spills on fish health. If these potential effects are excluded from assessment, please explain this exclusion.</p>	<p><b>May 5:</b> See Hatfield document attached to Board IR24.</p>	
29	Fisheries and aquatics DAR Addendum App C Section 8.0 and 9.0	<p><b>Comment</b> In the DAR Addendum Appendix C Sections 8 and 9, CanZinc provides its views on why additional baseline information on fish tissue chemistry and health are not required. However, the Review Board is of the opinion that obtaining relevant and current baseline data on these subjects is required in the development of future monitoring programs, in order to separate effects of the road from effects of the mine discharge, and in order to quantify and understand future unanticipated adverse impacts.</p> <p><b>Recommendation</b> Will CanZinc commit to collecting baseline on fish tissue chemistry and fish health data at key locations along the length of the proposed road alignment prior to construction, in order to facilitate the updating of its Aquatic Effects Monitoring Program?</p>	<p><b>May 5:</b> Firstly, we feel it is inappropriate to pose a pointed question such as this. Secondly, comments on IR's 26 and 27 above indicate that the data from the suggest work would have little utility. Thirdly, fish tissue and fish health studies are likely to have detrimental effects on fish populations that have low productivity. A well-designed study will likely pose a greater risk to fish populations than a spill. Fish in creeks along the road are generally too small for tissue plug sampling, meaning that most sampling will have to be lethal. Similarly, most health indices also require a lethal sampling program. Fourth, the comment</p>	


			to this recommendation refers to separating the effects of the road from effects of the mine discharge. What we would consider amenable is documenting the tissue metals content and health of sculpins in Funeral Creek and Prairie Creek. The existing AEMP for the Mine includes an effects monitoring and bull trout occupancy survey, and adding tissue metals to a common species is little additional effort without significant adverse impact.	
30	Wildlife DAR Addendum App E, Section 6.3	<p><b>Comment</b> DAR Addendum Appendix E pg. 96 states that there will be no direct loss of beaver habitat from the project and that no effects relating to habitat fragmentation are expected. However, DAR section 8.4 p169 states water withdrawal required for road maintenance will result in extraction of lake water (less than 10% of lake volume) and that beavers are sensitive to water level changes, as it may lead to pond abandonment.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please explain the apparent discrepancy between the statement that no direct loss of habitat or habitat fragmentation will occur as a result of the project and the need for lowering water levels through water withdrawal in water bodies that may be occupied by beavers.</li> <li>2. Please also explain why lowering water levels in lakes along the road route by up to 10% of lake volume could not result in habitat fragmentation associated with lowered water levels, especially in the case of small ponds or water bodies connected by shallow streams.</li> </ol>	<p><b>May 5:</b> 1. Extraction of water in winter was assessed in EA0809-002, so we will comment on summer extraction. Extraction of up to 10% of pond volume in summer does not mean that water levels will be lowered. The extraction would occur over the whole summer period, and inflow of surface and groundwater, as well as incident precipitation, will replenish the lost water. Water levels are expected to be remain the same. In any event, beaver presence was only noted in one lake previously identified for water supply, at Km 115 on the winter road. This lake is now well off the proposed road alignment, so is unlikely to be used in summer. 2. Answered in 1. above.</p>	
31	Species at risk DAR Addendum App E Section 7.1	<p><b>Comment</b> The Species at Risk Act Section 79(2) stipulates that all environmental assessments must "identify the adverse effects of the project on the listed wildlife species and its critical habitat". However, all three Myotis (bat) species in the project area, which are listed as Endangered under COSWEC, were excluded from effects assessment within the bounds of the Nahanni National Park Reserve. Table 7-1 explains this exclusion by noting that the road avoids karst habitat and due to a lack of population information. However, in some places (for example, km 56) the proposed road alignment is located within a few hundred meters of known karst formations.</p> <p><b>Recommendation</b> Please complete an assessment of effects on the three Myotis species potentially affected by the Project, as required in the Species at Risk Act.</p>	<p><b>May 5:</b> COSEWIC (2013) indicates that bats are most sensitive to effects during the winter. They also indicate that bats are not particularly sensitive to disturbances while overwintering, except if the activity is occurring directly at or within the hibernacula. Environment Canada agree with this. No adverse Project-bat interactions are expected since suitable hibernacula sites (caves in karst formations) are not present near the proposed route. The feature at Km 56 is a shallow pond, which may in fact not be a karst feature. Therefore, an assessment has already been completed, to the extent necessary. It is also worth noting that all season road operations will represent much less activity in winter than a winter road, and therefore the risk to bats is incrementally less.</p>	
32	Noise - detailed information about noise sources; DAR Section 11.4, DAR Addendum Section 6.4	<p><b>Comment</b> The DAR does not provide sufficient information for the Review Board to understand potential effects of noise from the project on the environment. The locations, timing (the start and end dates, time of day, season, etc...), duration (how long the sound is emitted) and magnitude (normal, peak, and cumulative decibel levels) of the sources of noise from the project during all its phases are not provided. For instance, information about noise from borrow sources should include their locations, time and duration they will be in operation and the cumulative noise they will generate from sources all sources such as: crushers, blasting, hauling and stockpiling material, and heavy equipment. This information is necessary to conduct an assessment of potential effects to valued components, including but not limited to caribou, bears, moose, birds, sheep and people. Please note that for this assessment, sources of noise include, but are not limited to: borrow sources associated with construction and operation (including all equipment present, blasting, and crushing), road construction (blasting, construction of bridges and other water course crossings), operations and maintenance activities (pumping of water for dust suppression, graders, heavy equipment), and the haul fleet (including a consideration of the use of engine breaks while under load and on grades).</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please provide detailed information about sources of noise from the project including, but not limited to: <ol style="list-style-type: none"> <li>1. their locations, timing (including, but not limited to, the start and end dates, time of day, seasonality etc.),</li> <li>2. duration (how long the sound is emitted), frequency and magnitude (including, but not limited to, normal, peak, and cumulative decibel</li> </ol> </li> </ol>	<p><b>May 5:</b> See Tetra Tech EBA document attached to Board IR16, Appendix A.</p>	

		<p>levels).</p> <p>2. Provide an assessment of how far this noise can travel until it reaches background for individual sources and for any combination of noise sources, such as multiple noise sources from a borrow source.</p> <p>3. Provide a consideration of how terrain, temperature, and weather may affect noise.</p>		
33	Noise - duration noise can be heard; DAR Section 11.4, DAR Addendum 6.4	<p><b>Comment</b> The duration that noise is emitted can greatly influence the effect it may have. For instance, how long will the sound from an individual haul truck be audible to a person or animal and what is interval between the audible noises from haul trucks? The DAR or DAR addendum does not appear to contain this information. Without this information an assessment of the effects of noise is not complete.</p> <p><b>Recommendation</b> Provide a time series analysis of noise from the project. In other words, estimate how long a valued component can hear noise associated with the project. For instance, how long would a person be able to hear a haul truck and what is the interval between being able to hear the noise from one haul truck until the noise from another haul truck is audible? This must include considerations of terrain, weather, peak sound emissions (use of engine breaks for instance), and time of year.</p>	<b>May 5:</b> See Tetra Tech EBA document attached to Board IR16, Appendix A.	
34	Dust emissions from borrow sources, effects to vegetation, water quality, fish and fish habitat.	<p><b>Comment</b> Emissions of dust from borrow sources and potential effects to vegetation and water quality do not appear to have been considered in the DAR or DAR addendum. Borrow sources can generate considerable amounts of dust which can negatively affect the environment including, but not limited to, vegetation, and water quality and fish habitat.</p> <p><b>Recommendation</b> Please provide an assessment of predicted dust emissions from stationary sources, such as borrow sites, to: vegetation, water quality, and fish and fish habitat. This will include a consideration of sensitive time periods, such as spawning times, egg and juvenile stages for fish; periods of low or no flow, and any other periods for increased vulnerability</p>	<b>May 5:</b> In Golder's air quality assessment (Appendix D of the DAR Addendum), fugitive dust generated from overburden removal, material handling, rock crushing and screening, compacting, grading, vehicular traffic (road dust) and air transport were estimated. By road phase, estimated dust emissions from operations were far greater than construction (2,609 tonnes/year versus 58.3 tonnes/year). The mitigation proposed for operations dust is to follow GNWT dust suppression guidelines, and by doing so, potential effects are "expected to be low" (p. 21). Golder say that the reason they excluded borrows from modelling in the work was that the construction phase was estimated to emit much less for a shorter period, and therefore the assessment of operational traffic on the road is a conservative analog for the construction phase of the project. Hence, there is no need or logic for assessing dust from borrows. In any event, the outcome would be the same, to follow GNWT suppression guidelines.	
35	Cultural and Heritage Resources – Cultural and spiritual sites and activities (DAR 11.9.2)	<p><b>Comment</b> In section 11.9.2 of the DAR, a grave site is identified a few hundred meters upstream of the Liard River crossing. More details on the proximity to the burial site to the development are required, including any indirect effects of the development, such as increased road access, to assess any impact to the burial site.</p> <p><b>Recommendation</b> Please describe how increased road access or project activities may affect the identified burial site near to the proposed Liard river ferry crossing and describe any mitigation that may be required.</p>	<b>May 5:</b> The NDDDB viewed road maps and determined that the grave site was a sufficient distance from the road. They did not specify the exact grave location. There is no reason to believe road activities would have any effect on the burial site. No one would have a reason to go there, and the site is inaccessible to road vehicles. Further, standard policy will be that personnel and contractors do not leave the road ROW, unless the activity is directly related to the project. No additional mitigation is considered necessary.	
36	Harvesting; DAR 5.2; DAR Addendum – Appendix B, Section 4	<p><b>Comment</b> Additional information on harvesting was sought in the DAR Addendum with respect to the type and number of species harvested and how harvesting activities may affect them. The updated concordance table lists an Appendix B, Section 4, but this section does not exist in the submitted package.</p> <p><b>Recommendation</b> Provide Appendix B, Section 4 and the requested information.</p>	<b>May 5:</b> .	
37	Tourism; DAR 5.5; DAR Addendum, section 20.1	<p><b>Comment</b> The DAR provides no discussion of the tourism economy in the region, or by community. Information on the value of tourism to the regional economy (e.g. amount of revenue from guiding, outfitting, tourism, and other tourism related ventures) is necessary to determine the impact of the tourism locally and assess what effect the project might have on tourism, tourists or those employed in the tourism industry.</p> <p><b>Recommendation</b> Provide a list of the different tourism industries in the region, the number of people employed in tourism and tourism-dependent jobs (according to</p>	<b>May 5:</b> We don't see the point of this. The Project will have minimal impact on the existing tourism, but has the potential to stimulate additional tourism because of the improved access. We know of one year when a few tourists visited the Ram Plateau area, which we noted. We also said that charters from Fort Simpson	



		gender, community and region), the revenue generated by each tourism industry and its overall value to the local and regional economies.	going to the central NNPR may overfly the western end of the road which already exists to all season standards. We discussed the Liard River crossing and explained that barge crossings are relatively rapid and would not hinder canoe/raft trips ending at Lindberg Landing. Other than that, the all season road will have no effect on tourism. Therefore, further research into tourism isn't going to identify any additional effect, and so isn't necessary.	
38	Tourism DAR 5.5; DAR Addendum, section 20.1	<b>Comment</b> Table 20-1 provides a detailed list of Nahanni National Park Reserve visitation statistics. The dollar value of these trips to the park and to local and regional economies is unclear. <b>Recommendation</b> Describe the direct and indirect economic value of Nahanni National Park Reserve visitors to the Nahanni National Park Reserve and to the local and regional economies.	<b>May 5:</b> Again, we don't see the point of this. NNPR activities clearly affect Fort Simpson in terms of charter and schedule flights and hotels, but the all season road wouldn't alter that. NNPR activities have relatively little affect on Nahanni Butte, other than a few seasonal jobs and river trips occasionally stopping for food or lodging in summer, and again the all season road wouldn't alter that, but could stimulate much greater tourism if the Band desired (controlled access).	
39	Baseline Regional and local Economies; DAR 5.5; DAR Addendum, section 20.2	<b>Comment</b> Numbers provided in this sections of the DAR and DAR Addendum are outdated. More current data is available from NWT Bureau of Statistics at: <a href="http://www.statsnwt.ca/">http://www.statsnwt.ca/</a> <b>Recommendation</b> Do the most recent statistics, released in 2015, affect the predictions made in the DAR?	<b>May 5:</b> The 2015 numbers present essentially the same picture as in past years. Population data are much the same e.g. Nahanni Butte, 97 residents in 2014, 94 in 2015. Data on traditional activities is still from 2013. Newer data is not available. Labour force data for 2015 are an update since 2009. Participation, unemployment and employment rates, respectively, are slightly different e.g. Nahanni Butte (50 vs 53.3, 13 vs 18.4, 44.6 vs 43.5) and Fort Simpson (68.9 vs 72.9, 12.2 vs 10.5, 60.5 vs 65.3). Therefore, assumptions made in the DAR do not change.	
40	Education, Training and Skills; DAR 5.1	<b>Comment</b> Statistics provided in this section of the DAR statistics are outdated. More current data is available from the GNWT. <b>Recommendation</b> Do the most recent statistics, released in 2015, affect the predictions made in the DAR?	<b>May 5:</b> Re 2014 aboriginal educational attainment in the NWT, total population has increased since 2006 (16,837 vs 14,465), numbers attending high school but not obtaining a diploma are about 10% less (7,195 vs 7,920), however numbers obtaining at least a diploma show a marked increase (9,195 vs 6,545). In Nahanni Butte, % with high school diploma in 2014 dropped markedly to 15.5, while % increased significantly in Fort Simpson to 73.5. Fundamentally, these numbers do not alter previous assumptions, which are that: Fort Simpson host the largest available labour pool and are more likely to benefit from Mine operations in terms of jobs than other communities; and, focussed training is required to maximize job potential in Nahanni Butte.	
41	Cultural and Heritage Resources – Cultural and spiritual sites and activities (DAR 11.9.2)	<b>Comment</b> The ToR sought relevant research pertaining to cultural and spiritual sites and activities, including that conducted by CanZinc and its consultants, the Nahanni Butte Dene Band Traditional Knowledge study, and any other relevant materials. This information was not provided in the DAR. To determine the adequacy of CanZinc's assessment on these valued components, the Review Board needs to understand what specific previous efforts have been made to identify cultural and spiritual sites and whether they address the concerns arising from an all-season road versus a winter road. <b>Recommendation</b> Distinguish between past baseline information and community engagement about the Project region and winter road route (EA0809-002) Describe engagement activities specific to cultural or harvesting concerns of an all season road (EA1415-01).	<b>May 5:</b> See document attached. <b>May 5:</b>  Response to MVEIRB IR41	
42	To the GNWT: Capacity of existing	<b>Comment</b> To the GNWT: The DAR stated that Highway 7 is "generally under-utilized," has the capacity to support increased usage, but also has road bed issues.	<b>Mar 11:</b> This is the response from GNWT:	

	infrastructure; DAR section 6.6, Existing Infrastructure and Facilities	<p>The DAR does not explicitly state what the capacity of Highway 7 is and if the proposed traffic may result in exceeding that capacity or may exacerbate the existing road bed issues.</p> <p><b>Recommendation</b> Please define the capacity of Highway 7 and any changes that may result to Highway 7 as a result of the project. Please also describe the capacity of the infrastructure adjacent to Highway 7 that will likely also be used, such as fuel stations or highway rest-stops.</p>	<p>The Liard Highway (Highway No. 7) is currently classified as an Arterial Class RAU 90 posted at 80 km/hr. It is currently a low volume road with seasonal weight bans in the spring. The Department of Transportation (DOT) will determine the amount of rehabilitation and/or reconstruction that is required to be done on Highway No.7 once the developer (CZN) has provided a detailed description of the volume of mine vehicle traffic, the type of vehicle traffic, loading of vehicles (axle weight) as well as the traffic flow schedule (by time of year) to the Design and Construction Division, which DOT recommends should be done as soon as possible. The existing pull-offs/rest-stops are located at km 0 (border BC/NT, km 38 - Liard access Road, km 145 - Day use area, km 197 and km 253. There is a fuel station in Fort Liard that sells gasoline and diesel.</p>	
43	To the GNWT: Impacts on Existing Transportation Infrastructure – Highway 7 improvements; DAR 11.11 and DAR Addendum – Appendix A	<p><b>Comment</b> To the GNWT: The DAR states that the mine traffic will "catalyze" road improvements by the GNWT, which will mitigate stated likely impacts related to dust, safety, and the possibility of accidents and spills. The DAR further states that Highway 7 and other roads are currently underutilized and can accommodate the anticipated increases in traffic, which are statistically significant. The Review Board seeks further input from CanZinc and the GNWT to support these claims.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Does the GNWT support the statement in the DAR that mine traffic will catalyze Highway 7 improvements by the GNWT? If so, why. If not, why not?</li> <li>2. Will GNWT upgrade Highway 7 if the all-season road and Prairie Creek Mine are in operation?</li> <li>3. Please describe any commitments the GNWT has made to improve Highway 7.</li> <li>4. Describe how the GNWT's operation and maintenance plans for Highway 7 would differ if the all-season road and mine proceeds from the current operations and maintenance plans.</li> </ol>	<p><b>Mar 11:</b>  <b>This is the response from GNWT:</b></p> <hr/> <p>1. GNWT supports the statement in the DAR that mine traffic will catalyze Highway No. 7 improvements within the available resources of the GNWT. DOT is willing to work with the CZN to identify additional funding to address Highway No. 7 improvements, maintenance, rehabilitation and reconstruction needs, and enhancements of the Nahanni Butte access road. DOT recommends that CZN file on the public registry as soon as possible any information relating to the development and operation of the Prairie Creek Mine and its anticipated transportation needs, as may be reasonably required for this purpose.</p> <hr/> <p>2. On August 24, 2012 the Prairie Creek Mine Project Transportation Collaboration Agreement was signed between the GNWT and CZN wherein the parties agreed that Highway No. 7 may need to be upgraded and enhanced to accommodate general public and mine project-related transportation needs. DOT is willing to work with CZN to identify additional funding to address Highway No. 7 improvements, maintenance, rehabilitation and reconstruction needs, and enhancements of the Nahanni Butte access road. DOT recommends that CZN file, on the public registry as soon as possible, any information relating to the development and operation of the Prairie Creek Mine and its anticipated transportation needs, as may be reasonably required for this purpose.</p> <hr/> <p>3. DOT is planning to invest available resources to conduct highway resurfacing, distress repairs, and drainage improvements in the high priority areas located on Highway No. 7 between km 38 - 130, during the period 2015 - 2019, as part of the funding from the Building Canada Plan.</p> <hr/>	

			<p>4. Due to the sensitivity of Highway No. 7 to heavy traffic, hauling during thaw/warm seasons would be subject to road conditions. DOT presently has in place a Road Preservation Plan that limits the weight of trucks traveling Highway No. 7 during the spring season. DOT is willing to work with CZN to identify additional funding to address Highway No. 7 improvements, maintenance, rehabilitation and reconstruction needs, and enhancements of the Nahanni Butte access road. DOT recommends that CZN file on the public registry as soon as possible any information relating to the development and operation of the Prairie Creek Mine and its anticipated transportation needs, as may be reasonably required for this purpose.</p>	
44	To GNWT : Access management options on GNWT lands; DAR Addendum Appendix E, Section 6.9	<p><b>Comment</b> To the GNWT: The proposed all season road is an industrial haul road with a single user. Other jurisdictions in Canada have legal mechanisms to control access by the public on single user industry roads in order to minimize safety risks and to protect wildlife by eliminating the risk over-harvesting of wildlife by the public. Since devolution of land and resource management responsibilities to GNWT, the territorial government is in a position to manage and regulate the use of new private industrial all season access roads.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please describe mechanisms for access control of the Prairie Creek Mine all season haul road, including but not limited to a lease (for part or all of route), license of occupation or other regulatory tool. Describe pros and cons of each access control mechanism and provide examples from the NWT and elsewhere in the North.</li> <li>2. Please describe options for a no hunting corridor along the access route.</li> </ol>	<p><b>Mar 11:</b>  <b>This is the response from GNWT</b></p> <hr/> <p>For the information of MVEIRB and all parties, GNWT is filing maps (attached) of the project area which show land administration and control and surface and sub-surface land withdrawals. Please note that this map is for illustrative purposes only. GNWT expects that access management/harvest management will be a key issue in this environmental assessment and is continuing to consider possible options for addressing it. We look forward to reviewing the responses to other IRs on this topic and to further dialogue with all parties as the EA proceeds.</p> <hr/> <p>1. The GNWT – Department of Lands is responsible for the management and control of public lands in the NWT, including managing and administering leases and other instruments. A lease is a tenure instrument which grants an exclusive right to occupy the leased land. Leases allow the GNWT to regulate activities on public land while protecting human health, property and the environment. Leases are legal agreements that benefit and protect occupants, land managers and taxpayers by providing security of tenure, environmental protection and taxpayer protection. GNWT does not view the granting of exclusive possession (i.e. leases) to linear lands as a sound land management practice, since sometimes the linear lands could be hundreds of kilometers in length. A lessee can control public access to the leased land. Lease holders can prohibit others, such as members of the public, including resident hunters and Aboriginal persons, from using, or crossing any portion of their leased land. A licence of occupation is a tenure instrument which grants a non-exclusive right to occupy the land. Because the right to occupy under a licence is non-exclusive, by definition, the licensee cannot control public access to the land. MVEIRB is correct that other jurisdictions in Canada have legal mechanisms to control access by the public on single user industry roads. The GNWT has reviewed its legislative and regulatory tools and has not identified any</p>	

such mechanisms in the NWT. GNWT has briefly reviewed examples from elsewhere in the North and contacted counterparts in other territories. To date GNWT has not identified any existing projects where the access control mechanisms in use could be applied to the Prairie Creek all-season road. For example, some projects and roads are located on land under the administration and control of Aboriginal Governments and Organizations pursuant to settled land, resource and self-government agreements, which is not the case for the Prairie Creek all-season proposed access road. As mentioned above, GNWT is continuing to consider options to address access management concerns and looks forward to dialogue with other parties as the EA proceeds.

2. The GNWT notes that IR44-2 is similar to an information request that was directed to the GNWT in March 2007 regarding CZN's Land Use Permit Application for the winter road to the Prairie Creek Mine (MV2003F0028). The 2007 response is attached for information; the response below is based on that response with updates to reflect the new Wildlife Act that came into force in November 2014. A letter from the Premier was also provided to the Chairman and Chief Executive of CZN on August 20, 2015 regarding management and control of use of the access road that outlined a similar response with respect to the possibility of implementing a "no shooting corridor." Elements of that letter have been used to inform the response below. GNWT posted the 2015 letter to CZN on the ORS on February 12, 2016 (GNWT IR 13).

The GNWT has the ability to limit shooting and/or hunting along roads for two separate reasons:


- The first reason would arise from concerns over public safety. For example the no shooting corridor along the Ingraham Trail was established by GNWT's Department of Municipal and Community Affairs under the Area Development Act. Sections 70(c) and 173(1)(z.36) of the Wildlife Act also allow for the development of regulations prescribing no-shooting areas for the purpose of public safety. However as there is no human habitation along the proposed Prairie Creek all season road, GNWT is of the view that human safety is not at risk in this case.
- The second reason is for wildlife management purposes. Under the Wildlife Act section 88(1) and 173(1)(z.49) and (z.53) regulations can be made designating areas of the NWT as management zones for the purpose of conservation and management of wildlife, and respecting the harvest of wildlife within those zones (e.g.

open/closed seasons, restricting number of wildlife that can be harvested, establishing quotas, requiring of tags to harvest wildlife, and restrictions based on species, size, age, sex or other characteristics). The creation of regulations for the Wildlife Act is a complex process and the GNWT would only begin this process if a wildlife management concern was clearly identified. The concern about wildlife management would either come from technical staff within the GNWT or as a request from local communities. If this were an undertaking conducted by government, it would require consultation with potentially adversely affected Aboriginal governments and organizations, as well as public and stakeholder engagement, with a view to reaching a workable solution.

Consultation on new regulations would require many months to complete, and possibly longer, depending on the outcome of the discussions. The timeframe for writing new regulations would be an additional three to four months, thus the entire process could take many months to several years. It needs to be noted that, depending on the issues raised in consultation, the recommendation at the end of the consultation process could be to not create a management zone.

CZN, for the most part, recognizes the potential impacts to wildlife from the road and provides a number of mitigation strategies to address them. These include:

- Implementing a Road Operations Plan (draft Road Operation Plan submitted to the MVLWB on April 5, 2012)
- Monitoring access through a check point manned by Nahanni Butte Dene Band Members (CZN draft Road Operation Plan s.3, page 4)
- Wildlife monitors on the road equipped with radios. 'The monitors will observe and record unauthorized road use, as well as any hunting fishing, camping or firewood harvesting activities'. (CZN draft Road Operation Plan, section 3, page 4)
- Maintaining a record of all wildlife sightings (draft WMMP s.5.3.2, page 10)
- Additional recommendations from the GNWT to reduce impacts to wildlife from the road:
- GNWT supports Dehcho First Nations' recommendation to use cameras to monitor road users (DFN IR# 20)
- Management of the volume of traffic by considering the pulsing of traffic rather than a continuous disturbance from a stream of traffic

			<ul style="list-style-type: none"> <li>• A mechanism for truck and other vehicle operators to report to each other wildlife sightings so that vehicle speed can be sufficiently reduced and proper attention given to passing wildlife</li> <li>• A protocol for operators to follow when wildlife is encountered that emphasizes that wildlife have the right-of-way and should be allowed free passage with minimal disturbance</li> </ul> <p>GNWT will continue to explore options to address wildlife concerns and looks forward to further dialogue with other parties as the EA proceeds.</p>	
45	To GNWT: Follow up and Monitoring; Data use and compatibility	<p><b>Comment</b> To the GNWT: The developer will conduct monitoring on water quality, soil metals concentrations, and wildlife types and numbers, and will "likely" submit monitoring reports to regulators and also upload data to CIMP's Discovery Portal</p> <p><b>Recommendation</b> Please clarify whether monitoring data (water quality, soil metals concentrations, and wildlife types and numbers) collected by CanZinc can and will be used by CIMP or other regional monitoring and research programs administered by the GNWT. Would CanZinc's described data be compatible with the GNWT, or its partners regional monitoring programs?</p>	<p><b>Mar 11: This is the response from GNWT:</b></p> <p>Monitoring data (water quality, soil metals concentrations, and wildlife types and numbers) collected by CZN may be used by the NWT Cumulative Impact Monitoring Program or other regional monitoring and research programs administered by the GNWT. Consistency in monitoring programs with other operators in the region is recommended to better enable comparisons of data and regional studies. It is recommended that CZN contact the NWT Cumulative Impact Monitoring Program as soon as possible for further information and to discuss how to integrate their monitoring data with other monitoring programs in the region.</p>	
46	To ECCC: Species at Risk; Boreal Caribou Recovery Strategy; DAR Addendum 4.3.2 Table 6-5 of DAR Addendum Appendix E	<p><b>Comment</b> To ECCC: Boreal caribou are protected under the federal Species at Risk Act. Boreal caribou are present along the eastern portion of the Prairie Creek All season access road.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Submit a copy of the 2012 Boreal Caribou Recovery Strategy.</li> <li>2. Describe how recommendations in the Boreal Caribou Recovery Strategy (2012) relate to this project.</li> </ol>	<p><b>Mar 11:  This is the response from ECC:</b> 1. ECCC released the "Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal population, in Canada" (the Recovery Strategy) on the Species at Risk Public Registry on October 5, 2012 (<a href="http://www.sararegistry.gc.ca/default.asp?lang=en&amp;n=24F7211B-1">http://www.sararegistry.gc.ca/default.asp?lang=en&amp;n=24F7211B-1</a>). As requested, a copy of the Recovery Strategy is provided with this submission.</p> <p>2. The recovery goal for boreal caribou is to achieve self-sustaining local populations in all boreal caribou ranges throughout their current distribution in Canada, to the extent possible. The likelihood of the self-sustaining population is based on two indicators: population trend and disturbance level within a boreal caribou range. Recovery is achieved for boreal caribou in the Northwest Territories range (NT1) by maintaining population and range conditions that support its self-sustaining status (the Recovery Strategy - Appendix F, Table F-1).</p> <p>Critical habitat necessary to achieve the recovery goal for boreal caribou, including Northwest Territory range - NT1 (the Recovery Strategy - Appendix J, Figures J-1 and J-2), is identified as:</p> <ul style="list-style-type: none"> <li>• the area within the boundary of each boreal caribou range that provides an overall ecological condition that will allow for an ongoing recruitment and</li> </ul>	

retirement cycle of habitat, which maintains a perpetual state of a minimum of 65% of the area as undisturbed habitat; and

- biophysical attributes required by boreal caribou to carry out life processes (see the Recovery Strategy - Appendix H, Figure H-1, Table H-1).

The nature of boreal caribou critical habitat is such that the precise location of the 65% undisturbed habitat within the range will vary over time. The habitat within a range should exist in an appropriate spatial configuration so that boreal caribou can move throughout the range and access required habitat when needed (i.e. connectivity). The key to this identification is achieving and maintaining an overall, ongoing range condition that allows for the dynamic habitat supply system with the biophysical attributes upon which boreal caribou depend, to operate. It is this dynamic habitat supply system that is the habitat condition necessary for the recovery of boreal caribou.

Activities resulting in the direct loss, degradation and/or fragmentation of boreal caribou critical habitat are likely to result in destruction critical habitat (Species at Risk Act Section 58 and Section 61).

The likelihood that critical habitat will be destroyed is increased if any one of these activities, or combination thereof, were to occur in such a manner, place and time, that after appropriate mitigation techniques any one of the following were to occur:

- compromises the ability of the NT1 range to be maintained at 65% undisturbed habitat;
- reduce connectivity within the NT1 range;
- increase predator and/or alternate prey access to undisturbed areas; or
- remove or alter biophysical attributes necessary for boreal caribou.

Determination of whether an activity is likely to result in the destruction of critical habitat within the NT1 range will be facilitated by a range plan. For example, a range plan would identify activities that are likely to result in direct loss, degradation, and/or fragmentation of habitat, relevant to specific local circumstances. Any development that does not align with the range plan would be considered an activity likely to destroy critical habitat.

Mitigation of the adverse effects on boreal caribou that may result from the Canadian Zinc - Prairie Creek All Season Access Road, could include different techniques. These techniques include avoiding destruction of undisturbed habitat or biophysical attributes necessary



			<p>for the species to carry out life processes, reducing noise or pollution, or minimizing disturbance by adapting its shape or adjusting the timing of the disturbance. Table I-1 in Appendix I of the Recovery Strategy provides examples of considerations and possible mitigation techniques when planning development within a boreal caribou range, including NT1 range.</p> <p>ECCC has a national role to play in the conservation and recovery of Species at Risk in Canada, as well as responsibility for management of birds described in the Migratory Birds Convention Act (MBCA). The Government of the Northwest Territories (GNWT) is the responsible management authority for boreal caribou and is also currently leading the development of a range plan for the species. Accordingly, the GNWT should be consulted to identify other appropriate mitigation and/or monitoring measures to minimize project effects to boreal caribou.</p>
47	To Parks Canada: Access management inside Nahanni National Park Reserve; DAR Addendum Appendix E Section 6.9, 7.11, 7.12	<p><b>Comment</b> To Parks Canada: Parks Canada is a regulator in Nahanni National Park Reserve. Parks Canada currently manages and regulates all season road access into Nahanni National Park along the Howard's Pass Access Road, north of Cantung. Understanding existing access control within the Park at other locations will help Parties to understand potential mitigation options for the Prairie Creek all season road project.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please describe existing access control techniques currently being implemented for the Howard's Pass Access Road in the Nahanni National Park Reserve.</li> <li>2. Please describe access control mechanisms proposed for the Prairie Creek all season road at the Nahanni National Park Reserve boundary.</li> <li>3. Please describe how Parks Canada will monitor and enforce use of the road in Nahanni National Park Reserve.</li> </ol>	<p><b>Mar 11: This is the response from Parks Canada</b></p> <p>1. Selwyn Chihong Mining Ltd. (SCML) financed all construction activities under existing permits to rehabilitate the Howard's Pass Access Road (HPAR). The project was completed in late 2014 providing all season access from the Nahanni Range road to their mining leases in Howard's Pass. This was the first operational road in the Nahanni National Park Reserve expansion area and Nááts'ihch'oh. Our primary guidance on managing the sections of the road in the park reserves is driven by our statutory/legislative requirements, consultations with our Aboriginal cooperative management partners, coordinating compliance monitoring and permitting with adjacent land regulators, and our positive working relationship with SCML.</p> <p>To date Parks Canada has constructed a boundary sign and gate at km 14 of the HPAR on the southern park boundary. The gate is not locked and remains open. It serves primarily as a tool to manage road access in cases when the road is not safe for passage e.g. construction activities, washouts, slides, avalanches and/or avalanche control activities. The boundary signage clearly indicates that there is no hunting or ATV access in the park and that visitors are required to register with Parks Canada when they enter and leave the park. These provisions do not apply to aboriginal persons in pursuit of traditional activities. Parks Canada consults with SCML in permitting visitor access on the road to ensure appropriate risk management is in place. This may include general cautions and safety messaging, or special conditions for activities on the road e.g. carry communications equipment, avoid parking in specific areas, limiting access near construction locations, limiting access during sensitive wildlife periods etc...</p>



			<p>2. It is presumed this question remains within the context of the HPAR and will be addressed in that context. The Nahanni National Park Reserve Nah?a Dehé Management Plan (2010) provides very broad policy guidance on road access and travel in Nahanni. Long term objectives for the road in the park must fit within Parks Canada's legislated mandate for ecological and cultural integrity, and visitor experience. These will be important considerations for developing long term objectives for the road which requires detailed discussions with the developer/proponent, our First Nations partners, stakeholders and other government regulators. These discussions have not occurred, however Parks Canada will participate in such future discussions when appropriate.</p> <p>3. Parks Canada staff work closely with SCML to coordinate regular and periodic compliance inspections on the HPAR. A designated Parks Canada law enforcement unit conducts patrols on the HPAR and will also respond to reports of illegal or suspicious activity in the park reserves. These operational practises will also apply should the Prairie Creek access road be constructed.</p>	
48	To Parks Canada: Wilderness quality and Long-term changes to Nahanni National Park Reserve; DAR Volume 1, Section 10.11 and 10.12 p226; DAR Addendum, Appendix E, Section 7.11 p196-197	<p><b>Comment</b> To Parks Canada: Approximately half of the Prairie Creek all season access road crosses the Nahanni National Park Reserve. CanZinc suggests in its DAR that the all season access road may facilitate increased tourism into the Nahanni National Park Reserve.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please submit the current version of the Nahanni National Park Reserve Management Plan and relevant regulations. Does the upgrade to an all season road conflict with the current management plan? If so, how?</li> <li>2. Are there long-term objectives for areas in the Nahanni National Park Reserve along the proposed all season road alignment? If so, what are they?</li> <li>3. How will Parks Canada address requests for use of the proposed all season road by outfitters, tourists and the general public into Nahanni National Park Reserve?</li> </ol>	<p><b>Mar 11: This is the response from Parks Canada:</b></p> <p>1. The Nahanni National Park Reserve Nah?a Dehé Management Plan (2010) is publicly available in pdf format on the federal government website: <a href="http://www.pc.gc.ca/eng/pn-np/nt/nahanni/plan/plan2.aspx">http://www.pc.gc.ca/eng/pn-np/nt/nahanni/plan/plan2.aspx</a> Authorities for issuance of permits for the roads comes from section 41.1 of the Canada National Parks Act. The CNPA allows Parks Canada to issue permits to Canadian Zinc (CZN) and SCML for the purposes of mining access roads and does not specify winter or all season. The management plan must be consistent with the CNPA.</p> <p>2. The policy direction in the management plan was based on a winter road context with regards to access. Should an all season road be permitted this policy direction will need to be revisited. Future policy development for long term objectives for the Prairie Creek all season road will follow the same strategy outline in our response to IR #47-2.</p> <p>3. Parks Canada will work with Aboriginal cooperative management partners, stakeholders, other government departments and Canadian Zinc in developing appropriate visitation and public access strategies for the Prairie Creek access road. Parks Canada intends to provide consistency in policy application for both the HPAR and Prairie Creek access roads.</p>	
Mackenzie Valley Environmental Impact Review Board: Sachi De Souza				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response

1	concordance table	<p><b>Comment</b> As per Terms of Reference (ToR) item 2.4, CanZinc is required to provide a concordance table to assist with the review of the DAR. Item 2-Summary Materials of the Adequacy Review identified deficiencies with the concordance table provided by CanZinc. However, the concordance table that CanZinc provided with the DAR Addendum also contained problems. Examples include:</p> <ul style="list-style-type: none"> <li>• ToR section 8, item 5: the concordance table includes a reference to DAR Addendum Appendix F, pgs 11 – 12. It is actually pg 14 and is also referenced in DAR Addendum Appendix A section 2.13.</li> <li>• ToR section 8, item 2: concordance table includes a reference to Appendix A section 2.3 and Appendix F. It is actually within Appendix A section 2.13 and Appendix F pg 14.</li> <li>• ToR section 5.1.1 item 1: concordance includes a reference to DAR Addendum Appendix A (section 2.2) and Appendix F (section 2.7). The section in Appendix F is actually 2.2.</li> <li>• ToR Section 9, Potential Accidents and Malfunctions, item 7. References App C which appears to be unrelated to the topic. The Review Board assumes that the reference should be DAR Addendum, Appendix A, which has an Appendix C.</li> </ul> <p><b>Recommendation</b> CanZinc must prepare a complete, accurate and detailed concordance table of all information provided in the DAR, DAR Addendum and supplementary materials. This is necessary to facilitate the efficient and thorough review of materials by parties and the Review Board. In order to expedite this review, CanZinc must submit this concordance table to the Review Board for posting on the public registry within two weeks of when the Review Board issues of the adequacy statement..</p>	<p><b>Jan 25:</b> See letter attached. <b>Jan 25:</b> See attached letter - concordance table</p>	
2	Clarification of project description and design (DAR section 6.3.2, DAR Addendum Appendix A (All North))	<p><b>Comment</b> In the DAR (section 6.3.2), CanZinc stated that it may construct Phase 1 of the all-season road (from the mine, east to the Tetcela Transfer Facility) first. If this is the approach taken, "the TTF would be enlarged from the version supporting winter road haul operations...to accommodate storage of all the concentrates..." CanZinc also stated that both phases could be constructed concurrently, subject to financing. In Appendix A of the DAR addendum, prepared by All North, the construction approach (see Table 4 of the report) was described as taking three years and commencing at the eastern end of the proposed road, closest to the Liard River. The construction of the road would begin at the eastern end and progress west, towards the Prairie Creek Mine, and would not be completed using the Phase 1 and Phase 2 approach. A clear understanding of the construction timing is necessary to ensure parties and the Review Board clearly comprehend what the project is and understand what the potential effects of construction may be on the environment.</p> <p><b>Recommendation</b> The developer needs to clarify the preferred scenario for road construction within two weeks of the issuance of the Adequacy Statement.</p>	<p><b>Jan 25:</b> See letter attached. <b>Jan 25:</b> See letter attached - clarification of project description</p>	
3	Terrain mapping summary report - clarification of stable vs unstable areas	<p><b>Comment</b> In the Mapping Summary Report prepared by Tetrattech, polygons were described as stable or unstable. A summary table describing the terrain attributes used to assign the categories was not provided.</p> <p><b>Recommendation</b> The developer will please provide a summary table of the terrain stability class criteria as soon as possible.</p>	<p><b>Jan 25:</b> See letter attached. <b>Jan 25:</b> See letter attached - terrain mapping clarification p20-21</p>	

## Oboni Riskope Associates: Cesar Oboni

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	Riskope EA1415-01 Phase 1: Technical Review; 1.1 Information requests	<p><b>Comment</b>  Please see attachment</p> <p><b>Recommendation</b> Please see attachment</p>		
2	Oboni #1 General spill risks considerations and mitigations	<p><b>Comment</b> The DAR summarizes the spill risks possible mitigations as follows:</p> <p>... Spill risks can be effectively mitigated by good road design and construction, driving in good conditions and at safe speeds, and having suitable spill response procedures in place, including control points and response materials available at key locations along the road. DAR, PR55 Page 11. More specifically for spills DAR states, among many other points:</p> <p>...a supply of soda ash will also be kept at Control Points to neutralize an acid spill. DAR, PR55 page 29.</p> <p>...the exceptions are concentrates, sodium sulphide and ammonium nitrate, all of which are soluble to some degree and could cause a significant impact if spilled into, or subsequently dissolve into, water. DAR, PR55 page 192.</p>	<p><b>May 5:</b> See document attached. <b>May 5:</b>  Response to Riskope IR01</p>	

		<p>From Appendix 1 of the Allnorth's "Proposed Prairie Creek Mine Access Road" report we understand The road construction standards will be consistent with the normal operating approach and standards as defined in the "Northern Land Use Guidelines for Roads and Trails" and the B.C. Forest Engineering Manual (and also with B.C. Ministry of Forests, Lands, and Natural Resources Engineering Handbook for some aspects). The mitigation statement above leaves ample room for interpretation: "good", "safe", and "suitable" should be specifically defined in order to allow an evaluation of the risks and then the effectiveness of mitigations. What is meant, for example, by "good" road design and construction" is not clear to the reader. It seems that the road construction standards and design are compliant with codes that may not entirely cover the peculiarities of the vehicles and traffic the road under consideration will carry. We have also noted that some prior experience with the winter road has been considered , but the absence of accident records from the early '80s is not a proof of safety of any kind, especially since that total traffic does not even represent one year of service of the new project.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please identify the characteristics that give the foreseen road design and construction the "good" attribute stated in the DAR as mitigation as opposed to "code compliant" according to the "Northern Land Use Guidelines for Roads and Trails" and the B.C. Forest Engineering Manual attribute.</li> <li>2. Please identify what traffic, vehicles and transported materials are foreseen in the the adopted "Northern Land Use Guidelines for Roads and Trails" and the B.C. Forest Engineering Manual codes.</li> <li>3. Please deliver a list of recorded accidents, incidents, near-misses on winter roads (if records exist, or "experience-based" information), including business interruption and road closures of any kind that may have been considered during the preparation of DAR (See note 1).</li> <li>4. Please define what "driving in good conditions" means in the particular environment of this project (day/night, all seasons meteorology) and transportation cycle duration.</li> <li>5. In addition to the traffic defined in DAR TABLE 9-1 please define a "average estimate" of all miscellaneous daily traffic during the various phases of the project's life such as, for example:             <ol style="list-style-type: none"> <li>1. Construction equipment and Oversized vehicles (own and contractors);</li> <li>2. Mining personnel and subcontractor buses, mini-buses;</li> <li>3. Management and supervisors vehicles;</li> <li>4. Food and other logistic deliveries, etc.; and</li> <li>5. Subcontractors vehicles.</li> </ol> </li> <li>6. Please explain how "safe speeds" are going to be enforced to all vehicles.</li> <li>7. Please define "suitable spill response" procedures and expected minimum and maximum spill reaction times on all the critical segments of the road in case of spill accidents occurring on mines' access roads in summer, winter, day, night conditions for the following scenarios that we have seen occurring on mining roads around the world:             <ol style="list-style-type: none"> <li>1. Truck overturns (hazmat on board, driver incapacitated or dead) on road or falls from bridge.</li> <li>2. Brakes overheat, fire is started.</li> <li>3. Truck hit by hazard and pushed out of road.</li> <li>4. Truck falls in a collapsed section of road or bridge (slope, riverbank, karst collapse).</li> <li>5. Severe traffic accident involving hazmat, heavy loadings (construction equipment, passenger vehicles).</li> <li>6. Same as all the points above in the steep sections of the project.</li> <li>7. Barge at Liard Crossing sinks or capsizes.</li> </ol> </li> </ol>	
3	Oboni #2 Acid spill risks mitigations	<p><b>Comment</b> The DAR discusses the modified acid transportation mode as follows: The main change from EA0809-002 is the form of container for sulphuric acid. Previously, 20,000 L tanker deliveries were envisaged. Now, delivery in totes weighing approximately 1.4 tonnes is planned. This represents a significant reduction in the risk of spills because of the much smaller container size, and the fact that totes are quite durable and not easily ruptured. DAR, PR55 page 190. We understand the logic, but in order to follow it more data are needed regarding the totes design and shock/ puncture resilience, as well as how they will be secured on vehicles, and how many per trip.</p> <p><b>Recommendation</b> Please provide what type of totes are going to haul the acid and other hazardous materials and how secure they are (in particular against punctures, falling from truck, in case of truck roll-over) including vehicles and the load securing techniques to be used.</p>	<p><b>May 5:</b> An example of the type of totes likely to be used can be found here: <a href="http://www.durastar.ca/schutz.htm">http://www.durastar.ca/schutz.htm</a>. The totes are 1.2x1 m rigid HDPE inside a rigid tubular steel cage with integrated pallet, capacity 1,250 L. Pallets would be strapped to the trailer deck inside the trailer box. Based on double trailers with inside dimensions 5.5x1.6 m (see DAR Appendix 1, Fig. 2), each load could carry up to 10 totes.</p>
4	Oboni #3 Concentrate and other fluids hazmat spill consequences and risks.	<p><b>Comment</b> The DAR discusses the trucking of concentrate and other fluid hazmat as follows:</p> <p>In winter, the winter environment will limit the risks posed by spills to some degree. This is because spills are usually not able to travel far, are easily</p>	<p><b>May 5:</b> 1. We did not implicitly assume that spills would only occur on and remain on the road. The point we were making re winter conditions is that snow is a natural absorbant, and so will retard migration of</p>

contained and can be readily cleaned-up with minimal risk to surface water and groundwater. DAR, PR55 page 192, NB: DAR's Table 9-1 gives the volumes per year, but the text before the table refers to the "operating period". The statement above seems to assume that spills only occur and remain on the road, that there is no accelerated flow due to drainage ditches, and that ruptured totes, tanks, or tankers, etc. will also remain on the road.

The DAR also states that:

Risks to surface water exist, but surface water contamination should be visible and can be cleaned up with downstream interception and collection. There is a risk to groundwater from a large spill if the spill is not completely absorbed by snow or surficial soil, and the underlying bedrock is permeable. The dolomitic rocks of the Nahanni Formation that form the Ram Plateau are potentially permeable, as are granular locations, such as flood-plains. DAR, PR55 page 192. It seems that the statement above may be referring to good visibility, "sunny day" conditions, but "winter, blizzard, and or night" conditions would give a completely different ability to react hence a significantly different risk distribution.

At page 193 the DAR states:

A matrix for the risk of spills, and their consequence, for different sections of the access road is given in Table 9-2. The matrix is based on the Failure Modes and Effects Analysis approach developed by Robertson and Shaw. In the matrix, 'risk' can be considered inter-changeably with 'likelihood'. The assessed magnitude of spill risk and consequence by road section is shown in Figure 9-1. We are surprised to see Table 9-1 use inter-changeably the term risk and likelihood. This leads to ambiguity because risk is universally known today to be the combination of likelihood and consequence: the use of a different definition or showing (DAR's Fig. 9-1) a risk (that is actually a likelihood) and consequences separately does not add to the understanding of the risk exposure. From that point on clarity is missing.

We note that in the DAR Addendum Table 7-1 tackles the likelihood of accidents leading to spills (it is unclear, however, how the different types of accidents are combined in order to deliver a "road segment" likelihood). Table 7-2 summarizes the consequence assessment and is also a modified version of Table 9-2 from the DAR, including those factors considered applicable to the assessment of the consequence of an accident leading to a spill. Finally, Table 7-3 delivers qualitative estimates of the road segments' risks split in five categories.

In DAR Addendum (PR100) we read:


A fuel spill is considered to be relatively highly reversible in terms of water quality, although moderately reversible for exposed fish which may exhibit longer effects. Reversibility of a concentrate spill is considered to be low for water quality and fish because, although effects should not be particularly significant, they could last for an extended period. Page 57, then Table 7-5 for Water and fish.


We also note that TABLE 7-6: EFFECTS MATRIX, ACCIDENTS LEADING TO SPILLS, ALL TYPES DAR Addendum (PR100) page 60, combines prior information to give a "all types" effect on soil, vegetation, wildlife, water and fish using rather complex reasoning which includes likelihoods and consequences.

#### **Recommendation**

1. Please clarify if the assumption was implicitly made that spills would only occur and remain on the road, the accelerating effect of the road drainage ditches would be nil, and the ruptured totes or tanks, or tankers, etc. would remain on the road after any type of accident.
2. Please clarify which stretches of the road have cross sections where either a truck, a passenger vehicle or its freight could roll away from the road to a distance that presently foreseen emergency cranes cannot reach.
3. Please identify stretches where road platform sudden cracking or severe deformations or collapse are possible due to hydro-geo hazards such as karst (dolines), unstable slope below the road, riverbank erosion and progressive failure, or any other hazardous condition.
4. Please clarify if it was implicitly considered that spill response would occur with good visibility, "sunny day" conditions.

a liquid spill. We recognized the potential for a spill to migrate from the road to a watercourse, hence our proposal for control points on key watercourses. We also did not assume that ditches have no accelerating effect, or that trucks and contents would necessarily remain on the road after an accident, although we believe that to be more likely than not. 2. Road sections Km 11.8-13.2, 13.5-15.2, 55.2-57.4 (based on the road maps in DAR Appendix 1, Appendix I). However, they could be reached by a winch. The road section Km 97-102 in the Silent Hills has not been included because dense tree cover would prevent roll aways. 3. There are no sections of the road where sudden cracking, deformations or collapse are considered likely. Please note that an all season road bed exists between Km 0 to 25, and is mostly visible to Km 40. Thereafter, the old winter road alignment is clearly visible. These have been present since 1981, and no such instabilities are evident. Regarding karst, we refer you to the Tetra Tech report submitted with our Jan. 29 submission to the Board. In section 2.2.2, it states "The karst features noted above (except for the Poljes area slope failures) are small. The probability of others being present with no surface expression is low. In addition, examination of the available airphotos, some as early as 1949, do not show changes in the karst features over the 63-year timeframe covered by the airphotos and LiDAR imagery. Because the Nahanni Formation dolostone is quite massive and hard, these features develop very slowly over time, on the order of hundreds of thousands of years to millions of years. The potential for sinkhole development, lack of detection and rapid instability is very small. This terrain is very different from that in, say, Florida where relatively soft and soluble limestone can lead to rapid sinkhole development". No unstable slopes have been noted below the road. Riverbank erosion occurred previously on some sections of the road adjacent to Prairie and Funeral Creeks. This was because the previous owner did not armour these areas. They have since been armoured. The proposed all season road alignment has been moved further from the Liard River to ensure it is not affected by bank erosion. No progressive failures or other hazardous condition are known. 4. Spill responses were contemplated in open water, frozen and snow conditions. Visibility can be assumed to be adequate for travel since vehicles would not have been on the road otherwise. 5. Refer to 4. above. The risk assessment assumed acceptable levels of visibility (i.e. not blizzard). 6. Yes. Slopes were accounted for in both the likelihood of a spill occurring (DAR Addendum Table 7-1) and the ability to contain a spill and thus the consequence (DAR Addendum Table 7-2). 7. Refer to the DAR page 196 for a description of considerations feeding into the consequence assessment. This shows that karst was considered. Following on from 3. above, we do not believe there are

		<p>5. Were "winter or blizzard or night" conditions (or any combination thereof) considered in the risk assessment and spill response evaluations?</p> <p>6. Were the longitudinal slopes and cross sections of the road considered for contaminant dispersion and spill response?</p> <p>7. Was the possible presence of karst (dolines) considered for contaminant dispersion and spill response?</p> <p>8. Please identify occurrences of the word "risk" that, like in Table 9-1, are used inter-changeably with the term risk and likelihood, so that any misleading table, conclusion, recommendation can be clarified in all documents.</p> <p>9. Please explain how the different types of accidents are combined in order to deliver a "road segment" likelihood.</p> <p>10. Could you please clarify (maybe using a schematic event tree or a flow chart) how the effects, including reversibility were evaluated?</p>	<p>any karst features in close proximity to the road due to the absence of any form of surface expression. 8. The risk assessment in the DAR is superceded by that in the DAR Addendum. Risk and likelihood are not used inter-changeably in the latter. 9. As explained in the DAR Addendum, page 50, in our opinion, the likelihood of an accident resulting in a spill has more to do with the nature of the road segment, which is what the likelihoods are based on, not accident types. 10. DAR Addendum page 57 explains the basis for ranking each variable i.e. significance, uncertainty, etc. Upon further review, it occurs to us that there is no overall assessment of 'effect'. This should perhaps be based on significance, timing (duration), magnitude (severity), and reversibility. Reversibility is ranked based on the receptor and the persistence of the spilled material. For example, for water quality, a fuel spill is ranked highly reversible assuming a response collects the majority of the spill, and on-going dilution diminishes the effect. However, reversibility for fish is considered moderate because even low fuel concentrations may be harmful.</p>	
5	Oboni #4 Road traffic considerations	<p><b>Comment</b> The DAR declares that: Since the all season road follows the general alignment of the permitted winter road, much of the information developed by SNC Lavalin and provided during EA0809-002 is also relevant. DAR page 147. The proposed road will not have runaway lanes. SNC previously determined that road grades are not steep enough to require them. The Allnorth road design has not increased road grades, and in cases has reduced them. DAR page 147. There will be no safety railings. Such railings would be ineffective in stopping trucks from leaving the road surface. Also, they are not considered to be necessary given the low vehicle volumes and slow speeds. DAR page 147. In absence of an evaluation of the full expected traffic (including staff, subcontractors, management, etc. as requested in question EA1415-01-1-1.1-001, 5, and given experience gathered on other mining "private" roads with entry checkpoints) it is difficult to evaluate the efficacy of guardrails (or the risks due to their absence) and other possible mitigations. Guardrails are furthermore useful as visual indicators at night, blizzard and heavy rain conditions and we note that once built, the winter road will be a public road on territorial land, and access by the general public cannot legally be denied. DAR, PR55 page 146. Furthermore there is a concern that non-resident hunters could access the interior via the river using their own boats. DAR, PR55 page 147</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. What is the information developed by SNC Lavalin and provided during EA0809-002 which was considered relevant for the DAR, road design and the risk evaluations to date?</li> <li>2. What would be the criteria to implement runaway lanes? Do these correspond to a standard or to previous experience on mountainous mining roads with a similar traffic of hazmat?</li> <li>3. Given that safety railings were ruled-out how is personnel vehicles safety going to be ensured?</li> <li>4. How is guidance at night, blizzard, heavy rain condition, fog going to be ensured (visual indicators, other)?</li> </ol>	<p><b>May 5:</b> See Allnorth document attached.</p> <p><b>May 6:</b>  Allnorth Report</p>	
6	Oboni #5 Bridge design criteria	<p><b>Comment</b> DAR states that: Design 1 in 100 year return period flow estimates for major crossings are provided in Appendices 3 and 4. Appendix 4 also provides equations for the calculation of 1 in 10 year and 1 in 250 year return period flows. These are estimated to be 70% and 115% of 1 in 100 year flows, respectively. DAR page 79.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Please specify if the air-space between the bridge deck and the flood water level has been foreseen to allow the passing of possible ice-jams, floating debris, water/air hammer effects and scouring.</li> <li>2. Please specify how bridge abutments and intermediate piles will be protected.</li> </ol>	<p><b>May 5:</b> 1. Yes. A minimum 1 m air-space between the design flood level and/or maximum locally indicated water level and/or bridge deck as assigned in the preliminary designs. Site assessments looked for evidence of abnormally high water levels, e.g. due to ice-jams. Evidence of this was found at only one crossing (Km 23), but there the bridge crosses a gorge several metres above the indicated high level. Deck clearance will be re-evaluated during detailed design using detailed topographic data. 2. All abutments, including those around any piles, will be</p>	

			suitably armoured, the exact specifications of which will be defined during detailed design.	
7	Oboni #6 Liard river barge crossing	<p><b>Comment</b> The DAR states that: In summer, a barge would operate on the Liard River crossing for mine traffic. The barge would be private, and so not available for public use. DAR, PR55 page 147. It is expected the barge will be operational from July to late October (due to Highway 7 load restrictions) and the winter ice bridge will be in place from late November to mid-April. Appendix 1 A pdf page 67 et Table 12: Historical Liard River Crossings data.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. What would be the consequences of a truck/bus falling into the Liard river with different types of contaminants and number of passengers?</li> <li>2. Is it correct that there will be approx. one month traffic interruption from late October to late November, respectively 2.5-3.5 months mid-April to July?</li> <li>3. How many days of traffic interruption are foreseen for other meteorological reasons (blizzard, heavy snowfall, heavy rains).</li> <li>4. How will the traffic interruption above (barge, bridge, road) impact traffic (e.g. possible increase of daily trips, tightening of transport cycles, reserve trucks, etc.?)</li> </ol>	<p><b>May 5:</b> 1. In terms of contaminants, the consequence would likely be low, and limited to some hydrocarbons associated with dissolution of oil/grease from the barge and/or vehicle. It is expected that cargo can be recovered largely intact. This would apply to concentrates in bags or sealed cars, diesel in dedicated tanks, acid in totes, and chemicals/mill reagents in bags/sacks. In terms of personnel, we would rate consequence as moderate. This requires more consideration, but depending on the barge, it would likely be good practice for all vehicle occupants to leave the vehicle and don life preservers for the crossing. This reduces the risk of fatality. 2., 3. and 4. See our April 1, 2016 letter to the Board.</p>	
8	Oboni #7 Tolerance/tolerability to risks	<p><b>Comment</b> As mentioned above, Table 7-3 of the DAR Addendum uses five classes of Qualitative risk levels designated, among others, by a colour-coding. Colour-coding is as follows: red indicates "very high" risk, orange is "high" risk, yellow is "moderate" risk, green is "low" risk, and blue is "very low" risk (adapted from British Columbia Ministry of Forests, 2002 not in the reference of the document, but cited in the text). DAR Appendix 2 (PR129) page 69. Although the colour-coding is used as a prioritization or criticality criteria, there is no explicit reference made to corporate or social risk tolerance/tolerability in the reports.</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. In which manner was the the colour coding adapted from BC Ministry of Forestry and based on which criteria, and for what reason?</li> <li>2. Is there a verbiage explaining what each "adjective" (very low to very high) means or can be interpreted (in other words a "scale definition").</li> <li>3. Is there any way to reconcile the various qualitative likelihood-consequence evaluations with quantitative values (for example: low could mean a certain expected frequency (range), or a certain probability (range)).</li> <li>4. On which basis are the colours allotted to each one of the cells of the matrix?</li> <li>5. How are the local level of consequences and regional level of consequences in Appendix 2 accounted for in the final risk evaluation?</li> <li>6. Where these colours and their meaning discussed with local authorities and regional authorities?</li> <li>7. Did local authorities have a saying in the colours allotment and scale definitions?</li> </ol>	<p><b>May 5:</b> See Tetra Tech EBA document attached. <b>May 5:</b>  Response to Riskope IR07</p>	
9	Oboni #8 Risk and Crisis Management Commitments	<p><b>Comment</b> In the DAR we read that Commitments are made to: 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 behaviour are established, and then carry out regular visual inspections thereafter, including 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 in winter (e.g. for rock fall that is freeze/thaw-related). Estimates of the expected duration before seasonal baselines are established, how visual inspections of "remotely located" (with respect to the road alignment) slopes is intended to be performed are apparently missing. 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. DAR, page 34. The Commitments do not seem to state what these inspections would involve, who would perform them</p> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>1. Could the Commitments be clarified in terms of the inspection protocol, the professional qualifications of the inspectors?</li> <li>2. Given the daily nature of mine traffic do the Commitments indicate that a daily inspection will be performed or they indicate that there will be an inspection after any mine traffic interruption?</li> </ol>	<p><b>May 5:</b> 1. The full inspection protocol will need to be defined during detailed design. This will also include the required frequency of inspections by different inspectors. It is expected that most inspections will be conducted by the Road Operations Supervisor, and/or his foreman, on the assumption that they will be given a checklist and training to conduct the inspection by a suitable geotechnical engineer. The engineer would also undertake inspections at a frequency to be determined. 2. Inspection frequency will depend on conditions. We do expect that maintenance crews and road monitors will be active on the road, so their duties could include checking on any problem locations on a daily basis. However, inspections by qualified inspectors would be less frequent, but guided by the required frequency stipulated by a qualified engineer, which will be related to circumstances i.e. major runoff events.</p>	