



Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
14QN039
Our file - Notre référence
CIDMS # 907643

April 13, 2015

Solomon Amuno
Technical Advisor
Nunavut Impact Review Board
PO Box 1360
Cambridge Bay, NU, X0B 0C0
Via electronic mail to: info@nirb.ca

Re: Notice of Part 4 Screening for City of Iqaluit's "Northwest Granular Deposit Road and Quarry Development" Project;

Dear Mr. Solomon Amuno,

On February 26, 2015, the Nunavut Impact Review Board (NIRB) invited parties to comment on the City of Iqaluit's "Northwest Granular Deposit Road and Quarry Development" project submitted by the Government of Nunavut – Community and Government Services' (GN-CGS). Aboriginal Affairs and Northern Development Canada (AANDC) appreciates the opportunity to provide comments and offers the responses below as it pertains to the NIRB's request:

Whether the project proposal is likely to arouse significant public concern; and if so, why;

AANDC cannot offer comments on whether the project is likely to arouse significant public concern as the Proponent has stated no consultations with the affected community have been conducted. AANDC recommends the Proponent consult any potentially affected communities prior to the commencement of the project.

Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;

AANDC believes that with appropriate management and mitigation, the proposed activities are not likely to lead to significant environmental or socio-economic impacts. However, after reviewing the project proposal and provided plans, several information gaps (described below) have been noted which should be addressed prior to completing the screening of the proposed quarry.

- It appears as though the provided *North West Iqaluit Granular Aggregate Evaluation* document proposes a "study to accurately determine a gravel resource large enough to justify the construction of a 5 to 6 kilometre road from Upper Base to the gravel deposits in the Northwest area", but does not carry out any of the field work or perform any of the analysis. AANDC recommends that the Proponent carryout the proposed study and provide it to the NIRB prior to completing the screening of the quarry.



- The Proponent stated that they intend “to lease individual lots to contractors, who in turn will be responsible for the abandonment and restoration of their own lots”. It is unclear how the Proponent will be ensuring that the contractors will be adhering to the *Abandonment and Restoration Plan*. AANDC requests that the Proponent provide information on how abandonment and Restoration will be carried out, identifying the role of the City of Iqaluit and the different lease holders.

- In the Proponent's Nunavut Water Board (NWB) Non-Technical Summary they stated:

“Culverts will be installed at these two stream locations to allow unrestricted stream flow. In addition, culverts will also be installed at a number of other locations along the roadway to promote drainage during freshet and during significant precipitation events”.

AANDC requests that the Proponent provide updates regarding specific locations prior to installing any culverts that are in addition to the two described in this application.

- It appears as though the exploration currently completed for the proposed quarry site has not included the identification of sensitive areas, such as slopes that are prone to erosion or areas of ice-rich permafrost and ice-lenses. It is also not evident whether overburden and granular materials have been tested for acid rock drainage or metal leaching potential. The NIRB Part 2 form states that “it is not anticipated that bedrock will be encountered during this project and therefore the likelihood of encountering Acid Rock is minimal”, however this should be supported through sample testing. AANDC requests clarification on whether studies or tests on sensitive areas and acid rock drainage have been conducted, and if they have not, AANDC recommends that these studies be completed.
- The Proponent's response to the NIRB's additional information request stated that they anticipate extracting 3,951,000 m³ of gravel from Area A and 680,000 m³ of sand and gravel mix from Area B, yet the Granular Aggregate Evaluation document provided quotes the study by Lisa Sankeralli as the areas having 3,429,197.1 m³ and 637,602 m³ respectively. AANDC requests clarification from the Proponent on the noted discrepancy.
- The *Survey Sketch* file provided contains a proposal to survey Areas A and B, as identified in the file, dated September 16, 2014. AANDC requests clarification on whether these surveying activities have taken place to date, and if so, whether the surveyed area was limited to the areas shown as surveyed area in the provided *Conceptual Design* file, as it differs from the *Survey Sketch*.
- AANDC requests clarification on whether the stockpiling that will occur on site will include extracted aggregate materials and is not limited to the organic material from stripping operations. AANDC also requests information on the locations of stockpiles.
- AANDC requests information on whether or not crushing activities will be occurring on or off site.
- The NIRB Part 2 form states that “a blasting area has not been identified in the Northwest Granular Deposit”. AANDC requests clarification on whether blasting is intended to be part of the quarry project at some time in the future.
- The Proponent states in their application that there will be no waste generated from this project and therefore a waste management plan wasn't required. AANDC requests clarification on whether there will be sewage produced when workers are working on the road and quarry.



Whether the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (please provide any recommended mitigation measures):

AANDC is confident that the potential impacts from the proposed project can be limited, reduced or avoided through the implementation of accompanying NIRB project-specific terms and conditions. AANDC is recommending that the Proponent become familiar with applicable portions of AANDC's *Northern Land Use Guidelines – Access: Roads and Trails and Pits and Quarries*, while ensuring they are in compliance with any permit or licensing requirements. While the project is not located on Crown Land, this document offers some best management practices. Portions pertaining to culverts have been pulled out of the aforementioned guidelines and are included in Appendix A.

As previously stated, it is unclear if site investigations to identify ice-rich permafrost areas have been conducted. Should the contractor encounter ice rich permafrost, AANDC's *Northern Land Use Guidelines – Pits and Quarries* recommends that "if ice-rich permafrost cannot be avoided, measures to mitigate its degradation include conducting work during the winter and replacing the organic layer prior to spring thaw to provide an insulating layer between the permafrost and warm air temperatures. If ice-rich material is excavated, it should be piled in rows and allowed to melt and drain before use".

The Proponent provided a *Dust Control Measure* document containing mitigation measures for dust issues potentially created by the construction and operation of the road, but did not include those created by the development and operation of the quarry itself. The Proponent should consider mitigation measures such as the following pulled from AANDC's *Northern Land Use Guidelines – Pits and Quarries*: "To minimize noise and dust, consider prevailing winds when designing the site and orient quarry faces to direct noise and dust away from other land uses. If this is not possible, consider constructing an earth berm to block noise and dust".

The *Spill Response and Erosion and Sediment Control Plan* also touched on mitigating impacts of erosion on waterbodies, but does not discuss measures to mitigate any potential seasonal or storm water management issues. AANDC's *Northern Land Use Guidelines – Pits and Quarries* recommends that "to avoid problems associated with operating in water, Proponents should not excavate the pit or quarry below the water table, and seasonal and storm-related fluctuations in groundwater levels should be accounted for in the planning stage. The Proponent should have an understanding of the maximum expected water flow in the project area, and plan water management structures to accommodate for peak periods of thaw and precipitation".

The *Abandonment and Restoration Plan* states that the final rehabilitation will include "stabilizing all slopes to a maximum slope of 1 (one) horizontal unit to 1 (one) vertical unit or less. Oversized or unsuitable material may be used to stabilize slopes in this scenario". AANDC recommends that the quarry be restored with slopes similar to the natural contours of the site prior to the quarry, where possible.

Any matter of importance to the Party related to the project proposal.

The 2005 study by Lisa Sankeralli, a Geomorphologist with Canada Nunavut Geoscience Office, which is referred to by the Proponent in the NIRB Part 2 form and is also discussed in this letter. This was primarily a desktop study that did not involve adequate field investigations to help confirm the ability of the Northwest Iqaluit Granular Aggregate Area to meet the City of Iqaluit's aggregate needs. AANDC is of the opinion that sufficient field investigations and data analysis information have not been adequately provided to perform a full screening of the quarry.

AANDC, known as Indian and Northern Affairs Canada at the time, completed an evaluation in 2006 called *Evaluation of the Northwest Iqaluit and Trail Area Aggregate Deposits*. The evaluation stated that the work for the Northwest Iqaluit Aggregate Area was not completed and provided a list of recommendations for further work in order to complete an evaluation of the area. These recommendations can be found in Appendix B. The completion of the recommended work would meet the needs of the information gaps provided in this project screening.



AANDC looks forward to working further with the NIRB and the City of Iqaluit on the review of this project. Should you have any questions, please contact Laura Harris at (867) 975-4567 or by e-mail at laura.harris@aandc-aadnc.gc.ca.

Sincerely,

[Original signed by]

Erika Marteleira
Senior Environmental Assessment Specialist



Appendix A: Excerpts from Northern Land Use Guidelines – Access Roads and Trails

Culverts

Culverts are the most common stream crossing method for smaller streams. Professional engineering advice should be sought for installation of culverts to ensure that they are sized to accommodate the entire stream channel width and the highest annual flows. This will require a good understanding of local hydrology.

Culverts should be buried into the bed of the stream channel to a minimum of 20 percent of the culvert diameter at both the upstream and downstream ends. This will promote the deposit of natural stream bed materials on the bottom of the culvert to maintain fish habitat and ensure that the water depth inside the culvert will be level with the water depth in the stream. Culvert alignment should approximate the existing stream channel alignment to mimic the natural stream flow, which will prevent bank erosion and channel scour. Culverts should extend a short distance beyond the toe of road fill material to prevent blockage at the end of the culvert by eroded soil. Granular material should be placed on top of the culvert to a minimum thickness of half the diameter of the culvert to prevent damage from vehicles travelling over.

In permafrost terrain, warm air circulating through 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 the circulation of warm air. These covers should be removed in early winter to accommodate high water levels in the spring.

In areas of ice-rich permafrost, flowing water can lead to rapid thawing and erosion of the ground so water should be channelled under a road through cross drains rather than cross ditches on the surface. Cross drains can be stacked on top of each other to maintain drainage in the event that the lower cross drain freezes.

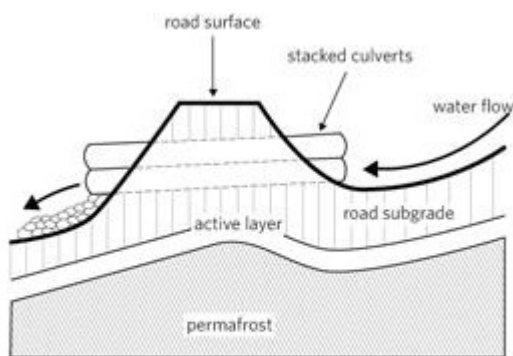


FIGURE 19. Stacked culverts can be used in permafrost terrain to ensure continuous drainage even if the bottom culvert becomes frozen. (modified from Hardy Associates (1978) Ltd., 1984)



Drainage Icings

In cold weather, drainage control structures, particularly on slopes and at stream crossings, are prone to blockage by ice. Icings can also occur in flat terrain where areas of uneven snow removal or shading cause variable freezing of the active layer, forcing groundwater to the surface where it spreads and freezes. Pressure caused by icings can damage engineered structures and the build-up of ice on roads is a safety concern. If icings are observed, attempt to keep small channels thawed to promote continuous water movement.

Cross drains are particularly prone to icing. Methods to moderate this problem include:

- using open-ditch drainage;
- insulating cross drains;
- creating a frozen area above cross drains to block the winter flow of groundwater; and,
- installing a steam-circulating or electric-wire circuit in the cross drain to prevent freezing.



Appendix B: Excerpt from Evaluation of the Northwest Iqaluit and Trail Area Aggregate Deposits (Written by: Paul Gertzbein P.Geo., DIAND District Geologist For the Qikiqtani Region Mineral Resources Division, October 16, 2006)

The work to delineated and evaluated the aggregate resource in the NWIAA was not completed as planned due to several circumstances. The largest being the discovery of the Trail Area which increased the scope of work by approximately 15%. The only field work that was not completed was the sampling on Poly16F, although the sampling that was completed on Poly16F should be sufficient to complete a resource calculation. I would like to make the following recommendation for further work:

1. The sieve testing of the samples from the NWIAA should be completed before a resource estimate is completed on the NWIAA.
2. The samples from the Trail area should be dried and sieved in order to get an accurate determination of the fine fraction.
3. All samples should undergo chemical testing to detect deleterious compounds that may affect its use as an aggregate in various applications.
4. All or a composite sample should undergo crush tests to determine it's suitability as an aggregate.
5. Air photos and topographic maps should be produced for the NWIAA and the area south to Iqaluit in order to facilitate the development of a proper management plan.
6. The valley that contains the Trail Area aggregate deposits should be explored further for more aggregate deposits. As one travels along the quad trail individual aggregate deposits can be seen. This valley may contain more valuable aggregate deposits that would be closer to Iqaluit and there less expensive due to smaller transport costs. These deposits, if too small, could be exploited for road building material.
7. Environmental baseline studies should be conducted before development proceeds.
8. A complete resource estimate should be completed on the NWIAA and the Trail area when the GPR survey report has be completed by EBA Engineering.
9. It should be noted that most, but not all aggregate deposits in the NWIAA were surveyed or accounts for in this report due to time constraints. There are deposits on the east side of the river from Poly114 to the north. The other area that requires further examination is east of Poly 12 and west of the river. These deposits should be evaluated and included in the inventory in the future.