



August 15th, 2018

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O Box 119
Gjoa Haven, NU X0B 1J0

Re: Agnico Eagle Mines – Meadowbank Division Responses to Culverts 8 9 11 & 22 Design Report Comments

Mr. Dwyer,

As requested, the following information and comments are intended to address the recommendations outlined in the below letter:

- CIRNAC – August 3, 2018, *Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC) Review of Agnico Eagle Mines Limited's Submission of Design Report for Culvert's 8, 9, 11 and 22 as well as Construction drawings and fuel farm designs - Water Licence 2AM-WTP1826 - Whale Tail Pit Project.*

Should you have any questions or require further information, please do not hesitate to contact me.

Best regards,

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Environmental Compliance Counselor



1) Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)

Comment 1i:

In **Section 1.2 - Scope of Work**, roads #8, 9, 11 & 22 are considered as access roads while in **Section 2.1 - Culvert Design Basis and Water Management Strategy**, the same roads are referred to as haul roads. Geotechnical factors to consider in the design and installation of the indicated culverts may vary based on the function that they are intended to serve. Agnico-Eagle is to clarify the type of traffic that will be driving over the culvert and update if necessary the provided design.

Agnico Eagle Mines response:

Agnico Eagle thanks CIRNAC for this question. As part of the road construction works at the Amaruq mine site, there are 2 classes of roads, namely:

a) Access roads:

Access roads are used to provide activities for mining operations by light vehicles or service vehicles (fuel oil distribution, transportation of materials, transportation of employees and workers, etc.).

b) Transport routes:

Transport routes will be useful for the transportation of ore by heavy trucks. These trucks types are:

Cat 777: 90 metric tons;

Cat 785: 140 metric tons.

For access roads, the minimum backfill height at the top of proposed culverts is 1000 mm, while for backfill along the transport routes, the minimum backfill height at the culvert's top is 1800 mm. In addition, for the thickness of steel culverts, the loads heavy vehicles must be considered.

Comment 1ii:

Adequate legend need to be provided on **Drawing 61-417-230-264 – Layout of Proposed Culverts** in order to identify any items (dike, access roads, haul roads, existing roads, etc.) used.

Agnico Eagle Mines response:

Please find the revised 61-417-230-264 design plan enclosed with this letter. It has been updated to describe items used.



Comment 1iii:

For drainage and erosion control, "where large diameter culverts cannot be avoided in permafrost regions, it is recommended to use riveted or bolted culverts and consider installation of polystyrene insulation beneath the culvert bedding material on the bottom and sloped sides of the excavation" [Transportation Association of Canada (TAC) - Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions]. The proposed culvert (1200 mm dia.) should be considered as a large diameter culvert. We notice that there is no insulation beneath the proposed culvert bedding material. Also, we would like to draw attention on the fact that the distance of culvert extension beyond the toe of road fill material is missing. "Culverts should extend a short distance beyond the tote of road fill material to prevent blockage at the end of the culvert by eroded soil" (INAC's Northern Land Use Guidelines - Access: Roads and Trails). Agnico Eagle is to clarify the design concept or take into consideration the above-highlighted TAC's recommendation for the proposed culvert installation. Also, Agnico Eagle is to provide dimension of culvert extension on the submitted drawing [**Drawing 61-417-230-226 – Cross Section and Details**].

Agnico Eagle Mines response:

There is no significant settlement to be anticipated with an increase of the active zone under the invert of large culverts. Existing soils are composed of high-density sand and gravel. As such, it is expected that the addition of insulation will have little impact on the stability of the culvert.

The structural resistance of the proposed culverts is sufficient for the live loads of the heavy trucks. Riveted or bolted joints is not standard among manufacturers for diameters less than 3000 mm. However, best management practices will be applied during compaction of the bedding and the lateral cover of the culvert.

Stabilization at the culvert ends (entry and exit) will be ensured by placing a layer of rip-rap of 100-300 mm crushed stone above a geotextile membrane. Also, a stone will be placed in the stream bed at the entrance and exit to reduce erosion. Finally, the culvert will extend an extra 300 mm beyond the rip-rap area (details are provided on drawing 61-417-230-226 provided with the design report).

Comment 1iv:

The proposed culverts as indicated on the provided plans and profiles do not appear to us clear and consistent. The schedule of the new culverts to be installed as part of this submission needs to be clarified (eg. Explosive Road: We have Culvert ID # is not indicated on the submitted profile).



Agnico Eagle Mines response:

Revised drawings are enclosed with this letter. For more clarity, additional information on proposed crossings has been added on the drawings.