Baffinland Iron Mines Corporation

October 31, 2023
Project #: OMGM2212-23

Annual Geotechnical Inspections – 2023 Report 2.

APPENDIX "C" – Tote/Haul Road - Photographs

Figures 92 to 115

Aerial view of bridge KM97 and a section of the Tote Road between the Mary River Mine and Milne Inlet Port

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4.0 Tote Road Between the Mary River Mine and Milne Inlet Port

4.1 Bridges (4)

a) Bridge 17 (located 17 km from Milne Inlet port)

Figure 92: View of the stable abutments with riprap erosion protection at the north side of bridge KM17.

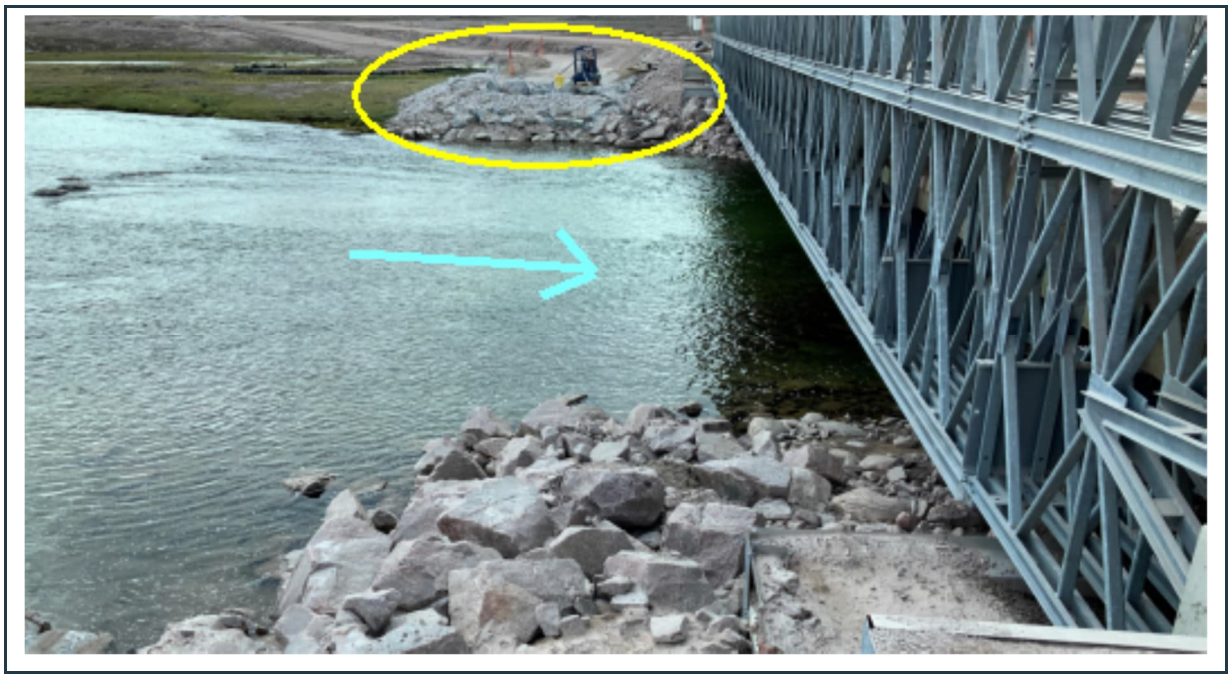

Figure 93: View of the stable abutments with riprap scour protection at the south side of bridge KM-17.

Figure 94: View of the west abutment, where the old metal crib has been removed and replaced with new riprap erosion protection at the south side of bridge KM17 (yellow circle in Figure 93).

Figure 95: View of the east abutment, where the old metal crib has been removed and replaced with new riprap erosion protection at the south side of bridge KM17.

b) Bridge 63 (located approximately 63 km from Milne Inlet port)

Figure 96: View of the west side of bridge 63, with stable abutments and riprap scour protection.

Figure 97: View of the stable abutments at the east side of bridge 63. Also note one (south) of the two "old" crib abutments with riprap protection and a silt-curtain.

c) Bridge 80 (located approximately 80 km from Milne Inlet port)

Figure 98: View of the west side of bridge 80, with riprap scour protection around the abutments.

Figure 99: View of the abutments with riprap scour protection at the east side of bridge 80.

d) Bridge 97 (located approximately 97 km from Milne Inlet port)

Figure 100: View of the stable abutments with riprap scour protection at the west side of bridge KM 97.

Figure 101: View of the two stable abutments with riprap scour protection at the east side of bridge KM97.

4.2 Selected Culvert (1) and Adjacent Check Dams

a) KM 33+000 Lake access road culvert and check dams

Figure 102: View of the damaged culvert at its inlet at KM 33+000. The culvert should be replaced as soon as practically possible. More rockfill should also be placed around the culvert's inlet.

Figure 103: View of the outlet of the culvert at KM 33+000. The ditch at the front of the culvert should be cleaned during culvert replacement and more ripraps should be placed.

Figure 104: View of the ditch and check dams at KM 33+000. The ditch should be cleaned (yellow circle) and the crest of the check dams repaired/raised (yellow arrows) during culvert replacement.

4.3 Section of the Haul Road Between the Crusher Pad and the Open Pit (KM104 – KM110)

Figure 105: View of the well-maintained haul road between the crusher pad and the open pit around KM-107. Note the safety berm along the downslope side and the upgraded, erosion-controlled drainage ditch along the upslope side of the road with additional rock fill in critical areas.

Figure 106: View of a cross drain (combination of a whoa-boy and shallow ditch) intercepting run-off flowing down the haul road and direct the collected water to the side-ditch. The excellent condition of the haul road is an indication of effectiveness of such drains.

4.4 Brief summary of impact of roads on permafrost.

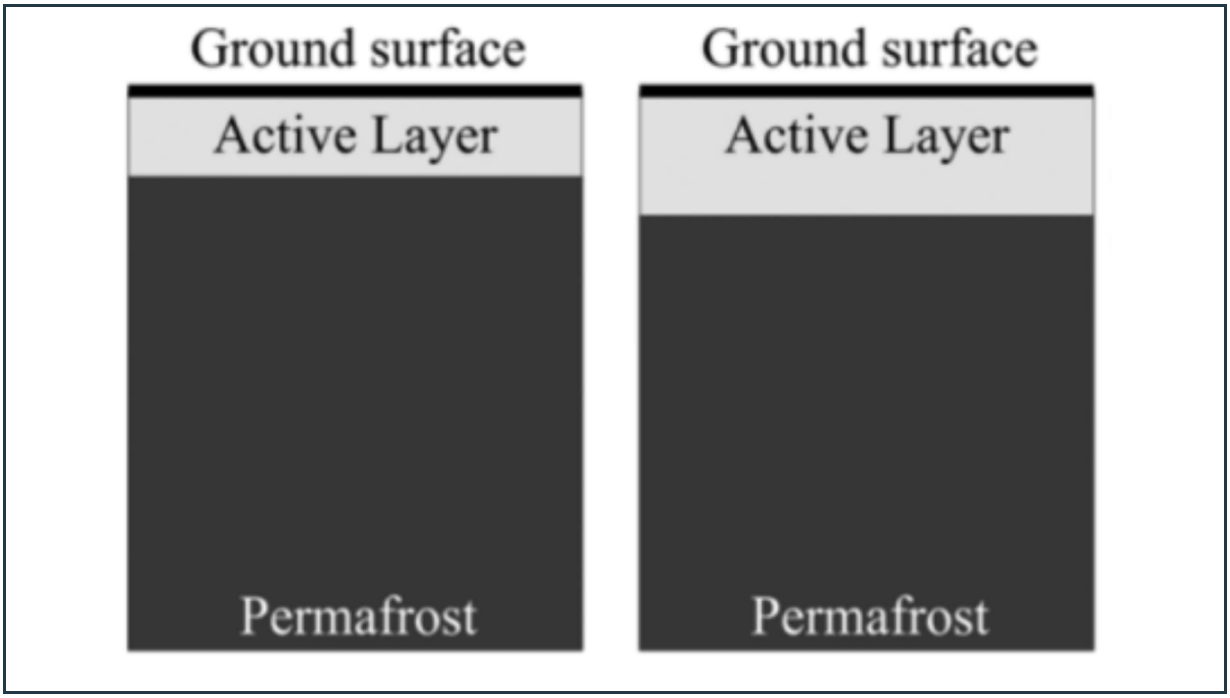

Figure 107: View of the two main zones in the ground in permafrost areas. The thickness of the two zones varies considerably depending on the location of the site (See Figure 108). At the Mary River site the thickness of the active layer is generally less than 1.5 m. - Source: Connon et al.

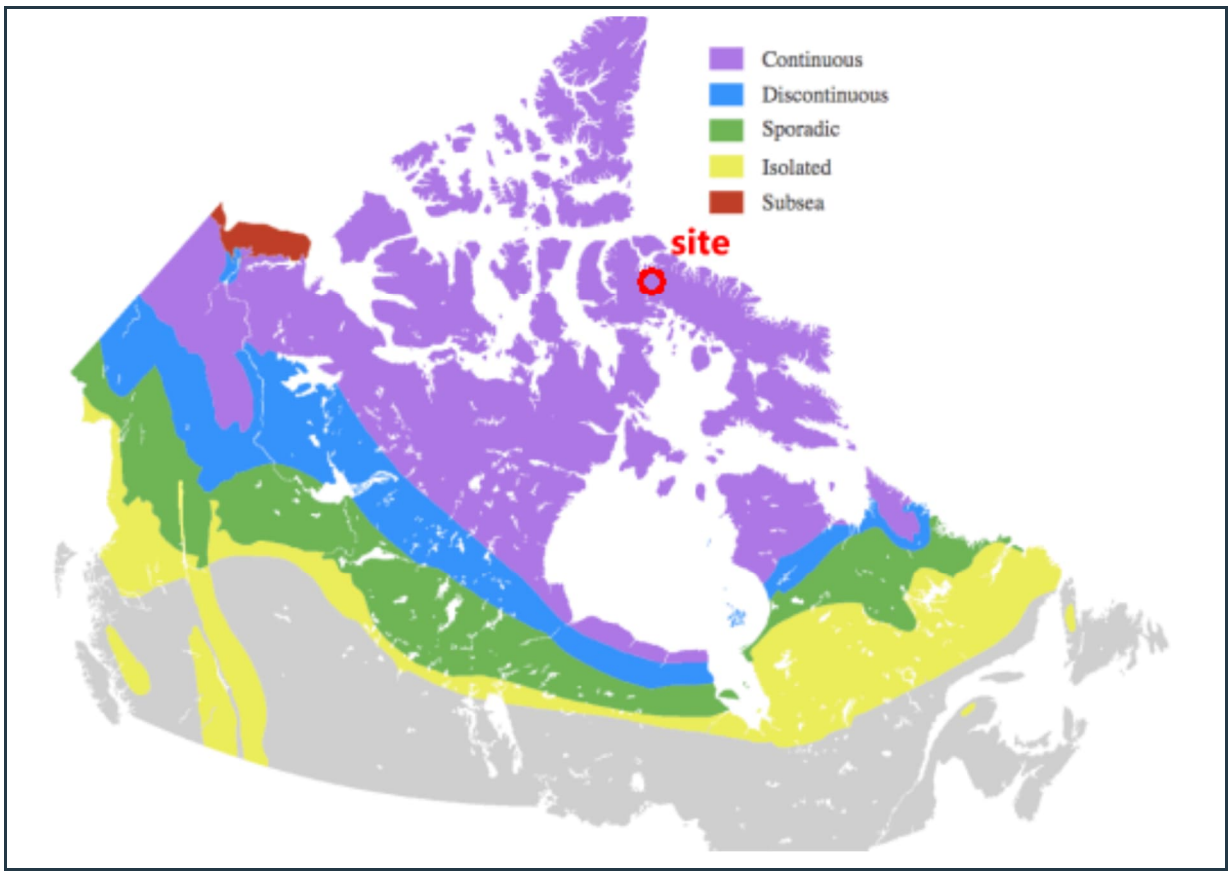

Figure 108: View of the various permafrost zones in Canada, with Mary River located within the continuous permafrost zone in the Baffin Region. - Source: Natural Resources Canada

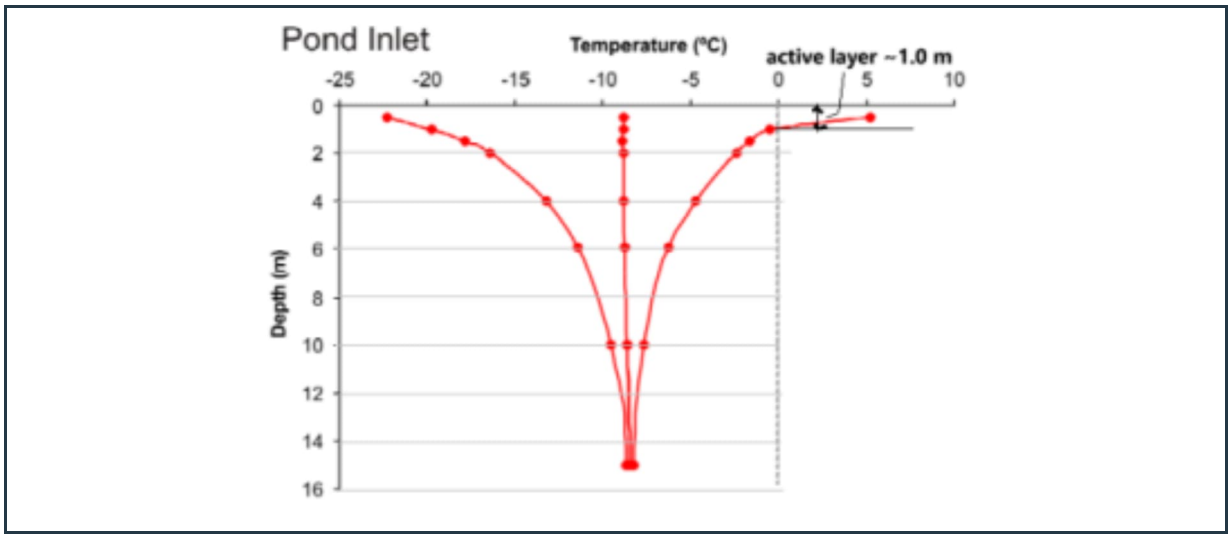

Figure 109: Annual mean, maximum and minimum ground temperatures to 15 m below grade in Pond Inlet (data collected from 2008-2009). Note the thin active layer of approximately 1.0 m. – Source: Geological Survey and Natural Resources Canada.

Community	Latitude (°N)	Longitude (°W)	MAAT (°C)[1]	Mean ground temperature (°C)[2]	Thaw depth (m)	Depth to zero annual amplitude (m)
Resolute Bay	74.7	94.9	-16.4	-12.3	0.8	26.5
Pond Inlet	72.7	77.9	-15.1	-8.5	0.8	17.6
Arctic Bay	73.0	85.2	-15.2	-10.6	1.3	17.4
Clyde River	70.4	38.6	-12.8	-7.2	1.0	16.6
Igloolik	69.4	81.8	-13.2	-8.5	1.2	18.2
Pangnirtung	65.7	68.1	n/a	-5.2	1.9	12.3

[1]Normal mean annual air temperature (MAAT) from Environment Canada 2009
[2]Mean ground temperature at 15 m depth

Figure 110: Temperature characteristics of typical sites within the Baffin Region. Note the thickness of active layer listed in the red rectangle. – Source: Geological Survey and Natural Resources Canada

Figure 111: View of a former borrow area at KM 6.9. - September 3, 2023.

Figure 112: View of a generally stable slope in a cut area, and the adjacent road embankment with poor surface drainage at KM 28.9. - September 3, 2023.

Figure 113: View of typical problems at one section of the Tote Road. (a) Ponding water adjacent to shallow road embankment and (b) unacceptably short culvert in a historic image from 2019.

Figure 114: View of a short culvert at a curve of the road in a historic image from 2019. The broken yellow line marks the desired (safe) edge of the road.

Figure 115: View of the most typical problems (short culvert and erosion at the toe of the embankment) along the Tote Road in a historic image from 2019.