July 25, 2019

Assol Kubeisinova
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RE: Baffinland Response to Comments
Km 106 Run of Mine Stockpile and Sedimentation Pond
Mary River Project, Type 'A' Water Licence - 2AM-MRY1325 - Amend. No. 1

Baffinland Iron Mines Corporation (Baffinland) has reviewed the comments and recommendations received from the Qikiqtani Inuit Association (QIA)[1] and Crown Indigenous Relations and Northern Affairs Canada (CIRNAC)[2] in regards to Baffinland's notification submitted to the Nunavut Water Board (NWB) detailing Baffinland's construction of the updated Run of Mine Stockpile and Sedimentation Pond at the Mine Site at the revised KM106 location.

Baffinland's responses to the comments and recommendations are provided in Attachment 1 of this letter. Additionally, Attachment 2 contains Figure 1 demonstrating the distance between the design footprint of the stockpile and the drainage channel to the west will maintain the minimum setback of 31m, as requested by QIA. Please do not hesitate to contact the undersigned should you have any remaining questions or comments.

Regards,

Christopher Murray
Environmental & Regulatory Compliance Manager

Attachments:

Attachment 1: Baffinland Response to Comments
Attachment 2: Figure 1 – General Arrangement

Cc: Karén Kharatyan (NWB)
Chris Spencer, Jared Ottenhof (QIA)
Bridget Campbell, Godwin Okonkwo (CIRNAC)
Megan Lord-Hoyle, Lou Kamermans, Shawn Stevens, Simon Fleury, Connor Devereaux, William Bowden, Amanda McKenzie (Baffinland)

[1] QIA (2019). 2AM-MRY1325 Baffinland Iron Mines Revised Run of Mine Stockpile and Sedimentation Pond Issued for Construction Drawings. July 10, 2019.
[2] CIRNAC (2019). Crown Indigenous Relations and Northern Affairs Canada's comments on Baffinland Iron Mines Corporation Revised Run of Mine Stockpile and Sedimentation Pond Issued for Construction Drawings for the Mary River Project, Water Licence 2AM-MRY1325 – Amendment No.1. July 10, 2019.

Baffinland

Attachment 1

Baffinland Response to Comments

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Table A-1 - Baffinland Response to Comments - Revised Run of Mine Stockpile and Sedimentation Pond at KM 106

ID	Relevant Section and Statement from Baffinland's Design Brief	Comment / Recommendation	Resolved?	Baffinland Response
		CIRNAC		
1	**Design Summary Report**	Comment: It is not clear from the Design Summary Report if Km 106 presents the same design assumptions as Km 107. It is vital to prevent the risk of the malfunctioning of this significant infrastructure by validating that the new contemplated area at Km 106 has similar civil and geotechnical characteristics as Km 107, and that the details and engineering designs of the planned construction work activities previously submitted (Construction Drawings – September 21, 2018) are applicable for Km 106. Recommendation: CIRNAC recommends that Baffinland demonstrate that the new contemplated area (Km 106) has similar civil and geotechnical characteristics as Km 107 and the details and engineering designs of the planned construction work activities previously submitted (Construction Drawings – September 18, 2018) are applicable for Km 106, before construction can commence.	No	Baffinland confirms that the KM106 area does not have similar characteristics to KM107, as demonstrated in the geotechnical investigation report. The KM106 Design and the KM107 Design both apply the same project design criteria (such as the design storm event, the required Factors of Safety, operating philosophy, and typical civil design details such as ditch and berm cross sections) but different geotechnical and hydrological design criteria (such as the foundation conditions and catchment areas). The foundation conditions at KM106 are more suitable/better for this type of infrastructure than at KM107 as confirmed in the geotechnical investigation, and the catchment areas at KM106 are smaller than those at KM107.
		QIA		
1	**General Omission**	Comment: Can the NWB confirm if a geotechnical site investigation and a slope stability analysis is needed for the run of mine stockpile? If yes, will it be included under a separate cover and Water Licence submission process? Recommendation: No action required; slope stability analysis of KM106 stockpile, access road and sedimentation pond included in KP report.	Yes	None
2,3	**Baffinland Letter** As this infrastructure was not included in the 2018 Work Plan or 2018 Work Plan Addendum, reclamation security for this specific activity is currently not in place. While a Work Plan addendum and security estimate could be pursued to address this gap, given the proximity to the 2019 Work Plan submission and ASR process, Baffinland believes reconciling this activity in the 2019 Work Plan is a suitable alternative. Therefore, this facility will be included in the 2019 Work Plan and associated 2019 Marginal Closure and Reclamation Financial Security Estimate. Baffinland has estimated the total reclamation cost of this facility to be approximately $250,000. Additionally, as Baffinland has not executed the earthworks associated with the Milne Port Laydowns outlined in the 2018 Work Plan (with the exception of Laydown 7), Baffinland is over-bonded with respect to earthworks in 2018. As a result, in the event reclamation of the earthworks associated with the ROM Stockpile would be required prior to the end of 2018, adequate security would be in place to complete the reclamation.	Comment: Baffinland is not to begin construction on Inuit Owned Land until sufficient reclamation security is in place for activities that create new liability on Inuit Owned Land. Recommendation: • As stated in the letter, Baffinland included the KM107 Stockpile, Access Road and Sedimentation Pond in its 2019 Lease Work Plan and thus, security has been collected for these items. • However, since the stockpile has been relocated to KM106 and the design has been updated, it is unclear whether the security held is adequate. Total area for the developments has not been clearly stated in the KP report (i.e. the foundation area of the Sedimentation Pond is 10,700 m2 in Table 6 but the highlighted catchment area in Figure 1 indicates it is 7,000 m2). Therefore, QIA recommends the following questions be answered by Baffinland prior to approving the construction: 1. Can Baffinland confirm the total area for the KM106 Stockpile and Access Road? If the area has increased from 133,400 m2 Baffinland will need to update security prior to any construction. 2. Can Baffinland confirm the total area for the KM106 Sedimentation Pond? If the area has increased from 7,400 m2 Baffinland will need to update security prior to any construction.	No	The footprints utilized in the 2019 Work Plan and associated security estimate are as follows: Stockpile Area = 90,000 m2 Access Road = 31,900 m2 Sedimentation Pond = 11,500 m2 Sedimentation Pond Lined Area = 7,400 m2 The KM106 design uses the following footprint: Stockpile (inc. access road) = 76,600 m2 Sedimentation Pond = 10,600 m2 Sedimentation Pond Lined Area = 7,500 m2 Due to the elimination of the access road and minor adjustments to the overall footprint of the stockpile area, the total disturbed area has decreased to a total of 87,200 m2, representing a reclamation security surplus of approximately $68,800 ($1.49/m2). The lined area of the sedimentation pond nominally increased by 100 m2, representing an adjustment to the security estimate of approximately $400 (4.12/m2). Based on this, Baffinland has provided adequate security for the design as proposed at KM106. As agreed to with QIA, footprints of disturbed areas and their associated reclamation security estimate will be reconciled in the year following construction utilizing Photosat.

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Table A-1 - Baffinland Response to Comments - Revised Run of Mine Stockpile and Sedimentation Pond at KM 106

ID	Relevant Section and Statement from Baffinland's Design Brief	Comment / Recommendation	Resolved?	Baffinland Response
4	**Design Brief Section 4.7 Diversion Berms.** The Diversion Berms were sized by treating the space between the berm's upstream slope and the stockpile slope (or the natural ground) as the two sides of a trapezoidal channel, with a base width of approximately 0.5 m. A freeboard depth of 0.3 m was included in the berm sizing to account for minor variations in the berm cross section and grade following construction.	Comment: Does the NWB consider the information provided is enough to confirm that the diversion berms are able to collect all runoff water from the Run of Mine Stockpile and demonstrated reporting on how it will meet Water Licence criteria? It is unclear if the water from the Run of Mine Stockpile is considered effluent from the perspective of MMER. QIA believes this water should be considered effluent under the Water Licence and needs to be managed and demonstrated to be within Licence compliance limits prior to discharge. Recommendation: Baffinland has updated the design of the diversion berms running from the stockpile to the sedimentation pond so that runoff flows to the sedimentation pond and discharges at MS-07.	Yes	None
5	**Design Brief Section 5.3 Materials and Parameters.** This generalized stratigraphy has been adopted for the stability analysis. The thickness of the Glacial Till layer is not known and is expected to range from 0 m to greater than 10 m. The strength of the foundation is expected to increase with depth through the permafrost and into the bedrock. It is likely that the strength of the upper till layers within the active zone will control the stability of the embankments. As such, the stability models incorporate thick zones of Glacial Till and evaluated the FoS for potential slip surfaces through the Glacial Till layer only. The stability models assume that the Glacial Till consists of well graded Sand and Gravel, and that massive ice is not present.	Comment: Baffinland to confirm if a geotechnical investigation of the subsurface has been completed in the vicinity of the proposed construction that can substantiate if this assumption is reasonable? Recommendation: No action recommended. KP conducted a geotechnical investigation at KM106 and KM107.	Yes	None
6	**Design Brief Section 5.4 Results.** Slow, steady creep of the Access Road and Sedimentation Pond embankments may occur if the ice rich materials or massive ice are present within the foundation soils. As such, regular monitoring is required to track the deformation and movement of the embankments, if any. Additional fill placement and surface grading may be necessary depending on the magnitude of the observed deformations.	Comment: Baffinland to confirm how they plan to include this in a monitoring plan or document to capture the need to collect and analyze this geotechnical information? Recommendation: The development relocated and KP has removed the statement that creep will occur. Monitoring for creep should be included during construction inspections with observations being included in the As-Built report.	N/A	None
7	**Design Brief Section 6.4 Foundation Preparation.** It is unknown whether the foundation soils are ice rich or contain massive ice. For the purposes of this design, we assume that the foundation materials are not ice rich and do not contain massive ice. Provided that the amount of organics and unsuitable material on the ground surface is negligible, disturbance to the original ground (excavation, scarifying, etc.) should be minimized so as to not impact current permafrost conditions. The foundations must be maintained clear of snow, ponded water and ice.	Comment: Baffinland to include confirmation drilling to assess foundation stability, ice richness, and the presence of massive ice. Recommendation: No action recommended. Baffinland completed a geotechnical investigation.	Yes	None
8	**Design Brief Section 6.4 Foundation Preparation.** The foundation must be approved and documented by the supervising Engineer prior to fill placement.	Comment: Baffinland to include this information in as-built documentation. Recommendation: • KP has identified that the foundation will be approved and documented by the supervising Engineer prior to fill placement. • This comment applies to the pending As-built documentation.	Yes	None

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Table A-1 - Baffinland Response to Comments - Revised Run of Mine Stockpile and Sedimentation Pond at KM 106

ID	Relevant Section and Statement from Baffinland's Design Brief	Comment / Recommendation	Resolved?	Baffinland Response
9	**Design Brief Section 6.10 Construction Quality Assurance/Quality Control (QA/QC).** It is assumed that a qualified Baffinland engineer will oversee and document construction of the Access Road, Sedimentation Pond and associated runoff management measures Geosynthetic materials and culverts will be installed as per the manufacturer's specifications and recommendations. The geosynthetics contractor will be responsible for performing and documenting the geosynthetics QC program. Qualified Baffinland personnel will be responsible for conducting the QC testing and inspections required on all placed and compacted fill materials	Comment: Baffinland to include each outcome from each of these in the as-built documentation. Baffinland to provide the frequency and type of QC testing and inspection required on all placed and compacted fill materials. Recommendation: This comment applies to the pending As-built documentation.	N/A	None
10	**Design Brief Section 7.0 Inspections and Maintenance.** KM107 Stockpile material placement and runoff management will need to be closely monitored during operation of the stockpile area, including use of the Access Road, and operation of the Sedimentation Pond and runoff management measures. The Sedimentation Pond will need to be emptied in a timely manner following a storm event or during freshet such that the pond is empty during normal operating conditions. Ongoing inspections and maintenance will be required to ensure that each of these structures are being operated as designed and that the Diversion Berms, culverts, and Sedimentation Pond water removal system and emergency overflow spillway are performing as designed.	Comment: Recommended that the Sedimentation Pond be equipped with survey prisms for deformation monitoring. This data would need to be reviewed and assessed by a qualified professional engineer for performance suitability. Recommendation: The completed geotechnical investigation, stability assessment, and for-construction drawings are satisfactory for this concern.	Yes	None
11	**Design Brief Section 4.3 Dam Classification** The Sedimentation Pond is classified as a LOW consequence structure (CDA, 2007) … The CDA recommends that LOW consequence dams be designed based an annual exceedance frequency of 1 in 100 years for flood and earthquake hazards. Design Brief Loading Conditions and Target Factors of Safety. The Sedimentation Pond is classified as a dam following the Canadian Dam Association Dam Safety Guidelines (CDA, 2007 and 2013). Design Brief Section 7.0 Inspections and Maintenance. Inspect the water removal system from the Sedimentation Pond (designed by others) to ensure each component is performing as designed.	Comment: The Sedimentation Pond is considered a dam, as per CDA section 3.23, which requires an OMS and subject to dam safety review. These are conditions of acceptance of this design. Recommendation: OMS manual is stated as being "in progress". QIA recommends the OMS manual be provided for information purposes and finalized with As-Built documentation.	No	Baffinland will retain Knight Piésold to prepare the OMS annual for the KM106 Sedimentation Pond. Baffinland will be responsible for overseeing the construction, preparing the as-built documentation, conducting ongoing monitoring and maintenance, and will be responsible for having the required dam safety inspections and dam safety reviews completed by a qualified person.
12		Comment: Drawing No. 300 which displays the general arrangement for the KM106 stockpile shows a stream passing close by the eastern edge of the development area. No distances to the ordinary High Water Mark of water bodies have been included in the drawing but based on a measurement using the scale provided, the diversion berm and access road may encroach the 31-metre buffer zone required by the Licence (see Figure 1 for highlighted location). QIA requests that Baffinland confirm the minimum distance of the development area to the passing stream and provide any supporting documentation to confirm.	NEW	The potential disturbance area was estimated as a constant offset of 75 m from the edge of each structure. This disturbance area was estimated to include all areas that could have the potential to be impacted during construction. Construction of the KM106 Stockpile and diversion berms will be completed such that the drainage is not impacted and that a minimum distance of 31 m from the high water mark is maintained for any disturbance area or construction. A figure demonstrating the distance between the disturbed footprint of the stockpile and the drainage channel is attached for reference.
13		Comment: QIA requests that Baffinland provides more information on the "potential disturbance area", shown as a dotted line in multiple figures. This area is illustrated as crossing multiple water bodies and more information should be provided as to the nature of the potential disturbance.	NEW	The potential disturbance area was estimated as a constant offset of 75 m from the edge of each structure. This disturbance area was estimated to include all areas that could have the potential to be impacted during construction. However, these areas are not intended to be disturbed, nor are they part of the design footprint for the stockpile. Construction of the KM106 Stockpile and diversion berms will be completed such that the drainage is not impacted.

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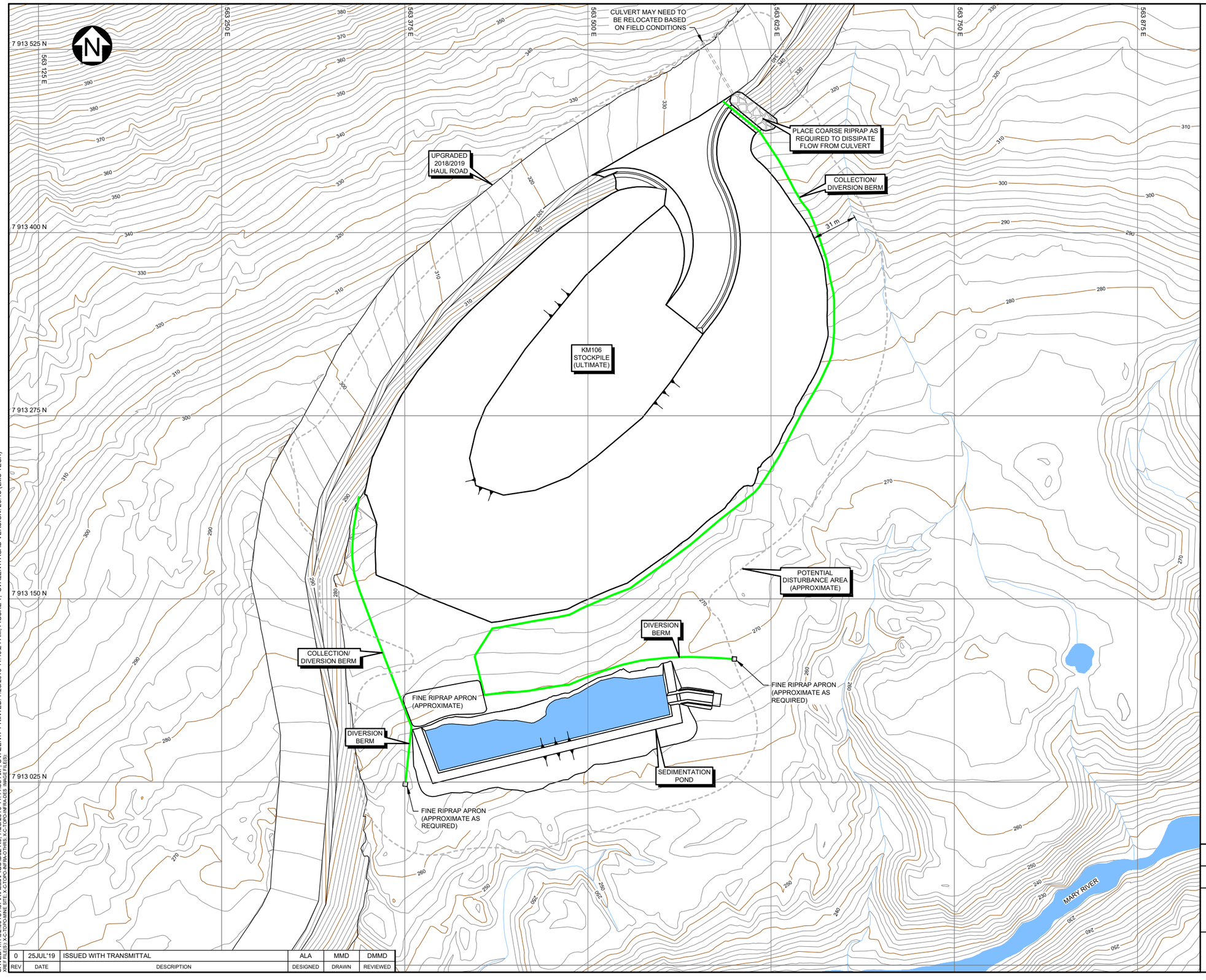
Attachment 2

Figure 1 – General Arrangement



LEGEND:

- WATER
- COARSE RIPRAP
- CULVERT
- COLLECTION/DIVERSION BERM
- POTENTIAL DISTURBANCE AREA (APPROXIMATE)

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 17.
2. TOPOGRAPHY BASED ON INFORMATION PROVIDED BY EAGLE MAPPING (2008).
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 2 m.
4. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
5. LOCATIONS AND DETAILS OF CONSTRUCTION ITEMS MAY BE MODIFIED TO SUIT ACTUAL SITE CONDITIONS.
6. UPGRADED 2018/2019 HAUL ROAD AND KM106 STOCKPILE PROVIDED BY BAFFINLAND.
7. ALL INFRASTRUCTURE SHOWN IS PROPOSED UNLESS NOTED OTHERWISE.

SCALE A: 25 12.5 0 25 50 75 100 125 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	25JUL'19	ISSUED WITH TRANSMITTAL	ALA	MMD	DMMD

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

KM106 STOCKPILE GENERAL ARRANGEMENT

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/57	NB19-00590

FIGURE 1 REV 0