



NIRB File No.: 08MN053
INAC File No.: N2008T0014
DFO File No.: 2008 MR
QIA File No.: LUA-2008-008

November 27, 2017

Todd Burlingame
Vice President, Sustainable Development
Baffinland Iron Mines Corporation
2275, Upper Middle Road East
Oakville, ON L6H 0C3

Sent via email: todd.burlingame@baffinland.com

Re: The Nunavut Impact Review Board's 2016-2017 Annual Monitoring Report for the Mary River Project and Board's Recommendations

Dear Todd Burlingame:

The Nunavut Impact Review Board (NIRB or Board) is hereby releasing its *2016-2017 Annual Monitoring Report for Baffinland Iron Mines Corp.'s Mary River Project* (Monitoring Report) which includes the 2017 Winter and Summer Site Visits for the NIRB's monitoring of the Mary River Project (Appendix II within the Monitoring Report). The enclosed Monitoring Report is based on the NIRB's monitoring activities as set out within the Mary River Project Certificate No. 005 and pursuant to Sections 12.7.1 and 12.7.2 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement). This report provides findings that resulted from monitoring of this Project that took place from October 2016 through September 2017.

By way of a motion carried during its regular meeting held in November 2017, the Board has issued the following recommendations to assist Baffinland in achieving compliance with the Mary River Project Certificate and to ensure the NIRB has all information necessary to adequately discharge its mandate with respect to the provisions within section 12.7 of the Nunavut Agreement as such pertain to the Mary River Project.

1. Recommendations based on the NIRB's Review of the 2016 Annual Report

Monitoring Sea Levels and Storm Surges at Steensby Port and Milne Inlet

Baffinland is required pursuant to Conditions 1 and 83 of the Project Certificate to undertake monitoring of sea levels and storm surges at Steensby Port, and Milne Inlet area using GPS and tidal gauges. Within its annual reporting to the NIRB, Baffinland reported that it utilized the tidal data collected in 2014 for informing its oceanography and ballast water dispersion modelling for

the Project, and that following the completion of the modeling exercise, the tidal gauge was removed and was not re-installed at Milne Port in 2016, and as such no tidal data were collected or available from Milne Port for the current reporting period. The NIRB notes that in its 2016 Board Recommendations to Baffinland, Recommendation #1 specifically requested that the Proponent submit tidal gauge monitoring data for 2014 and 2015 respectively, including information regarding how it intends to address site-specific issues affecting the implementation of sea levels and storm surges monitoring in the Project area. While Baffinland indicated within its response to Board Recommendations that it has engaged its consultant to re-install the tidal gauge, and commence GPS monitoring at Milne Port in the summer of 2017, the NIRB reminds the Proponent that trends related to sea levels and storm surges from the Milne Inlet area cannot be predicted based on the data available for 2014 only. Further, the NIRB also reiterates that the submission of this monitoring data is required to clarify whether implementation of additional mitigation measures are necessary to ensure that the impacts of climate change on Project infrastructure, including Milne port facilities are adequately minimized and mitigated.

Recommendation 1: The Board requests that Baffinland recommence the monitoring of sea levels and storm surges at Milne Inlet to support trend analysis and that it identifies any site-specific conditions that continue to limit its efforts to retrieve data from the tidal gauge installed at Milne Inlet. It is requested that confirmation of resumption of monitoring is provided to the NIRB following re-installation of the tidal gauges, and that associated monitoring data be submitted to the Nunavut Impact Review Board in the 2017 Annual Monitoring Report.

Greenhouse Gas Emission Reporting

Baffinland is required pursuant to Condition 3 of the Project Certificate to provide interested parties with evidence of continued initiatives undertaken to reduce greenhouse gas (GHG) emissions from the Project area. Within its 2016 Annual Monitoring Report to the NIRB, Baffinland reported that it calculated the annual GHG emissions from the Project site; however, the NIRB notes that the Proponent did not include within its annual reporting information or documents substantiating how it has implemented site-specific initiatives to reduce GHG emissions.

Recommendation 2: The Board requests that Baffinland provide the Nunavut Impact Review Board with updates regarding its climate change strategy, noting any specific activities it has undertaken or anticipated initiatives to be implemented to specifically reduce greenhouse gas emissions from the Project sites. It is requested that Baffinland provide an update on this within its 2017 Annual Report.

Air Quality Monitoring

Baffinland is required pursuant to Conditions 7 and 8 of the Project Certificate to update its Air Quality and Noise Abatement Management Plan to support the continuous monitoring of SO₂ and NO₂ emissions from the Project site, and report on the data collected, in order to ensure that emissions remain within predicted levels across the Project sites, and where applicable, within limits established by all applicable guidelines and regulations. Within its 2016 Annual Monitoring Report to the NIRB, Baffinland reported that it could not collect or measure emissions parameters due to equipment failure, as such no specific updates were made to the Air Quality and Noise Abatement Management plan during the reporting period. In its 2016 Board Recommendations, the NIRB notes that Recommendation #3 to Baffinland requested that the details of any contemplated changes to the ongoing air quality monitoring program, including rationale for the potential suspension of any monitoring parameters (e.g., SO₂ and NO₂), be

provided to the NIRB and other authorizing agencies prior to terminating such monitoring activities. While Baffinland has not indicated its intention to suspend air quality monitoring or discontinue the measurement of these parameters, the NIRB notes that Baffinland has not consistently monitored SO₂ and NO₂ emissions across the project site or developed an alternative strategy for monitoring emissions in the event of instrumentation malfunction or failure.

Recommendation 3: The Board requests that Baffinland recommence the monitoring of SO₂ and NO₂ emissions across the project site and develop an alternative strategy for monitoring such emissions in the event of instrumentation malfunction or failure. The Nunavut Impact Review Board also requests that Baffinland provide information on the ambient concentration of SO₂ and NO₂ from different project sites, including a time-series analysis of emission variations across Project sites and that this update be provided within the Proponent's 2017 Annual Report to the Nunavut Impact Review Board.

Dust Management

Baffinland reported that dust management and monitoring was incorporated into the Air Quality and Noise Management Plan and the Road Management Plan prior to the start of construction, and that it further developed a Dust Mitigation Action Plan in response to excessive dust generated onsite. Baffinland also referenced the submission and updates to two (2) key documents (the Air Quality and Noise Management Plan and the Road Management Plan) in substantiating its compliance with Condition 10 of the Project Certificate as pertaining to dust management. Further, the NIRB notes that the web link provided by the Proponent in the 2016 Annual Monitoring Report to enable access to the referenced documents was non-functional; as such the NIRB was unable to confirm whether the Proponent is in full compliance with this term and condition of the Project Certificate. In addition, 2016 Board Recommendation #9 to Baffinland indicated that the 2015 Air Quality and Noise Abatement Management Plan was not updated with information that reflected the specific mitigation measures and adaptive management measures that would be implemented in the event of high threshold level of dust deposition, exceeding levels predicted in the FEIS or FEIS Addendum.

Recommendation 4: The Board requests that Baffinland substantiate its efforts of undertaking dust management and monitoring activities by submitting the referenced documents (the Air Quality and Noise Management Plan and the Road Management Plan), and provide details of the specific changes or updates made to its existing Dust Monitoring and Mitigation Plan in response to excessive dust emissions generated from the site, with details of how it intends to incorporate adaptive management strategies for increased dust deposition from its operations. It is requested that Baffinland provide updates on its efforts for dust management and monitoring, and also submit all the referenced documentation within the next 30 days to the Nunavut Impact Review Board.

Noise and Vibration Monitoring

Condition 14 of the Project Certificate requires Baffinland to conduct noise and vibration monitoring at Project accommodations during all phases of the Project during the summer and winter seasons. In the 2016 Annual Monitoring Report, Baffinland stated that in July 2016, one (1) room at the Mine Site and two (2) rooms at the Milne Port site were tested for noise and vibration levels. Baffinland further reported that due to equipment malfunction and availability issues that could not be resolved before the end of 2016 it was unable to conduct the scheduled winter noise and vibration monitoring during the 2016 period. The NIRB also notes that Baffinland did not provide any information within its annual reporting regarding what shifts or when exactly in the summer season the tests were done. The NIRB also questions the validity of

Baffinland's conclusion regarding the seasonal variation of noise/vibration levels between the two (2) sites due to the relatively low sample size (Mine site=1; Milne Port=2), which is not statistically robust enough and fully representative of the noise/vibration condition levels of the project area.

Recommendation 5: The Board requests that Baffinland improve its ongoing noise/vibration monitoring program by increasing the overall sample size and frequency of monitoring of noise and vibration levels at the Mine site and Milne Port accommodation facilities, and where possible provide details of the specific time and work shifts when such testing are done, including an analysis of any observed seasonal variation of noise and vibration levels and a discussion of the implication for workers' health and safety onsite. Further, it is requested that Baffinland provide information on how it intends to address future equipment malfunction issues to ensure that noise and vibration levels continue to be adequately monitored across the Project site. It is requested that this be provided within 30 days receipt of the Board's recommendations.

Aircraft Movements and Flight Levels

In the 2016 Annual Monitoring Report, Baffinland indicated that helicopter flights associated with the Project site have not been compliant with Conditions 59, 71, and 72 of the Project Certificate as pilots are to maintain the minimum cruising altitudes of at least 610 metres during point to point travel when in areas likely to have migratory birds, and 1,000 metres vertical, and 1,500 metres horizontal distance from migratory birds. Baffinland further reported that for the transects flown within the snow goose area during July and August, compliance was 28 percent (%) and 2% respectively. Further, Baffinland indicated that the helicopter flight height compliance outside of the snow goose area in July and August was 37% and 34% respectively, and that all areas flown outside of the sensitive season for waterfowl in June and September, saw 37% and 4% compliance respectively and that in general compliance to minimum cruising altitude was lower in 2016 than it was in 2015.

Recommendation 6: The Board requests that Baffinland to develop an action plan to mitigate aircraft disturbance to migratory birds, and address the consistent non-conformance with the flight altitude guidelines. It is requested that Baffinland provide information on how it will work with the helicopter contractor on revised protocols, pilot training and monitoring of flight logs to improve performance and compliance with the required flight altitude guidelines. It is also requested that Baffinland provide an update on its conformance within the 2017 Annual Report to the Nunavut Impact Review Board.

Shipboard Observer Program

Baffinland reported to the NIRB that the ship-based surveillance monitoring was conducted in 2013, 2014 and 2015, but was discontinued in 2016 due to safety concerns arising from the on-boarding of the observers, and the general lack of success of observers on ships to observe marine mammals during ship voyages. The NIRB notes that Baffinland provided no updates within its annual reporting on the status of compliance with this condition, nor discussed any alternative programs it was considering for monitoring vessel interactions with marine mammals and seabirds during the year. While Baffinland indicated that it will continue discussions with the Marine Environment Working Group (MEWG) to identify an alternative program that would incorporate an accidental strikes reporting protocol, the NIRB expects the Proponent to remain committed to achieving compliance with this condition. This is particularly important, recognizing Baffinland is currently seeking regulatory approvals associated with its Phase 2 Development proposal which involves increasing the frequency of shipping for the Project;

failure to demonstrate adherence to shipboard monitoring may contribute to public concern regarding potentially increasing shipping levels.

Recommendation 7: The Board requests that Baffinland develop an alternative strategy for monitoring vessel interactions with marine mammals, including seabirds should the ship-board observer program continue to be unfeasible due to safety concerns. It is also requested that Baffinland should notify the Nunavut Impact Review Board of any updates on this condition as pertaining to the design of any alternative programs, including evidence of Marine Environmental Working Group consensus on the agreed alternatives before the implementation of such programs. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Marine Environment-Ship Noise

Baffinland is required pursuant to Conditions 110 and 111 to develop a monitoring protocol to prevent impacts to marine mammals from Project shipping activities and expected to work with the Marine Environment Working Group (MEWG) to determine appropriate early warning indicator(s) that will ensure rapid identification of negative impacts along the southern and northern shipping routes. In addressing these conditions, Baffinland indicated within its 2016 Annual Report to the NIRB that the two (2) acoustic sites quantified vessel noise and detected the acoustic presence of marine mammal calls, but that the effects on marine mammals and marine mammal populations were not assessed. In addition, Baffinland also noted that no early warning indicators of negative impacts of vessel noise have been developed.

Recommendation 8: The Board requests that Baffinland provide information on how it intends to work with the Marine Environmental Working Groups in developing its early warning indicators of negative impacts of vessel noise on marine mammals pursuant to Condition 110 of the Project Certificate. It is also requested that the Proponent report on the specific indicators being developed noting how the Marine Environmental Working Group has been involved in identifying such indicators for use, including a description of how the indicators are to be used to inform marine mammal-vessel interactions. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Freshwater Aquatic Environment

Baffinland indicated within its 2016 Annual Monitoring Report that there were three (3) exceedances involving effluent discharges to the receiving environment, which constituted non-compliances with Condition 17 of the Project Certificate. In reporting these exceedances, Baffinland further indicated that in 2016, there were other sedimentation events including instances where surface water run-off downstream of Project facilities exceeded the discharge criteria for total suspended solids (TSS) and other parameters, which also constituted non-compliance with the requirement of Condition 46 of the Project Certificate. Baffinland also outlined that as a result of these reported exceedances, it received a Fisheries Act Direction in June of 2016 from Environment and Climate Change Canada under the Fisheries Act, and a letter of non-compliance from Indigenous and Northern Affairs Canada. Although Baffinland clarified that the high number of non-compliant discharges in 2016 was largely as a result of the freshet that occurred in the early spring, the NIRB reminds the Proponent that compliance with Conditions 17 and 46 of the Project Certificate, and implementation of protocols within the Sediment and Dust Mitigation Action Plans continue to be a requirement for the Mary River Project.

Recommendation 9: The Board request that Baffinland demonstrate how it has complied with the requirement of Conditions 17 and 46 of the Project Certificate, and implemented the protocols for managing sedimentation events during freshet onsite. It is requested that this information be incorporated in the 2017 Annual Monitoring Report to the Nunavut Impact Review Board.

Freshwater Aquatic Environment – Watercourses

Pursuant to Condition 47 of the Project Certificate, Baffinland is required to ensure that all Project infrastructure in watercourses are designed and constructed in such a manner that they do not unduly prevent and limit the movement of water in fish bearing streams and rivers. Within the 2016 Annual Monitoring Report to the NIRB, Baffinland indicated that mild (e.g. CV-106) to severe (e.g. south channel at BG-50) hanging culverts or culvert that are above the water line were noted at a few crossings as described in Table 3.3 of the 2016 Annual Report to the DFO. Baffinland further reported that mild perching of culverts does not appear to have affected fish passage, but indicated that the crossing at BG-50 was sufficiently perched through erosion to prevent all upstream access for fish in the south channel. INAC previously noted in 2015 that 11 of 34 fish-bearing in-water crossings had minor issues that required monitoring and potentially mitigation, and that there is potential for the crossing at BG-01 to become impassable in the future. The NIRB also notes that its 2016 Board Recommendation 15 to Baffinland requested that the Proponent develop an action plan for the improvement of the identified fish-bearing crossings. Further, the NIRB notes that there is a growing number of hanging or perched culverts around the vicinity of fish bearing streams, as such recommends that Baffinland take action to improve fish passage and make upgrades to culverts along the Tote Road.

Recommendation 10: The Board requests that Baffinland develop an action plan to address the hanging culverts around fish bearing streams, particularly for the crossing at BG-50. It is requested that Baffinland clarify how it has consulted Fisheries and Oceans Canada and modified its fish habitat monitoring program, and that it demonstrate how the Tote Road Earthworks Execution Plan has included an assessment of improvements to fish passage and upgrades to culverts along the Tote Road. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Survey and Monitoring of Arctic Char

Condition 48(a) requires Baffinland to provide plans to conduct additional surveys for the presence of arctic char in freshwater bodies and implement ongoing monitoring of arctic char health in areas affected by the Project. While Baffinland reported that surveys of arctic char were ongoing in the Project area, the NIRB notes that Baffinland's 2016 Annual Monitoring Report did not contain information or data on the general health status of arctic char population in freshwater bodies around the Project site. The NIRB requested in its 2016 Board Recommendation 4 to Baffinland that the Proponent support its conclusions regarding mine-related effects on fish health beyond reliance on morphometric parameters (length, size, weight, and age) and metal bioaccumulation trends in assessing effects. Further, the NIRB also recommended that Baffinland consider improvements to its Core Receiving Environment Monitoring Program (CREMP) to further substantiate its conclusion of no mine-related effects on fish population. In reviewing the 2015 Annual Monitoring Report, the NIRB notes that the Proponent did not provide any follow-up details regarding arctic char health or exposure-related effects due to mining derived contaminants.

Recommendation 11: The Board request that Baffinland provide information on how it is meeting Condition 48(a) and implementing monitoring of arctic char health in areas affected by the Project, including a discussion of how this monitoring would be informed through consultation with the Mittimatalik Hunters and Trappers Organization. It is also requested that the status of arctic char health sampled from the vicinity of the mine area and reference locations be provided and included within the 2017 Annual Report to the Nunavut Impact Review Board.

Marine Environment – Vessel Fouling Monitoring

Pursuant to condition 91, Baffinland is required to develop a detailed monitoring plan for Steensby Inlet and Milne Inlet for vessel fouling, and includes sampling areas on ships where antifouling treatment is not applied such as the areas where non-native species are most likely to occur. Within its annual reporting to the NIRB, Baffinland indicated that fouling had been monitored in Milne Port and Ragged Island (located in Eclipse Sound at the mouth of Milne Inlet) using annually collected underwater videos of the habitat offset area adjacent to the ore dock and natural benthic habitat (Milne Port only), and from settlement baskets (filled with native rocks to provide a surface for the settlement of fouling species) deployed in Milne Port and Ragged Island in 2014 and 2016 to detect settlement that would occur over two years. Baffinland further reported that no fouling monitoring has taken place on vessel hulls, and that no trends in fouling in the marine environment of Milne Inlet have been reported to date based on the collected 2014 and 2015 data.

Recommendation 12: The Board directs Baffinland to implement fouling monitoring on vessel hulls, as required by Condition 91. It is also requested that Baffinland provide the results of its settlement basket monitoring and underwater video surveys, including the proposed SCUBA-based monitoring program for detection of fouling on vessel hulls moored at Milne Port. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Culture, Resources and Land Use – Public Consultation

Baffinland is required pursuant to Condition 162 of the Project Certificate to engage Elders and community members of the North Baffin communities in order to have community level input into its monitoring programs and mitigative measures to ensure that these programs and measures have been informed by traditional activities and cultural resources. Within the 2016 Annual Monitoring Report to the NIRB, Baffinland indicated that in 2016 it completed workshops and community surveys on the Phase 2 Development Project that had been initiated in 2015 and further noted that the feedback it received during the Phase 2 workshops had helped to contribute to its decision-making with respect to the duration of shipping on the Phase 2 Development proposal submitted to the Nunavut Planning Commission. The NIRB notes that Baffinland annual reporting only discussed compliance with Condition 162 within the context of the proposed Phase 2 Development proposal and not for the approved Mary River Project.

Recommendation 13: The Board requests that Baffinland clarify how its engagement with communities for its Phase 2 Development proposal addressed issues from the monitoring of the approved Mary River project as required by Condition 162. It is requested that this update be included be provided within 30 days to the Nunavut Impact Review Board.

2. Recommendation from Authorizing Agencies' Comments on 2016 Annual Report

Qikiqtani Inuit Association (QIA)

Migration of Inuit and non-Inuit residents and Inuit Employee Turnover Rate

The QIA indicated that Baffinland's 2016 Annual Monitoring Report did not provide sufficient data regarding in-migration and out-migration of Inuit and non-Inuit residents within the North Baffin Local Study Area (LSA). The QIA also noted that information regarding employee residence, housing and migration status were not available for 2016 as required pursuant to Condition 133 of the Project Certificate. The NIRB notes that its 2016 Board Recommendation #13 to Baffinland requested that the Proponent, in consultation with the Qikiqtaaluk Socio-Economic Monitoring Committee, develop robust indicators to measure and survey the in-migration and out-migration of Inuit and non-Inuit residents in the North Baffin Local Study Area. The NIRB reminds Baffinland to continue to work with the QIA and the Qikiqtaaluk Socio-Economic Monitoring Committee to address the expectation for monitoring the migration of Inuit and non-Inuit residents and Inuit employee turnover rate.

Recommendation 14: The Board requests that Baffinland, in consultation with the Qikiqtaaluk Socio-Economic Monitoring Committee, develop robust indicators to measure and survey the in-migration and out-migration of Inuit and non-Inuit residents in the North Baffin LSA and discuss how this may affect local housing opportunities within the LSA. It is requested that Baffinland conduct a survey of the Inuit employee turnover rate on an annual basis and that the results of the survey be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Non-Inuit LSA residents and Contractor Employees

The QIA requested that Baffinland provide data for non-Inuit residents and contractors' employees who reside in the local study area, including information regarding Baffinland's Inuit employee payroll. The NIRB notes that its 2016 Board Recommendations 14 to Baffinland requested that the Proponent provide information regarding monitoring of non-Inuit residents and contractor employees in the local study area (LSA), and where applicable, provide information regarding Baffinland's Inuit employee payroll, in order to provide an understanding of the expansion of the local market for consumer goods and services within the LSA. The NIRB has consistently encouraged the Proponent to work with the QIA to address this information gap.

Recommendation 15: The Board requests that Baffinland consult with the Qikiqtani Inuit Association in discussing priorities regarding monitoring of non-Inuit residents and contractor employees in the local study area, and where applicable, provide information regarding Baffinland's Inuit employee payroll, in order to provide an understanding of the expansion of the local market for consumer goods and services within the local study area. It is requested that this data be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Environment and Climate Change Canada (ECCC)

Marine Environmental Effects Monitoring Program

ECCC commented on Section 4.5. 10 and Table 4.18 of the annual report noting that while the focus of the section was on ship ballast water, prop wash effects, and ore dust deposition, the

Marine Environmental Effects Monitoring Program (MEEMP) is also designed to detect effects associated with seepage and surface runoff from the Milne Port facility, in fulfilment of Condition 76 of the Project Certificate. ECCC noted that the results of the MEEMP were not included with the NIRB submission.

Recommendation 16: The Board request that Baffinland submit the results of the Marine Environmental Effects Monitoring Program within 30 days receipt of these recommendations.

Aquatic Effects Monitoring Plan

ECCC noted that the results of the Aquatic Effect Monitoring Program (AEMP) submitted in the 2016 Annual Monitoring Report is version 1, while the version available on Baffinland's web portal was an updated version. ECCC recommended that Baffinland provide the current version of the AEMP results to the NIRB for inclusion with the 2016 Annual Report on the NIRB public registry.

Recommendation 17: The Board request that Baffinland provide the current version of the Aquatic Effect Monitoring Program for inclusion with the 2016 Annual Report on the Nunavut Impact Review Board registry within 30 days receipt of these recommendations. It is also recommended that the next update of the Aquatics Effects Monitoring Plan include maps and figures that are legible and that this information be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Dustfall Monitoring Program

ECCC noted that a substantial portion of the Dustfall Measuring Program report appears to be missing. ECCC further indicated that the report made the following statement *“annual dust fall results are analyzed against the predicted dust deposition thresholds for the Project to determine if dust fall exceeds the applicable indicator threshold. Results are also reviewed to investigate dust fall on a temporal and spatial scale relative to background with focus on seasonal differences in dust fall data.”* and then proceeded immediately to references without a discussion of the analysis described.

Recommendation 18: The Board requests that Baffinland provide the missing sections of the Dustfall Monitoring Program report as well as a discussion of the information as relevant to dustfall monitoring. It is requested that this information be provided within 30 days receipt of these recommendations.

Groundwater & Surface Water

ECCC noted that Table 4.11 of the 2016 Annual Report states that *“groundwater is not monitored; surface seepage is monitored in accordance with the Water License”*. ECCC further indicated that groundwater around the mine waste rock piles should be monitored for metal leaching which could drain during the freeze-thaw cycle, and that Baffinland should provide its justification for not monitoring groundwater around the mine waste rock piles.

Recommendation 19: The Board requests that Baffinland monitor groundwater drainage around the mine waste piles and in other Project locations pursuant to Condition 23 of the Project Certificate or clarify/justify why groundwater is not currently being monitored. It is requested that data regarding groundwater monitoring be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Air quality

ECCC noted that no incinerator stack testing has been conducted since the initial testing in 2013. ECCC specifically noted that potential problems with incineration may have arisen since the initial testing, resulting in the potential release of contaminants, such as dioxins, furans, and mercury at levels exceeding allowable standards into the environment. ECCC further indicated that Baffinland has not included any commitments to conduct a follow-up incinerator stack testing in the Project's Waste Management Plan and recommended that Baffinland perform stack testing of the incinerators every three (3) years.

Recommendation 20: The Board requests that Baffinland perform stack testing of incinerators at regular three (3) year intervals, and to report the results of such testing in future Annual Reports to the Nunavut Impact Review Board.

Indigenous and Northern Affairs Canada (INAC)

Effluent Discharge Criteria, including Ground water/surface water monitoring

INAC reported that Baffinland's annual reporting did not include detailed information of water volume and analytical data associated with effluent discharges from the Crusher Pad Sedimentation Pond (MS-06) and Waste Rock Sedimentation Pond (MS-08) pursuant to Conditions 17 and 24 of the Project Certificate. INAC also commented on Baffinland's compliance status with Conditions 20 through 30 of the Project Certificate noting that on page 79 of Baffinland's 2016 Annual Monitoring Report the Proponent was not clear on how many instances or one-time exceedances of effluent discharges from the project site have occurred. In addition, Baffinland reported that surface water runoff downstream of active quarries and mining areas showed elevated ammonia and nitrate levels in comparison to baseline concentrations during the 2016 period. INAC indicated that Baffinland did not include any detailed data of the chemical parameters in the report or identified where such data could be found and accessed.

Recommendation 21: The Board requests that Baffinland include detailed data of water volume and analytical data associated with the surface water runoff from active mining/quarries areas and effluent discharges from the Crusher Pad Sedimentation Pond (MS-06) and Waste Rock Sedimentation Pond (MS-08) and other project facilities in order to verify its compliance with terms and conditions 17 and 24 of the Project Certificate. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Hydrodynamic Modelling

INAC commented on page 183 of the Annual Monitoring Report noting that the report lacked detailed measurement data for the hydrodynamic modelling sampling program conducted in Milne Inlet pursuant to condition 83(a) of the Project Certificate. Although Baffinland reported that the results of the sampling showed a well-defined vertical gradient in salinity, increasing from the surface the bottom of the marine water, INAC requested that the Proponent clarify when or in which season the above-noted salinity profile was taken and also indicate whether it would be different in different seasons. Further, INAC also commented that the results of physical and chemical parameters, such as conductivity, total suspended solids, turbidity, nutrients, metals and other chemical species in the water column and in the sediment collected from Milne Inlet area were only presented in descriptive terms without any quantitative data description being provided within the report.

Recommendation 22: The Board requests that Baffinland improve upon its reporting of results associated with the hydrodynamic modeling program by incorporating both descriptive and quantitative data of all relevant parameters in future annual reports. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Ballast Water Management

INAC commented on the erroneous data presented on Table 4.8 on page 194 of the annual report, and questioned the validity of Baffinland's quality assurance (QA)/ quality control (QC) procedures and practices for ballast water monitoring, as well as its conclusion regarding its compliance with Condition 89 of the Project Certificate.

Recommendation 23: The Board requests that Baffinland improve Quality Assurance and Quality Control protocols for its ballast water sampling program in order to prevent erroneous data and to ensure that ballast water meet the salinity requirements of the applicable regulations prior to discharge at the Milne Port. It is also requested that the Proponent provide corrected results of its ballast water sampling, including details of how Quality Assurance/Quality Control methods would be improved upon and validated for subsequent sampling within 30 days receipt of the Board's recommendations.

Government of Nunavut (GN)

Nunavut Annual Net Migration

The GN noted that some surveyed Baffinland employees indicated that they intend to relocate to a different community in the next 12 months and with housing inventories not available in many communities, the GN further expressed concerns that such move may place additional stress on housing-related issues. The GN recommended that further questions be developed and incorporated into the pre-existing voluntary employee survey to better define the effects of project-related influences on housing in the north Baffin LSA.

Recommendation 24: The Board requests that Baffinland assess Project-related influences on housing in the north Baffin local study area, as well as to continue developing employee surveys to properly address all socio-economic indicators likely to arise due to migration. It is requested that the results of the survey be provided and incorporated within the 2017 Annual Report to the Nunavut Impact Review Board.

Community Survey Results

The GN commented that the 2016 North Baffin community survey reported on in the 2016 Annual Report did not report examples of negative changes expressed in the community surveys. The GN further noted that the availability of such information would lead to opportunities to review impacts reported on behalf of communities, and where impacts are found to be valid, the Proponent can then investigate whether mitigation measures have been or can be successfully implemented.

Recommendation 25: The Board requests that Baffinland adhere to the recommendation of the Government of Nunavut to provide examples of negative changes or concerns reported in the community surveys and a description of how Baffinland intends to address these impacts and confirm that proper mitigation measures have been implemented. The

positive and negative results associated with the community surveys should be provided and included within the 2017 Annual Report to the NIRB.

Childcare availability and Cost

The GN commented that the lack of child care in communities may result in the increase in Inuit turnover rates at the Project and recommended that the Proponent investigate the feasibility of using the Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat (INPK) to provide additional supports to community daycares or child care services over and above what is available through the GN's Start-up Contribution program.

Recommendation 26: The Board requests that Baffinland follow the recommendation of the Government of Nunavut to address the increase in Inuit turnover rates at the Project by exploring the feasibility of using the Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat fund to provide additional supports to community daycares or child care services over and above what is available through the Government of Nunavut's Start-up Contribution program. It is requested that updates with respect to providing additional supports to community daycares or child care services for employees or through Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat fund be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Food Security

The GN noted that Baffinland's annual reporting did not make any conclusion regarding food security for affected community members and that the majority of discussion in the 2016 Annual Monitoring Report tended to focus on income, including food access and affordability of food in the local communities. The GN specifically commented that the access to hunting grounds continues to be identified as an ongoing issue for residents of Pond Inlet but that Baffinland has yet to measure or report this impact.

Recommendation 27: The Board requests that Baffinland consider working with appropriate stakeholders to develop a measurement tool/indicator for food security and provide information on the impact of the Project on food security, including access to hunting grounds. It is requested that this update be included within the 2017 Annual Report to the Nunavut Impact Review Board.

Pressures on Existing Health and Social Services

The GN reported that the Project has had impacts on the health care service provisions and recommended that service requests and interactions be tracked to monitor the degree of impact and determine if improvements can be made to the system and process currently in place for health and social services.

Recommendation 28: The Board requests that Baffinland engage with the Government of Nunavut to discuss possible Project implications on existing health and social services, including strategies for tracking health and social service requests. The Proponent should also consider providing information regarding outbreak investigations of communicable diseases, medical assessment or return to work as a requirement of insurance or workplace policies, and treatment of workplace injuries upon returning to the community. It is requested that an update on this engagement and related outcomes be included within the 2017 Annual Report to the Nunavut Impact Review Board.

World Wildlife Fund (WWF)

Collection of Marine baseline data

The WWF noted that Condition 99 of the Project Certificate requires Baffinland collect baseline data on marine wildlife, including shore-based observations of pre-Project narwhal and beluga behaviour at Milne Inlet at an appropriate frequency for not less than three consecutive years. In reviewing the 2016 Annual Report to the NIRB, the WWF noted that Condition 101 requires that Baffinland incorporate a schedule for periodic aerial surveys as recommended by the Marine Environmental Working Group. The WWF further noted that the results of the 2016 aerial survey were not included within Baffinland annual reporting to the NIRB, and as a result questioned the validity of Baffinland's conclusions regarding narwhal abundance and behaviour. In addition, WWF recommended that Baffinland incorporate more monitoring data such as DFO-led aerial surveys prior to interpreting results and providing conclusive statements within its annual report.

Recommendation 29: The Board requests that Baffinland strengthen its marine monitoring program by including data from acoustic monitoring and aerial surveying, and where possible integrate results from Fisheries and Oceans Canada led surveys, prior to the interpretation of results and provision of conclusions within its annual reporting. It is further recommended that Baffinland comment on its ability to undertake more direct studies on disturbance, including for instance, acoustic monitoring before, during, and after ship transits, drone monitoring before, during, and after ship transits and possibly photo surveys before, during and after transits. In addition, it is also requested that Baffinland submit documentation of the results of the shore-based observations of narwhal behavior that took place in 2016 within 30 days' receipt of the Board's recommendations.

3. Recommendations Based on NIRB's 2017 Site Visits

Below is a summary of the issues noted during the 2017 site visits, and suggested recommendations to address them:

Used Tires

During the 2017 site visits, used tires continue to be a significant waste stream across the Project sites, particularly around the mine site and Mile Port, and as noted in the 2016 site visit. While the NIRB Project Certificate does not have any specific terms and conditions for addressing this particular waste stream, the management measures committed to by Baffinland in both the Final Environmental Impact Statement and the Environmental Protection Plan stated used tires were expected to be stockpiled for shipment offsite (e.g., re-treading, reuse, or disposal). During the August 2017 site visit, Baffinland indicated that used tires were being stored in seacans for shipping and disposal offsite in the south, and that plans were underway to repurpose some of the historical tires for other site use. The NIRB's 2016 Board Recommendation #17 to Baffinland requested that the Proponent provide an explanation as to why the used tire management measures committed to in the Final Environmental Impact Statement (FEIS) and FEIS Addendum for the Mary River Project and Early Revenue Phase, which stated that used tires would be stockpiled for shipment offsite (e.g., re-treading, reuse, or disposal), were not in place onsite.

Recommendation 30: The Board requests that Baffinland provide an update regarding how it has implemented measures within its Tire Management Plan for re-treading, reuse,

or offsite disposal of tires generated from the site. It is further recommended that a more organized method of storing the tires be implemented. It is requested that a response to this recommendation be provided within 30 days' receipt of these recommendations.

Waste Landfill

At the time of the March and August 2017 NIRB site visits, it was noted that all of the protective mesh around the landfill area were completely removed from the supporting poles similar to previous site visit observations in 2014, 2015, and 2016, and the wooden fence around the facility was insufficient to contain wind-blown debris originating from the landfill. The NIRB further notes that the condition of the fencing around the landfill during the 2017 site visits have not significantly improved compared to previous years as Baffinland has yet to install a more durable fencing materials consistent with best practices, and as recommended by the NIRB in 2014, 2015, and 2016 respectively. Further, the NIRB's 2016 Board Recommendation #18 requested that Baffinland continue to evaluate its need for an upgraded litter fence around the active areas of the landfill in the light of changing environmental conditions at site.

Recommendation 31: The Board directs Baffinland to adhere to industry best practices for landfill operations, including through the installation and continued maintenance of landfill litter fences to ensure waste materials are not dispersed offsite. It is requested that an update regarding this recommendation be provided within the next 30 days to the Nunavut Impact Review Board.

Uncontrolled Seepages from Waste Rocks

During the tour of the waste rock dump that occurred as part of the NIRB's 2016 site visit, NIRB staff noted uncontrolled seepage of site contact water into the adjacent tundra from the piles of potentially acid generating waste rocks. It was observed that the waste rock storage area lacked appropriate water management structures required to properly divert or intercept overland runoff from waste rock dump to the nearby sediment pond. Subsequent to the 2016 visit, Baffinland constructed the MS-08 facility (sedimentation pond and ditching) to address the issue. The NIRB's 2016 Board Recommendation 19 to Baffinland specifically requested that the Proponent provide an explanation for the uncontrolled seepage of site contact water from the piles of potentially acid generating waste rock into the adjacent tundra and provide an action plan for addressing the environmental issue. During the March 2017 site visit NIRB staff noted that MS-08 had been constructed, but as a result of the snow and freezing conditions onsite it was not possible to assess the effectiveness of the facility.

Prior to the August 2017 site visit, it was noted by the QIA and ECCC that the MS-08 facility was not effective in containing the runoff from the waste rock pile during the freshet. During the August 2017 site visit, the NIRB staff further noted that MS-08 had overflowed, with the site contact water/ runoff flowing into the adjacent tundra. Baffinland indicated its intent to re-ditch the western portion of MS-08 and re-engineer the sedimentation pond and interception ditch as necessary to prevent further seepage and overflow from the facility.

Recommendation 32: The Board requests that Baffinland provide an action plan showing how the MS-08 facility will be improved to ensure that site contact water is properly managed around the waste rock piles, and that discharge from the waste rock dump meets criteria and is properly contained and channeled, and not allowed to flow into the adjacent tundra. It is requested that this information be provided within 30 days receipt of these recommendations.

Landfarm - Contaminated Snow, Soil and Synthetic Liners

During the March and August 2017 site visits, the NIRB staff noted significant improvement to the landfarm facility due to the ongoing removal of entrenched synthetic liners and the control of windblown debris from the site consistent with the request of the NIRB's 2016 Recommendation #20 to Baffinland. However, the NIRB staff observed that some liner scraps continue to be visible within the contaminated soils located in the facility. In addition, waste barrels, plastic buckets and other non-soil debris were also observed in the landfarm.

Recommendation 33: The Board requests that Baffinland adhere to industry best practices for landfarm operations, including for management of contaminated snow and waste synthetic liners. It is requested that an update regarding this recommendation be provided within the next Annual Report to the Nunavut Impact Review Board.

Terrain Stability at Sewage Outfall Area

As noted during the 2016 site visit, some areas within the vicinity of the sewage outfall area showed signs of terrain instability, and could pose a fall risk to workers unfamiliar with the site. The NIRB's 2016 Board Recommendation 22 to Baffinland requested that the Proponent address the terrain stability issues noted at the sewage outfall area in relation to impacts resulting from freshet events or spring thaw. Although Baffinland responded to the NIRB that the location will be included as part of the bi-annual geotechnical inspection of the Mary River Project infrastructure as required under the Type "A" Water Licence; the August 2017 NIRB site visit noted that the terrain situation around the sewage outfall area continues to remain unstable due to significant erosion and permafrost thawing.

Recommendation 34: The Board requests that Baffinland provide an action plan for addressing the terrain stability issues consistently noted at the sewage outfall area in relation to impacts caused by freshet events or spring thaw. It is requested that this information be provided within 30 days receipt of these recommendations.

The Board respectfully requests that for items requiring follow-up action by Baffinland that a response be provided within the timeline as requested for each of the recommendations.

Should you have any questions or require further clarification regarding the Board's recommendations or the NIRB's monitoring program for the Mary River project, please contact me directly at (867) 983-4603 or samuno@nirb.ca

Sincerely,



Solomon Amuno, PhD
Mary River Project Monitoring Officer
Nunavut Impact Review Board

cc: Megan Lord-Hoyle, Baffinland Iron Mines Corp.
Mary River Distribution List

Enclosure (1): The Nunavut Impact Review Board's 2016 – 2017 Annual Monitoring Report for Baffinland Iron Mines Corp.'s Mary River Project