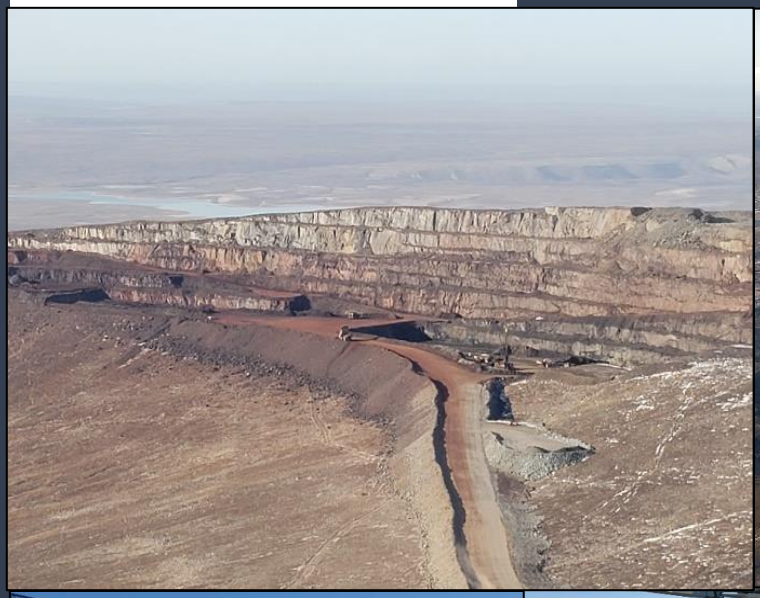
Nunavut Impact Review Board

Board Site Visit Report for the NIRB's Assessment of the Phase 2 Development Proposal

Issued October 22, 2019




Baffinland Iron Mines Corporation's

Mary River Project

NIRB File No. 08MN053

1. Background and Notice Regarding the Site Visit:

On August 29, 2019, as part of the NIRB's assessment of the Phase 2 Development Proposal, the Nunavut Impact Review Board (NIRB or Board) provided formal notice that it was undertaking a site visit of the approved project to increase understanding and familiarity with the physical setting of the project for both Board and registered Intervenors. The scope of the proposed site visit, as provided in the notice, was to conduct the visit over one day, Saturday, September 21, 2019 and provide participants the opportunity to view existing infrastructure as well as to understand the scale of changes being proposed for the Phase 2 Development. Further, the notice also provided parties direction on coordinating accommodations and responsibilities for cost incurred to participate in the event.

2. The Purpose of the Site Visit

The purpose of the site visit was to provide the Board and the Intervenors in attendance with an opportunity to:

- Increase their understanding and familiarity with the existing infrastructure at the Mary River, Tote Road, and Milne Port sites;
- Understand the physical setting of the proposed infrastructure and activities associated with the Phase 2 Development Proposal in the context of the already-approved Project; and
- Get a first-hand view of the site features, better understand scale of activities, the area and general location of both existing and proposed infrastructure and activities within the scope of the Proposal.

3. Itinerary

The Phase 2 Development proposal involves works at both the Mary River mine site as well as the Milne Port site, which was the priority initially discussed with Baffinland to draft the itinerary for the site visit. The inserted agenda was provided by Baffinland to all participants prior to the site visit.

Two interpreters, which provided Inuktitut/English interpretation services, accompanied the ground portion of the tour throughout the day.

Baffinland

September 21, 2019
Agenda for Nunavut Impact Review Board Visit to Mary River

Time	Activity	Notes
8:00:00 AM	***Depart Iqaluit for Mary River Air Terminal***	**Guests responsible for their own transportation to and from the Airport** **Please arrive at the Iqaluit Airport by 7:15 am and check in at the First Air Counter**
10:30:00 AM	*Arrive Mary River Air Terminal*	Arrive Mary River Air Terminal
10:40:00 AM	*Safety and Helicopter Orientation, Distribution of Personal Protective Equipment for Group A and B*	Guests will be asked to pack a lunch for the bus ride to Milne Port Group B travelling by helicopter will be required to complete an additional helicopter safety orientation
11:15:00 AM	*Group A Board Bus for Mine Site Driving Tour and Travel to Milne Port via Tote Road*	Driving tour of Mine Site followed by travel along the Tote Road to Milne Port
12:00:00 PM	*Group B begin helicopter tour*	Helicopter over flight of Mine Site, Deposit 1, Tote Road, Proposed Rail Alignment, Milne Port, and Bruce Head Monitoring Station
1:15:00 PM	*Group B Helicopter Flights land at Port Site*	Group B to proceed to Port Site Complex (PSC) Cafeteria for refreshments
3:30:00 PM	*Group A Arrive at PSC by Bus*	Proceed to PSC Cafeteria for refreshments
4:00:00 PM	*Group A and B Meeting with Shiploading and Port Management*	Baffinland Port Management Team to provide an overview of Port Site operations and changes proposed at the Port Site under the Phase 2 Proposal
4:30:00 PM	*Group A and B Tour of Port and Ship loading facilities*	Driving Tour
5:00:00 PM	*HEALTH BREAK*	PSC Cafeteria
5:30:00 PM	*Group A and B Board bus for transit to Mary River Air Terminal*	During transit to Mary River Air Terminal group to stop at Mock Rail Embankment
9:00:00 PM	*Bus Arrives at Mary River Air Terminal for Departure to Iqaluit*	Guests will be asked to leave all Personal Protective Equipment before boarding aircraft to Iqaluit
11:25:00 PM	***Arrive Iqaluit***	**Guests responsible for their own transportation to and from the Airport**

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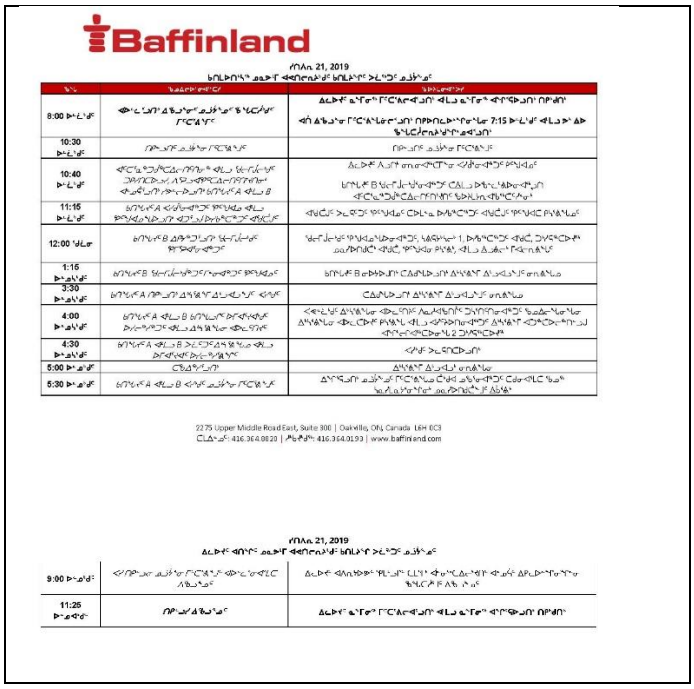


The site visit took place on Saturday, September 21, 2019 from 8:00 a.m. to 11:30 p.m., and consisted of the following itinerary:

- 8:00 a.m. the Board, Intervenors, and select Baffinland staff checked in at the Iqaluit Airport and travel by charter flight from Iqaluit to the Mary River Mine site;
- 10:30 a.m. arrived at the May River site and the Board, Intervenors and Baffinland personnel (including external consultants) gathered in the terminal to participate in a safety briefing and site orientation. Maps were provided to Board members to help determine landmarks as verbal communication was not possible between participants aboard the helicopters, see Section 6: Figures provided to the Board during the site visit. Participants pack a light bag lunch to consume on the tour;
- The Intervenors and a NIRB staff member boarded a bus with Baffinland personnel to drive a circuit of the Mary River Mine Site and the length of the Tote Road to Milne Port. At the mine site, Baffinland personnel noted key aspects of the site as the bus passed (the components of the site viewed during the tour are as listed below in Table 1: Project Components Viewed by Attendees During the September 21, 2019 Site Visit);
- Once the bus passengers loaded and left the terminal at the Mary River Mine Site, the NIRB Board members with the Executive Director and legal counsel viewed the helicopter safety video, attended the on the ground helicopter safety demonstration provided by the helicopter pilots and boarded two helicopters. Points of interest along the flight included a fly over of the Mary River Mine Site, above existing Tote Road, a view of the North Railway alignment where it is planned to diverge from the Tote Road, flying over Milne Inlet and the Bruce Head marine mammal observatory and flying over and landing at the Milne Port site;
- The helicopter tour departed the Mary Rive Mine Site approximately 12:30 pm and landed at the Milne Port site at 2:00 pm. While at the Milne Port site, the participants from the helicopter tour have lunch at the site camp while awaiting the arrival of the site visit participants on the bus;
- 12:04 pm the bus began the drive on the Tote Road, briefly stopping at kilometer 60 for a rest stop;
- 2:30 pm the bus arrives at the Milne Inlet Port site, and all site visit participants gather at the site camp for a brief break.
- Following the brief break, all NIRB Board members, Intervenors and Baffinland personnel continue by bus to tour the Milne Port site, noting specific aspects of the site as the bus passes, including the port area, crushing, and storage areas;
- Additional stops for the group occurred on the return bus trip, including an opportunity to observe the ore loading dock, tankers, stockpiles, and the simulated rail approach/caribou crossing;

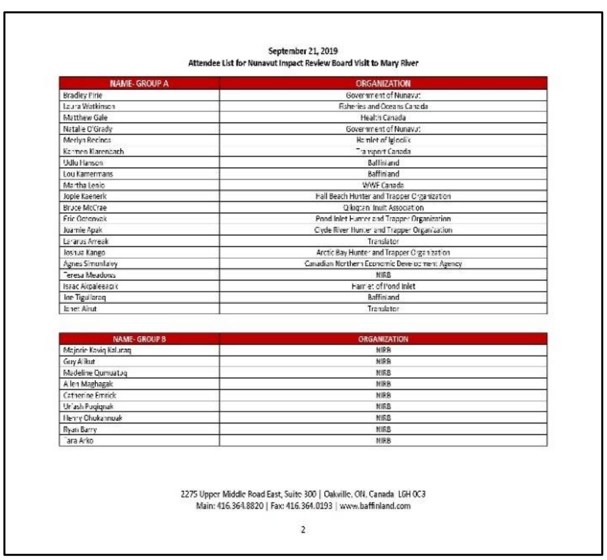
- The bus with all participants and Baffinland personnel returned back to the Mary River Mine Site via the Tote Road, briefly stopping at kilometre 60 for a rest stop. Along the drive, Baffinland personnel described the proposed orientation of the Northern portion of the railway in relation to the existing road, as well as identifying the proposed location for new bridges and road crossings, and pointed out existing components of the previously-approved project such as archaeological sites, dust sampling sites, and procedures for traffic using the road
- 8:30 pm arrived at the Mary River Mine Site and bus proceeded to the air terminal where, following a brief break to return safety equipment the Board, Intervenors, and select Baffinland staff boarded the charter flight at approximately 9:00 pm for the return trip back to Iqaluit;
- 11:15 pm the Board, Intervenors, and select Baffinland staff arrive at the Iqaluit Airport ending the site visit.

Table 1: Project Components Viewed by Attendees During the September 21, 2019 Site Visit

Project Component	Notes/Items Highlighted
Mary River site tour for group on bus: • Baffinland personnel noted that the bus would not proceed to the mining area itself but focus on the crushers and staging areas	
Main warehouse and supplies staging area	
Ore haul trucks and yard	Pointed out that they were hauling every day
Newer staff accommodations which are still under construction	Pointed out that they were named by the community as Salivik which means resting place or place of gathering
Bulk fuel storage facilities	
Electric plant to service site	
Water and wastewater treatment plant	
Mobile maintenance shops for various equipment	
Older camp and main office	
Emergency response and rescue team areas	
Trucks actively hauling ore away from mine, and their use of the roads at site	Noted where proposed location for crusher and pads, transfer areas, stockpiles, rail terminal, train size. Railway woud have 3 trains, each with 2 locomotives and 64 rail cars for ore; each car will carry 160 tonnes. Load time for train would be approx. 2 hours, they would be weighed, then transport would commencel
Crushing and screening equipment at the main area	Noted the product went direct to shipping and was sorted based on particle size. Amount of rock that bypasses crushing is about 70% as the particle size is already small enough, as determined by screening, and only about 30% of rock requires crushing prior to being loaded onto trucks and taken to Milne for further processing
Staging area for changing over daily mine operations team	
Site services workshop at the end of the tote road	

Project Component	Notes/Items Highlighted
Driving Tote road	Noted a more detailed tour would occur on the return trip with the Board present, but during the initial drive with Intervenors personnel would note where the railway is expected to diverge from or rejoin the road
Milne Port Site tour:	
Offices, cafeteria	
Ambulance and fire truck buildings	
Mobile maintenance building	
Bulk fuel tanks	
Power generators	
Incinerator	
Ore pad viewed from the SE corner	Noted piles are 16 metres high and stacked using the mobile stacker which was pointed out
Ship loader	
Ore carrying vessel	Noted that vessel 59 was currently being loaded
Mock Railway embankment demonstration area	Noted rock size comparison being considered, approximately 30 caribou crossings being considered based on human and wildlife use, 15 underpass culverts where rail line is too high to allow caribou crossings (track more than 4-10 metres high)
Components of note on the Tote Road observed on drive returning to Mary River mine site	Signage (kilometer markers), call in requirements noted by the signs, radio towers, procedures for communicating location and right of way on the road, cell coverage, key lakes and marking of no-go areas to preserve archaeological sites, flagging of culverts for clearing and maintenance

4. Attendees



September 21, 2019

Attendee List for Nunavut Impact Review Board Visit to Mary River

NAME- GROUP A	ORGANIZATION
Bradley Pirie	Government of Nunavut
Laura Watkinson	Fisheries and Oceans Canada
Matthew Gale	Health Canada
Natalie O'Grady	Government of Nunavut
Merlyn Recinos	Hamlet of Igloolik
Karmen Klarenbach	Transport Canada
Udlu Hanson	Baffinland
Lou Kamermans	Baffinland
Martha Lenio	WWF Canada
Jopie Kaenerk	Hall Beach Hunter and Trapper Organization
Bruce McCrae	Qikiqtani Inuit Association
Eric Ootoovak	Pond Inlet Hunter and Trapper Organization
Joamie Apak	Clyde River Hunter and Trapper Organization
Lazarus Arreak	Translator
Joshua Kango	Arctic Bay Hunter and Trapper Organization
Agnes Simonfalvy	Canadian Northern Economic Development Agency
Teresa Meadows	NIRB
Isaac Akpaleeapik	Hamlet of Pond Inlet
Joe Tigullaraq	Baffinland
Janet Airut	Translator

NAME- GROUP B	ORGANIZATION
Marjorie Kaviq Kaluraq	NIRB
Guy Alikut	NIRB
Madeline Qumuatuq	NIRB
Allen Maghagak	NIRB
Catherine Emrick	NIRB
Uriash Puqiqnak	NIRB
Henry Ohokannoak	NIRB
Ryan Barry	NIRB
Tara Arko	NIRB

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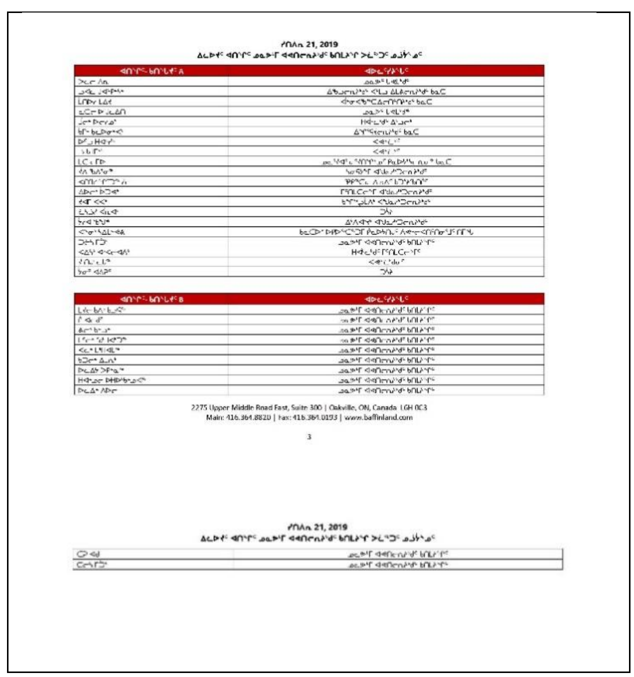


5. Questions Asked by Attendees During Site Visit

The following is a list of the questions asked by the attendees during the site visit (as summarized by NIRB staff in attendance):

- What does the red number on the side of the truck mean?
- Where would the train go?
- Is the current stockpile at the Milne Port Site typical for this time of year (or is it bigger or smaller than previous years)?
- Will there be another crusher at the Milne Port Site (or is the other crusher proposed during the Phase 2 Project Proposal going to be located at the Mary River Mine Site)?
- What will the contractor, Hatch, be responsible for with respect to the Phase 2 Project Proposal?
- How is the ore stacked in the stockpile (both the method and the progression of the stockpiling)?
- How much ore is currently in the stockpile (as of the site visit on September 21, 2019)?
- How many truck loads of ore are delivered to the site every day?
- How many ships are loaded each day during the shipping season?
- Where are the ships going when they are loaded—are they all going to the same destination?
- How many tonnes of ore will be shipped by the end of this shipping season?
- How many Inuit staff are employed at the ship loading site specifically and at the Milne Port Site generally?
- Has Baffinland met their quota/target for ore shipments each year since the mine has been operating?
- If Phase 2 is approved, will the existing ship loading dock be the only dock that is operational, or would there be another dock at the Milne Port Site?
- When does Baffinland expect the last shipment to take place this year?
- How much is the iron ore loaded on this ship worth?
- At the end of the shipping season will there be any ore left on the stockpile, and if so, how much ore will be left?
- What is the size of the biggest ship that can load at the current dock?
- What would be the size of the biggest ship that could load at the dock proposed for the Phase 2 Project Proposal?
- Where will the second ship loading dock planned for the Phase 2 Project Proposal be constructed relative to the current dock?
- How deep is the draft of the existing ore ships (74,000 tonnes)?
- Is there security on the ore ships (to ensure that the ship makes it to its destination)?
- Has the land around the current ore dock been “manmade” (i.e. dewatered and then built up with rock)?
- In the Phase 2 Project Proposal how much faster will the second loading dock be able to load the ore onto the ships compared to the ship loading facility that is in place now?
- How many loading towers would be in place at the second loading dock facility planned under the Phase 2 Project Proposal?
- If the Phase 2 Project Proposal were to be approved, how much would the total annual shipping capacity be?

- Would the increase in shipping capacity under the Phase 2 Project Proposal provide sufficient revenues to support Baffinland's construction of the full Mary River Project as originally approved?
- How long would the Phase 2 Project Proposal have to operate for Baffinland to have sufficient revenues to build the original project?
- Does the price of iron ore fluctuate widely—and if so, does that make it very difficult to predict and plan your operations?
- Where are the marine monitors for the ship loading dock facility at the Milne Port Site located?
- What are the projections for additional Inuit employment during the Phase 2 Project Proposal?
- How long has it taken to develop the current Mary Rive Mine and Milne Port Site?
- How close together will the caribou crossings be located?
- How close together will the snow machine/ATV crossings be located?
- How high above the basic embankment will the actual rails for the railway be located?
- What do the embankments that are greater than 4 metres look like, and what is the maximum elevation of the embankments?
- For the culverts that will be serving as railway underpasses, when the culverts get blocked with snow, who is responsible for keeping them cleared out so that people can still use them to cross the railway?
- Why are the proposed caribou and snow machine crossings not wedge shaped so that all sides have the same angle of attack rather than a drop off around the edges?
- Can the side slopes of the proposed level crossings be flattened to improve access to the proposed crossings?
- If the design is not going to be more wedge shaped, how are the edges of the embankments marked so that people crossing the lines can see where the crossings drop off?
- What is the biggest cut Baffinland will have to make to construct the railway embankments?
- How many tunnels will be built along the railway?
- How will the rails be incorporated into the crossings so that they will be level (i.e. not raised six inches above the embankment so that someone passing over each rail would have to go up and over each rail line)?
- When the road and the railway are in close proximity and there is a crossing, will the crossings be designed so that there is a single level crossing that extends across both the road and the rail?
- How many trains would Baffinland propose to run on the north rail line?
- How many trains would run back and forth daily?
- How frequently would the trains run on the north line every day?
- What would happen if there was wildlife observed on the north rail line?
- How long does it take the train to stop?
- Are there dustfall monitors along the Tote Road, and if so, where?
- How high off the ground are the dustfall monitors placed?
- What are the typical types of archaeological sites that are found along the road/rail and at the Mary River Mine Site and the Milne Port Site?
- Who oversees mitigating any archaeological sites that are identified?
- If mitigation involves removing artifacts, where do the artifacts go?
- Is there a water pipeline from the Lake at kilometre 32 (where the Milne Port Site's drinking water comes from) back to the Milne Port Site?

- What are the kilometre markers along the Tote Road used for?
- How are drivers able to distinguish the edge of the road from the horizon during 24 hours of darkness and/or stormy weather (rain or snow)?
- At Kilometre 50, where is the north rail alignment, relative to the Tote Road?
- Will activity on the Tote Road be affected by the operation of the north railway?
- Have there been any accidents/incidents resulting in fatalaties at the Mary River Mine Site or Milne Port Site since the Mine started operating?
- Were there corrective actions, repairs, or other actions taken to prevent these kinds of things from happening again?
- Were the families of the deceased workers provided with compensation, and/or counselling following the incidents?
- How much ore is in Deposit 1?
- What is the life of the Mary River Mine?
- How many of the current haul truck drivers will lose their jobs if the north railway starts running?

6. Pictures Taken During Site Visit

View landing at the Mary River site

Terminal at Mary River site airstrip

Participants gathering at site orientation and safety briefing

Baffinland introduction of personnel at site orientation and safety briefing

NIRB Board members preparing for helicopter tour

NIRB Board members taking off for helicopter tour

Mary River mine site viewed from helicopter

Mine pit viewed from helicopter

Waste Rock Storage pad at Deposit 1

Haul truck on Tote Road

Tote Road

Tote Road river crossing

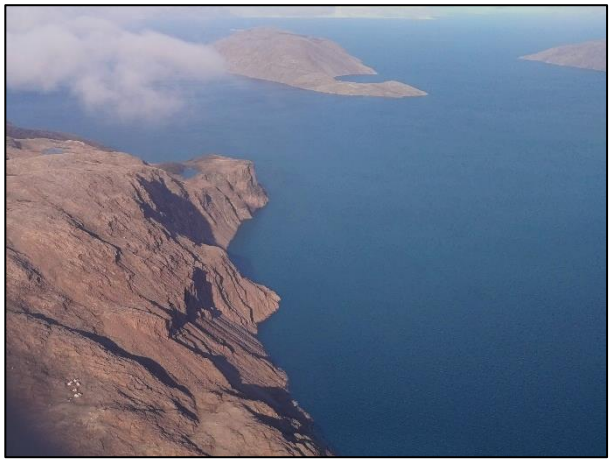
Tote Road quarry

Tote Road approaching Milne Port site

Milne Port site

Milne Port and barges

Milne Port marine infrastructure



View from Bruce Head monitoring site

Bruce Head monitoring site and shelters

Barge loading dock from helicopter

Barge loading area as viewed during bus tour

Barge loading area noting conveyor belts and chutes

Structures at Milne Port as viewed on bus tour

Tank farm at Milne Port

Generators at Milne Port

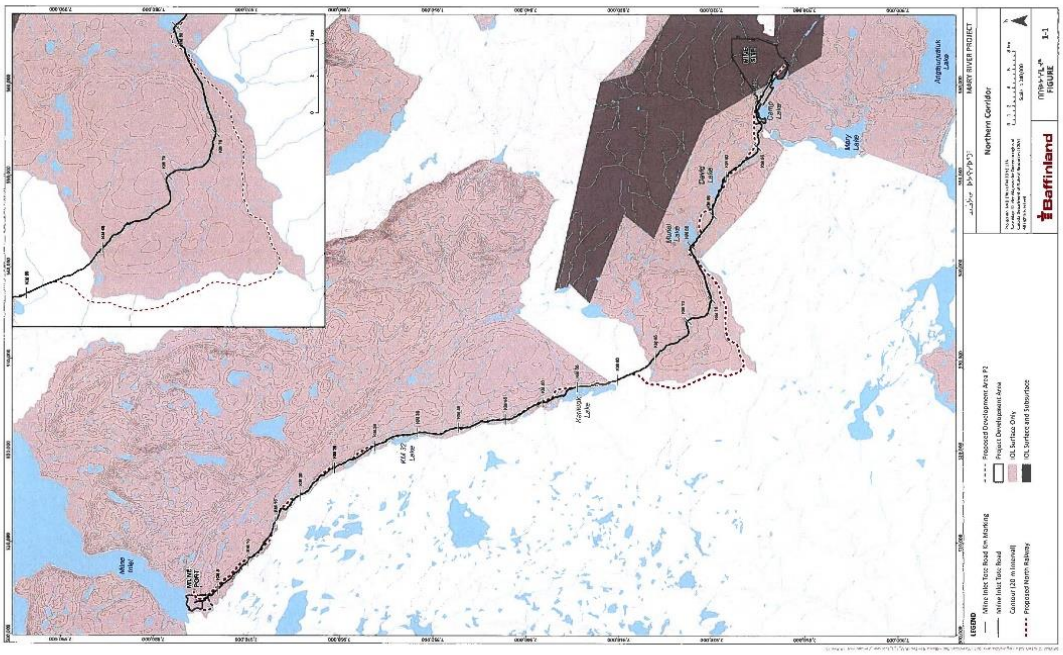
Demonstration site for the railway embankment/ crossings as viewed from helicopter

View of proposed style of railway embankment and crossings

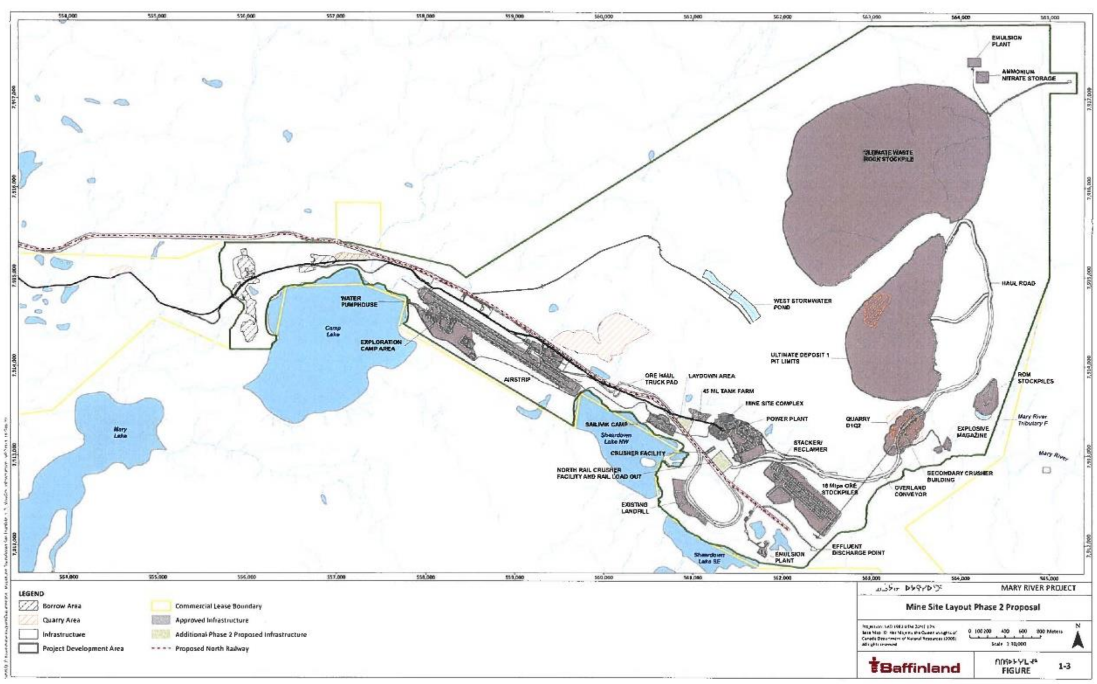
Dust monitoring stations adjacent to Tote Road

Archaeological sites marked out near Tote Road

Figures provided to the Board during site visit (the following maps 1-3)




MARY RIVER PROJECT
Milne Port Site Layout Phase 2 Proposal
FIGURE 1-2
NORTH RAILWAY
TOTE ROAD
ACCESS ROAD
ORE STOCKPILE
FREIGHT DOCK
FUEL TANK FARM
LEGEND
Foreshore Lease Boundary
Project Development Area
Commercial Lease Boundary
Approved Infrastructure
Additional Phase 2 Proposal Infrastructure


EMULSION PLANT
AMMONIUM NITRATE STORAGE
ULTIMATE WASTE ROCK STOCKPILE
HAUL ROAD
WEST STORMWATER POND
ULTIMATE DEPOSIT 1 PIT LIMITS
ROM STOCKPILES
WATER PUMPHOUSE
Camp Lake
EXPLORATION CAMP AREA
AIRSTRIP
ORE HAUL TRUCK PAD
LAYDOWN AREA
45 ML TANK FARM
MINE SITE COMPLEX
POWER PLANT
QUARRY D1Q2
EXPLOSIVE MAGAZINE
Mary River Tributary F
Mary River
SAILIVIK CAMP
CRUSHER FACILITY
STACKER/ RECLAIMER
SECONDARY CRUSHER BUILDING
NORTH RAIL CRUSHER FACILITY AND RAIL LOAD OUT
18 Mtpa ORE STOCKPILES
OVERLAND CONVEYOR
EXISTING LANDFILL
EFFLUENT DISCHARGE POINT
Mary Lake
EMULSION PLANT
LEGEND
Borrow Area
Quarry Area
Infrastructure
Project Development Area
Commercial Lease Boundary
Approved Infrastructure
Additional Phase 2 Proposed Infrastructure
Proposed North Railway
MARY RIVER PROJECT
Mine Site Layout Phase 2 Proposal
Scale 1:30,000
Baffinland
FIGURE 1-3

7. Deferred Responses

During the site visit, three questions were asked by participants that required deferral of responses from Baffinland personnel; the following responses were received by the NIRB on or before October 16, 2019:

- *Can the side slopes of the proposed level crossings be flattened to improve access to the proposed crossings?* Baffinland Response: Baffinland is able to design the proposed level crossings such that the slide slope of the approach ramps to the level crossings will also be 1 (vertical) meter to 5 (length) meters to ensure consistent level crossings. This would allow for an approach to a level crossing at any angle.

- *How much iron ore is in deposit number 1?* Baffinland Response: Deposit 1 contains 383.7 million dry metric tonnes combined of proven and probable reserves at an average grade of 65.2% iron. This estimate is as of January 1, 2018 and does not reflect reserves mined since January 1, 2018. Baffinland continues to explore Deposit 1 to better define reserves within the deposit. Estimates on the amount of iron ore within the deposit are based on the amount of drilling that has been done to prove the continuity and grade of material. Additional potential reserves, also known as inferred resources, are at depth in Deposit 1. Given the limitations of drilling deep holes in permafrost, Baffinland must further mine into Deposit 1 before it can undertake additional drilling to increase the overall reserve. In close proximity to Deposit 1 are Deposits No. 2 and 3. Drilling to date indicates the ore characteristics of Deposits No. 2 and 3 are the same as those for Deposit number 1. Further test work is required and ongoing for Deposits number 2 and 3.

- *How long does it take the train to stop?*

Estimated Stopping Distance (ft.)	**Locos**	**Ore Cars**	**Empty Train (Flat – 0%)**	**Loaded Train (Flat – 0%)**	**Loaded (Uphill– 1.5% grade)**	**Loaded (Downhill – 2.5% down grade)**	**Empty (Uphill – 2.5% grade)**	**Empty (Downhill – 1.5% down grade)**
60km/hr (max speed) - feet	2	64	957	2238	1722	4466	789	1097
60km/hr (max speed) - meters			290	678	522	1353	239	332
40km/hr (average speed) - feet	2	64	379	886	682	1768	313	434
40km/hr (average speed) - meters			115	268	207	536	95	132

8. Closure

The NIRB did not engage in any substantive discussions of the Phase 2 Development Proposal with any parties, and also did not receive any information about the Phase 2 Development Proposal that was not part of the Public Registry for the file.

In closing, the Board thanks Baffinland for making the arrangements, including providing the travel and logistical support necessary for the Board and Intervenors to participate in the site visit, and for ensuring the site visit was conducted in a manner that respects the Board's limits and procedures for site visits. The Board and participating Intervenors were able to form a better understanding and familiarity with physical features, setting and location of key project components at the Mary River and Milne Sites, as well as the Tote Road, including the infrastructure and activities being proposed by Baffinland within the scope of the Phase 2 Development.