



Project Proposal

Mary River Winter Sealift

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1 Popular Summary

Baffinland Iron Mines Corporation (Baffinland) is a Canadian mining company that operates the Mary River iron ore mine, located in the Qikiqtani Region of Nunavut on Baffin Island. The Project is authorized to mine up to 22.2 million tonnes per annum (mtpa) of iron ore and to transport up to 18 mtpa of iron ore to market by the Southern Transportation Corridor and Shipping Route and to transport up to 4.2 mtpa of iron ore to market by the Northern Transportation Corridor via the Northern Shipping Route (from Milne Inlet to Baffin Bay) during the open-water season (July to October).

In 2016, production and transportation of ore at the Mary River site allowed the shipment of 2.7 mt of iron ore through the Northern Shipping Route. In order to improve on the 2016 production, additional ore haul trucks and trailers will be required prior to open water in the spring of 2017 to increase the fleet at the site. Baffinland proposes to complete a Winter Sealift using an icebreaking bulk carrier to bring the trucks as well as seacans of spare parts and tires to the site. If possible, the MV Nunavik will also carry several sea containers of supplies for Pond Inlet.

It is anticipated that the icebreaking carrier will enter the region near Pond Inlet around March 20 and enter Milne Inlet around March 22. Following a two-day period for off-loading cargo, the carrier will enter the region near Pond Inlet on its return trip around March 25, and depart the area on March 28. The actual shipping dates will be adjusted to adapt to fluctuations in weather and ice conditions.

Baffinland has consulted with the communities of Pond Inlet and Arctic Bay in regards to shipping through ice since 2014. Most recently, community meetings were held in Pond Inlet on December 6, 2016 related to the Winter Sealift to listen to concerns about the sealift from Hamlet council, the Hunters and Trappers Organization (HTO) and the community. Concerns raised by the community will be addressed using mitigation and monitoring programs developed in cooperation with Pond Inlet.

To allow the safe passage of local travelers across the broken ice left by the vessel, an ice bridge will be installed along the broken ice near Pond Inlet. Route markers as well as signage in English and Inuktitut will also be installed to identify the path left by the vessel so areas of thin ice are highlighted to local travelers.

Baffinland will work with SmartICE and Ikaarvik: Barriers to Bridges, both community research organizations based in Pond Inlet, to develop and deliver the community-based monitoring program. The proposed monitoring activities are intended to address concerns of community members and to build capacity for such monitoring activities within the community. A workshop will be held in Pond Inlet prior to the sealift to discuss potential impacts, mitigation measures, community safety and the plans for the sealift. The proposed monitoring activities will assess physical ice impacts, impacts on seals, noise and community socio-economic impacts.

This Project Proposal for the 2017 Mary River Winter Sealift has been prepared for submission to the Nunavut Planning Commission (NPC) and Nunavut Impact Review Board (NIRB).

2 Introduction

Project Certificate No 005 authorizes Baffinland Iron Mines Corporation (Baffinland / the Company) to mine up to 22.2 million tonnes per annum (mtpa) of iron ore from Deposit No. 1 and to transport up to 18 mtpa of iron ore to market by the Southern Transportation Corridor (southern railway and Steensby Port) and by year-round shipping along the Southern Shipping Route (Foxe Basin – Hudson Strait) and to transport up to 4.2 mtpa of iron ore to market by the Northern Transportation Corridor (Tote Road and Milne Port) via the Northern Shipping Route (Milne Inlet – Eclipse Sound – Baffin Bay) during the open-water season (July to October).

In 2016, production and transportation of ore at the Mary River site allowed the shipment of 2.7 mt of iron ore through the Northern Shipping Route. In order to improve on the 2016 production, a number of improvements are being made to the operations but it has been identified that additional ore haul trucks and trailers will be required to replace trucks and trailers that require maintenance and to increase the fleet at the site. The new trucks and trailers will help the facility meet production targets for 2017. The trucks could be brought on to the site in late July or early August with the summer sealift but would only be able to contribute to production for two months before the open water shipping season was finished.

3 Proponent information

Baffinland is a Canadian mining company that operates the Mary River iron ore mine, located in the Qikiqtani Region of Nunavut on Baffin Island, Canada. Baffinland is owned by ArcelorMittal and by Iron Ore Holdings (IOH). Baffinland's Head Office is located in Oakville, Ontario, Canada and its Northern Headquarters are located in Iqaluit, Nunavut. In addition to its Head Office, Baffinland maintains a year-round presence at the Mary River Mine Site and Milne Port (Milne Inlet) as well as having community liaison offices in Pond Inlet, Arctic Bay, Clyde River, Hall Beach, and Igloolik.

4 Project proposal description

4.1 Purpose

In 2016, production and transportation of ore at the Mary River site allowed the shipment of 2.7 mt of iron ore through the Northern Shipping Route. In order to improve on the 2016 production, a number of improvements are being made to the operations but it has been identified that additional ore haul trucks will be required to replace trucks and trailers that require maintenance and to increase the fleet at the site. In order to meet production targets for 2017, the new trucks will be required prior to open water shipping in the spring of 2017.

4.2 Scope

The Winter Sealift will utilize the MV Nunavik, an icebreaking bulk carrier owned and operated by the Canadian shipping company Fednav. The MV Nunavik is 188.8 meters long and has a beam of 26.6 meters. She is strengthened for navigation in ice according to the International Association of Classification Societies (IACS) Polar Class 4, which allows year-round operation in thick first-year ice which may include old ice inclusions.

The MV Nunavik will carry four (4) Western Star ore haul tractors (trucks), sixteen (16) SmithCo ore haul trailers, and several sea containers (seacans) of spare parts for Baffinland's operations. If possible, the



MV Nunavik will also carry several sea containers of supplies for Pond Inlet. A table showing the expected cargo that will be brought to Milne Port is shown below. The exact cargo will be verified closer to the shipment date once the availability of the materials is confirmed.

Description of Cargo	Quantity
Western Star Ore Tractor HX54	4
SmithCo Model S4-3823-L Lead Trailer	4
SmithCo Model S4-3223-P Pup Trailer	4
SmithCo Model S4-3823-L Lead Trailer	4
SmithCo Model S4-3223-P Pup Trailer	4
5 Mtpa Shiploader Upgrade Components	2 seacans
Diesel Exhaust Fluid (DEF)	8 seacans
Spare Tires for OHT Fleet	8 seacans
Toromont PCR Components	10 seacans

The MV Nunavik will transport trucks and trailers to the Mary River Project as part of a shipping route that includes a stop at the Raglan Nickel Mine at Deception Bay in the Nunavik region of northern Quebec. The shipping route will include

- Pick-up of trucks, trailers and materials at a port in the United States (Baltimore),
- Delivery of fuel to the Raglan Mine,
- Loading of approximately 27,000 metric tons of Nickel concentrate at the Raglan Mine, which will remain on the vessel for the duration of the voyage
- Travel to Milne Port to deliver trucks, trailers and materials, and
- Travel to Europe to discharge the nickel concentrate.

The Winter Sealift will not include delivery of fuel to Mary River or the transportation of any iron ore from Mary River. Since the MV Nunavik will be loaded with nickel concentrate, there will be no need for ballast water exchange at any point in the voyage in Eclipse Sound or in water around Nunavut.

Offloading of cargo at Milne Inlet will take place using the MV Nunavik's own cranes. There are two (2) cranes with capacity of 30 metric tons and one (1) crane with capacity 50 metric tons. Cargo will be offloaded directly onto frozen sea ice near the vessel.

At Milne Inlet, a contractor will be engaged to construct an ice road leading from the MV Nunavik to the beach. Baffinland's Site Services team will transport equipment from the offload point to the beach as each piece is offloaded. The approximate route that the MV Nunavik will take is shown in Figure 1 attached.

4.3 Timing

The MV Nunavik is anticipated to travel at approximately 3 to 5 knots when transiting through ice near Pond Inlet through to Milne Inlet. Based on this speed and the cargo discharge time required at Milne Inlet, it is anticipated that the MV Nunavik will enter the region near Pond Inlet around March 20 and enter Milne Inlet around March 22. Following a two-day period for off-loading cargo, the carrier will enter the region near Pond Inlet on its return trip around March 25, and depart the area on March 28. The actual shipping dates will be adjusted to adapt to fluctuations in weather and ice conditions.

A preliminary schedule of the MV Nunavik Winter Sealift voyage is indicated below:

Schedule Event	Timing
Depart Deception Bay (Quebec) and enter Baffin Bay	March 11 to 18
Enter area near Pond Inlet, discharge Pond Inlet cargo	March 20 to 22
Enter Milne Inlet	March 22
Discharge Baffinland cargo at Milne Inlet	March 22 to 24
Depart Milne Inlet	March 24
Enter area near Pond Inlet	March 25
Transit through Pond Inlet and enter Baffin Bay	March 25 to 28

4.4 Authorizations

A preliminary review of authorizations required for the Winter Sealift indicates that the following approvals will be required;

- NPC Conformity Determination
- NIRB Project Screening
- Ice Road approval from the Mines Inspector

4.5 Alternatives

Baffinland has assessed several alternatives to the Winter Sealift approach for bringing large vehicles up to the site but there are limited alternatives to the sealift, as the Baffinland site is inaccessible by water during this time of year, except via specialized ice breaker vessels.

One alternative would be to wait for the summer sealift to bring the trucks and trailers to the site. In order to meet production targets for 2017, the new trucks will be required in the spring of 2017. The trucks could be brought on to the site in late July or early August with the summer sealift but would only contribute to production for two months before the open water shipping season was finished in October 2017.

Another alternative that Baffinland is investigating is the option of transporting the trucks and trailers to site using a large cargo plane. The size of the trucks and trailers would require a very large transport plane that would not be able to land at the current airport at the mine site. It may be possible to land a large cargo plane on an ice landing strip as has been previously used by Baffinland during project development. The full cost and viability of developing an ice landing strip strong enough to support the weight of a large cargo plane is being investigated but is not expected to be practical at this point.

Transportation using an air ship (hybrid-dirigible) was investigated but there are no air ships currently available. Hybrid air ships are still under development and won't be available until 2018 at the earliest.

5 Description of the existing environment

The winter sealift vessel will need to transit through ice from the entrance of Pond Inlet to Milne port as shown in Figure 1 attached . The approximate extent of sea ice expected in March 2017 is also shown in Figure 1 based on historical data. The extent of sea ice could be larger than shown depending on weather conditions in 2017.

6 Community Consultation and Public Participation

6.1 Current Community and Stakeholder Consultation

Since 2014, Baffinland has consulted with the communities of Pond Inlet and Arctic Bay respecting shipping through ice, both as an aspect of consultation on Phase 2 and specifically in relation to the proposed winter sealift. Consultation on shipping through ice has been conducted with Hamlet Councils, the relevant Hunters and Trappers Organizations, the Mary River Community Group and both communities.

Engagement activities have been directed at providing communities and stakeholders with relevant information on shipping through ice in an accessible, culturally appropriate and timely manner in order to enable stakeholders to identify issues and concerns and provide input into the development of mitigation measures.

Specifically, the following consultation activities respecting shipping through ice have been undertaken:

1) Site Visit to Nain, Labrador

In April, 2015, Baffinland brought select participants from Pond Inlet and QIA to Nain, Labrador to directly observe shipping through landfast ice and discuss associated mitigation measures to ensure safety and access to the area of the ship's track for traditional and recreational land use activities (hunting, fishing, firewood collection and cabin usage) and other aspects of winter shipping operations with the Labrador Inuit. Topics discussed during the site visit included:

- Impact of shipping through ice on hunting practices
- Differences in ice conditions between Nain and Pond Inlet
- Impact on marine wildlife, particularly seals and whales (impact on birthing lairs, impact of noise, wildlife fatalities)
- Frequency of ship travels and routes
- Refreezing and ice formation
- Spills and other emergencies
- Set up of ice bridge and pontoon crossings

A copy of the Report on the Nain site visit has been uploaded to the NIRB Project Proposal website alongside this revised proposal as a separate document. The site visit was structured as an



informational session, in anticipation of a series of subsequent workshops sponsored by Baffinland on aspects of Phase 2, including shipping through ice.

2) Phase 2 Workshops

Between March 2015 and May 2016, Baffinland conducted a series of workshops on Phase 2 of the Mary River mine development. The workshops focused on five main themes: *Contemporary Inuit Land Use in the Eclipse Sound and Navy Board Inlet*, *Shipping Through Ice*, *Open Water Shipping*, *Caribou*, and *Phase 2 and Arctic Bay*. The first four workshops were held in Pond Inlet and the fifth in Arctic Bay. Each workshop was followed by an afternoon/evening public open house and in Pond Inlet, a meeting with the Mary River Community Group (MRCG) was also held following the workshops to gather additional feedback. Workshop participants included representatives of Baffinland and contemporary land users, elders and other residents of Pond Inlet and Arctic Bay with detailed knowledge of the workshop topics. Information gathered at the five workshops was verified by a subsequent meeting with workshop participants on May 9-10, 2016 in Pond Inlet.

While the focus of the five workshops was on the potential effects of the Phase 2 development, the issue of shipping was specifically discussed at Workshop #2 – *Shipping Through Ice*, with additional commentary on the potential impacts of shipping through ice being made during the other workshops. A summary of the workshops is provided below. All comments on this topic were integrated in sections 4.2 – 4.5 of the Report on the *Results of Community Workshops Conducted for Baffinland Iron Mines Corporation's Phase 2 Proposal*. A copy of this Report has been uploaded to the NIRB Project Proposal website alongside this revised proposal as a separate document.

The objectives of Workshop #2 were:

- To discuss the location, timing, and intensity of contemporary Inuit land use activities in the Eclipse Sound and Navy Board Inlet areas during the Inuit seasons of Ukiaksaq (October to mid-November), Ukiuq (mid-November to February), Upirngaksaq (March to May), Upirngaaq (late May to July), and Aujaq (end of July to September) and how those activities could be affected by shipping through ice
- To document community feedback regarding the shipping through ice component of Baffinland's Phase 2 proposal and to identify potential mitigation measures.

With respect to shipping through ice in March (Upirngaksaq), workshop participants expressed concerns that harvesting, travel, and other land use activities could be negatively affected and stressed the importance of land and ocean-based travel to local Inuit, and the importance of marine mammal and other wildlife harvesting. Safety, particularly during spring and early summer, also emerged as an important concern. It should be noted that concerns related to harvesting and interference with travel routes were more directly associated with the months of April – June, the peak harvesting period; however, shipping through March raised issues related to possible interference with seal pupping.

These concerns are set out in the following table:

Potential Land Use Interaction	Community Concern
<ul style="list-style-type: none"> • Pond Inlet floe edge activities • Sea ice seal hunting • Seal pup hunting • Use of ice cracks • Ship track crossing (e.g. to access floe edges and Button Point, marine mammal harvesting, sport hunting, fishing, travel to Arctic Bay) 	<ul style="list-style-type: none"> • Shipping through ice in Eclipse Sound raises concerns for the residents of Pond Inlet and is not a preferred route for many residents. A number of residents questioned whether Navy Board Inlet could be used by Baffinland during ice covered months instead. • Local residents lack experience with shipping through ice and are unfamiliar with all of its potential effects • Potential negative effects on marine wildlife, Inuit harvesting, and Inuit travel may occur as a result of shipping through Eclipse Sound • Crossing an unstable ship track can be dangerous • The ship track and crossings will be difficult for Inuit hunters to see in the dark • Shipping in June is a concern. June is the peak period for Inuit hunters and families going out on the ice to hunt, travel, and camp. • Shipping during March is a concern as seal pups are born in this month. Shipping during April and May is also a concern for some individuals. • Hunter safety during the months of March to June is a concern, as the ice is weaker at this time and its stability could be affected by ice breaking. The potential for emergencies and rescue situations is a concern. • Large pieces of ice may break off when ships pass by, creating dangerous conditions for hunters • Pieces of the floe edge could potentially break off during June ice breaking • Community members will need to be notified of the shipping schedules and ship track crossing safety protocols • The travel route to Arctic Bay could be cut off due to the ship track • The Phase 2 shipping route may affect the route of the Nunavut Quest dog team race

Potential mitigation, monitoring and research, and compensation and benefits measures related to shipping through ice were also raised at Workshop #2. Considerable discussion focused on the use of ship track crossings (e.g. pontoon bridges, ice crossings) and a number of potential seasonal ship track crossing locations for the seasons of Ukiakaaq (October to mid-November) and Ukiuq (mid-November to February) plus the month of March were identified. Many participants indicated that crossings could be a useful way for Inuit to pass over the ship track. Workshop participants did not identify potential crossing locations for Upirngaaq (late May to July) and strongly recommended that Baffinland avoid shipping in June which was the peak period for hunting on ice. It was also suggested that shipping through Eclipse Sound only occur after community travel to the floe edge was shut down by the Pond Inlet HTO. Shipping during March was a concern for some participants due to the potential impact on seal pupping and the Nunavut Quest dog team race.

A review of the comments made during Workshop #2 as well as at other workshops does not demonstrate broad opposition to shipping through ice. Although participants expressed a preference for open water shipping, the possibility of shipping through ice (except during peak hunting periods) was not dismissed provided suitable mitigation and safety measures were instituted. In order for residents to gain a better understanding of the implications of shipping through ice, some interest was expressed at Workshop #3 in conducting a potential 'pilot project' in Eclipse Sound which would involve the transit of an ice breaking vessel during an ice-covered period (but prior to full project approval) so that residents of Pond Inlet witness shipping through ice in their local environment, view its effects first hand, and ultimately make a more informed decision on whether or not the activity should be approved.

3) Winter Sealift – Pond Inlet Meetings, December 6, 2016

Subsequent to the workshops described in the preceding section, four meetings were held in Pond Inlet on December 6, 2016 specifically related to the Winter Sealift:

- 1) Meeting with Joe Enook, MLA;
- 2) Meeting with Hamlet council;
- 3) Meeting with the Mittimatalik Hunters and Trappers Organization (HTO); and,
- 4) Public Meeting with the community (roughly 45 people in attendance).

Several comments and concerns were raised during the meetings including:

- Seal pups are born in March and some seal pups may be negatively impacted,
- How will the people of Pond Inlet be informed of the winter sealift and ice breaking?
- The Nunavut Lands Claim Agreement (NLCA) and Nunavut Planning Commission (NPC) have restrictions on ice seasons. How will this be managed?
- Can the ice breaker go through multi-year ice?
- Can an air ship be used to bring the trucks to the site instead of ice breakers?
- One sealift ship in winter is fine.
- Shipping for operations is OK in July to December. January to June should be closed.
- Ice around Pond Inlet is rougher than ice near Nain. How will the ice breaker manage with rougher ice?
- Ship track could be dangerous for young hunters.
- Is the winter sealift in 2017 a one-time only event or for the life of the project?
- Need to involve all community members in the sealift
- Pond Inlet people have never seen an ice breaker going through the ice in mid-winter. People can see first-hand if there is a winter sealift.
- MV Arctic track used to be frequented by seals.
- Pontoon bridge would be good for hunters but may be more than one crossing location.

As was the case with the previous workshops, there does not appear to be broad-based opposition to the proposed sealift but rather, an emphasis upon the need to ensure that any shipping through ice be conducted to minimize or avoid interference with land use activities and that adequate safety measures are implemented.

In addition to the consultation activities described above, in November, 2016, Baffinland discussed the potential winter sealift with the Director, Department of Major Projects, Qikiqtani Inuit Association (QIA). QIA indicated that it had no objections to the concept of a sealift and that it would be helpful for future discussions if the communities could observe ice breaking. In November, 2016, Baffinland also conducted a community tour of the 5 North Baffin communities to discuss Phase 2. Although the proposed winter sealift was not specifically discussed, the issue of shipping through ice was raised on several occasions and a general preference for open water shipping was expressed in order not to interfere with harvesting.

6.2 Future Community Consultation and Public Participation

Baffinland will continue to meet with Pond Inlet (Hamlet Council, HTO and residents), QIA and any other interested stakeholders to provide information on the proposed sealift and will work with the community to develop and implement mitigation measures to ensure that the proposed sealift does not interfere with land use activities.

The next planned community consultation will occur in Pond Inlet on February 3, 2017 and will consist of a community based workshop to further develop the winter sealift execution plan as well as identify community participants for the monitoring and mitigation programs. The workshop will include members of several local organizations including the Mittimatalik Hunters and Trappers Organization (MHTO), Mary River Working Group, SmartIce and Ikaarvik: Barriers to Bridges.

The current schedule for Pond Inlet community consultations following the planned workshop on February 3, 2017 is provided below.

- February 2017 - Coordination of community participants to assist in sealift execution and monitoring
- March 2017 – On ice dry run – trial run of execution plan and safety training for community participants
- March 2017 - Implementation of community communication plan
- March 2017 – Sealift execution – documentation of feedback from observers and community participants
- April 2017 - Interviews with mayor and council, MHTO and the public to document feedback and response to the ships passage and its potential impact on harvesting patterns

In addition to consultations listed above, an information session will be held in Arctic Bay prior to the Winter Sealift to ensure residents travelling between Arctic Bay and Pond Inlet are aware of the sealift schedule, ice bridge location, and safety protocols associated with the sealift activities.

6.2.1 Community Feedback

Following the winter sealift, Baffinland will engage the community to get feedback on the winter sealift and to provide input into to future planning if a winter sealift is contemplated in the future due to operational requirements. The feedback will include interviews with hunters/harvesters to document the impacts of the ship passage on harvesting patterns and with community members to document their responses to the ship passage.

7 Potential environmental and socio-economic effects

7.1 Marine Wildlife

The primary potential impact to marine mammals is the risk to seal dens on the ice with seal pups being born in March at approximately the same time as the 2017 sealift. Seal den surveys will be conducted to assess the risk prior to the sealift and follow-up surveys will be conducted after the sealift to assess any damage to seal dens that may have occurred.

In addition to the seal den surveys, a wildlife observations log will be developed to record any incidental wildlife interactions observed during the proposed winter sealift.

7.2 Ice Quality

The passage of the ice breaker through winter sea ice will result in an area of open water and broken ice along the ship track that will refreeze over time. The time to refreeze and allow safe passage across the ice will be evaluated as part of the sealift.

The anticipated time for the ships tracks to refreeze and allow for safe passage across is expected to range between twelve (12) hours to several days, depending on ambient temperatures and weather conditions. Assuming there are not significant winter storms and ambient temperatures remain within the seasonal range of -26° to -34° C (Environment Canada, 2016), the ship's tracks are expected to refreeze within one day. This estimate is based on observations made by Nain residents involved with monitoring ship tracks through land fast ice near Vale's Voisey's Bay Mine.

7.3 Noise

The potential impact of noise from the ice-breaking has been raised as a concern. The potential impact of noise on seals and other marine mammals is currently being assessed and, if required, noise monitoring will be included in monitoring programs during the sealift.

7.4 Traditional Use of the Ice

The passage of the ice breaker through winter sea ice will result in an area of open water and broken ice along the ship track that will refreeze over time. The open water will create a temporary barrier along traditional hunting routes across the ice. The open water will also pose a safety risk to snowmobiles travelling on the ice. The roughness of the ice could also increase along the ship track which could create safety concerns for snowmobiles using the ice. As assessment of roughness before and after the sealift will be completed with involvement from the local community as part of the community-based monitoring program.

8 Potential cumulative effects

Baffinland does not know of any other shipping or marine traffic in the area that will require ice-breaking and therefore does not expect any cumulative effects from the Winter Sealift in 2017.

9 Mitigation measures and potential residual impacts

9.1 Health & Safety Plan

Baffinland's safety plans and procedures will be followed for all of the work for the winter sealift. A job hazard analysis (JHA) will be developed to address safety risks that are specific to this project including working on ice, off-loading equipment from an ice-breaker, and monitoring programs on the ice.

The MV Nunavik's crew will remain onboard the vessel for the duration of the voyage and will be required to follow the vessel's health & safety processes and procedures. Baffinland will engage with ice engineering consultants to develop project-specific offload procedures and associated health and safety plans.

Community safety will also be incorporated into the health and safety planning for the sealift including training programs for community members involved in monitoring programs and mitigation measures described in more detail below.

9.2 Safety Training

Standard site safety training will be provided to all personnel involved in the cargo discharge process. Safety training specific to working on ice and near the MV Nunavik will be arranged in association with the project-specific health and safety plans.

Safety training will also be provided to community members who will be involved in any monitoring or mitigation programs to ensure that they are prepared for safe operations. In particular, training around safe use of the ice and cold water rescue will be included in community training.

9.3 Mitigation Measures

Baffinland will work with Pond Inlet Inuit to develop and deliver a safety program, develop plans to monitor the ice breaking, and conduct and document the transit and test mitigation measures.

To allow the safe passage of local travelers across the broken ice left by the vessel, Baffinland will install an ice bridge system along the broken ice near Pond Inlet. Baffinland will also install route markers as well as signage in Inuktitut and English to identify the path left by the vessel so areas of thin ice are highlighted to local travelers.

The ice bridge system that will be used was developed in Labrador for the Voisey's Bay Mine and consists of several pontoon bridge sections that interconnect to allow safe passage across the ship's track, as shown below in Photo 1. This system will not necessarily be the exact mitigations that will be most effective for winter shipping activities near Pond Inlet. The use of the ice bridge system will allow safe passage but will also provide Pond Inlet Inuit with firsthand experiences that will assist in their understanding of how ships, ice and Inuit interact in North Baffin and determine if the bridge system will work in Pond Inlet or if modifications will be required to improve the design.



Photo 1 – Deployed Pontoon Ice Bridge System in Nain, Labrador

Baffinland will work with Pond Inlet to deploy and test the ice bridge system, route markers and signage. This will include drafting and refinement of an overall safety plan to govern the trial and will contain a community communication plan that will allow Baffinland to effectively inform residents of the trial including; what is happening; when it will happen; and how public safety will be addressed leading up to, during and after the transit. In order to ensure community safety and awareness, the community communication plan will include safety procedures for the public during the ship's transit through the ice and will outline how the sealift schedule, ice bridge location, sealift passage and updates on the refreeze status of the ship's tracks will be broadcasted and made available to the communities of Pond Inlet and Arctic Bay.

The deployment of the ice bridge system adjacent to Pond Inlet will be started once the vessel enters the waters near Pond Inlet. All stages of the activity will be photographed, videoed and documented. A chronological sequence of events will be compiled and notes will be taken regarding the effectiveness of the bridge system and its ancillary equipment, especially noting any deficiencies or areas for improvement. Environmental conditions will also be documented and track conditions and refreeze times will be noted. Any issues related to ice thickness will be noted, particularly those which might result in different track formation, ice rubble roughness and effects on the bridge system deployment or use.

During the outbound transit the ice bridge system will be deployed immediately following ship transit as this represents an opportunity to gather additional information and to gain further experience with the communications methods and ice bridge system. Following full refreeze of the ship's track, the pontoon sections making up the ice bridge system will be retrieved and stored in Pond Inlet for future use.

A summary of the proposed mitigation measures and monitoring programs to address potential land use interactions and ensure conformity with the North Baffin Regional Land Use Plan is provided in the table below.

North Baffin Regional Land Use Plan Conformity Criteria	Potential Land Use Interaction/Concern	Proposed Mitigation Measures and Monitoring Plans
<ul style="list-style-type: none"> Harm to wildlife 	<ul style="list-style-type: none"> Disruption of seal pupping 	<ul style="list-style-type: none"> Seal den survey Wildlife observations log
<ul style="list-style-type: none"> Harm to wildlife habitat/environment 	<ul style="list-style-type: none"> Disruption of seal dens 	<ul style="list-style-type: none"> Seal den survey Wildlife observations log
<ul style="list-style-type: none"> Disruption to community travel routes and traditional land use activities 	<ul style="list-style-type: none"> Pond Inlet floe edge activities Seal hunting Ship track crossing (e.g. to access floe edges and Button Point, travel to Arctic Bay) 	<ul style="list-style-type: none"> Deployment of ice bridge system to allow for safe passage across ship's tracks Delineation of ship's tracks with reflective markers and bilingual signage (English and Inuktitut) Community consultation, communication plan and notification of sealift activities Safety Plan, including resources to enable an emergency response Refreeze and ice quality monitoring of ship's tracks

9.4 Accidents and Malfunctions

Winter shipping is a new activity introduced with the 2017 Winter Sealift. All other activities associated with the Mary River Project have been evaluated and assessed for accidents and malfunctions.

Baffinland's suite of Emergency Response Plans include:

- 1) Emergency Response Plan.
- 2) Spill Contingency Plan.
- 3) Milne Port Oil Pollution Emergency Plan.

Prior to the winter sealift, the emergency response plans will be reviewed to ensure that they include the necessary measures to address the risks associated with the winter sealift. Since the vessel will only be off-loading trucks, trailers and seacans of equipment, the risk of fuel or oil spills is considered low.

9.5 Effects Monitoring

In order to assess the effects of the winter sealift and to provide information that could help to develop and improve future ice breaking activities in the North Baffin region for Baffinland and other organization, Baffinland will develop a community-based monitoring program that will engage the local community in the monitoring of impacts from ice breaking.

Baffinland will work with SmartICE and Ikaarvik: Barriers to Bridges, both community research organizations based in Pond Inlet, to develop and deliver the community-based monitoring program. The proposed monitoring activities are intended to test a range of potential community-based monitoring programs related to winter shipping that address concerns of community members and are also intended to build capacity for such monitoring activities within the community. The proposed monitoring activities are described below and fall within four categories: 1) physical ice impacts; 2) impacts on seals; 3) noise and 4) community socio-economic impacts.

9.5.1 Ice Quality

Physical sea ice impacts will be monitored using the SmartQAMUTIK, a mobile sea-ice thickness sensor drawn by a snowmobile, SmartICE will conduct pre and post ship-transect surveys along planned shipping routes. Immediately following the ship passage, ship track markers and signage can be erected to delineate the open ship track and removed at the end of the ice season. Monitoring will also include assessment of the spring ice-breakup season and comparison with historical normals through community Elder interviews and a 30-year sea ice climatology. The break up will be assessed both visually and with cameras installed along the route, if practical, to document the breakup at strategic locations.

9.5.2 Marine Wildlife

The largest risk to wildlife has been identified as the risk to seals that will be pupping on the ice in late March. A seal den survey will be completed prior to the freighter entering the ice in Eclipse Sound to evaluate the potential impacts and to establish a baseline that can be re-assessed after the freighter has left the area.

The presence of seal dens and open/frozen over breathing holes will be monitored along and adjacent to the proposed ship routes before and following the ship passage. The ratio of open to frozen breathing holes provides an indication of abandonment. If practical, the occurrence of seal dens could be used to refine the ship route.

In addition to the seal den surveys, a wildlife observations log will be developed to record any incidental wildlife interactions observed during the proposed winter sealift.

9.5.3 Noise

Depending on the assessment of the potential for noise impacts to marine mammals, Baffinland will evaluate the installation of a transect of hydrophones through the ice to monitor ship and ice breaking noise. The hydrophones will be placed at varying distances away from the ship route to illustrate the spatial pattern in noise intensity.

10 References

Environment Canada (2016, April 19). Canadian Climate Normals 1981-2010 Station Data – Pond Inlet A. http://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?stnID=1774&autofwd=1

FIGURES

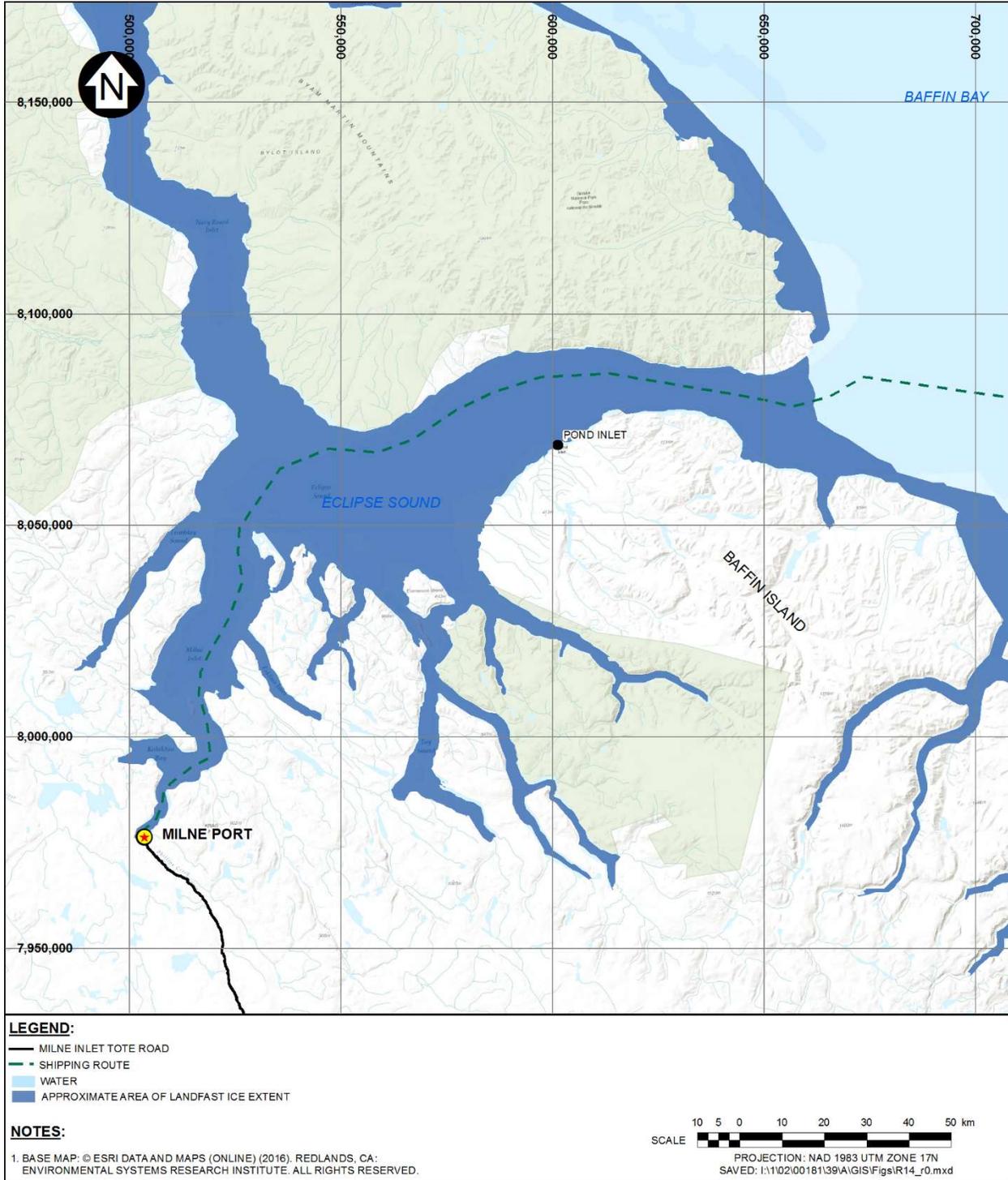


Figure 1: Approximate Route of the Winter Sealift Vessel.