IR Number: *1*
Source: *Parks Canada*
To: *Baffinland Iron Mines Corporation (Baffinland)*
Subject: Implications of project on "Wilderness Experience" in context of Sirmilik National Park and proposed Lancaster Sound National Marine Conservation Area.
Preamble:
PC specified EIS Guidelines subsection 8.2.4.2 Potential impact on tourism from mine development which impairs the "wilderness experience" of tourism in the Project region. BIM will provide a more complete explanation and rationale that includes the proximity of the Park in relation to the project activities and includes a variety of perspectives. The number of eco-tourists is not seen as the only factor as a Park should be available for the "wilderness" experience no matter who chooses to come. A brief description of the shipping frequency is required. As well, it may be appropriate to offer to mitigate the potential surprise someone may have in expecting wilderness and seeing the ships by informing Parks when shipments are expected so they can pass on that information to visitors. In addition, there is a concern around the potential for frequent over flights of a key fjord in the Park by flights from Mary River to Pond Inlet. A better understanding of the frequency of these flights, altitude over the fjord and options for moving this path outside or to a more remote part of the Park may be considered. John Olyslager provided the following considerations he would like to see addressed: Based on information provided by Baffinland, it appears that the air-route between Pond Inlet and Baffinland crosses Oliver Sound and Paquette Bay. Oliver Sound in particular is used by people from the community, and there has been interest in use of this area by kayakers. We know from feedback from visitors to Auyuittuq National Park that the air traffic between Pangnirtung and Qikiqtarjuaq detracts from the wilderness experience, particularly annually. Feedback from visitors at Gwaii Haanas National Park Reserve also identifies air traffic as a negative influence on their experience, especially as the sound is amplified over water."

Request:

1. *Please assess the implications of the project on 'wilderness' experience', particularly in the context of the presence of Sirmilik National Park and the proposed Lancaster Sound National Marine Conservation Area.*

BAFFINLAND RESPONSE

Background

While the Mary River Project is a considerable distance from the boundary of Sirmilik National Park (approximately 80 km from the southern portion of the park), some transportation routes to the project area will be in closer proximity to park boundaries. Aircraft will be used to move employees to and from the mine site, while ships will service the mine, sailing through to Milne Port and Steensby Port. The presence of over-flights and shipping routes can have the potential to affect the wilderness experience of visitors to the park.

The Canada National Parks Act states that "The national parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment...." Parks Canada is committed to offering high-quality visitor services by ensuring that park resources do not deteriorate and that quality visitor experiences are not diminished. With the Mary River project having air and shipping routes that will pass by the Sirmilik National Park boundary, artificial

disturbances such as over-flights and shipping need to be examined in terms of how these activities will affect visitor satisfaction and their overall "wilderness experience" within the park.

Wilderness experience is a nebulous term that can be difficult to define or quantify. The concept of "wilderness" can mean many things to different individuals, and vary based on personal experience and cultural context. The concept of wilderness can differ depending on expectations individuals have for a visitor experience. According to McCool et al. (2007), wilderness experience in Auyuittuq National Park was found to encorporate a variety of experience dimensions, including (1) serenity/freedom, (2) challenge/adventure, (3) arctic experience, (4) naturalness, (5) learning/appreciation, and (6) humility/spirituality. Similar expectations for wilderness experience likely apply to Sirmilik National Park.

Methodology

The anticipated affects of air and water traffic associated with the Project have been evaluated using a combination of literature review and key informant interviews with staff from Parks Canada. The selection of respondents from Parks Canada was based on selecting individuals who had intimate knowledge of visitation within Sirmilik National Park and on-the-ground experience and familiarity with park management. Carey Elverum (Sirmilik National Park Manager in Pond Inlet) and Pauline Scott (Visitor Experience Manager & Prevention Coordinator in Iqaluit) were interviewed on their perceptions of potential impacts to wilderness experience of visitors. Interviews were conducted by phone, with discussions focused upon characterizing visitation to the park, the types of recreational activities most likely to be influenced by the presence of overflights and shipping, the likely effect associated with overflights and shipping, and possible mitigation techniques. Maps were developed that depict the anticipated flight and shipping paths in association with the park boundaries. These were used as visual tools during the interview process. Through the course of the interview, areas were identified where interactions between visitors and mine-related activities would be most prominent and contentious (i.e. those areas of recreational importance that may be in closest proximity to flights and shipping).

Respondents from Parks Canada were also asked to characterize visitation within the park. This involved providing visitation numbers, primary destinations of visitors, primary activities of visitors, seasons of use and number of guided tours. The respondents were asked to discuss how they expect park visitors to respond to the added presence of more over-flights and shipping traffic. The discussions from Parks Canada were then corroborated with findings from other outdoor recreation studies and literature that focus on wilderness experience and

industry-related disturbances. Based on the findings of the interviews and literature review, mitigation methods were proposed to minimize the disturbance of these project-related activities on visitor experience in the park.

Over-flight and Shipping

The Mary River project will be supported by a variety of modes of transportation, including aircraft flights and shipping. Air transportation includes flights by helicopter, Boeing 737, Dash-8 and small fixed wing planes. The general routes followed by these various modes of air transportation are depicted in Map 1. More specific to the Sirmilik National Park, two flight lines are shown in relation to the park boundary, both along a Dash-8 route (see Map 2). One route flies from the mine site through Pond Inlet then to Clyde River. This route is projected to fly over the southern section of Sirmilik National Park, near Oliver Sound and Paquet Bay. The other route flies from the mine site to Arctic Bay crossing inland over Borden Peninsula. As projected, this second route does not fly over the park boundary.

The frequency of flights is not known with certainty, as this will depend in part on the number of workers that will be employed from each of the communities, although in the first two years of construction, it is anticipated that seven flights will service the mine site per week. Of these seven flights, it is estimated at this stage that one would bring employees from Pond Inlet and one would bring employees from Arctic Bay. Thus, only two over-flights a week (i.e., flight to the mine and flight away from the mine) would be anticipated along the flight lines near Sirmilik National Park. After the first two years, the frequency of flights is anticipated to be lower. It is expected that Dash 8 aircraft will service the flights from Arctic Bay and Pond Inlet. The Dash 8 aircraft has a maximum cruising altitude of 25, 000 feet. This altitude does vary with approach, take off, weather conditions and distance travelled.

Table 1. Air Traffic by Sirmilik National Park.

Route	Aircraft	Frequency				
		Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5 - 25**
Mine Site – Arctic Bay	Dash-8	1 each week	1 each week	1 each week or less	1 each week or less	1 each week or less
Mine Site – Pond Inlet – Clyde River	Dash-8	1 each week	1 each week	1 each week or less	1 each week or less	1 each week or less

Baffinland will also use shipping to move freight and fuel to the mine site. Of the two shipping routes, only the Milne Port shipping route will pass by Sirmilik National Park and the proposed Lancaster Sound National Marine Conservation Area (NMCA). The Milne Port shipping route goes from Milne Inlet through Eclipse Sound out into Baffin Bay. This route is outside of the Sirmilik National Park boundary, although ships will pass between Bylot Island and Oliver Sound, both areas within the park (see Map 3). The ships will transit through the proposed Lancaster Sound NMCA.

Shipping frequency from Milne Inlet is described in Table 2. Peak shipping of freight vessels will occur during the construction phase of the project, with an estimated 10 freight vessels and 2 fuel tankers over Year 1, and 6 freight vessels and 3 fuel tankers in Year 2. After the first two years of construction, the frequency of ships will decrease substantially, with an estimated total of 3 freight and 3 fuel vessels in Year 3 and 4 of construction. During the operation phases of the Project it is expected that only over sized equipment that can not be carried on the rail line from Steensby Port to the Mine Site will be delivered to Milne Port and transported on the Tote Road to the Mine Site. It is not expected that fuel shipments to Milne Port will occur during the operation Phase of the Project.

Table 2. Shipping Traffic from Milne Inlet by Sirmilik National Park Boundary.

Shipping of Freight and Fuel	Construction Phase				Operation Phase
	Year 1	Year 2	Year 3	Year 4	Year 5 - 25
Freight vessels	10	6	3	3	Only oversized equipment delivery
Fuel tankers	2	3	3	3	0

Park Activities and Visitation

Sirmilik National Park offers a variety of wilderness experiences. Typical activities in the park include kayaking, hiking, camping, floe edge tours and ski touring. Several expedition cruise ships visit Pond Inlet and the surrounding area each year. Visitation typically occurs in spring (late April to early June) for winter activities, and after ice break-up in summer (late July to early September) for kayaking, hiking and camping. The park is not accessible during ice break-up (mid-June to late July) and freeze-up (mid-October to early November). Spring is best for a number of activities, including ski-touring on the sea ice, mountaineering and ski-touring in the glacier fields, and touring the floe edges. Hiking and camping opportunities are typically undertaken during the short summer season at Bylot Island, the Borden Peninsula, and Oliver Sound. Sea kayaking and canoeing are popular ways of visiting the park during the summer season, particularly in Oliver Sound and Eclipse Sound. August is the most popular month for sea kayaking (Pers. Comm., Carey Elverum, Parks Canada, August 19, 2011).

Access into the park typically is from Arctic Bay or Pond Inlet, and is arranged by local tour outfitters who are licensed to operate in the park. Outfitters will take you to and from the park by either boat or snowmobile, depending on the season.

Sirmilik National Park has seen relatively high visitation (compared to other northern parks) although visitation has dropped substantially over the past decade. Until recently, much visitation was associated with guided tours offered through expedition Arctic cruises. Parks Canada staff estimate that the park was visited by approximately 300 non-local visitors annually between 2001 and 2004 (Pers. Comm., Pauline Scott, Parks Canada, August 16, 2011). Visitation has dropped significantly since then, with current estimates of visitation ranging between 16 to 35 annually. This drop in visitation is largely thought to be associated with restrictions that

were implemented that ban the possession and use of firearms as protection against polar bears (Pers. Comm., Pauline Scott, Parks Canada, August 16, 2011). Amendments to this policy are likely, which may result in increased visitation in the future.

Effects on Wilderness Experience

Over-flights by aircraft can result in reduced wilderness experience by park visitors, as witnessed in other northern parks including Kluane, Auyuittuq and Quttinirpaaq National Parks (Lachapelle, McCool and Watson, 2005). Visitor satisfication has been expressed to be negatively influenced by aircraft overflights. The degree of dissatisfaction or annoyance often is typically related to the volume of noise and the frequency of overflights (Gramann, 1999). Excessive noise from overflights would have an adverse impact on visitors' ability to achieve an experience of serenity, an experience identified as being a key objective of visitors to other remote northern parks (McCool et al. 2007).

Other northern parks have chosen to set indicators of what is acceptable for encounters with air traffic in order to ensure that "wilderness experience" is maintained. For example, on the Alsek River Corridor in Kluane National Park and Reserve, a target for aircraft encounters has been set at three flights over the course of two days (Parks Canada 2010). In the icefields of Kluane, the target for mean number of encounters with aircrafts has been set at less than 1.6 per day along routes, and less than 3.7 per day at (base) camps.

As described in Table 1, Baffinland estimates that one flight per week could fly from both Pond Inlet and Arctic Bay at the construction stage of the project, and fewer flights during mine operations. The extent of the effects associated with overflights will be local in nature. Oliver Sound likely will be the area most affected by the sounds of over-flights due to its popularity as a destination and its position under the flight path. Kayakers, canoers and backcountry hikers could see or hear passing aircraft. While overflights could result in a slight negative effect on visitor satisfaction, the frequency of such effects should be so low that this will not affect their overall wilderness experience significantly, nor influence the behaviour or destination choice of visitors within the park. The duration of these effects will end immediately upon the completion of the project. The effects of overflights can be further minimized by incorporating various mitigation methods, to be discussed below.

Unlike the affects of air traffic, the affect of shipping traffic on wilderness experience and visitor satisfaction is not discussed in detail in the outdoor recreation literature. As in terrestrial systems, increased human presence in a marine environment, such as shipping, will generally result in a negative impact on the overall quality of wilderness experience (Barr 2001). Similar principles considered for air traffic likely apply, where the frequency of interactions with ships

is correlated with negative impacts on visitor satisfaction and wilderness experience. The negative effect would not likely be related to noise, but rather an impediment on achieving a sense of naturalness.

In the context of the Mary River project, shipping traffic is restricted to Milne Inlet and Eclipse Sound, which are outside the boundaries of Sirmilik National Park but within the boundaries of the proposed Lancaster Sound NMCA. The extent of potential impacts on visitor experience due to freighter ships would be focused primarily within Eclipse Sound (Pers. Comm., Carey Elverum, Parks Canada, August 19, 2011). Visitors most affected by the presence of ships would be recreational boaters, such as sea kayakers and tourists on expedition cruise ships, using Eclipse Sound. Parks Canada staff familiar with the area anticipate that the presence of large ships would detract from the wilderness experience of sea kayakers in Eclipse Sound and that kayakers' threshold for a negative impact (i.e. number of encounters that was acceptable) could be very low (Pers. Comm., Pauline Scott, Parks Canada, August 16, 2011).

As reported in Table 2, Baffinland estimates that the frequency of interactions will be highest during the first two years of the construction phase, with a maximum of 10 freight ships and two fuel tankers in Year 1. The frequency will be considerably lower during the operation phase, when it is expected that only oversized equipment would be delivered to Milne Port and no delivery of fuel to Milne Port would occur. As such, the negative effect on wilderness experience on boaters and sea kayakers will be most pronounced during the first two years of construction, when interactions are most likely. The duration of these effects will end immediately upon the completion of the project.

Impacts on wilderness experience of visitors within the boundaries of Sirmilik National Park should be minimal, although sea kayakers accessing the park using Eclipse Sound who see these ships will likely feel that their wilderness experience is diminished. Some of these effects can likely be mitigated by various management techniques.

Concerns were raised about the effect of shipping on sea ice, with fears that shipping might result in ice breaking (Pers. Comm., Carey Elverum, Parks Canada, August 19, 2011). Sea ice is integral to transportation by locals for much of the year. Any ice breaking by ships would result in a negative impact to the transportation by these residents, and ultimately on their wilderness experience. Ice breaking should not be an issue as shipping to Milne Inlet will only be done during open water conditions.

Mitigation of Impacts

Various mitigation techniques can be applied to minimize any potential effect of air and shipping traffic on the wilderness experience of visitors. Several mitigation techniques specific to management of noise from air traffic are consistent with those identified in the "Replacement Class Screening Report for Aircrafts Landing in the Northern National Parks of Canada" (Parks Canada, 2004).

Recommended mitigation techniques to ensure that there is no significant impacts on the wilderness experience of visitors include the following:

- Maintain a minimum flying altitude of 2,000 feet (maximum cruising altitude of a Dash 8 is 25, 000 feet) when in the air space over the park except for approach to land, take-off or for safety reasons.
- Ensure certification of noise compliance, if applicable, is current.
- Provide Parks Canada and tour companies with regular flight and shipping schedules and information that can be used to brief visitors to the park. Briefing visitors on flight and shipping schedules will help prepare them for possible interactions and allow visitors to practice some avoidance if so desired.
- Schedule shipping to occur as much as possible outside the month of August, which is the busiest time for sea kayaking. As much shipping should occur immediately after spring break-up, in mid- to late-July, or just prior to winter freeze-up, in September to October.

Although shipping and air flights have the potential to have a negative effect on visitor experience, the implementation of the recommended mitigation measures coupled with the low frequency of interactions should result in a negligible impact on the wilderness experience for visitors in Sirmilik National Park.

Shipping in particular may have a slight negative impact on wilderness experience of sea kayakers and other boaters on Eclipse Sound as it likely conflicts with recreationists' expectations for naturalness. However, as the frequency of ships decreases substantially after Year 2 of the project, the potential impacts on wilderness experience will also diminish. Awareness of the shipping schedule by recreationists prior to venturing into Eclipse Sound can reduce negative impacts by shaping expectations for a visitor experience and allowing visitors to plan around the presence of large freighter ships.

Literature Cited

Barr, B. 2001. "Getting the job done: protecting marine wilderness". In Harmon, D. (Ed.) *Crossing Boundaries in Park Management: Proceedings of the 11th Conference on Research and Resource Management in Parks and on Public Lands*, Hancock, Michigan: The George Wright Society.

Gramann, J. 1999. "The Effect of Mechanical Noise and Natural Sound on Visitor Experiences in Units of the National Park System". Social Science Review. Volume 1, Number 1, Winter 1999.

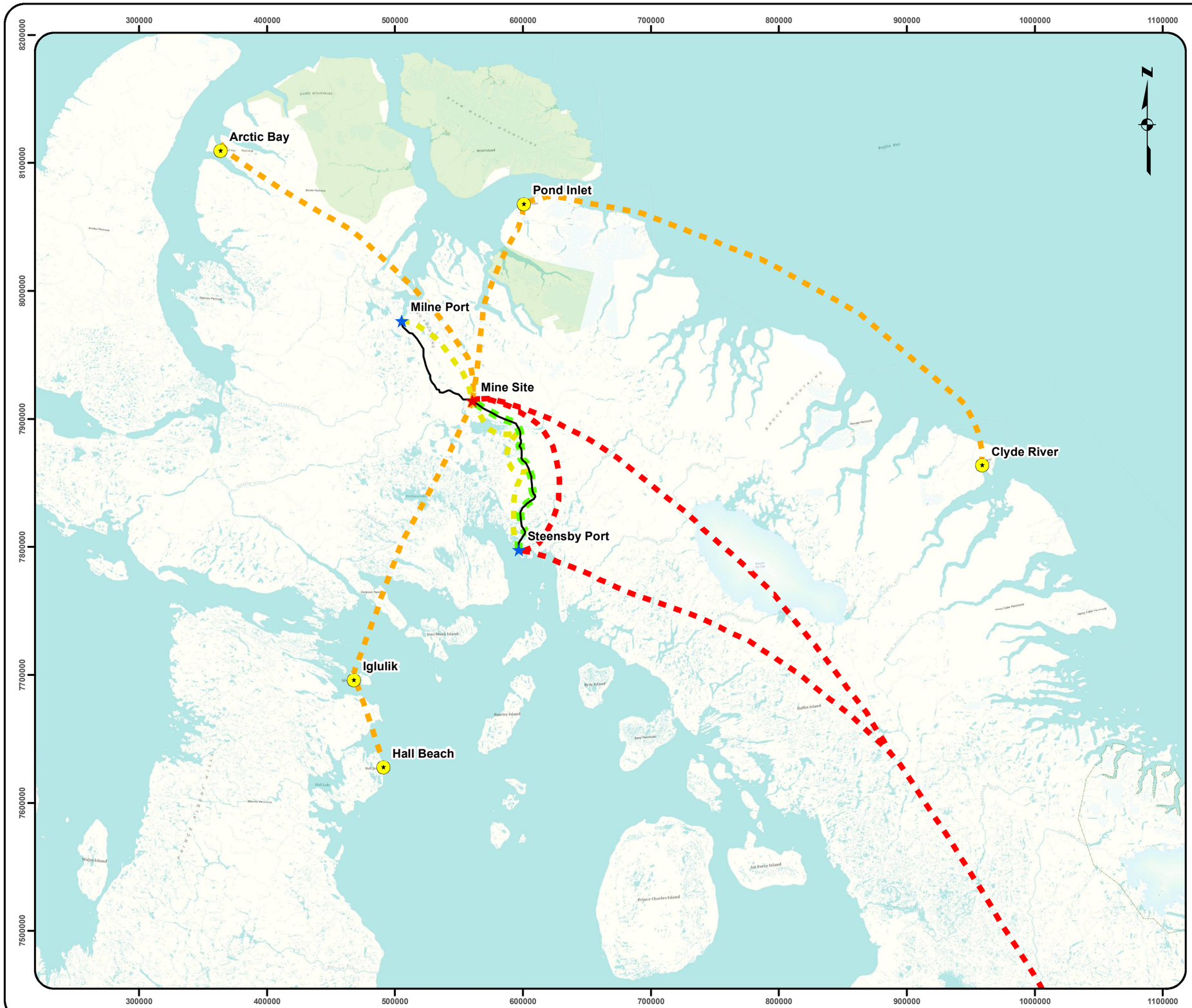
Lachapelle, P.R., McCool, S.F, and Watson, A.E. 2005. Auyuittuq and Quttinirpaaq National Parks Summer 2004 Visitor Experience Study. University of Montana and Aldo Leopold Wilderness Research Institute. Missoula, MO.

McCool, S.F., Lachapelle, P.R., Gosselin, H., and Sahanatien, V. 2007. "Managing Recreational Experiences in Arctic National Parks: A Process for Identifying Indicators". In Watson, A., Sproull, J. and Dean, L., (Ed.) 2007. *Science and stewardship to protect and sustain wilderness values: eighth World Wilderness Congress symposium: September 30–October 6, 2005; Anchorage, AK. Proceedings RMRS-P-49.* Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Parks Canada. 2004. Replacement Class Screening Report for Aircraft Landings in the Northern National Parks of Canada. Viewed August 9, 2011 <http://www.ceaa.gc.ca/050/documents/5548/5548E.pdf>

Parks Canada. 2010. Kluane National Park and Reserve of Canada: Management Plan. Viewed August 9, 2011 <http://www.pc.gc.ca/eng/pn-np/yt/kluane/plan.aspx>

Map 1. Overview of all flight paths servicing the Mary River project.



LEGEND

- Communities

Other Sites

- Milne Port
- Mine Site
- Steensby Port

Flight Lines

- Helicopter
- 737 Flight
- Dash-8 Flight
- Small Fixed Wing
- Tote Road

National Parks

- Sirmilik

0 37.5 75 150
Kilometers

Scale: 1:3,000,000 Original Map Size 11x17in

Baffinland Iron Mines Corporation

Figure 1: Air Traffic Patterns

Drawn: D. Weber	Datum/Projection: NAD 1983 UTM Zone 17N
Checked: R. Morris	EDI Project No.: 11-Y-0128
Date: 09/08/2011	Data Sources: Refer to References Section

EDI ENVIRONMENTAL DYNAMICS INC.

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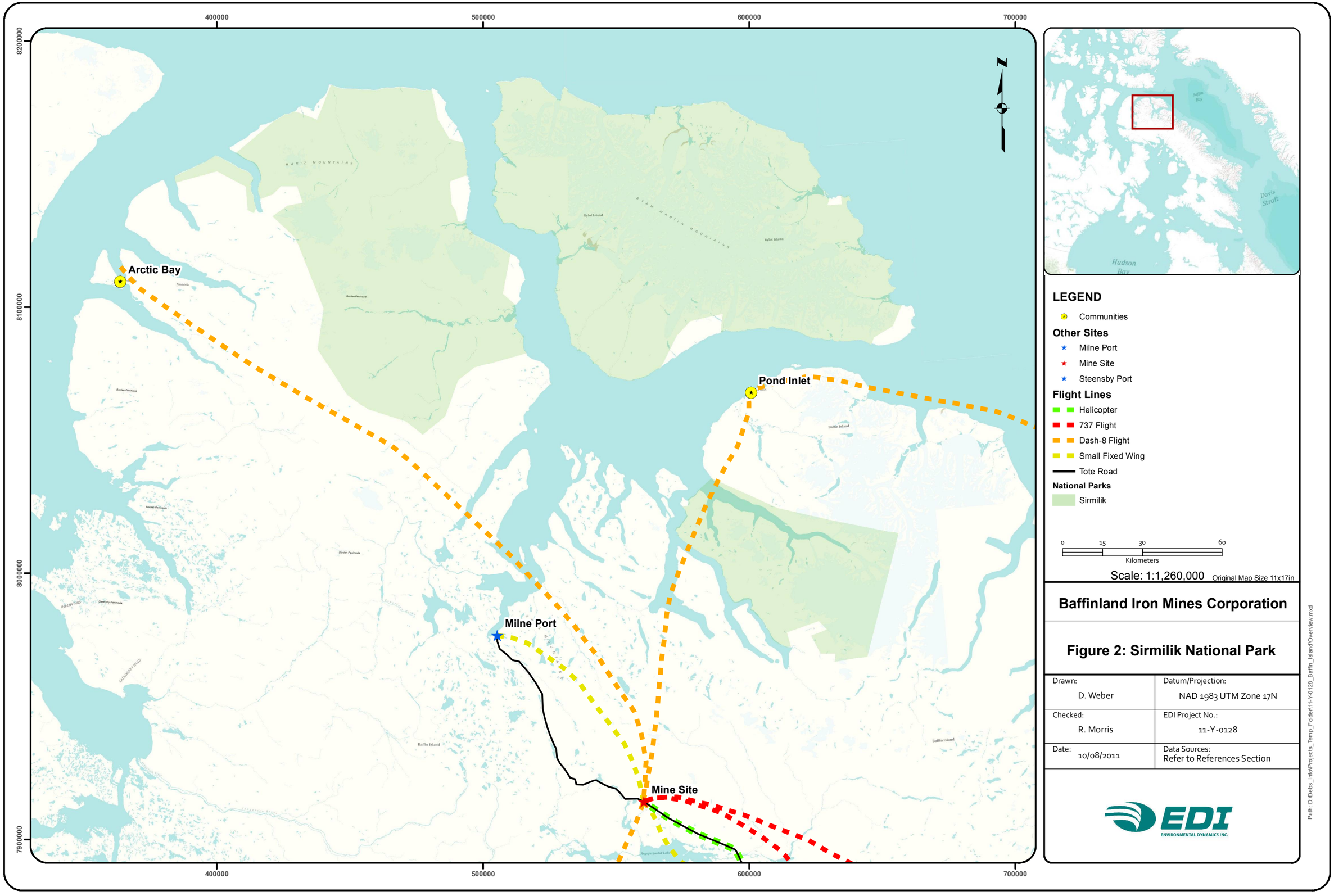
Map 2. Flight paths in close proximity to Sirmilik National Park.



LEGEND

- Communities

Other Sites

- Milne Port
- Mine Site
- Steensby Port

Flight Lines

- Helicopter
- 737 Flight
- Dash-8 Flight
- Small Fixed Wing
- Tote Road

National Parks

- Sirmilik

0 15 30 60
Kilometers

Scale: 1:1,260,000 Original Map Size 11x17in

Baffinland Iron Mines Corporation

Figure 2: Sirmilik National Park

Drawn: D. Weber	Datum/Projection: NAD 1983 UTM Zone 17N
Checked: R. Morris	EDI Project No.: 11-Y-0128
Date: 10/08/2011	Data Sources: Refer to References Section

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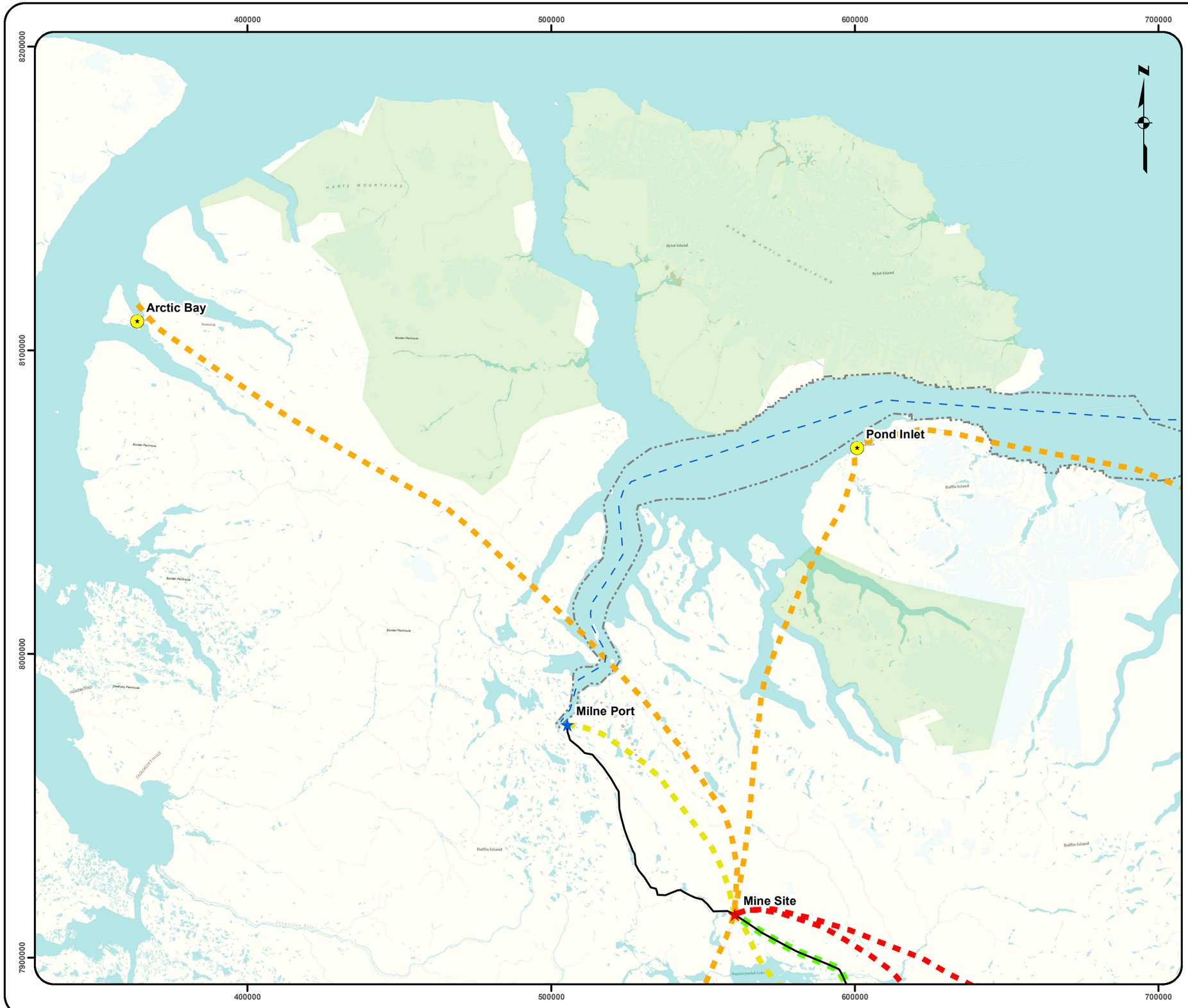
Map 3. Shipping route from Milne Port near Sirmilik National Park



LEGEND

- Communities

Other Sites

- Milne Port
- Mine Site
- Steensby Port

Flight Lines

- Helicopter
- 737 Flight
- Dash-8 Flight
- Small Fixed Wing
- Tote Road
- Shipping Route (Graphic Rep Only)
- Ship Route (20kmBuffer)

National Parks

- Sirmilik

0 15 30 60
Kilometers

Scale: 1:1,260,000 Original Map Size 11x17in

Baffinland Iron Mines Corporation

Figure 3: Milne Port Shipping Route

Drawn: D. Weber	Datum/Projection: NAD 1983 UTM Zone 17N
Checked: R. Morris	EDI Project No.: 11-Y-0128
Date: 15/08/2011	Data Sources: Refer to References Section

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