Baffinland Iron Mines Corporation
Mary River Project

Quarry Operations and Management Plan:

Quarry Q77 + 200

2012-01-11	B	Approved for Use – Environmental Permit	A. Grzegorczyk	J. Binns	S. Perry	
2011-11-03	A	Approved for Use – Environmental Permit	J. Donetz	J. Binns	J. Casson	
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY
			HATCH			CLIENT

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1. Introduction

This management plan is prepared within the context of the Baffinland Mary River Final Environmental Impact Statement (FEIS), and is meant to provide supporting information for consideration towards a Type A Water Licence for the project. A more complete project description of all components can be found in Volume 3: Project Description, and further management plan descriptions in Volume 10, Appendix 10-D of the Final Environmental Impact Statement. The purpose of the Quarry Operations and Management Plan: Q77 + 200 is to set out the objectives and measures to maintain and enhance environmental performance of the quarries while avoiding to the extent practical, remedying, and mitigating any potential adverse environmental effects associated with quarrying.

This document outlines the Management Plan, Site Description and Operations for the quarry as additional information for the Type A Water Licence Application.

1.1 Management and Operations Plan

As discussed in the Type A Water Licence Application, Borrow Pit and Quarry Management Plan (Appendix 10D-6), a separate management plan is required for each quarry within the Mary River Project footprint. This is in addition to the overall Quarry Management Plan. This management and operations plan provides more specific details on the development and management of this particular quarry.

Under the guidelines provided by the Nunavut Water Board (NWB), quarrying is not specifically listed as an activity that requires a Type A Licence. Under *Guideline 3 Activities Requiring Licence Types, Table 2: Summary of Type B and A Water Licence Criteria pursuant to the Regulations, Industrial Undertakings, 3(c)),* quarrying is listed as only requiring a Type B Licence. However, NWB Guideline 3 also states:

"If one component of a project requires a type A Licence, the entire project will be reviewed as a Type A Licence."

In addition to a Type A Water Licence, the Mary River borrow pit or quarry development requires a quarry permit under the Territorial Quarrying Regulations, and if activities include the use of equipment that exceeds the thresholds of the applicable land-use regulations, a land-use permit is required. Both permits include terms and conditions specifying how operations must be conducted. A quarry lease may be applied for instead of a quarry permit if longer-term tenure is desired.

Quarry operations that require blasting might require regulatory approval from the Worker's Safety and Compensation Commission.

The guidelines provided by the Nunavut Impact Review Board (NIRB) and Indian and Northern Affairs Canada (INAC) with regards to a Quarrying Permit Application state:

A Quarry Operations Plan is required with (this) application and must be approved by a Land Use Inspector prior to approval and issuances of the quarry permit if:

1. the volume being applied for is greater than 1,000 m^3
2. the quarry site is being operated by multiple users.

The proposed quarry at the Quarry Q77 + 200 is estimated to provide an aggregate volume of 150,000 m^3, and will exceed the volume threshold of 1,000 m^3, and a plan is required. This plan should be used in conjunction with the Type A Water Licence Application Borrow Pit and Quarries Management Plan, and other plans referred to in the document.

1.2 Site Description

The following physical description and environmental setting are summaries from the Mary River Final Environmental Impact Statement (FEIS). For a more complete description, refer to Attachment3: Project Wide Documents of the Type A Water Licence Application, and Baffinland Iron Mines Corporation, Final Environmental Impact Statement, Feb 2012, Volumes 6, 7, and 8.

1.2.1 Site Physical Description

The layout for the proposed Quarry Q77 + 200 is shown in Figure 1- 1. The basic quarry specifics are shown in Table 1- 1 below:

Table 1- 1: Quarry Q77 + 200 Specifications

Requirement	Description
NTS Map Sheet (1:50,000)	37 G/2 Edition 1 ASE Series A 713
Quarry Coordinates (UTM)	• 604840E 7857588N (centre point) • 604390E 784653N (NW extent) • 604690E 7856138N (SW extent) • 605290E 7856238N (SE extent) • 604790E 7857338N (NE extent)
Volume with Contingency (m^3)	152,642 m^2
Area of Existing Clearing	No clearing is required as site is primarily exposed rock
Area of Proposed Quarrying	Figure 1- 1 shows the quarry extents
Topsoil / Overburden Storage Area	None is required as site is primarily exposed rock
Access Roads / Trails	No roads currently exist to the site. As part of the PDW temporary access roads will be constructed as shown in Figure 1- 1
Camp Locations	No camp will be built specifically for the quarry operation. Personnel will be housed at the existing Mary River camp

Topography varies considerably across the Project area. Topography in the vicinity of the proposed quarry is described as a fairly flat. The land to the west is characterized by rolling topography with valleys and lakes.

Valley walls are generally steep and abrupt, often with distinct terraces.

Near surface glacial deposits and bedrock is dominant in the quarry area. Limited overburden is in the form of marine sediments and localized deposits of till. The majority of the overburden is located in depressions between the numerous bedrock outcrops and is typically overlain by a layer of vegetation and boulders. This is evident along the base of the rock outcrops at the quarry site.

The Project is located in a zone of continuous permafrost. The active layer through the Project area typically ranges from approximately 1 m to 2 m but may be greater in areas where there is loose, sandy soil at the edges of lakes or ponds and less in areas with a substantial surface layer of wet organics. The proposed quarry site has areas where permafrost would be encountered. These are primarily in the deposition areas and deposits to the south of the actual site can range up to 30 m in depth with ice rich deposits.

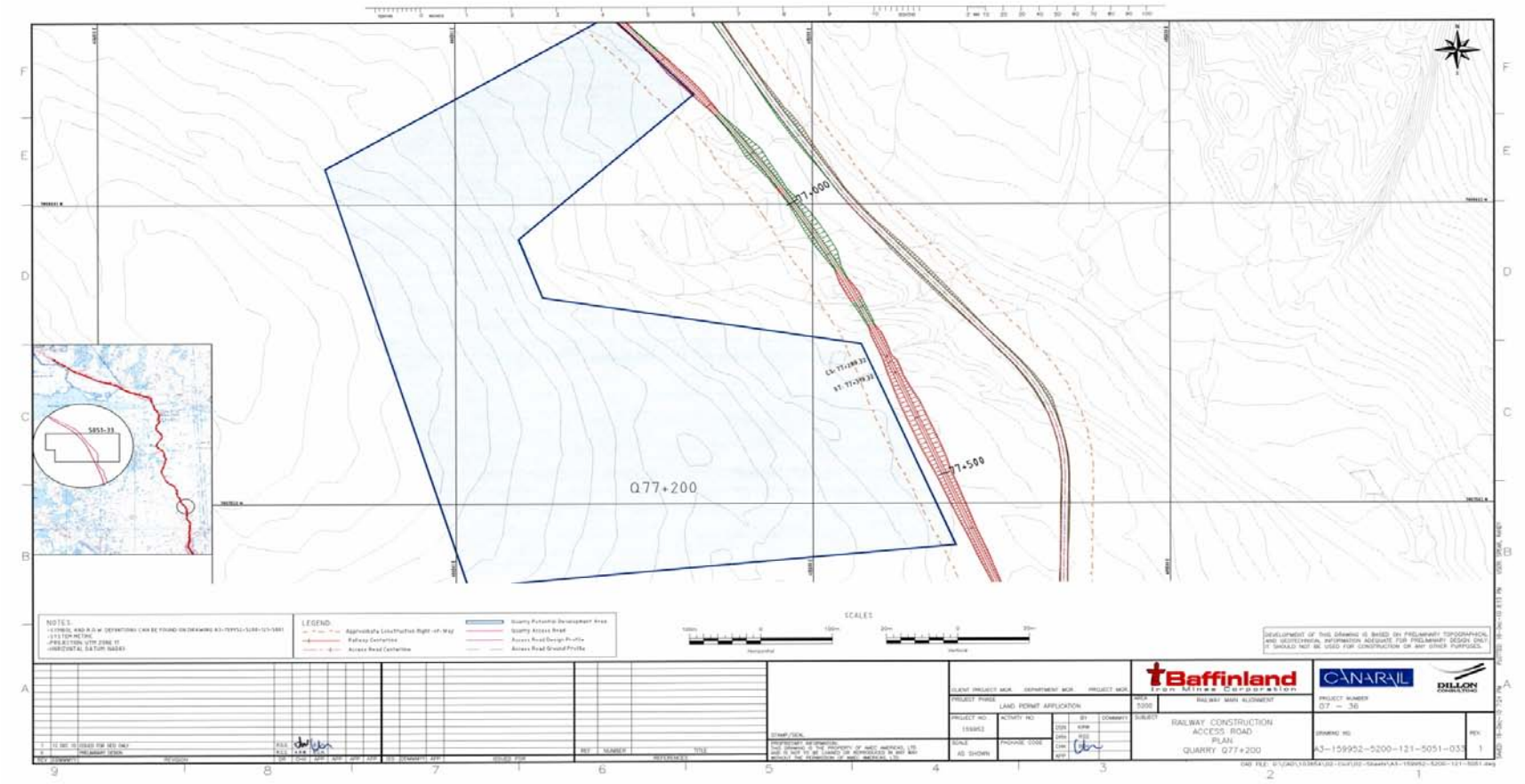

Figure 1- 1: Quarry Q77 + 200 - Site Layout

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1.2.2 Environmental Setting

In general, the proposed quarry area at the proposed Mary River quarry was found to be primarily either exposed bedrock hills or bedrock very close to surface with glacial deposits and boulders (see Figure 1- 2). Lower depressions between the hills generally have a moderate layer of wet organics at surface and drainage is poor. These lower areas have a range of materials present from colluvial/alluvial type deposits to till with significant fines present. In areas where overburden was present, this generally comprised of a thin layer of organics, underlain by moist gravely sand with some silt.

No water bodies are located within 200 m of the proposed quarry.

Figure 1- 2: Proposed Quarry Q77 + 200 Looking West

Vegetation within the Mary River Project area is described in the Vegetation Baseline Study Report in Volume 6 of the FEIS (Appendix 6C). A total of 155 vascular plant species were recorded through the total Project area, a vegetation classification system was developed and a species list was compiled. No plant species considered to be "rare" in Canada were found to occur in the survey locations. Vegetation is extremely limited in the area of the proposed quarry, and exists in small patches where organic deposits occur around the base of the rock outcroppings, and in the valleys in between large boulders. Several species of songbirds and

shorebirds migrate to this area annually to breed, and were predominately found in the various types of lowland habitats (river deltas, coastal plains, tundra, and near wetlands) that offer an abundant source of insects and vegetation for foraging and nesting habitat. This type of habitat is present within and near the proposed quarry site. Bird densities though, are considered to be relatively low.

Terrestrial wildlife on north Baffin Island is described in the terrestrial wildlife baseline report (FEIS, Volume 6: Terrestrial, Appendix 6F). Terrestrial wildlife includes caribou, wolves, foxes, arctic hares, ermine, and small mammals. Occurrence of most wildlife species on north Baffin Island is relatively sparse, and this is expected to be especially true at the quarry site given the type of terrain. Arctic foxes, arctic hares and lemmings are reported in the area, and caribou are known to occur.

Marine mammals are not present in the area as the quarry site is displaced from shoreline habitat sufficiently to avoid being regarded as suitable habitat. However, polar bear are occasionally known to move through the area.

No settlements or known hunting camps or areas are located in proximity to the proposed quarry site. There are currently no roads, buildings or structures at the site.

2. Operation

The following outlines the operational activities for the proposed quarry at the Quarry Q77 + 200.

2.1 Organization and Reporting

The entire Project will be under control of a Construction Director, with a Site Specific Manager directly reporting to him. An Area Coordinator Lead (AC) will report to the Construction Manager, and supervise AC#3, who will be directly responsible for quarry development and operations.

Common to all aspects of the construction will be a Project Administrator, a Safety Manager, and Engineering Site Lead, and an Environmental Lead.

All names and contact numbers for the above positions will be provided prior to the commencement of quarrying activities.

2.2 Quarry Set Up and Operation

The quarry will be accessed by a temporary road from the main rail bed construction zone, and will be approximately less than 50 m in length and constructed of granular material. Equipment transported to the quarry site will include:

- crushing, screening and cleaning plants;
- drilling Equipment;

- rock hauling trucks;
- scrapers;
- excavators;
- blasting gear.

A small (< 50 m^2) portable field office trailer will be placed at the quarry site. Equipment will be serviced at maintenance facilities located at the nearby laydown area.

2.3 Quarrying Activities

The following describes the general activities:

2.3.1 Explosives Management and Blasting

Blasting operations will be carried out by Orica, an independent engineering firm specializing in blast monitoring and design. As this is one of the later quarries developed, it is expected that a permanent manufacturing facility for explosives will have been constructed (Attachment 10: Explosives) and AN mixtures will be available. Transportation of explosives to and from the quarry site will occur from the explosives magazine storage area via the temporary access road.

Drilling for the blasting will take place on a five foot grid pattern in an effort to minimize the rock size resulting from the blasting. Blasting management will be coordinated with the Area Coordinator responsible for quarries and borrow pits.

Blasting will take place on a day shift, seven days per week. An Explosives Management Plan for the Project, has been developed and is available for review (refer to FEIS, Appendix 10C-4).

2.3.2 Excavation and Crushing

The entire operation takes place in an area of permafrost, and groundwater is therefore not an issue. Drilling will be monitored to avoid creating run off and drainage issues. Washing of aggregate is not required, as the material will be used for site preparation only. Quarrying will work along the exposed rock faces and will be terraced to minimize run off from the site. Efforts will be made during blasting operations to avoid creating depressions which might collect run off or melt waters.

Drilling and extraction exercises may occur concurrently, depending on issues of safety and schedule.

Blast areas will be cleared by loader and/or scraper and put into rock trucks for transport to the crusher/screener facility. Loaders will feed rock to the crushing and screening operation.

Crushing and stockpiling areas will be located as near as practical to the southern extent of the quarry within easy access to the road location. Very little topsoil is present at the site, and would be considered as incidental material. As a result, no stockpiling area for topsoil will be required.

Crushing operations and screening operations will take place during the day shift, seven days per week. The operation will process all rock from the quarry, and may also process rock from other areas if required. Final material will be cleaned and stored by aggregate size in stockpiles for transport to the appropriate construction sites.

2.3.3 Site Security and Safety

Copies of all safety and management documents will be made available to on site personnel and mandatory training for operations at the Quarry Q77 + 200 will take place. The Area Coordinator will ensure that operations are consistent with other management plans, terms and conditions of the issued permits, and safety procedures for the Project.

Security signage will be posted at the entrance to the quarry. The remoteness of the quarry and the onsite presence of operations personnel will make perimeter fencing unnecessary. Audible warning systems will be employed for all blasting operations at posted intervals prior to any detonations.

Blasting and processing operations will be suspended if incursions into the quarry occur, or if observations of wildlife in the immediate quarry area are made. On site monitors for bear will provide warnings if approach by any animals is noted.

2.4 Site Management Measures

Best management practices for quarry operations will be followed for the Quarry Q77 + 200. The following management activities will be incorporated into the site operations:

2.4.1 Drainage Management

The potential to alter drainage patterns and affect local water quality exists, although the quarry is not situated in an area with existing surface water. Prior to quarry operation, the hydro-geological regime around the quarry site will need to be defined, and appropriate direction of flows from site managed to maintain the natural flow patterns as much as possible. The quarry is currently designed to avoid surface water courses and drainage channels by a minimum of 30 m.

Sources of contamination from the operation that could affect water quality include dust from blasting and refuelling for equipment. Blast residues from explosives will be managed by ensuring that all material is ignited during the blasting process. Vehicle fuelling will be conducted at a centralized fuelling facility off site that has proper containment and spill response capability. Fuelling for non-moveable onsite equipment, such as generators, will take place in a secured area with approved spill containment.

2.4.2 Dust Management

The primary sources of dust at the Quarry Q77 + 200 are blasting, loading and crushing and screening of aggregates. Very little topsoil exists at the quarry site, and is not considered a primary source of dust. The management of dust will be accomplished by minimizing the creation of dust at source. Crushing activity will take place as far from surface water or dust sensitive areas as is practical at the site. If possible, protection from prevailing winds will be

accomplished by situating the crushing operation to take advantage of the local topography for shelter. Transport of material will be subject to speed limit restrictions to help reduce dust.

Dust management activities will include monitoring surrounding snow for accumulations of quarry dust. If such deposits are noted, the snow layer will be removed prior to melting, and transported to the land farm.

2.4.3 Noise Management

Quarry activities will generate noise from equipment operation, blasting and crushing and screening operations. Noise receptors within the area are restricted to wildlife, as no dwellings or other land use that is sensitive to noise occur nearby.

During quarry operations, monitors will inform the quarry manager if significant wildlife activity, such as caribou movement or seal pull outs, is occurring. Depending on the concentrations and likely effect of the noise generating activity, the quarry manager may temporarily suspend operations. Please refer to FEIS, Appendix 10B – Environmental Protection Plan, Section 2.20 and 2.25.

2.5 Monitoring

Operation of the Quarry Q77 + 200 must be monitored to ensure compliance with the Borrow Pit and Quarry Management Plan and to meet the terms and conditions of the regulations and land-use permits granted for the Project. Monitoring will focus on:

- Regular inspection of site-preparation measures;
- Regular inspection of drainage from the quarry site;
- Quantification and quality estimates of the granular resource material;
- Monitoring for ground-ice presence;
- Monitoring for presence of avian, terrestrial and marine mammals in the area;
- Monitoring of water quality for changes;
- Monitoring of snow surrounding quarries for dust deposition;
- Reporting requirements as outlined in any permits.

3. Supporting Management Plans

This plan should be viewed in concert with the following additional plans prepared for the Type A Water Licence Application, and found under their respective headings as follows:

- Emergency Response and Spill Contingency Plan (Appendix 10C-1)
- Borrow Pit and Quarry Management Plan (Appendix 10D-6)

- Surface Water and Aquatic Ecosystems Management Plan (Appendix 10D-2)
- Fresh Water Supply, Sewage and Wastewater Management Plan (Appendix 10D-3)
- Terrestrial Environment Management (Appendix 10D-11)
- Explosives Management Plan (Appendix 10C-4)
- Preliminary Mine Closure and Reclamation Plan (Appendix 10G)

4. Closure Activities

The abandonment of quarries and borrow pits will be Quarry Q77 + 200 integrated into the overall Project Close Out plan. However, separate closure plans for the Quarry Q77 + 200 and borrow pit operations are required. Abandonment of the quarry will involve removing all materials, equipment and infrastructure and reclaiming the site to self sustaining productive ecosystem as near its original condition as is achievable and practical.

4.1 Abandonment of Active Quarry Face

The active quarry face will be terraced during operation to closely manage issues related to drainage and will not be altered for closure. The quarry development will preclude the creation of pits and depressions as much as possible.

4.2 Waste Disposal

All site waste will be collected and placed in appropriate containers for removal. Pre and post waste removal inspections will be made to ensure the thoroughness of the program. Waste will include metallic waste, construction material waste and domestic waste.

At the current time, no washroom facilities for personnel are expected at the quarry site. Any requirement for such facilities will be met by easily removable portable toilets. These will be operated in a manner consistent with regulations, and disposal will be in accordance to the waste management plans.

4.3 Stockpile Removal

Quarrying activities will be closely managed to avoid the accumulation of unnecessary stockpiles of aggregate. Any stockpiles that do remain will be dealt with as follows:

- Large rock will be spread out on the landscape.
- Medium sized rock will be used to re-contour affected areas to re-establish a more natural appearance to the area.
- Small crushed rock will be used to assist in drainage restoration, and spread on the landscape to re-establish more natural contours.

4.4 Road Closure

The Quarry Q77 + 200 access are provided by the temporary road related to construction of the railway. The entire road bed will be removed, and the material utilized in re-establishing natural contours throughout the area.

4.5 Soil Remediation for Contaminated Soils

A pre-closure inspection of the entire quarry site will be made. Any contaminated soils, snow or ice packs, or overburden will be flagged. The extent of the contamination will be determined, and the material removed. Hydrocarbon contaminated soils or overburden will be transported to the land farm established on site. Other contamination, such as heavy metals or toxins, will require containerization for shipping off site to an appropriate facility (refer to FEIS, Appendix 10G – Preliminary Mine Closure and Reclamation Plan).

Annex 1:
Quarry Permit Applications Forms and cheque

QUARRYING PERMIT APPLICATION

***Privacy Act* Statement**

The information you provide in this document is collected under the authority of the *Territorial Quarrying Regulations* for the purpose of applying for a quarrying permit. Information on individuals is used Indian and Northern Affairs Canada Mineral and Petroleum Resources Branch employees who need to know the information in order to respond to the program requirements. We do not share the personal information with other government departments. The personal information will be retained for 5 years after the last administrative use and then transferred to Library and Archives Canada. Individuals have the right to the protection of and access to their personal information under the *Privacy Act* http://lois.justice.gc.ca/en/P-21/index.html.

Applicant Name	Company Name
Erik Madsen, Vice-President Sustainable Development	Baffinland Iron Mines Corporation

Address

Suite 1016, 120 Adelaide Street West, Toronto, Ontario M5H 1T1

Telephone Number	Facsimile Number	Cellular Number
416-814-3980		416-996-5523

Sub-Contractor or Pit Operator ☑ Same as above	Name/Company

Address

Telephone Number	Facsimile Number	Cellular Number

I hereby apply for a Quarrying Permit for the purpose of taking:

Amount of Cubic Metres	Sand	Gravel	Stone	Loam	Other (please specify)
153,000 ▶	○	○	●	○	○
▶	○	○	○	○	○
▶	○	○	○	○	○

Location of Pit	NTS Map Sheet No.	Co-Ordinates
Baffin Island, Nunavut, Railway Quarry Q77 + 200	37 F/6 Edition 1 ASE Series	604840E 7857588N Zone 18

Land Use Permit

● Existing	Land Use Permit No.	Expiry Date	○ New Application	Application Date
	N2007F0004	(YYYYMMDD) 2012-06-04		(YYYYMMDD)

Quarry Site

○ Existing ● New | Application made to: ○ MVLWB ○ WLWB ○ SLWB ● GLWB

1. A Quarry Operations Plan is required with this application and must be approved by a Land Use Inspector prior to approval and issuance of the quarry permit if:

   (A) The volume being applied for is greater than 1,000 m3 and/or
   (B) The quarry site is being operated by multiple users

   The Quarry Operations Plan includes the following mandatory information:
   - -North Arrow
   - -Map Scale at 1:5000
   - -NTS Map Sheet or acceptable alternate at 1:50,000
   - -Coordinates of quarry site - 4 corners (NE, NW, SE, SW)
   - -Total area of the identified quarry resource
   - -Area of existing clearing
   - -Area of proposed quarrying
   - -Topsoil/overburden storage area
   - -Access roads/trails
   - -Camp locations identifying all infrastructure to be established on the site
   - -When applicable, blast pattern details must be indicated
   - -Closure and Reclamation Plan including:
     - -Camp reclamation, if applicable
     - -Abandonment of active quarry face
     - -Waste disposal
     - -Stockpile removal
     - -Road closure
     - -Soil remediation for contaminated soils

Failure to submit an acceptable Quarry Operations plan (when required) will result in rejection of the Quarry Permit Application. Complete 2 - 7 below only if a Quarry Operations Plan is not required.

2. Is any part of the land occupied? And if so, by whom and for what purpose?

The land is unoccupied

3. The only buildings or other improvements on the said lands are as follows:

Nature of Improvements

No permanent buildings will be established on site. Please refer to Section 1.2 and 1.3 of attached plan.

Value of Improvements

-Not applicable-

Owner of Improvements

- No long term improvements are anticipated -

4. The land is/is not wooded.

● No ○ Yes ▶ If yes, describe species of trees and approximate size:
No trees present on site. Please refer to Section 1 of attached plan.

5. Please describe the proposed methods of brush and or timber disposal to be used on the site (if required).

- Not Applicable-

6. If a camp is to be utilized please describe the proposed methods for:

Combustible Garbage - Not Applicable- Please see Section 2.0 of attached plan.	Non-combustible Garbage - Not Applicable- Please see Section 2.0 of attached plan.
Food Wastes - Not Applicable- Please see Section 2.0 of attached plan.	Grey Water - Not Applicable- Please see Section 2.0 of attached plan.
Black Water - Not Applicable- Please see Section 2.0 of attached plan.	Potable Water Supply - Not Applicable- Please see Section 2.0 of attached plan.

7. Please describe the proposed reclamation techniques that will be applied to the quarry site upon or prior to termination of the Quarry Permit.

The abandonment of quarries and borrow pits will be integrated into the overall Project Close Out plan. Abandonment of the quarry will involve removing all materials, equipment and infrastructure and reclaiming the site to self sustaining productive ecosystem as near its original condition as is achievable and practical. (Please see attached plan, Section 4.0 for details)

I enclose the required fees as indicated below:	Total $
Quarrying Permit Fee: ($150.00)	150.00
Royalties on sand, gravel, loam per cubic metre: ($1.50)	
Royalties on other building materials per cubic metre: ($1.25)	
Total Fees ▶	**150.00**

Canada

1. The attached plan is a sketch plan of the land as required by the Territorial Quarrying Regulations (Sketch should include an indication of the area to be worked).

☑ See Quarry Management Plan

2. Sketch Plan:

Use Additional sheets if required.

3. Co-ordinates of Site (Latitude and Longitude):

NW Point	NE Point	SW Point	SE Point
• 604390E 784653N	• 604790E 7857338N	• 604690E 7856138N	• 605290E 7856238N

Signature of Applicant

Date (YYYYMMDD) 2012/01/15

Note to Client: Alteration to base form will not be accepted.

For Internal Use Only

Reviewing Officer (Print Name)		Signature	
Date Application Deemed Complete (YYYYMMDD)	Date Application Faxed (YYYYMMDD)	Sent to: ○ Yellowknife	○ Inuvik ○ Nunavut

Canada

BAFFINLAND IRON MINES CORPORATION

5162

Vendor ID	Name	Payment Number	Cheque Date	Document Number
REC001	Receiver General For Canada	PP-0000000016969	1/10/12	005162

Invoice Number	Date	Amount	Amount Paid	Discount	Net Amount Paid
QUARRYQ77+200	1/09/12	$ 150.00	$ 150.00	$ 0.00	$ 150.00
		$ 150.00	$ 150.00	$ 0.00	$ 150.00

THIS DOCUMENT CONTAINS SECURITY FEATURES INCLUDING FLUORESCENT FIBRES AND A TRUE WATERMARK

CHEQUE NO.
5162

Baffinland
Iron Mines Corporation
Suite 1016, 120 Adelaide Street West, Toronto, ON M5H 1T1

The Bank of Nova Scotia 47696
www.scotiabank.com/businessservice
1-888-855-1234

DATE 01 10 2012
M M D D Y Y Y Y

PAY **One Hundred Fifty Dollars And 00 Cents**

$ **150.00**