APPENDIX F3

SITE WATER MANAGEMENT PLAN AND QA/QC PLAN

(Pages F3-1 to F3-125)

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2012 SITE WATER MANAGEMENT PLAN

Rev. No.	Revision	Date	Approved
0	Issued in Final	October 25, 2007	KDE
1	Updated for 2008 Field Season	March 31, 2008	KDE
2	Issued in Final	March 31, 2009	JM
3	Issued in Final	March 31, 2010	JM
4	Issued in Final	March 31, 2011	JM
5	Issued in Final	March 31, 2012	JM

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BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2012 SITE WATER MANAGEMENT PLAN

REVISIONS MADE

Modifications / Additions	Document Reference	
	Section	Page Number
Updated 2012 proposed scope of work	1.1	1
Updated to include changes to Water License No. 2BB-MRY1114	1.2	2
Updated to include landfill surface water monitoring location MRY-13.	6.3.1	29
Updated to include changes to Water License No. 2BB-MRY1114	7.0	33
Table 6.1 was revised to include the addition of Water Quality Monitoring Locations MRY-7A, MRY-13A and MRY-13B.	Table 6.1	End of Document

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2012 SITE WATER MANAGEMENT PLAN

SECTION 1.0 - INTRODUCTION

1.1 PROJECT

The Mary River Project (the Project) is an iron ore advanced exploration project in the North Baffin region of Nunavut. The Project is located about 160 km south of Mittimatalik (Pond Inlet) and 270 km southeast of Ikpiarjuk (Arctic Bay) as shown on Figure 1.1.

Baffinland commenced exploration at Mary River in 2004 and has since completed a number of field investigations in the region. Camp accommodations have been established at Mary River, Milne Inlet, Nivek Lake, and Steensby Inlet to support ongoing field investigations including exploration drilling and resource delineation, geotechnical drilling and engineering planning, and environmental and social data collection. A bulk sampling program has been undertaken with a resultant 113,000 tonnes of iron ore shipped to the European market during the summer of 2008.

Field programs and activities are ongoing in support of continued advancement of the Mary River Project. Baffinland submitted its Draft Environmental Impact Statement (DEIS) for the Mary River Project to the Nunavut Impact Review Board on January 21, 2011 and the Final Environmental Impact Statement (FEIS) was submitted on February 13, 2012. The FEIS was accepted by NIRB and is currently in the review process. Based on a review of the Project and commitments made during the DEIS and FEIS process, a work program for 2012 has been developed and is presented below.

Currently, it is anticipated that the 2012 field work program that will be associated with the SWMP will include the following items:

- Continued occupation of the Mary River and Milne Inlet camps throughout 2012 and seasonal occupation of Steensby Inlet. Mid-Rail Camp will remain unoccupied throughout 2012.
- Fixed wing aircraft and helicopter to support general site activities including environmental monitoring and ongoing environmental/geotechnical drilling at Deposit No. 1, regional exploration for outlying areas, and scientific data collection to support ongoing integrity of baseline programs.
- Ongoing surface exploration on Baffinland's exploration lands including on Deposits Nos. 6 to 9, incl.
- Continue archaeological surveys at project component areas as required.
- Follow up on the requirements pursuant to the Fisheries Authorization for the Tote Road Not Net Loss and Monitoring Program, QIA lease, and INAC land permit and quarry permit requirements.
- Implementation of a freshet management plan for the Milne Inlet Tote Road to minimize associated environmental risks.
- Continued progressive reclamation of areas of current and past use in association with drilling, bulk sample, and historical exploration programs.
- Sealift resupply at Milne Port and possibly Steensby Port including supplies and equipment to support ongoing permitted activities.

- Transport of needed fuel and supplies stored at Milne Inlet to the Mary River Camp to support the existing permitted activities.
- Commencement of decommissioning of the Milne Inlet fuel bladder storage area that involves the commissioning of the new five million litre steel tank and ancillary facilities and the transfer of remaining P-50 diesel from the bladder farm to the steel tank. The Jet-A fuel currently stored in bladders will remain there for another year.
- Demobilization of equipment and supplies not required for near term activities, as well as the current inventory of hazardous waste and other materials by means of sealift from Milne Inlet and possibly Steensby Inlet.
- Continued deposition of non-hazardous wastes into the constructed landfill in accordance with the landfill operations and maintenance manual.
- Continued implementation of treatment methodologies utilized for the separation of oil and waste from stormwater that is resident in the engineered lined fuel storage containment and hazardous waste areas at Milne Inlet and Mary River.
- Discharge of treated sewage stored in PWSPs at Mary River Camp and Milne Inlet after treatment as required. Two periods of discharge are planned, the first corresponding to freshet (May-June), and the second later in the summer if required.
- Other scientific and engineering studies would be undertaken in support of ongoing baseline and engineering data collection as required from the Project FEIS. Some of these studies will be based out of a research vessel in Steensby Inlet, similar to what was completed last year and include benthic sample collection, bathymetry, and limited geophysical bottom profiling work.

In addition to the above activities, site maintenance and minor site upgrades will be undertaken to enhance safety and environment, improve and facilitate existing pre-construction operations.

The Mary River Project includes the following components which define the aerial extent of the project area as shown on Figure 1.2:

Mary River Project site, including Deposits 1 through 9 as well as new claim blocks from the 2011 staking program.

- Milne Inlet Tote Road
- Milne Inlet port site and adjacent marine areas
- Proposed future railway heading south from Mary River to Steensby Inlet
- Proposed future port site at Steensby Inlet and adjacent marine areas
- Potential future hydro-electric generation site

1.2 WATER LICENCE REQUIREMENTS

The water licence issued to Baffinland in July 2007 (NWB File No. 2BB-MRY0710) and amended in early 2008 (Amendment No. 2, dated February 29, 2008) was renewed and reissued to Baffinland in April 2011 as License No. 2BB-MRY1114. This document has been updated to fulfill the requirements of the Nunavut Water Board (NWB) Type B Water License No. 2BB-MRY1114 to resubmit the Site Water Management Plan (as stated on the license in Part B, Item 6(11)) and to provide an Environmental Monitoring Plan.

A summary of the specific requirements of the water licence as it relates to site water management is as follows:

- The volume of water extracted for the project for the purposes of this licence shall not exceed 385 cubic metres per day (approximately 60 cubic metres for potable water/camp use and the remainder for drilling purposes)
- GPS coordinates (in degrees, minutes, seconds) of all locations where water is used will be recorded and reported to the Inspector prior to use
- Daily quantities of water use will be measured and recorded, in cubic metres, for camp, drilling and other purposes
- Surface water samples will be collected throughout the Mary River Exploration Property, including Deposits No. 4 and 5, and at sites near Milne Inlet and Steensby Inlet. Subsequent laboratory analytical results are used to identify water quality trends and potential impacts to surface water.
- Quantities of domestic waste, sewage and hazardous waste hauled off-site for disposal will be measured and recorded, in cubic metres. The location and name of the disposal facility(s) and the date that waste was hauled off-site will be recorded.
- All water for domestic purposes shall be obtained from the following sources; Camp Lake (Monitoring Station MRY-1), Phillips Creek (Monitoring Station MRY-2), km 32 Lake (Monitoring Station MRY-3), an unnamed lake at km 32 along the Milne Inlet Tote Road, Deposit No. 4 Camp (location to be identified prior to use), an unnamed lake adjacent to Rail Camp, an unnamed lake near Steensby Inlet Camp, the alternate source for freshwater identified in the Application or at an alternate location approved by the Nunavut Water Board (NWB)
- All water intake hoses shall be equipped with a screen of an appropriate mesh size to ensure fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen
- Camps will not be located, nor material stored, on the frozen surface of a stream or lake, except where for immediate use
- Water Supply Facilities shall be maintained to the satisfaction of the inspector
- Streams will not be used as a water source unless authorized and approved by the NWB
- Water use for drilling will be taken from sources adjacent to drill locations or as otherwise approved by the NWB
- No land based drilling shall be conducted within 31 m of the ordinary high water mark of any water body, unless a request has been submitted and received by the NWB, ten (10) days in advance of drilling. The request must include a thorough description of the proposed activities and the following:
  - An appropriately scaled site map, complete with approximate GPS coordinates of planned drilling locations and the associated water bodies
  - Locations of waste deposition, that are consistent with Part F, Item 4
  - Mitigation measures that are planned to be in place, prior to, during drilling and following if required to protect waters
- Drill waste, including water, chips, muds and salts, in any quantity or concentration, from land-based drilling, will be disposed of in a properly constructed sump or an appropriate natural depression located at least 31 m from the ordinary high water mark of any adjacent water body, where direct flow into a water body is not possible and no additional impacts will be created

- If artesian flow is encountered, drillholes will be immediately sealed and permanently capped. If encountered, artesian flow will be reported to the NWB
- If the bottom of permafrost is broken through by the drill, the depth and location will be recorded and reported to the NWB
- If water is required in sufficient volume as to cause drawdown of the water body, approval by the NWB will be obtained 30 days prior to use. Details to be submitted include: volume required, hydrological overview of water body, details of impacts and proposed mitigation measures.
- Stream banks will not be cut and material shall not be removed from below the ordinary high water mark of any water body unless authorized
- The licensee will not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion
- With respect to access roads, pad construction, and other earthworks, debris and sediment will not be deposited into or on any water body. The materials will be deposited at least 31 m from the ordinary high water mark in such a fashion that they do not enter the water. Chemicals, fuels or wastes associated with this will not be allowed to enter any water body.
- Stream crossings will be located so as to minimize approach grades. Approaches will be stabilized during construction and upon completion in order to control runoff, erosion and subsequent siltation to any water body.
- Machinery will not travel up the streambed of a water body. Fording will be kept to a minimum and limited to one area and a one-time event for each piece of equipment, where possible. Equipment will be well cleaned and free of oil and grease and fluid leaks.
- Pollutants from machinery fording water crossings will not enter the water
- Activities will be conducted so as to minimize impacts on surface drainage, and will undertake corrective measures if surface drainage is impacted
- Sites will be prepared in such a manner as to prevent surface rutting
- Fill material used during construction will be from an approved source and free of contaminants
- Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water
- Equipment storage holding areas will be located on gravel, sand or other durable land, at least 31 m from the ordinary high water mark of any water body to minimize impacts on surface drainage and water quality
- Equipment and vehicles will not be used unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of vehicles will cease if rutting occurs.
- An area will be designated for deposition of excavated and stockpiled material that is at least 31 m from the ordinary high water mark of any water body
- In-stream activity will be limited to low water periods, and will not be undertaken during fish migration, unless approved
- Except where approved, winter lake and stream crossings will be constructed entirely of water, ice, or snow, with disturbance minimized by situating ice bridges in areas with minimal approach grading and short crossing routes. Stream crossings will be removed or the ice notched prior to spring break-up.
- GPS coordinates (in degrees, minutes, seconds) will be determined for all locations of temporary and permanent storage areas where wastes associated with camp, drilling and infrastructure operation are deposited. These locations will be reported to the Inspector prior to depositing wastes.

- All waste disposal areas shall be located a minimum of 31 m from the ordinary high water mark of any water body, such that the quality, quantity, or flow of water is not impaired, unless otherwise approved
- All Polishing / Waste Stabilization Pond (PWSP) discharges will be released in a manner that minimizes surface erosion
- PWSP's will be bermed to ensure there is no seepage
- All greywater not directed to the Waste Water Treatment Facility (WWTF) will be contained in a sump located at least 31 m from the ordinary high water mark of any water body, at a site where direct flow into the water body is not possible and additional impacts are not created, unless otherwise approved
- Latrines will be located at least 31 m from the ordinary high water mark of any water body
- The Inspector will be notified of any discharge from waste facilities at least 10 days prior to the discharge

SECTION 2.0 - DRILLING PROGRAMS

2.1 EXPLORATION DRILLING

The exploration drilling program is carried out to identify the quality and quantity of the ore located at Mary River Deposit Nos. 1, 2, 3, 3B, 4, and 5, as well as providing information on geomechanical and geochemical aspects necessary for the mine design.

Calcium chloride brine is used as the drilling fluid during the exploration drilling due to the cold temperatures at the site and the presence of permafrost. This prevents the drill rods from freezing in the deep exploration holes. During periods of drilling, the maximum water (brine) use rate is approximately 45 litres per minute (12 US gallons per minute) or 7.5 x 10-4 cubic metres per second per drill rig based on the capacity of the pumps serving the drills. Drilling additives are also used to increase operational efficiencies. Drilling additives include polymers such as DR-133 and W-OB.

A mixing station which produces the calcium chloride brine is basically a tank equipped with hydraulic mixers. Water is added to the tank from a water pumping station. Salt is transported to the mixing station in bags and is added to the tank to be mixed with the water. The entire station will be located more than 31 m from any water body. Special care is taken to ensure housekeeping measures are completed at all times at the salt mixing station. The quantity of salt added is kept to a minimum.

The water pumping stations will draw water from bodies of water of sufficient quantity (i.e. Mary River) so as not to cause drawdown of the water level in the water body. Screens will be placed over the intake hoses to ensure that fish are not entrained. The pumping rate will also kept at a rate to ensure that fish do not become impinged on the screens, and minimize water use.

In 2008, the pumping system and salt mixing station used during previous programs was replaced by an enhanced system that was redesigned to decrease water demand, salt use, minimize the potential for spillage, and improve safety and drilling productivity. This system has been systematically improved in each subsequent year.

2.2 GEOTECHNICAL DRILLING

The geotechnical program is conducted to identify and qualify the types and depth of soils at the project sites. Information from the geotechnical drilling is used to assist in foundation design for project infrastructure.

The geotechnical drilling program consists of overburden drilling and limited coring of bedrock to confirm bedrock contact. The holes drilled for the geotechnical program are generally shallow; most are less than 30 m deep.

Calcium chloride brine will not been used for the geotechnical drilling. Less water is generally required for geotechnical drilling as opposed to exploration drilling. During periods of drilling, the maximum water use rate is approximately 38 litres per minute (10 US gallons per minute) or 6.3 x 10^{-4} cubic metres per second based on the capacity of the pumps servicing the drills.

The water pumping stations draw water from bodies of water of sufficient quantity so as not to cause drawdown of the water level in the water body. Screens have been placed over the intake hoses to ensure that fish are not entrained. The pumping rate is kept at a rate to ensure that fish do not become impinged on the screens, and to minimize water use.

SECTION 3.0 - GENERAL MITIGATION MEASURES

The following measures are used to mitigate potential environmental impacts due to issues from discharge of water from the water management areas. If a need is identified, additional measures will be implemented.

3.1 SILT FENCE

3.1.1 Description

Silt fences are a geotextile or fabric barrier that impedes the flow of surface water which potentially may cause suspended sediment to be deposited. Silt fences are typically supported using wooden stakes (usually attached to the fabric by the manufacturer) and may be placed using a variety of methods such as digging a trench and backfilling material to ensure stability. Attempts are made to install silt fence in lines of equal elevation (along contour lines) to prevent channelling or focusing of the runoff.

Standards for installation including trench excavation, insertion of fabric, and backfilling and compacting can be found on the Ontario Provincial Standard Drawing (OPSD) 219.110 - Light Duty Silt Fence Barrier and 219.130 - Heavy Duty Silt Fence Barrier.

3.1.2 Typical Locations of Use

Silt fences are used in areas where surface water could potentially come into contact with disturbed sites causing elevated suspended solids. Typical installation locations are:

- Downstream of drill rigs
- Along roads where surface runoff is expected
- Surrounding stockpiles of material or drill cuttings

3.1.3 Substitutes

Free standing silt fences are considered for use in areas where a typical silt fence is impractical for example on rock or impenetrable surfaces. Diversion/collection channels or berms are also used in certain locations.

3.2 DIVERSION/COLLECTION CHANNEL OR BERM

3.2.1 Description

Diversion/collection channels or berms are used to locally direct surface water runoff.

When required, the channels or berms are constructed using suitable materials to divert the surface water without causing erosion or suspension of additional sediment. Excavation of channels may be an option; however, construction of berms using soil or man-made structures such as sand bags/tubes is also evaluated.

3.2.2 Typical Locations of Use

Channels or berms are used in locations where it is required to divert or collect surface water. Diversion structures are installed to prevent runoff from entering a site where the surface soil has been disturbed and would cause suspension of sediment. Additionally collection channels or berms may be constructed to collect runoff emerging from an area of soil disturbance.

One possible use of a diversion/collection channel or berm is to ensure runoff is directed to a constructed mitigation measure such as an in-ground sump.

3.2.3 Substitutes

Silt fences can be used as an alternative to constructing a channel or berm.

3.3 CONTAINMENT BERM

3.3.1 Description

A containment berm can be constructed to establish a sump, basin or pond to contain or collect water. The sump could be used to contain discharge water to allow suspension of sediment prior to discharge or to temporarily contain the water for re-circulation. The berm is constructed using native soils or other suitable man-made products.

Care is taken when constructing berms to ensure the base is on a solid foundation. Soil placed to construct the berms is nominally compacted to provide strength for the structure. Berm heights are minimized (<1 m).

3.3.2 Typical Locations of Use

Containment berms are constructed across small valleys or around natural depressions to augment the capacity of the berms.

3.3.3 Substitutes

In-ground sumps or portable containment sumps or tanks can be used in place of a containment berm.

3.4 ARMOURING

3.4.1 Description

Armouring is used as a barrier between water flow and materials susceptible to erosion. Quarry rock and/or naturally occurring granular borrow material to protect underlying fined grained materials from scour and erosion.

3.4.2 Typical Locations of Use

Armouring may be used in areas of cuts/excavations and in the installation of culverts.

3.4.3 Substitutes

Water diversion, berms, sumps and/or silt fencing may be used where armouring is impracticable due to the lack of aggregate availability or unnecessary based on the level of risk/significance for significant erosion and associated potential for down gradient impacts.

3.5 IN-GROUND SUMP

3.5.1 Description

An in-ground sump can be constructed to establish a sump, basin or pond to contain or collect water, similar to the containment berm. An in-ground sump is constructed by excavating a depression into soil to provide water containment. Excavated material from the sump can be used to construct a containment berm surrounding the sump to augment the capacity of the sump.

3.5.2 Typical Locations of Use

In-ground sumps are used in some areas where excavation of soil is possible.

3.5.3 Substitutes

Containment berms, or portable containment sumps or tanks can be used in place of an in-ground sump.

3.6 PORTABLE CONTAINMENT SUMP

3.6.1 Description

Portable containment sumps are used to establish a sump to contain water from a source such as a drill rig. The portable sump requires only minimal excavation or construction to provide a level base for the sump.

A series of portable containment sumps can be connected together to provide additional containment or settling capacity if required.

Collected sediment or drill cuttings from the portable containment sumps are removed from the sumps as necessary and disposed of in pit locations approved by Baffinland management and located at distances of at least 31 m from water bodies.

3.6.2 Typical Locations of Use

Portable containment sumps are used in areas where containment berms or in-ground sumps are impractical such as steep topography or in areas where overburden is not readily available.

3.6.3 Substitutes

Containment berms or in-ground sumps are used in place of a portable containment sump.

3.7 FLOCCULENTS (CO-POLYMER BLENDED BLOCKS)

3.7.1 Description

Co-polymer blended flocculent blocks are an environmentally friendly means of controlling siltation in ditches and streams, commonly used on construction sites throughout North America. Placing co-polymer blocks in a runoff stream causes sediment particles to settle by flocculation. Once introduced into the runoff stream, polymers transform elevated levels of fine suspended particles, including colloidal clays, phosphorus, and nutrients into masses easily removed from moving water. Therefore, construction site storm water can be clarified prior to discharge into receiving waters. Adequate mixing and settling times for the flow rate, temperature, and sediment load must be achieved for optimum polymer performance. Baffinland has completed some laboratory test work and have preselected several products for field testing.

3.7.2 Typical Locations of Use

This product will be used in non-fish habitat runoff streams, particularly in areas of rugged relief where other methods of sediment/siltation control are not effective (e.g., access road to Deposit No. 1). Flocculent blocks could potentially substitute for other methods of sediment/siltation control where those methods are ineffective due to factors such as stream velocity, equipment access, rugged topography, and frozen ground conditions. The use of flocculent blocks, if effective, could reduce the degree of disturbance caused by other more intrusive sediment control measures.

SECTION 4.0 - HYDROLOGY AND PREDICTED SURFACE WATER RUNOFF RATES

The following sections present the information required by Part B (6) of the Nunavut Water Board (NWB) license 2BB-MRY1114 for the Mary River Project.

4.1 SURFACE WATER RUNOFF EVALUATION

The data presented in this report are based on evaluations based on field data collected during the 2006, 2007, 2008, 2010 and 2011 field seasons.

A summary of the unit surface water runoff rates for the Mary River Project area is presented on Table 4.1. The locations of the stream gauging stations are shown on Figures 4.1 and 4.2. The runoff values indicate that from October to May there should be no runoff and that approximately half of the flows occur in July.

4.2 WATER USAGE FOR DRILLING

Based on the flow evaluation discussed in the previous section, special consideration for drill water requirements will be made when creating seasonal drilling schedules. Drilling in locations not adjacent to larger water bodies will be scheduled during periods of high flow to ensure drawdown will not occur. Drillholes located adjacent to larger bodies of water are not water dependent and are completed at times convenient to the drilling schedule.

Drilling programs are undertaken such that any consumption of water from ponds, lakes and rivers will not result in measurable drawdown of the water bodies. A maximum drawdown threshold of 5% has been set for all water bodies, assuming no recharge of the water body. No water is used from streams where there is a potential for drawdown effect without first obtaining regulatory approval as required.

SECTION 5.0 - WATER MANAGEMENT AREAS

The following sections provide a site description, details of surface water quantity and direction and mitigation procedures for the water management areas.

5.1 MARY RIVER CAMP SITE

The location of the site is provided on Figures 1.1 and 1.2 respectively.

5.1.1 Description

- A personnel camp and associated support facilities to service approximately 200 people during peak periods
- Domestic water supply from adjacent Camp Lake
- Sewage treatment using pre-engineered facilities discharging to either storage pond or Sheardown Lake
- Engineered non-hazardous landfill site
- Gravel airstrip
- Helicopter landing pad
- Bulk and barrel fuel storage and handling areas

5.1.2 Surface Water Direction and Quantity

The catchment areas for the Mary River Camp Site are shown on Figures 5.1 and 5.2. Ultimately the surface water at the site is directed towards Camp, Sheardown and Mary Lakes. The estimated surface water runoff quantities for each catchment area are shown on Table 5.1.

5.1.3 Mitigation Procedures

The Mary River Camp Site is not expected to have significant areas of disturbed soils and as such should not have sediment and erosion issues. The site will be regularly monitored (as discussed in the Monitoring section of this report). If mitigation measures are required to control sediment and erosion they will be selected and installed as previously discussed in the section General Mitigation Measures.

Mary River Drilling Area
The location of the site is provided on Figure 1.2.

5.1.4 Description

- No permanent structures or buildings
- A historic camp from the exploration work undertaken in the 1960's located on the way to the Deposit No. 1 has been fully remediated
- No new camps
- Exploration drilling focused on Deposits No 1, 2, 3 and 3B
- Geotechnical and exploration drilling, and possible surface trenching

- Water pumping stations where water will be pumped from either Mary River or Sheardown Lake to the salt mixing stations
- Salt mixing stations where salt is mixed with the water to create a brine solution. This solution is pumped from the salt mixing stations to drill rigs used for exploration drilling. The brine may be heated in colder temperatures. Drill additives, as discussed earlier, will be added as required.
- Drill water discharge (using mitigation measures previously discussed)
- Fuel is stored at the Mary River Camp Site within the storage facility and transported to the drill sites and to the pumping stations as required
- Geophysical survey using ground penetrating radar (GPR) and resistivity methods at mine infrastructure area

5.1.5 Surface Water Direction and Quantity

The catchment areas for the Mary River Drilling Area are shown on Figure 5.2. Ultimately the surface water at the site is directed towards Camp, Sheardown and Mary Lakes. The estimated surface water runoff quantities for each catchment area are shown on Table 5.1.

During the field work seasons there is additional surface water discharge from the drill rigs. During the field work seasons there is additional surface water discharge from the drill rigs. This flow is estimated to be a maximum of 1.5 m^3 per linear metre of drillhole advance per drill. This is based on historical water use logs over the last several years.

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5.1.6 Mitigation Procedures

Sediment and erosion control measures are periodically required and are installed as per the previous section: General Mitigation Measures. The site is regularly monitored (as discussed in the Monitoring section of this report).

Fuel required for drilling will be transported in fuel drums or double walled day tanks. Drip pans are used under the tanks to prevent fuel contamination.

5.2 DEPOSIT NO. 4 AND 5 DRILLING AREA

The location of the site is provided on Figure 1.3.

5.2.1 Description

- No permanent structures or buildings
- Permitted winter road and temporary camp but this will not be used during 2011
- Exploration drilling focused on Deposits No 4 and Deposit No. 5 and vicinity
- Access using helicopter, no roads
- Geotechnical and exploration drilling, and possible surface trenching
- Water pumping stations where water will be pumped from nearby water sources to the drills

- Water pumps and drill fluid mixing equipment for production of drill water mud-brine solution as required. The use of mud-brine solution will be minimized to the greatest extent practicable. Because of relatively shallow planned drillhole depths, the use of a centralized salt mixing station will not be required. Brine, as required, will be mixed at each drill. Drill water discharge (using mitigation measures previously discussed)
- Fuel is stored at the Mary River Camp Site within the storage facility and transported to the drill sites as required via helicopter.
- Geophysical survey using ground penetrating radar (GPR) and resistivity methods at mine infrastructure area

5.2.2 Surface Water Direction and Quantity

The catchment areas for the Deposit No. 4 and 5 area are shown on Figure 5.1. Ultimately the surface water in the Deposit No. 4 area drains in an westerly direction and the surface water around Deposit No. 5 and vicinity drains in a southerly direction.

During the field work seasons there is additional surface water discharge from the drill rigs. This flow is estimated to be a maximum of 1.5 m^3 per linear metre of drillhole advance per drill. This is based on historical water use logs over the last several years.

5.2.3 Mitigation Procedures

Sediment and erosion control measures are periodically required and are installed as per the previous section: General Mitigation Measures. The site is regularly monitored (as discussed in the Monitoring section of this report).

Fuel required for drilling will be transported in fuel drums via helicopter. Drip pans and portable mini berms are used under the tanks to prevent fuel contamination.

5.3 MILNE INLET CAMP SITE

The location of the site is provided on Figures 1.1 and 1.2.

5.3.1 Site Description

- A personnel camp and associated support facilities to service approximately 60 people during peak periods of use. During 2009 and 2010, there are only two personnel present for most of the year with a slight increase during the summer during field activities.
- When at the higher levels of camp occupancy, domestic water supply from Phillips Creek (Monitoring Location MRY-2) during the summer months and an unnamed lake along the Milne Inlet Tote Road at km 32 during the winter season
- Sewage treatment using pre-engineered facilities discharging to either storage pond or to Milne Inlet via a local drainage ditch. During 2009 and 2010, the treatment system was not operational due to low camp occupancy.

- Gravel airstrip
- Seasonal sea-lift of materials and supplies, as required
- Fuel storage areas for bulk fuel and barrel fuel, as well as waste storage areas. Each consists of a lined containment area.

5.3.2 Surface Water Direction and Quantity

The catchment areas for the Milne Inlet Camp Site are shown on Figure 5.3. The surface water at the site is ultimately directed to Milne Inlet. The estimated surface water runoff quantities for each catchment area are shown on Table 5.2.

5.3.3 Mitigation Procedures

The Milne Inlet Camp Site is not expected to have significant areas of disturbed soils and as such should not have sediment and erosion issues. It can be reasonably expected that there will be some surface soil disturbance in association with seasonal sea-lift activity. The site is regularly monitored (as discussed in the Monitoring section of this report). If mitigation measures are required to control sediment and erosion they will be selected and installed as previously discussed in the General Mitigation Measures section.

5.4 MILNE INLET TOTE ROAD REFUGE STATIONS

The location of the sites is provided on Figure 1.2.

5.4.1 Description

- Small half size trailers located at km 33 and 68 of the Milne Inlet Tote Road
- Fuel storage area for 4 fuel drums per camp; no berms or liners
- Bottled water stored in trailers

5.4.2 Surface Water Direction and Quantity

The surface water at the km 33 refuge station ultimately reports to an unnamed lake and Philips creek, and the water at the km 68 refuge station ultimately reports to an unnamed creek.

5.4.3 Mitigation Procedures

The refuge station sites are not expected to have significant areas of disturbed soils and as such should not have sediment and erosion issues. The site is regularly monitored when in use (as discussed in the Monitoring section of this report). If mitigation measures are required to control sediment and erosion they are selected and installed as previously discussed in the section General Mitigation Measures.

5.5 STEENSBY INLET CAMP SITE

The location of the site is provided on Figures 1.1 and 1.2.

5.5.1 Description

- Seasonal drill camp with water flown or pumped (using collapsible water line) from an unnamed lake located approximately 3 kilometres east of camp and toilet wastes incinerated on site
- Grey water sump used for kitchen and wash tent
- Airstrip - there is no fixed runway at the Steensby Inlet Camp Site. A seasonal on-ice runway is used during the winter near the site
- Seasonal sea-lift supply of consumables, as required
- Fuel storage area consists of lined containment berm(s) with a historical capacity for approximately 7,500 drums
- Geotechnical drilling
- Water for drilling will be obtained from Steensby Inlet and other sources adjacent to the drilling locations
- Drill water discharge (using mitigation measures previously discussed)
- Geophysical survey using ground penetrating radar (GPR) at nearby lakes for water source bathymetry

5.5.2 Surface Water Direction and Quantity

The catchment areas for the Steensby Inlet Camp Site are shown on Figure 5.4. The surface water at the site ultimately reports to Steensby Inlet. The estimated surface water runoff quantities are shown on Table 5.3.

5.5.3 Mitigation Procedures

The Steensby Inlet Camp Site is not expected to have significant areas of disturbed soils and as such should not have sediment and erosion issues. It can be reasonably expected that there will be some surface soil disturbance in association with seasonal sea-lift activity. The site is regularly monitored when in use (as discussed in the Monitoring section of this report). If mitigation measures are required to control sediment and erosion they are selected and installed as previously discussed in the section General Mitigation Measures.

5.6 STEENSBY INLET ON-ICE DRILLING AREA

The location of the site is provided on Figure 1.2.

5.6.1 Description

- No permanent structures or buildings
- No camps
- No fuel storage
- On-ice geotechnical drilling
- Water for drilling is taken from the ocean
- Drill water discharge
- On-ice probing (no water taking or discharge)

5.6.2 Mitigation Procedures

Only geotechnical drilling is completed on the ice, and no drill water is discharged on the ice. For drilling operations on ocean ice in unconsolidated sediments, there was no return water collected and therefore no opportunity for recycling of drill water or capture of drill waste. .All return water escapes from the hole at the casing/ocean bottom interface. If drilling continues into bedrock the drill water is discharged into a portable containment sump and removed from the ice. The water and cuttings contained in the portable containment sump are disposed of in a pit location at least 31 m from water to be determined by Baffinland.

No fuel is stored on the ice. Fuel required for drilling will be transported in fuel drums or double walled day tanks. Drip pans are used under the tanks to prevent fuel contamination.

5.7 MID-RAIL CAMP (UNNAMED LAKE)

The location of the site is provided on Figures 1.1 and 1.2.

5.7.1 Description

- The camp has remained unoccupied since 2009 and will likely remain unoccupied in 2012
- Seasonal drill camp with water from adjacent unnamed lake and toilet wastes incinerated on site
- Grey water sump used for kitchen and wash tent
- Airstrip - there is no fixed runway at the Rail Camp Site. A seasonal on ice runway will be used during the winter near the site.
- Fuel storage area will consist of two lined containment berms with a capacity for approximately 2000 drums
- Geotechnical drilling
- Water for drilling will be obtained from lakes adjacent to the drilling locations
- Drill water discharge (using mitigation measures previously discussed)
- Geophysical survey using ground penetrating radar (GPR) at nearby lakes for water source bathymetry

5.7.2 Surface Water Direction and Quantity

The surface water at the site ultimately reports to an unnamed lake adjacent to the site.

5.7.3 Mitigation Procedures

The Rail Camp Site is not expected to have significant areas of disturbed soils and as such should not have sediment and erosion issues. The site is to be regularly monitored when in use (as discussed in the Monitoring section of this report). If mitigation measures are required to control sediment and erosion they are selected and installed as previously discussed in the section General Mitigation Measures.

5.8 PROPOSED RAIL ALIGNMENT

The alignment is shown on Figures 1.1 and 1.2.

5.8.1 Description

- Seasonal drill camp as detailed in the Rail Camp section
- No permanent structures or buildings
- Small temporary fuel caches as required
- Geotechnical drilling
- Water for drilling is obtained from sources adjacent to the drilling locations
- Drill water discharge (using mitigation measures previously discussed)
- Geophysical survey using ground penetrating radar (GPR) and resistivity methods

5.8.2 Surface Water Direction and Quantity

The catchment areas for the Proposed Rail Alignment are shown on Figure 5.5. The surface water along the corridor is ultimately directed to Cockburn River, Cockburn Lake, Ravn River and Angajurjualuk Lake. Specific surface water runoff quantities were not calculated for the transportation corridor due to the large catchment area and the minimal quantity of water required for the drilling.

5.8.3 Mitigation Procedures

Sediment and erosion control measures may be required and are installed as per the previous section General Mitigation Measures. The site is regularly monitored as discussed in the Monitoring section of this report.

Fuel required for drilling will be transported in fuel drums or double walled day tanks. Drip pans are used under the tanks to prevent fuel contamination.

5.9 STEENSBY INLET RAIL ALIGNMENT ON-ICE DRILLING

The alignment is shown on Figures 1.1 and 1.2.

5.9.1 Description

- No permanent structures or buildings
- No camps
- No fuel storage
- On-ice geotechnical drilling
- Water for drilling is taken from lakes and sources close to the drill sites
- Drill water discharge
- On-ice probing (no water taking or discharge)
- Geophysical survey using ground penetrating radar (GPR) at proposed bridge locations

5.9.2 Mitigation Procedures

Portable containment sumps will be employed for drilling on ice. A “T” connection will be installed through the drill casing to allow the collection of drill water return during operations. The drill casing will be allowed to freeze into the ground to maximize the effectiveness of the annular seal between the casing and the

formation. During drilling operations, the drill water will be pumped into a collection bin located adjacent to the drill. The collection bin is periodically emptied by means of pumping or air-lifting to a sediment disposal location established at each drill site at a distance greater than 31 metres from any water body.

No fuel is stored on the ice. Fuel required for drilling will be transported in fuel drums or double walled day tanks. Drip pans are used under the tanks to prevent fuel contamination.

5.10 PROPOSED HYDRO-ELECTRIC SITE

The location of the site is shown on Figure 1.2

5.10.1 Description

- No permanent structures or buildings
- No camps
- Fuel is stored at either the Milne Inlet or Steensby Inlet Camps within the storage facilities and flown to the drill sites as required
- Geotechnical drilling
- Water for drilling is taken from lakes adjacent to the drill sites
- Drill water discharge (using mitigation measures previously discussed)

5.10.2 Surface Water Direction and Quantity

Specific surface water runoff quantities were not calculated for the proposed hydro-electric site due to the large catchment area and the minimal quantity of water required for the drilling.

5.10.3 Mitigation Procedures

Sediment and erosion control measures may be required and are installed as per the previous section General Mitigation Measures. The site will be regularly monitored as discussed in the Monitoring section of this report.

5.11 BULK SAMPLE OPEN PIT OPERATIONS

Predictions with regard to ARD/ML of residual waste rock and ore produced during the bulk sampling program were made prior to the initiation of the Bulk Sampling Program. Based on the results of that work, the risk of acid-rock drainage (ARD) and metal leaching (ML) was considered to be very unlikely for the Bulk Sampling Program. To help validate these results, an additional environmental geochemical testing program was conducted in 2008 to assess the potential for excavated materials (i.e. waste ore and surplus ore) and exposed excavation faces to leach metals and/or acidity that could degrade the quality of receiving surface waters. Based upon the test results, it is concluded that the excavation surfaces and ore form the bulk sample program have essentially no potential to produce acid rock drainage. The detailed results and discussion of this work are presented in the 2008 Annual Water License Report.

The locations of the bulk sample pit and residual waste rock and ore stockpiles (at Deposit No. 1, the crusher, and Milne Inlet) are shown in Figures 5.2 and 5.3.

5.11.1 Description

- A single mining pit established at the top of Deposit No. 1. Approximately 225,000 tonnes of weathered surface rock and ore was removed in 2007 and 2008 by drill and blast techniques.
- Mining pit has been confirmed to be free draining
- ARD and ML tests have been conducted with results indicating that, due to the physical environment and the geochemistry of the ore, ARD and ML are very unlikely to occur
- No camps
- No fuel storage

5.11.2 Surface Water Direction and Quantity

The catchment areas for the bulk sample open pit operations are shown on Figures 5.1 and 5.2. Ultimately the surface water at the site is directed towards Mary River Camp, Sheardown and Mary Lakes. The estimated surface water runoff quantities for each catchment area are shown on Table 5.1.

5.11.3 Mitigation Procedures

Sediment and erosion control measures are not expected to be required with the completed pit. Mitigating measures are not expected to be required to address potential for ARD or ML. The site will be regularly monitored as discussed in the Monitoring section of this report.

5.12 WEATHERED ORE / WASTE ROCK STOCKPILE

5.12.1 Description

- A stockpile containing approximately 28,000 tonnes of surficial weathered ore excavated from the surface of Deposit No. 1 remains on the deposit. The roadbed between the stockpile and the pit was also constructed from weathered ore. Approximately 6,000 tonnes of representative (i.e. ore grade) material was left in the bulk sample pit
- ARD and ML tests have been conducted with results indicating that, due to the physical environment and the geochemistry of the ore, ARD and ML are very unlikely to occur

5.12.2 Surface Water Direction and Quantity

The catchment areas for the bulk sample open pit operations are shown on Figure 5.2. Ultimately the surface water in the area is directed towards Camp, Sheardown and Mary Lakes. The estimated surface water runoff quantities for each catchment area are shown on Table 5.1.

5.12.3 Mitigation Procedures

Sediment and erosion control measures are not expected to be required in association with the weathered ore stockpile. Mitigating measures are not expected to be required to address potential for ARD or ML. The site will be regularly monitored as discussed in the Monitoring section of this report.

5.13 CRUSHING OPERATIONS AT MARY RIVER

Crusher locations are provided on Figure 5.2.

5.13.1 Description

- A temporary crusher station was established north-east of Sheardown Lake at Mary River
- Approximately 190,000 tonnes of ore was hauled from the bulk sample pit to the crusher station and crushed into lump and fine fractions
- Stockpiles containing approximately 25,000 tonnes of non-representative ore (i.e. separate lump and fine high manganese 'waste' ore) remain at the Mary River crusher site
- ARD and ML tests have been conducted on the fresh ore, with results indicating that, due to the physical environment and the geochemistry of the ore, ARD and ML are very unlikely to occur

5.13.2 Surface Water Direction and Quantity

The catchment areas for the stockpiles and crusher operations in the vicinity of the Mary River Camp are shown on Figure 5.2. Surface water in this area is directed towards Sheardown Lake. The estimated surface water runoff quantities for each catchment area are shown on Table 5.1.

5.13.3 Mitigation Procedures

Sediment and erosion control measures may be required and will be installed as per the previous section General Mitigation Measures. The site will be regularly monitored as discussed in the Monitoring section of this report.

5.14 TEMPORARY ORE STORAGE AT MILNE INLET

5.14.1 Description

- A total of approximately 152,000 tonnes of crushed ore was transported to Milne Inlet from the Mary River Area using the Milne Inlet Tote Road
- An ore stockpile pad containing approximately 24,000 tonnes of non-representative ore (i.e. high manganese 'waste' ore) remains at Milne Inlet. Approximately 6,000 tonnes of representative (i.e. ore grade) material is stockpiled on this pad at Milne Inlet adjacent to the beach loading area.
- ARD and ML tests have been conducted on the fresh ore, with results indicating that, due to the physical environment and the geochemistry of the ore, ARD and ML are very unlikely to occur

5.14.2 Surface Water Direction and Quantity

The catchment areas for the stockpiles at Milne Inlet are shown on Figure 5.3. Surface water in this area is directed towards Milne Inlet. The estimated surface water runoff quantities for each catchment area are shown on Table 5.2.

5.14.3 Mitigation Procedures

Sediment and erosion control measures may be required and will be installed as per the previous section General Mitigation Measures. The site will be regularly monitored as discussed in the Monitoring section of this report. The ore pad and stockpile is located in excess of 31 m from the normal high water mark of Milne Inlet and other water bodies.

5.15 BULK FUEL STORAGE AREAS

Described in sections detailing camp and refuge station descriptions.

5.16 MILNE INLET TOTE ROAD

5.16.1 Description

- Historic dirt road constructed in the mid 1960's (Tote Road / bulk sampling road)
- The existing 105 km Tote Road running between Milne Inlet and the Mary River camp was upgraded to support transport of the bulk sample from Deposit No. 1
- Upgrades were made to the tote road by adding fill to the roadbed, cutting and filling on hills, and installing crossing structures (mainly culverts) at watercourse crossings and drainages
- A haul road from the top of Deposit No. 1 to the crusher location was completed by adding fill to the roadbed, cutting and filling on hills, and installing culverts at drainage crossings
- Fill materials needed for the upgrade of the tote road and the mine haul road was obtained from designated large borrow sources and from areas within the road alignment. Approximately 1.1 million m^3 of borrow material was excavated through the course of the bulk sample program. A portion of this material was required for civil works associated with infrastructure improvements at Mary River and Milne Inlet camps.
- Two temporary refuge stations, one at km 33 and one at km 68 consisting each of a half size trailer and 4 drum fuel storage area
- No permanent structures or buildings
- The Milne Inlet Tote Road is shown on Figures 1.1 and 1.2

5.16.2 Surface Water Direction and Quantity

The catchment areas for the Milne Inlet Tote Road are shown on Figure 5.6. Ultimately the surface water north of Katiktok Lake discharges in Milne Inlet via Phillips Creek and surface water south of Katiktok Lake eventually flows into Mary River via Camp, Sheardown and Mary Lakes. Specific surface water runoff quantities were not calculated for the transportation corridor due to the large catchment area and the

minimal quantity of water required for road construction and maintenance. Culvert crossings were designed based on estimated water flow and in consideration of the use and temporary nature of the tote road.

5.16.3 Mitigation Procedures

The Milne Inlet Tote Road was upgraded to a year-round all-weather road to support the heavier traffic volume during the bulk sample program. Most of the water crossings along the tote road were installed during the winter of 2008 when water was not present. Construction procedures including the use of water diversion structures, the use of silt fencing, and limiting in-water work minimized the amount and duration of sediment release during installation of water crossings during non-freezing conditions. Visual observations and turbidity measurements before, during and after construction confirmed the short duration and limited extent of sediment release. There were localized areas of sediment release during the spring and summer of 2008 due to contact of run-off with disturbed areas associated with road construction and due to overtopping of the road at spillway locations and isolated areas of embankment failure.

Road operations and maintenance is expected to continue through the proposed future construction of a full-scale mine. The tote road will continue to be inspected on a regular basis to confirm adequate physical stability with erosion and control measures installed when required as per the previous section General Mitigation Measures.

5.17 ASSOCIATED CONSTRUCTION MATERIAL AND QUARRY OPERATIONS

5.17.1 Description

- Granular material borrow pits (sand and gravel up to cobble sized material) were advanced to support road upgrades for the bulk sampling road and camp infrastructure
- Three primary borrow areas were advanced: Borrow Area 1 near Milne Inlet, Borrow Area 2 near km 63 of the Milne Inlet Tote Road, Borrow Area 3 near Mary River camp. In addition to these three primary areas, suitable borrow material was used in areas directly adjacent to the Tote Road, within the right-of-way.
- Borrow materials are expected to be required to support ongoing operations and maintenance of the landforms (roads and camp sites)
- Surficial borrow materials will be obtained by stripping and excavation of the active layer
- Excavation will not occur within 31 m of a watercourse, and seasonal drainage ways will be re-established during pit development
- Rock quarries may be developed for various construction purposes
- Potential rock quarry locations are near Milne Inlet and Mary River
- Rock will be obtained through drilling and blasting
- Quarrying will not occur within 31 m of a watercourse, and drainage will be re-established during quarry development
- Acid rock drainage (ARD) and metal leaching (ML) tests have been conducted on rock samples, with results indicating that, due to the physical environment and the geochemistry of the rock, ARD and ML are very unlikely to occur from quarry materials
- No camps
- No fuel storage
- Locations of the primary borrow sites and rock quarries are shown on Figure 5.7

5.17.2 Surface Water Direction and Quantity

The catchment areas for the borrow and quarry operations are shown on Figure 5.6. Specific surface water runoff quantities were not calculated due to the number of large catchment areas that would be involved.

5.17.3 Mitigation Procedures

In 2008, some borrow areas experienced minor settlement and water release due to thawing of ice-rich soils. In most instances borrow areas were constructed with a control berm to allow for the gradual seepage of released ground meltwater or surface run-off from the borrow area through the permeable control berm. Some regrading will be required and inspections will continue to be undertaken to confirm physical stability and continue to implement sediment and erosion control measures as required and as per the previous section General Mitigation Measures. Berms and other drainage measures will be established as needed to limit erosion and maintain positive drainage to minimize water ponding. Contouring, berming and silt fences will be applied as necessary for sediment and erosion control. The site will be regularly monitored as discussed in the Monitoring section of this report.

SECTION 6.0 - MONITORING

In addition to specific monitoring and reporting requirements under the regulatory approvals such as the water license, QIA land lease, land use permits and fisheries authorization, routine inspections of various aspects of the operations will be undertaken. Routine water management related inspections will be conducted at drill sites, camp sites and related infrastructure, roadways, and landforms generated in association with the shipment of the bulk sample in 2008 (borrow areas, mining pit, residual ore stockpiles).

Routine inspections and water license monitoring is outlined below.

6.1 ROUTINE INSPECTIONS

6.1.1 Drill Sites

Pre-drilling inspection of the immediate area surrounding the drill site will be completed as part of the safety/environmental inspection prior to the setup of the drill by drilling and other site personnel.

Particular items for review are:

- Drillhole coordinates
- Water source coordinates
- Site photo
- Water source photo
- Distance to nearest water source
- Archaeological approval
- Completed wildlife survey

Routine daily inspections of the immediate area surrounding the drills will be completed as part of the safety/environmental inspection on a daily basis by drilling or other site personnel.

Particular items for review are:

- Fuel leaks
- Drip Pans
- Equipment condition
- Sediment and erosion control measures
- Water intakes
- Water management systems
- Flow meter readings

Post-drilling inspection of the immediate area surrounding the drill site will be completed as part of the safety/environmental inspection after the drill has been removed from site by drilling and other site personnel.

Particular items for review are:

- All materials and debris removed from site
- Quantity of equipment, rods or casing left in the hole
- Site photo
- Water source photo
- Water use assessment
- Environmental concerns
- Wildlife concerns

Pre and Post-Drilling water sampling will be completed for each on-ice drillhole.

The methodology for the water sampling is:

- Select a location a maximum of 30 m from the proposed drillhole location
- Auger a hole through the ice and clear the hole of ice cuttings
- Use a bailer to obtain a water sample from below the bottom of the ice
- Transfer the water sample to the sample bottles
- Repeat the steps to collect a second sample following completion of the drillhole

6.1.2 Camp Sites and Temporary Refuge Stations

Routine camp and temporary refuge station inspections will be completed.

Particular items for review are:

- Fuel leaks
- Sediment and erosion control structures

6.1.3 Roadways

It is intended that the Milne Inlet Tote Road will continue to provide all-season access to the Mary River Site until after proposed construction of the full-scale Mary River Project. Prior to mine construction, the road will be used to facilitate transport of fuel and consumables. The road is expected to require regular maintenance, from snow-ploughing during winter months (when used) to culvert and crossing maintenance in the summer.

The design of the watercourse crossings is such that, during summer, heavy flows may overtop some of the culvert crossings equipped with overflow swales. The road may be unavailable to haul traffic during a brief period in the summer, and minor repairs to the crossings may be required.

Routine inspections will continue to be undertaken to monitor physical stability and any environmental concerns related to the road and associated water crossings and borrow areas.

6.1.4 Borrow Areas

Fill materials needed for upgrade of the Milne Inlet Tote Road, the mine haul road, and other civil works have been obtained from designated large borrow areas and from within the road alignment.

Re-contouring of the borrow areas has commenced, with further work required to confirm that as-built conditions are suitable for eventual decommissioning. Borrow areas will be contoured and drainage control measures will be established as necessary to reduce the risk of substantial erosion and sediment release that may have an effect on receiving waters. Monitoring will continue to be undertaken to confirm stability of the borrow areas.

6.1.5 Bulk Sample Pit

The bulk sample pit was constructed as a side-hill cut and was confirmed by land survey at its completion in 2008 to be free-draining. The bulk sample pit was designed to be free-draining so as to reduce any risk for poor water quality run-off. The pit will continue to be inspected on an annual basis to ensure the pit slopes will be stable in the long term.

6.1.6 Stockpiles

The bulk sample program generated stockpiles of ore adjacent to the pit at Deposit No.1, at the crusher site at the base of Deposit No.1, and at Milne Inlet where the ore was loaded for shipment in 2008. These stockpiles are expected to be stable in the long term. Monitoring of run-off water quality is discussed in Section 6.2.

6.1.7 Bulk Fuel Storage Areas

Routine inspections will be completed at the bulk fuel storage areas.

Particular items for review are:

- Evidence of hydrocarbon staining or leaks from containment devices
- Full-time supervision of fuel transfer operations
- Full-time supervision of treatment and release of accumulated water from within the containment areas
- Sediment and erosion control structures

6.2 WATER QUALITY MONITORING

The water quality monitoring program consists of several elements as follows:

a) Measurement, recording and reporting of water volumes extracted, as prescribed by the water license
b) Sampling, analysis and reporting of water quality, as prescribed by the water license
c) Weekly to monthly monitoring downstream of exploration drilling activities during periods of open water

Table 6.1 summarizes the water quality and quantity monitoring program.

An exploration drill water quality monitoring program has been undertaken since 2005 at selected locations upstream (reference), downstream along the Mary River (potentially affected), and along steep seasonal flow channels that drain the rugged topographic terrain that characterizes the land surface in the vicinity of Deposits 1,2 and 3. The main objective of the monitoring program is to identify and measure Contaminants of Potential Concern (COPCs) in Mary River, both upstream at locations unaffected by drilling activities, and downstream at locations that may be potentially affected by drilling activities. Each year, the water quality monitoring program is dependent and specific to the planned scope of the drill program. The Environmental Superintendent will, in consultation with Operations personnel the annual exploration drill water quality monitoring program and ensure that it is implemented. The results of the monitoring program will be used to guide adaptive management measures, as appropriate.

6.3 WASTE DISPOSAL MONITORING

6.3.1 Monitoring Stations

Signs will be posted in appropriate areas at Monitoring Stations, and will be located and maintained to the satisfaction of the Inspector. Monitoring Stations will be maintained at the following locations:

Monitoring Station Number	Description
MRY-1	Water supply for the Mary River Camp at Camp Lake
MRY-2	Summer water supply for the Milne Inlet Camp at Phillips Creek
MRY-3	Winter water supply for Milne Inlet Camp at the Km 99 lake (See Note 1)
MRY-4	Mary River Camp sewage discharge at the WWTF
MRY-4a	Mary River Camp sewage discharge from the PWSP
MRY-5	Milne Inlet Camp sewage discharge at the WWTF
MRY-5a	Milne Inlet Camp sewage discharge from the PWSP
MRY-6	Water collected within the Bulk Fuel Storage Facility at Mary River prior to release

Monitoring Station Number	Description
MRY-7	Water collected within the Bulk Fuel Storage Facility at Milne Inlet prior to release
MRY-7A	Water collected within the 5 Million Liter Steel Tank Bulk Fuel Storage Facility at Milne Inlet prior to release
MRY-8	Minewater and surface drainage either pumped or released from the Hematite Open Pit (See Note 2)
MRY-9	Minewater and surface drainage either pumped or released from the mixed ore (Hematite and Magnetite) Open Pit
MRY-10	Surface discharge from the weathered ore stockpile
MRY-11	Surface discharge from the lump ore and fine ore stockpiles at the processing area
MRY-12	Surface discharge from the lump ore and fine ore stockpiles at the processing area
MRY-13a and 13b	Surface discharge from the non-hazardous materials landfill area, 13b is downstream of 13a

NOTES:

1. The winter water supply for the Milne Inlet Camp is at km 32 not km 99.
2. Monitoring Station MRY-8 is no longer required as there is only one open pit which will be monitored by MRY-9.

An additional monitoring location has been added immediately downstream of the landfill.

The monitoring locations are shown on Figure 6.1.

6.3.2 Bulk Sample Open Pit

All discharge from the bulk sample open pit will be analyzed and discharge at Monitoring Station MRY-9 will not exceed the following limits:

Parameter	Maximum Average Concentration (mg/L)	Maximum Concentration of Any Grab Sample (mg/L)
Total Arsenic	0.5	1.00
Total Copper	0.30	0.60
Total Lead	0.20	0.40
Total Nickel	0.50	1.00
Total Zinc	0.5	1.00
Total Suspended Solids	15.0	50.0
Oil and Grease	No visible sheen	N/A
Waste discharged will have a pH between 6.0 - 9.5		

6.3.3 Waste Water Treatment Facility (WWTF)

All sewage will be discharged to a Waste Water Treatment Facility at Mary River and Milne Inlet unless otherwise approved.

All sewage discharged from the Waste Water Treatment Facility at Monitoring Stations MRY-4 and MRY-4a, at Mary River, will not exceed the following quality standards:

Parameter	Maximum Average Concentration
BOD_5	31 mg/L
Total Suspended Solids	35 mg/L
Fecal Coliform	1000 CFU/100 mL
Oil and Grease	No visible sheen
pH	between 6.0 - 9.5

All sewage discharged from the Waste Water Treatment Facility at Monitoring Stations MRY-5 and MRY-5a, at Milne Inlet, will not exceed the following quality standards:

Parameter	Maximum Average Concentration
BOD_5	100 mg/L
Total Suspended Solids	120 mg/L
Fecal Coliform	10,000 CFU/100 mL
Oil and Grease	No visible sheen
pH	between 6.0 - 9.5

6.3.4 Monitoring Station Discharge

Effluent discharged from Monitoring Stations MRY-4 and MRY-4a, and MRY-5 and MRY-5a will be demonstrated to be acutely non-toxic in accordance with test procedures measuring acute lethality to Rainbow trout, Oncorhynchus mykiss (Environment Canada's Environmental Protection Series Biological test Method EPS/1/RM/13) and Daphnia magna (Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14). Testing will occur once annually during open water season.

Samples will be collected at Monitoring Stations MRY-4 and MRY-5 every four weeks during discharge and at Monitoring Stations MRY-4a and MRY-5a once prior to discharge and every 4 weeks thereafter. Samples will be analyzed for: Biochemical Oxygen Demand (BOD), total suspended solids (TSS), pH, fecal coliforms, oil and grease (visual).

6.3.5 Bulk Fuel Storage Facilities

Effluent discharged from the Bulk Fuel Storage Facilities at Monitoring Stations MRY-6 and MRY-7 will meet the following effluent quality standards:

Parameter	Maximum Average Concentration (µg/L)
Benzene	370
Toluene	2
Ethyl benzene	90
Lead	1
Oil and Grease	15,000 and no visible sheen

6.4 ADAPTIVE MANAGEMENT STRATEGIES

Housekeeping and operational measures have been instituted at the salt mixing stations and increased use of sumps and silt curtains at the exploration drill sites have been put in place to further reduce the potential risks for salt related impacts. Work procedures will continuously be adapted with the goal to reduce salt use, reduce water use and reduce the potential effects related to water management on the environment.

Baffinland is committed to continual improvement in its work activities in the aim of reducing risks to the environment and improving operational effectiveness. The strategy employed at Baffinland is regular monitoring supported by operational change and adoption of other mitigating measures if warranted.

SECTION 7.0 - QA/QC PLAN

The Surface Water Sampling Program - Quality Assurance and Quality Control Plan (QA/QC Plan Rev. 5) is included in Appendix A of this report. The QA/QC Plan has been prepared to fulfil the requirement of Part I, Item 12 of the License No. 2BB-MRY1114 issued by the NWB to Baffinland in April, 2011.

The QA/QC best practices that are outlined are designed to provide guidance to field staff and analytical laboratories in order to maintain a high level of confidence in the water quality data generated from the Mary River Project. The plan addresses best practice methods for water samples collected from lakes, streams and rivers, treated wastewater effluent, drinking water and site drainage.

For a more detailed and comprehensive outline, please refer to the appended report.

TABLES

Baffinland Iron Mines Corporation

TABLE 4.1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2011 SITE WATER MANAGEMENT PLAN

MONTHLY UNIT RUNOFF SUMMARY

Station	Drainage Area (km^2)	Unit Runoff ($l/s/km^2$)																			
		2006					2007					2008					2010				
		Jun	Jul	Aug	Sep	Oct	Jun	Jul	Aug	Sep	Oct	Jun	Jul	Aug	Sep	Oct	Jun	Jul	Aug	Sep	Oct
H1	250.2	-	59.9	21.9	15.8	0.0	18.2	26.5	13.9	3.2	0.0	42.4	39.1	27.5	8.7	0.0	-	-	-	-	-
H2	209.5	-	96.9	25.4	16.1	0.0	22.0	36.7	18.9	5.6	0.0	55.6	59.5	31.9	12.0	0.0	-	68.3	11.1	-	-
H3	30.5	-	155.7	26.9	19.5	0.0	29.7	46.6	15.4	3.7	0.0	75.5	71.4	34.4	21.5	0.0	-	92.2	11.5	-	-
H4	9.6	-	79.0	30.4	16.9	0.0	14.9	21.1	15.1	6.2	0.0	41.4	33.2	26.7	9.3	0.0	-	-	-	-	-
H5	5.3	-	75.0	27.3	15.7	0.0	22.9	19.3	19.3	6.1	0.0	53.0	28.4	29.0	10.4	0.0	-	-	-	-	-
H6	240.0	-	109.8	24.7	14.6	0.0	27.7	48.2	20.5	4.1	0.0	64.5	69.8	31.0	12.4	0.0	-	-	-	-	-
H7	14.7	-	102.6	18.6	11.0	0.0	25.4	39.0	16.5	4.7	0.0	61.6	53.9	22.2	10.4	0.0	-	-	-	-	-
H8	208.4	-	96.1	22.5	14.6	0.0	23.8	47.4	20.7	4.1	0.0	61.8	64.9	26.5	11.5	0.0	-	-	-	-	-
H9	157.6	-	-	11.1	13.0	0.8	12.0	15.9	6.2	4.7	0.7	27.2	14.9	29.1	11.1	1.0	-	-	-	-	-
BR11	52.7	-	-	-	-	-	-	-	-	-	-	84.4	83.8	33.3	13.9	0.0	-	-	-	-	-
BR25	113.1	-	-	-	-	-	-	-	-	-	-	74.0	70.8	32.9	11.9	0.0	-	-	-	-	-
BR96-2	30.7	-	-	-	-	-	-	-	-	-	-	50.0	34.4	42.2	13.4	0.0	-	-	-	-	-
BR137	308.1	-	-	-	-	-	-	-	-	-	-	27.5	33.7	41.6	38.4	2.4	-	13.5	4.7	-	-
Mary River(06SA001)	690.0	-	-	27.9	20.6	1.4	9.3	43.5	15.9	6.8	0.4	26.9	59.2	32.3	17.0	0.8	-	-	-	-	-
Mary River(06SA002)	8219.0	-	-	-	-	-	2.4	44.8	21.6	11.0	2.3	19.9	61.0	35.9	18.0	3.4	-	-	-	-	-
Rowley River(06SB002)	3499.0	-	-	-	3.4	1.0	0.8	50.4	15.1	7.3	0.5	32.9	59.6	28.7	12.8	0.9	-	-	-	-	-
Isortoq River	7172.0	-	-	51.8	3.1	1.2	5.5	99.3	65.0	9.9	0.5	51.9	101.4	60.6	10.6	0.7	-	-	-	-	-
Average		-	96.9	26.2	13.7	0.4	16.5	41.4	20.3	6.0	0.3	50.0	55.2	33.3	14.3	0.5	-	58.0	9.1	-	-
5th Percentile		-	65.2	14.9	3.3	0.0	1.8	17.9	10.8	3.5	0.0	25.5	25.7	25.6	9.2	0.0	-	19.0	5.3	-	-
Minimum		-	59.9	11.1	3.1	0.0	0.8	15.9	6.2	3.2	0.0	19.9	14.9	22.2	8.7	0.0	-	13.5	4.7	-	-

NOTES:

1. All values are based on data presented in the Baseline Hydrology Report (Knight-Piesold, 2009) and 2010 Hydrology Data Collection Summary (Knight-Piesold, 2010)
2. The flows from October to May were assumed to be zero based on field observations in 2006/2007.

TABLE 5.1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2011 SITE WATER MANAGEMENT PLAN

MARY RIVER AREA - ESTIMATED CATCHMENT RUNOFF RATES

Catchment No.		MR-01	MR-02	MR-03	MR-04	MR-05	MR-06	MR-07	MR-08	MR-09	MR-10	MR-11	MR-12	MR-13	MR-14	MR-15	MR-16	MR-17	MR-18	MR-19	MR-20
	Unit Runoff Rate																				
	($m^3/s/km^2$)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)
Catchment Area (km^2)		874.50	248.70	6311.00	217.50	7663.40	122.97	30.40	9.39	10.45	3.58	5.41	14.70	85.43	114.20	18.02	8.61	1.48	21.75	15.66	73.02
January	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
March	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
April	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	0.0132	11.53	3.26	83.21	2.87	101.04	1.62	0.40	0.12	0.14	0.05	0.07	0.19	1.13	1.51	0.24	0.11	0.02	0.29	0.21	0.96
July	0.0251	21.94	6.24	158.34	5.46	192.27	3.09	0.76	0.24	0.26	0.09	0.14	0.37	2.14	2.87	0.45	0.22	0.04	0.55	0.39	1.83
August	0.0096	8.38	2.38	60.45	2.08	73.40	1.18	0.29	0.09	0.10	0.03	0.05	0.14	0.82	1.09	0.17	0.08	0.01	0.21	0.15	0.70
September	0.0067	5.86	1.67	42.29	1.46	51.35	0.82	0.20	0.06	0.07	0.02	0.04	0.10	0.57	0.77	0.12	0.06	0.01	0.15	0.10	0.49
October	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
November	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTES:

1. The Unit Runoff Rate is obtained from Table 4.1 and is the minimum average monthly unit runoff rate for the catchment areas listed.
2. The maximum drill water consumption for the exploration/geotechnical drilling are 7.5×10^{-4} m^3/s and 6.3×10^{-4} m^3/s respectively

TABLE 5.2

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2011 SITE WATER MANAGEMENT PLAN

MILNE INLET AREA - ESTIMATED CATCHMENT RUNOFF RATES

Catchment No.		MI-01	MI-02	MI-03	MI-04	MI-05	MI-06
	Unit Runoff Rate						
	($m^3/s/km^2$)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)
Catchment Area (km^2)		5.27	3.59	4.11	62.32	5.61	7.96
January	0.0	0.00	0.00	0.00	0.00	0.00	0.00
February	0.0	0.00	0.00	0.00	0.00	0.00	0.00
March	0.0	0.00	0.00	0.00	0.00	0.00	0.00
April	0.0	0.00	0.00	0.00	0.00	0.00	0.00
May	0.0	0.00	0.00	0.00	0.00	0.00	0.00
June	0.0132	0.07	0.05	0.05	0.82	0.07	0.10
July	0.0251	0.13	0.09	0.10	1.56	0.14	0.20
August	0.0096	0.05	0.03	0.04	0.60	0.05	0.08
September	0.0067	0.04	0.02	0.03	0.42	0.04	0.05
October	0.0	0.00	0.00	0.00	0.00	0.00	0.00
November	0.0	0.00	0.00	0.00	0.00	0.00	0.00
December	0.0	0.00	0.00	0.00	0.00	0.00	0.00

NOTES:

1. The Unit Runoff Rate is obtained from Table 4.1 and is the minimum average monthly unit runoff rate for the catchment areas listed.
2. The maximum drill water consumption for the exploration/geotechnical drilling are 7.5×10^{4} m^3/s and 6.3×10^{-4} m^3/s respectively

TABLE 5.3

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2011 SITE WATER MANAGEMENT PLAN

STEENSBY INLET AREA - ESTIMATED CATCHMENT RUNOFF RATES

Catchment No.		SI-01	SI-02	SI-03
	Unit Runoff Rate			
	($m^3/s/km^2$)	(m^3/s)	(m^3/s)	(m^3/s)
Catchment Area (km^2)		5.27	3.59	4.11
January	0.0	0.00	0.00	0.00
February	0.0	0.00	0.00	0.00
March	0.0	0.00	0.00	0.00
April	0.0	0.00	0.00	0.00
May	0.0	0.00	0.00	0.00
June	0.0132	0.07	0.05	0.05
July	0.0251	0.13	0.09	0.10
August	0.0096	0.05	0.03	0.04
September	0.0067	0.04	0.02	0.03
October	0.0	0.00	0.00	0.00
November	0.0	0.00	0.00	0.00
December	0.0	0.00	0.00	0.00

NOTES:

1. The Unit Runoff Rate is obtained from Table 4.1 and is the minimum average monthly unit runoff rate for the catchment area listed.
2. The maximum drill water consumption rate for the exploration/geotechnical drilling are 7.5×10^{-4} m^3/s and 6.3×10^{-4} m^3/s respectively.

Baffinland Iron Mines Corporation

TABLE 6.1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2012 SITE WATER MANAGEMENT PLAN
WATER QUALITY AND QUANTITY MONITORING LOCATIONS

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Monitoring Location ID	Description	UTM Coordinates (NAD83) Easting (m)	UTM Coordinates (NAD83) Northing (m)	Parameters	Maximum Amount/ Average Concentration	Maximum Grab Concentration	Sampling Frequency	Monitoring and Reporting Requirement	Reporting Frequency
MRY-1	Water Supply for the Mary River Camp at Camp Lake	557,682	7,914,693	Daily Volume	< 60 m^3/d (combined total for all camp usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
MRY-2	Summer Water Supply for the Milne Inlet Camp at Phillips Creek	514,503	7,964,579	Daily Volume	< 60 m^3/d (combined total for all camp usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
MRY-3	Winter Water Supply for the Milne Inlet Camp at km 32 Lake[1)]	521,714	7,951,862	Daily Volume	< 60 m^3/d (combined total for all camp usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
Unnamed	Water Supply for the Rail Camp at Unnamed Lake Adjacent to Camp	595,547	7,876,328	Daily Volume	< 60 m^3/d (combined total for all camp usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
Unnamed	Water Supply for the Steensby Inlet Camp at 3km Lake, 10 km Lake or Ocean	596,585	7,800,231	Daily Volume	< 60 m^3/d (combined total for all camp usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
Various	Water Supply for Exploration and Geotechnical Drilling at Various Named and Unnamed Sources Throughout the Project Area	Various locations upstream, downstream, and near-field.		Daily Volume	< 455 m^3/d (combined total for all drilling usage)	N/A	Daily	Water License Part B, Item 5 Part I, Items 7, 19 and 20	Daily Volume Requirement for monthly reporting
MILNE-INF	Sewage Influent - WWTF at Milne Inlet Camp	Primary Chamber		BOD5 Total suspended solids (TSS) Faecal coliforms pH Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus	N/A	N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
MILNE-RC1	Receiving waters of Milne Inlet, adjacent drainage ditch	TBD	TBD	BOD_5 Total suspended solids (TSS) Faecal coliforms pH Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus	N/A	N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
MRY-INF	Sewage Influent - WWTF at Mary River Camp	Primary Chamber		BOD_5 Total suspended solids (TSS) Faecal coliforms pH Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus	N/A	N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
Shear-RC1	Sheardown Lake in the vicinity of the sewage outfall	TBD	TBD	BOD_5 Total suspended solids (TSS) Faecal coliforms pH Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus Dissolved oxygen	N/A	N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
MRY-4	Mary River Camp sewage discharge at the WWTF	557,920	7,914,372	BOD_5 TSS pH Faecel Coliforms Oil and Grease Volume	30 mg/L 35 mg/L 6.0 to 9.5 1,000 CFU/100 mL No visible sheen	N/A	Every 4 weeks during discharge; daily for volumes	Water License Part B, Item 5 Part D, Item 10 Part I, Items 3, 19 and 20	Daily Volume Requirement for monthly reporting
				Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus		N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
				Acute lethality to Rainbow Trout and Daphnia magna (Biological Test Methods EPS/1/RM/13 and EPS/1/RM/14)	Non-toxic	N/A	Once annually during open water	Water License Part B, Item 5 Part D, Item 12 Part I, Items 4, 19 and 20	Monthly report following testing; annual report
MRY-4a	Mary River Camp sewage discharge from the PWSPs	558,706	7,913,930	BOD_5 TSS pH Faecel Coliforms Oil and Grease Volume	30 mg/L 35 mg/L 6.0 to 9.5 1,000 CFU/100 mL No visible sheen	N/A	Once prior to discharge and every 4 weeks thereafter; daily for volumes	Water License Part B, Item 5 Part D, Item 10 Part I, Items 3, 19 and 20	Daily Volume Requirement for monthly reporting
				Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus		N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
				Acute lethality to Rainbow Trout and Daphnia magna (Biological Test Methods EPS/1/RM/13 & EPS/1/RM/14)	Non-toxic	N/A	Once annually during open water	Water License Part B, Item 5 Part D, Item 12 Part I, Items 4, 19 and 20	Monthly report following testing; annual report

Baffinland Iron Mines Corporation

TABLE 6.1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

2012 SITE WATER MANAGEMENT PLAN
WATER QUALITY AND QUANTITY MONITORING LOCATIONS

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Monitoring Location ID	Description	UTM Coordinates (NAD83) Easting (m)	Northing (m)	Parameters	Maximum Amount/ Average Concentration	Maximum Grab Concentration	Sampling Frequency	Monitoring and Reporting Requirement	Reporting Frequency
MRY-5	Milne Inlet Camp sewage discharge at the WWTF	503,462	7,975,764	BOD_5 TSS pH Faecel Coliforms Oil and Grease Volume	100 mg/L 120 mg/L 6.0 to 9.5 10,000 CFU/100 mL No visible sheen	N/A	Every 4 weeks during discharge; daily for volumes	Water License Part B, Item 5 Part D, Item 11 Part I, Items 3, 19 and 20	Daily Volume Requirement for monthly reporting
				Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus		N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
				Acute lethality to Rainbow Trout and Daphnia magna (Biological Test Methods EPS/1/RM/13 and EPS/1/RM/14)	Non-toxic	N/A	Once annually during open water	Water License Part B, Item 5 Part D, Item 12 Part I, Items 4, 19 and 20	Monthly report following testing; annual report
MRY-5a	Milne Inlet Camp sewage discharge from the PWSP	503,344	7,976,118	BOD_5 TSS pH Faecel Coliforms Oil and Grease Volume	100 mg/L 120 mg/L 6.0 to 9.5 10,000 CFU/100 mL No visible sheen	N/A	Once prior to discharge and every 4 weeks thereafter; daily for volumes	Water License Part B, Item 5 Part D, Item 11 Part I, Items 3, 19 and 20	Daily Volume Requirement for monthly reporting
				Total Kjeldahl Nitrogen (TKN) Ammonia-nitrogen Total phosphorus		N/A	Every 4 weeks during discharge	Baffinland Requirement	For information only; not reported
				Acute lethality to Rainbow Trout and Daphnia magna (Biological Test Methods EPS/1/RM/13 and EPS/1/RM/14)	Non-toxic	N/A	Once annually during open water	Water License Part B, Item 5 Part D, Item 12 Part I, Items 4, 19 and 20	Monthly report following testing; annual report
MRY-6	Water collected within the Bulk Fuel Storage Facility at Mary River prior to release	558,186	7,914,780	Benzene Toluene Ethylbenzene Lead Oil and Grease	370 µg/L 2 µg/L 90 µg/L 1 µg/L 15,000 µg/L and no visible sheen	N/A	Monthly during removal of water	Water License Part B, Item 5 Part D, Item 17 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-7	Water collected within the Bulk Fuel Storage Facility at Milne Inlet prior to release	503,309	7,976,097	Benzene Toluene Ethylbenzene Lead Oil and Grease	370 µg/L 2 µg/L 90 µg/L 1 µg/L 15,000 µg/L and no visible sheen	N/A	Monthly during removal of water	Water License Part B, Item 5 Part D, Item 17 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-7A	Water collected within the 5 Million Liter Steel Fuel Storage Tank Containment Berm at Milne Inlet prior to release	503,309	7,976,097	Benzene Toluene Ethylbenzene Lead Oil and Grease	370 µg/L 2 µg/L 90 µg/L 1 µg/L 15,000 µg/L and no visible sheen	N/A	Monthly during removal of water	Water License Part B, Item 5 Part D, Item 17 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-8	Minewater and surface drainage either pumped or released from the Hematite Open Pit	NO LONGER REQUIRED[2]							
MRY-9	Minewater and surface drainage either pumped or released from the Magnetite Open Pit[2]	563,239	7,914,596	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.5	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-10	Surface discharge from the weathered ore stockpile	563,349	7,915,262	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.5	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Seepage / surface run off - monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-11	Surface discharge from the lump ore and fine ore stockpiles at the processing area	560,987	7,913,364	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.5	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Seepage / surface run off - monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-12	Surface discharge from the lump ore and fine ore stockpiles at Milne Inlet	12a - 503,356	7,976,452	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.5	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Seepage / surface run off - monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
		12b - 503,522	7,976,399						
MRY-13A	Surface discharge downstream of landfill	560,756	7,912,496	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.5	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Seepage / surface run off - monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
MRY-13B	Surface discharge downstream of landfill	560,756	7,912,496	Total Arsenic Total Copper Total Lead Total Nickel Total Zinc TSS Oil and Grease pH (of waste discharged)	As 0.5 mg/L Cu 0.30 mg/L Pb 0.20 mg/L Ni 0.50 mg/L Zn 0.50 mg/L TSS 15 mg/L O&G No visible sheen pH Between 6.0 and 9.6	As 1.00 mg/L Cu 0.60 mg/L Pb 0.40 mg/L Ni 1.00 mg/L Zn 1.00 mg/L TSS 50.0 mg/L	Seepage / surface run off - monthly during periods of flow	Water License Part B, Item 5 Part D, Item 9 Part I, Items 5, 19 and 20	Monthly report following testing; annual report
Exploration Drill Monitoring		Various locations upstream, downstream, and near-field.		Major ions, total metals, general parameters, flow.	N/A	N/A	Weekly to monthly during drilling.	Annual NIRB Report	Once per year.

NOTES:
1. Shaded monitoring location ID cells denote Water Licence Monitoring Locations.
2. Shaded parameters cells denote required parameters to be reported under the Water Licence.
3. This location is referenced as Km 99 Lake in the Water Licence. This is in error.
4. There is actually only one bulk sample pit now.
5. More frequent sampling of MRY-4, 4a, 5, 5a, Milne-INFL, and MRY-INFL may be undertaken for the purpose of internal process management and early detection of potential upset conditions.
6. Coordinates are approximate.

FIGURES

XREF FILE(S): IMAGE FILE(S): 4 Baffinland logo-big corp NORTH BAFFINLAND

grQ/q5
LEGEND:

- wu6 WATER
- b4m3=sJ6 kNz CAMP LOCATION
- kNo4 COMMUNITY

xqiz
0NMs5b3ymJ6# 40 20 0 40 80 120 160 200 rMub
SCALE (APPROX.) km

Baffinland Iron Mines Corporation

k]l]yi s/C4ys3g5 MARY RIVER PROJECT

WoE=sJ6 kNzb kNaxz
PROJECT LOCATION MAP

Knight Piésold CONSULTING

P/A NO.	REF.	REV.
NB102-181/32	NB12-00131	0

ttCs/3ymJ6 **FIGURE** **1.1**

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

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XREF FILE(S): TOPO - 01 - MAR 06 2009; INUIT OWNED LANDS - SURFACE AND SUBSERFACE - 01 - MAR 05 2009; RAILWAY ALIGNMENT - MARY RIVER STEENSBY - OCT 07 2008; ROAD EXISTING - 01 - MAR 05 2009; ROAD TOTE AS-CONSTRUCTED - 01 - JAN 29 2008; RAILWAY CONSTRUCTION ACCESS ROAD -01 - OCT 15 2008; RAILWAY CONSTRUCTION CAMPS - 01 - SEPT 19 2008; BIM_CLAIMS_DEC_2011 IMAGE FILE(S): Baffinland logo-big corp

500000 E
550000 E
600000 E
650000 E
8000000 N
7950000 N
7900000 N
7850000 N
7800000 N
7750000 N
N
MILNE INLET
MILNE PORT
PHILLIPS CREEK
PI-19
PI-20
PI-14
PI-13
PI-12
PI-15
PI-17
PI-16
CROWN MINERAL CLAIMS
MILNE INLET TOTE ROAD
KATIKTOK LAKE
MCOUAT LAKE BLOCK
DEPOSIT NO. 5
DEPOSIT NO. 4 MINING LEASE 2483
DEPOSIT NO. 5
TURNER RIVER BLOCK
DEPOSIT NO. 7
QIA SURFACE COMMERCIAL LEASE BOUNDARY
GLACIER LAKES CLAIMS
DEPOSIT NO. 6
DEPOSIT NO. 1 MINING LEASE 2484
MARY RIVER CAMP
NTI BAFFINLAND JOINT VENTURE AREA 16,695 HA
DEPOSIT NOS. 2, AND 3
MINING LEASE 2485
NORTH COCKBURN RIVER DEPOSIT NO. 8
NORTH ROWLEY RIVER
DEPOSIT NO. 9
SOUTHERN BOUNDARY OF NORTH BAFFIN
PLANNING REGION
ANGAJURJUALUK LAKE
QUARTZ LAKE
NINA BANG LAKE
COCKBURN RIVER
ROWLEY RIVER
PROPOSED RAILWAY
CONSTRUCTION ACCESS ROAD
ERICHSEN LAKE
RAVN RIVER
TARIJUAQ ARM
STEENSBY PORT
STEENSBY INLET

LEGEND:

- WATER
- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
- MINERAL LEASE BOUNDARY
- CROWN LAND
- EXISTING BORROW AREA (IOL COMMERCIAL LEASE)
- EXISTING ROCK QUARRY (IOL COMMERCIAL LEASE)
- NTI EXPLORATION AREA
- CROWN MINERAL CLAIMS
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- PROPOSED CONSTRUCTION ACCESS ROAD
- RIVER/STREAM/DRAINAGE
- CONTOUR
- PROPOSED TEMPORARY CONSTRUCTION CAMP

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL CONSULTANTS INC.
5. BIM CLAIM BOUNDARIES PROVIDED BY BAFFINLAND IRON MINES CORPORATION, DECEMBER 12 2011.

SCALE A 0 10 20 30 40 km

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

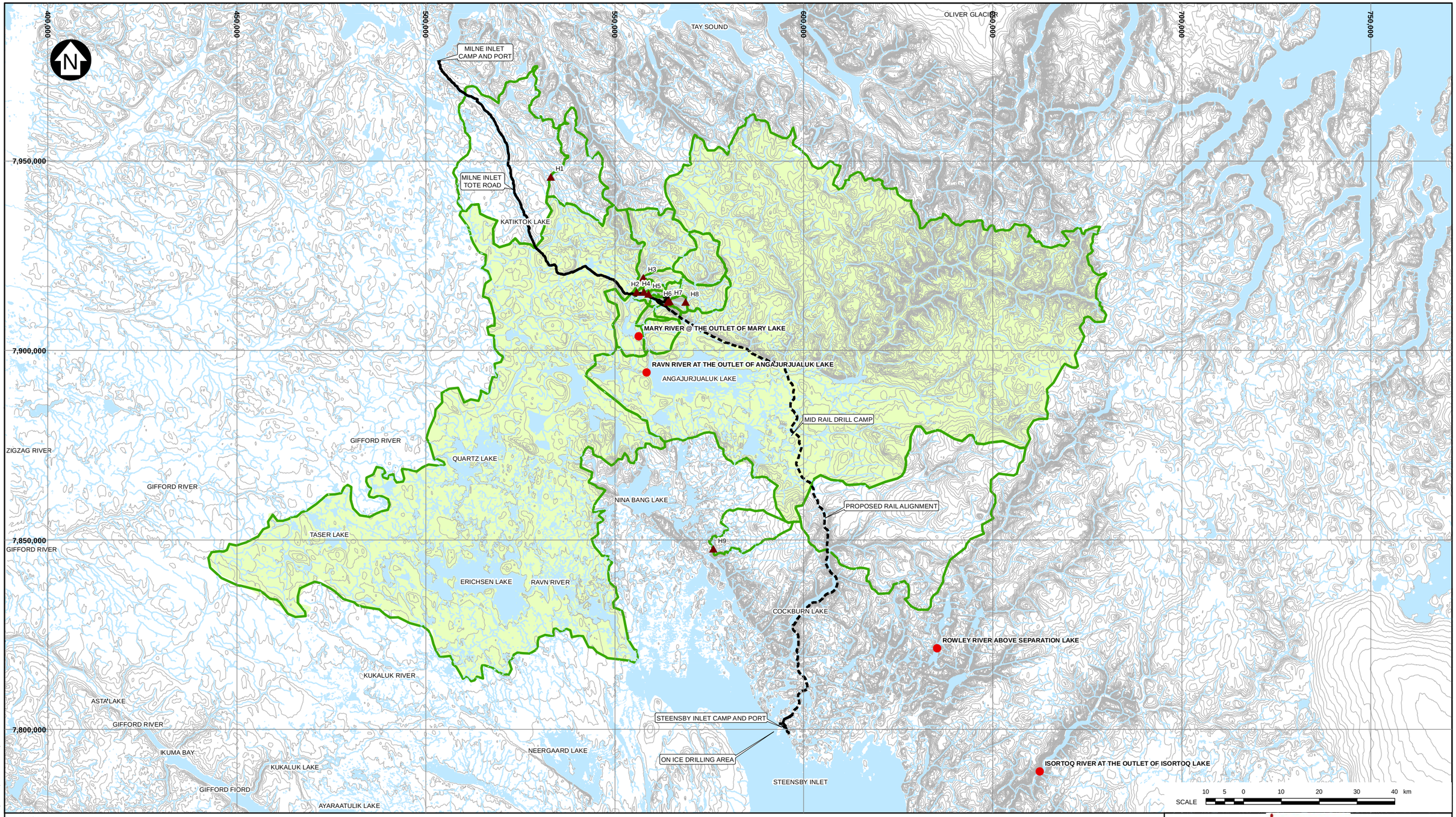
Baffinland Iron Mines Corporation

MARY RIVER PROJECT

LOCATION OF PROJECT ACTIVITIES

Knight Piésold CONSULTING

P/A NO. NB102-181/32 | REF NO. NB12-00131 | FIGURE 1.2 | REV 0



LEGEND:

- WSC STATION
- STREAMFLOW GAUGING STATION
- CATCHMENT BOUNDARY
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- WATER
- RAVN RIVER CATCHMENT

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2009). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL CONSULTANTS INC. IN 2010.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

Baffinland Iron Mines Corporation

MARY RIVER PROJECT

STREAMFLOW GAUGING STATIONS MARY RIVER PROJECT SITE AND SURROUNDING AREA

Knight Piésold CONSULTING

P/A NO. NB102-181/32

REF NO. NB12-00131

FIGURE 4.1

REV 0

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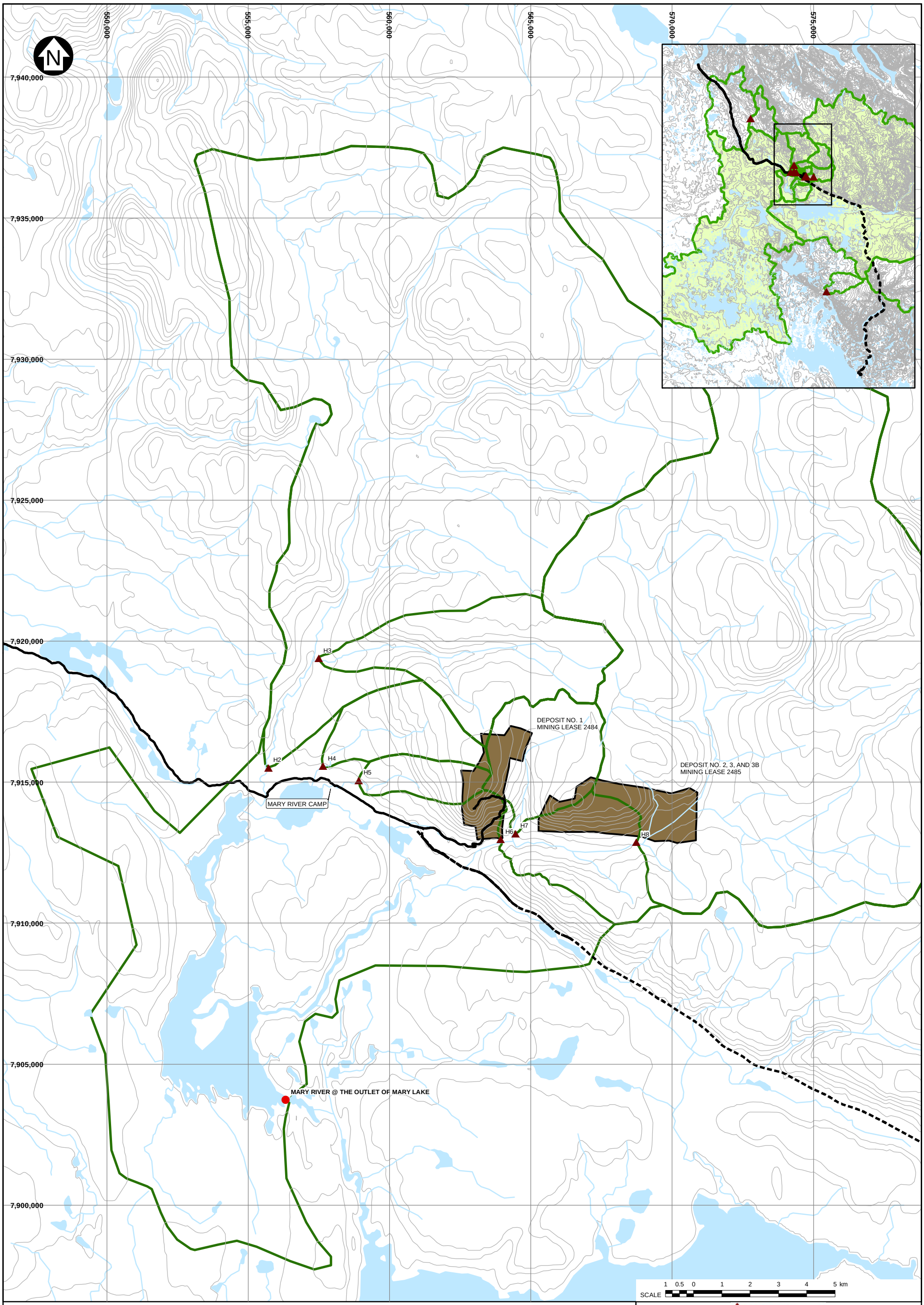

LEGEND:

- STREAMFLOW GAUGING STATION
- WSC STATION
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- ESTIMATED CATCHMENT BOUNDARY
- WATER
- MINERAL LEASE BOUNDARY

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES, (2009). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL CONSULTANTS INC. IN 2010.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

Baffinland Iron Mines Corporation

MARY RIVER PROJECT

STREAMFLOW GAUGING STATIONS
MARY RIVER WATERSHED

Knight Piésold CONSULTING

P/A NO. NB102-181/32

REF NO. NB12-00131

FIGURE 4.2

REV 0

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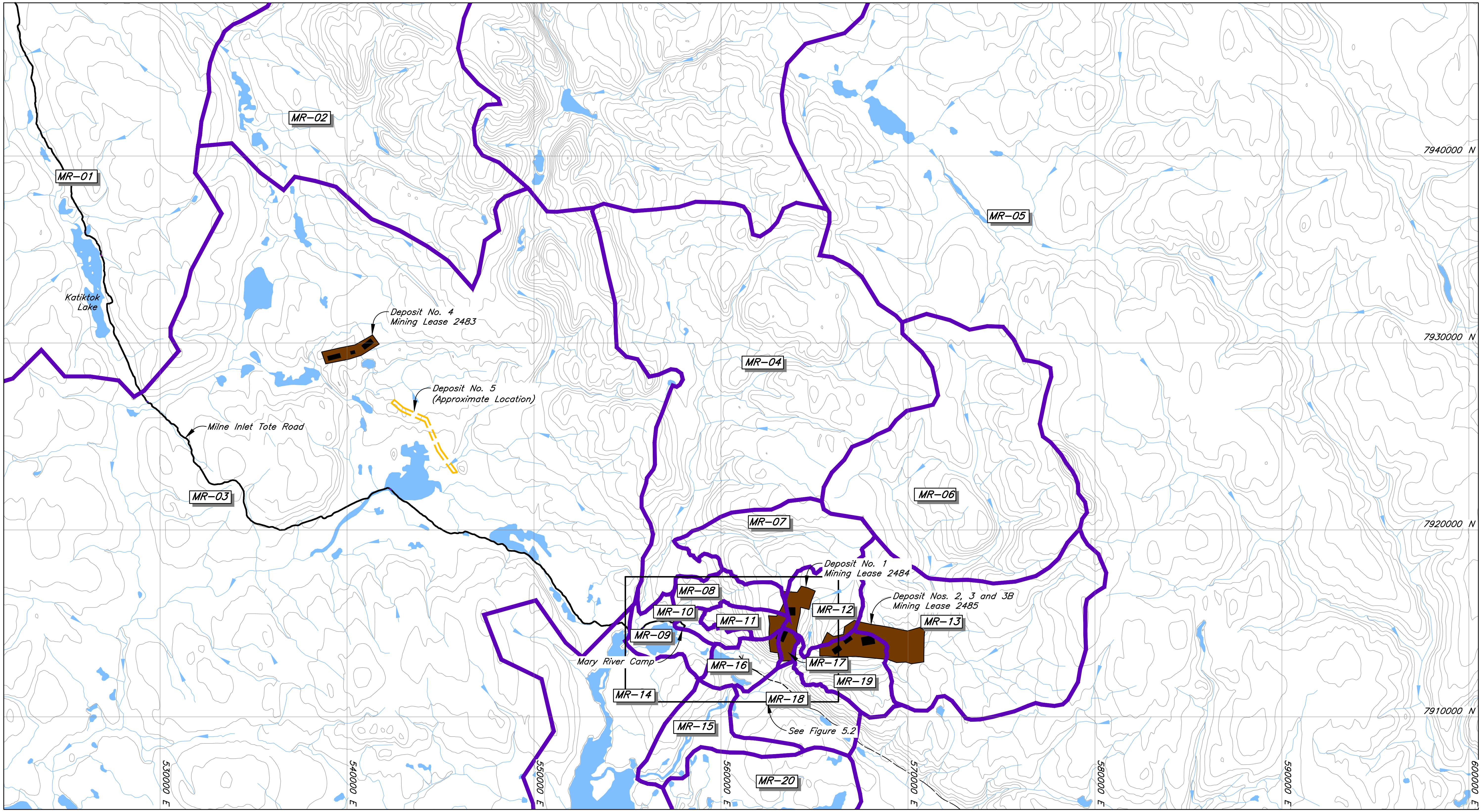


LEGEND:

- WATER
- MINERAL LEASE BOUNDARY
- MR-03 CATCHMENT AREA NAME
- RIVER/STREAM/DRAINAGE
- DIRECTION OF SURFACE WATER RUNOFF
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- ESTIMATED CATCHMENT BOUNDARY
- DEPOSIT NO. 5 (APPROXIMATE LOCATION)

NOTES:

1. BASE MAP © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. CATCHMENT AREAS CALCULATED USING MAPINFO.
5. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL CONSULTANTS INC. IN AUGUST 2010.

CATCHMENT	AREA (km^2)
MR-01	874.5
MR-02	248.7
MR-03	6311
MR-04	217.5
MR-05	7663.4
MR-06	122.97
MR-07	30.40
MR-08	9.385
MR-09	10.45
MR-10	3.58

CATCHMENT	AREA (km^2)
MR-11	5.412
MR-12	14.70
MR-13	85.43
MR-14	114.2
MR-15	18.02
MR-16	8.61
MR-17	1.48
MR-18	21.75
MR-19	15.66
MR-20	73.02

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

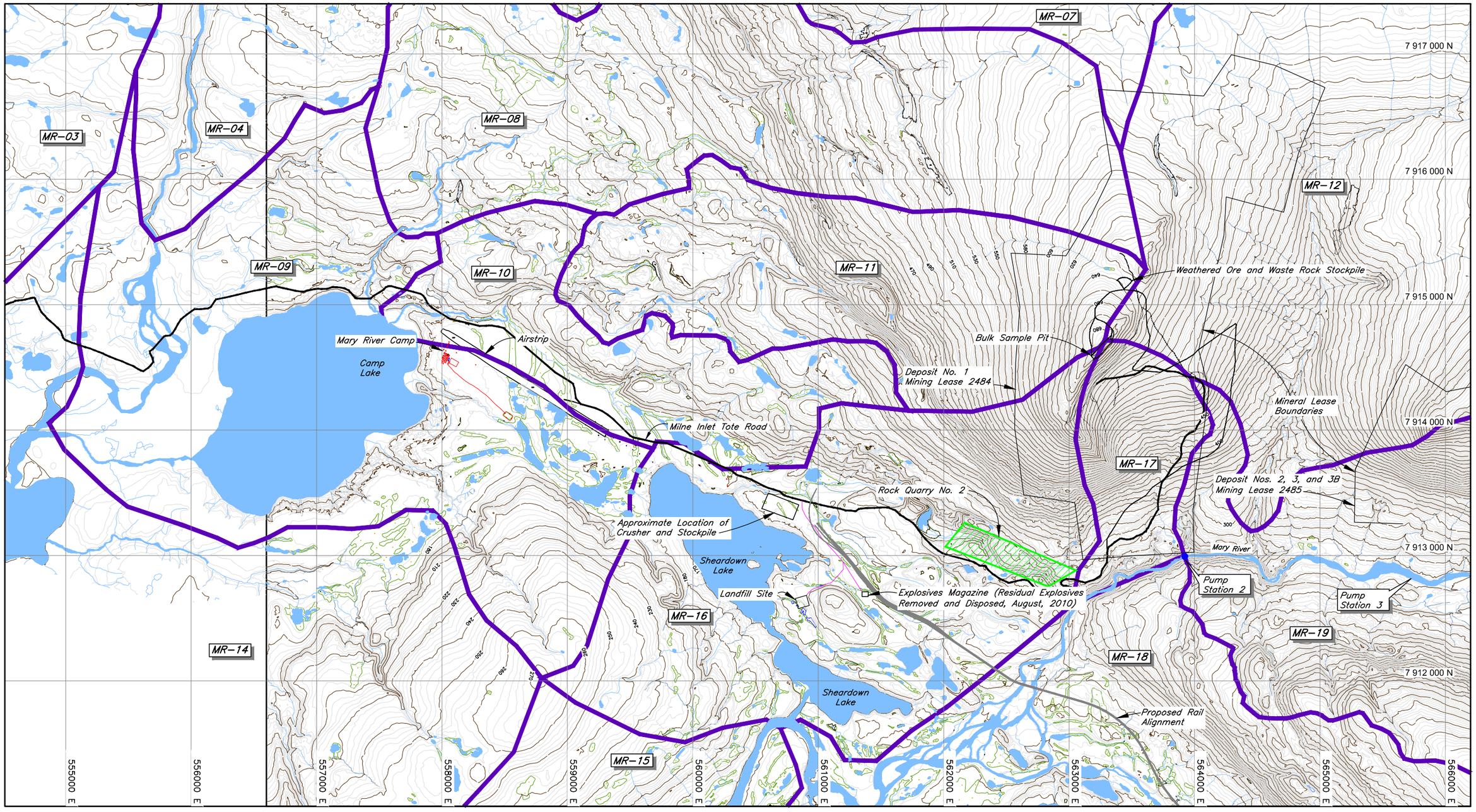
MARY RIVER PROJECT

MARY RIVER AREA
CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/32	NB12-00131

FIGURE 5.1 REV 0



LEGEND:

- WATER
- ROCK QUARRY LOCATION
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- DRILL ROAD
- PROPOSED RAIL ALIGNMENT
- CATCHMENT BOUNDARY

NOTES:

1. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOUR INTERVAL IS 10 METRES.
4. SOME INFRASTRUCTURE NOT SHOWN FOR CLARITY.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

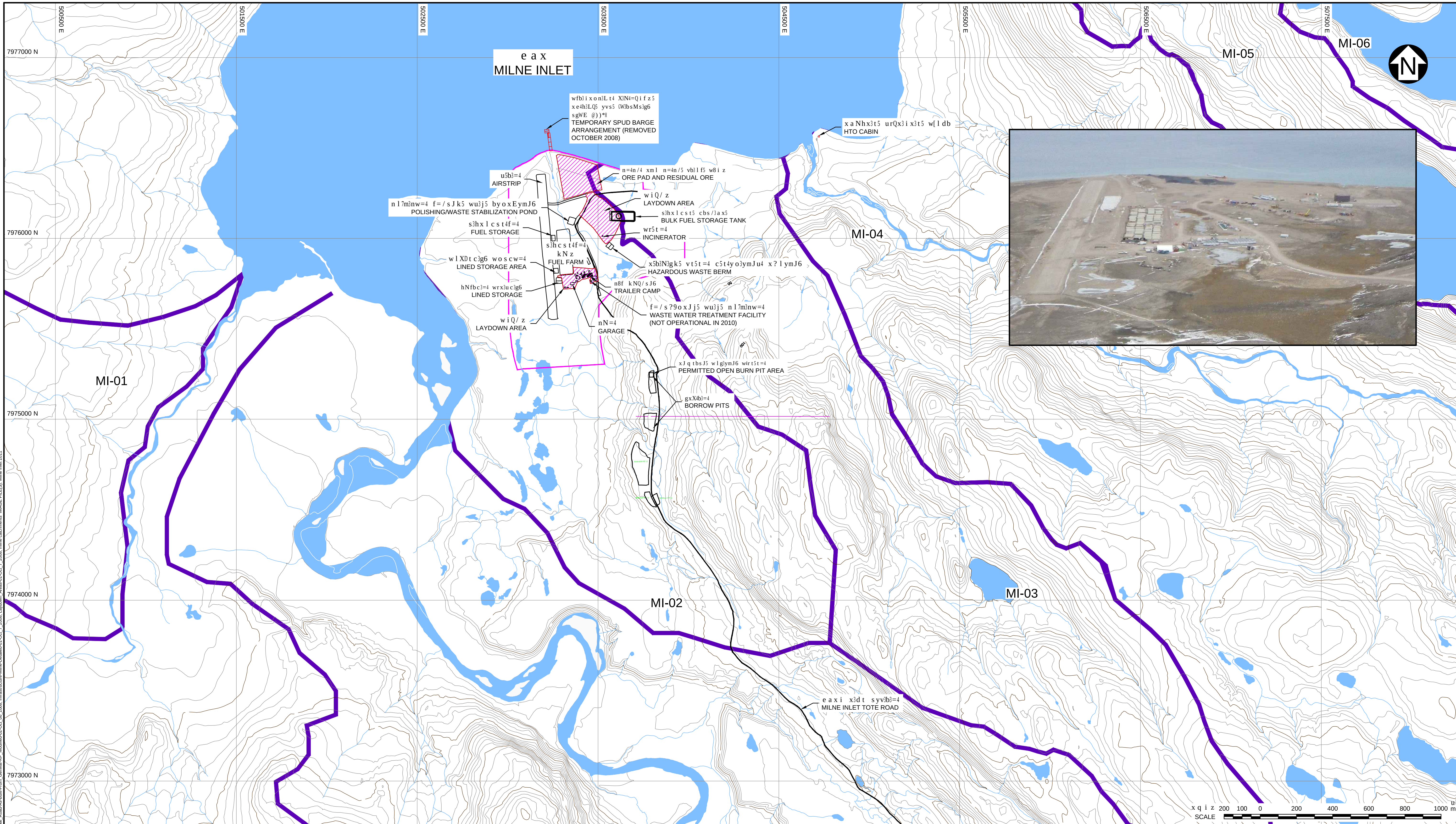
MARY RIVER PROJECT

MARY RIVER DRILLING AREA CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/32	NB12-00131

FIGURE 5.2 REV 0



LEGEND:

- WATER
- WETLAND
- LAYDOWN AREA
- BAFFINLAND'S COMMERCIAL LEASE ON INUIT OWNED LAND
- RIVER/STREAM/DRAINAGE
- DIRECTION OF SURFACE WATER RUNOFF
- MILNE INLET TOTE ROAD
- ROAD
- ESTIMATED CATCHMENT AREA

CATCHMENT	AREA (km²)
MI-01	5.27
MI-02	3.59
MI-03	4.11
MI-04	62.32
MI-05	5.61
MI-06	7.96

1. EAGLE MAPPING (2005)
2. UTM (NAD83) ZONE 17

NOTES:

1. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 5 METRES.
4. CATCHMENT AEAS CALCULATED USING MAPINFO.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

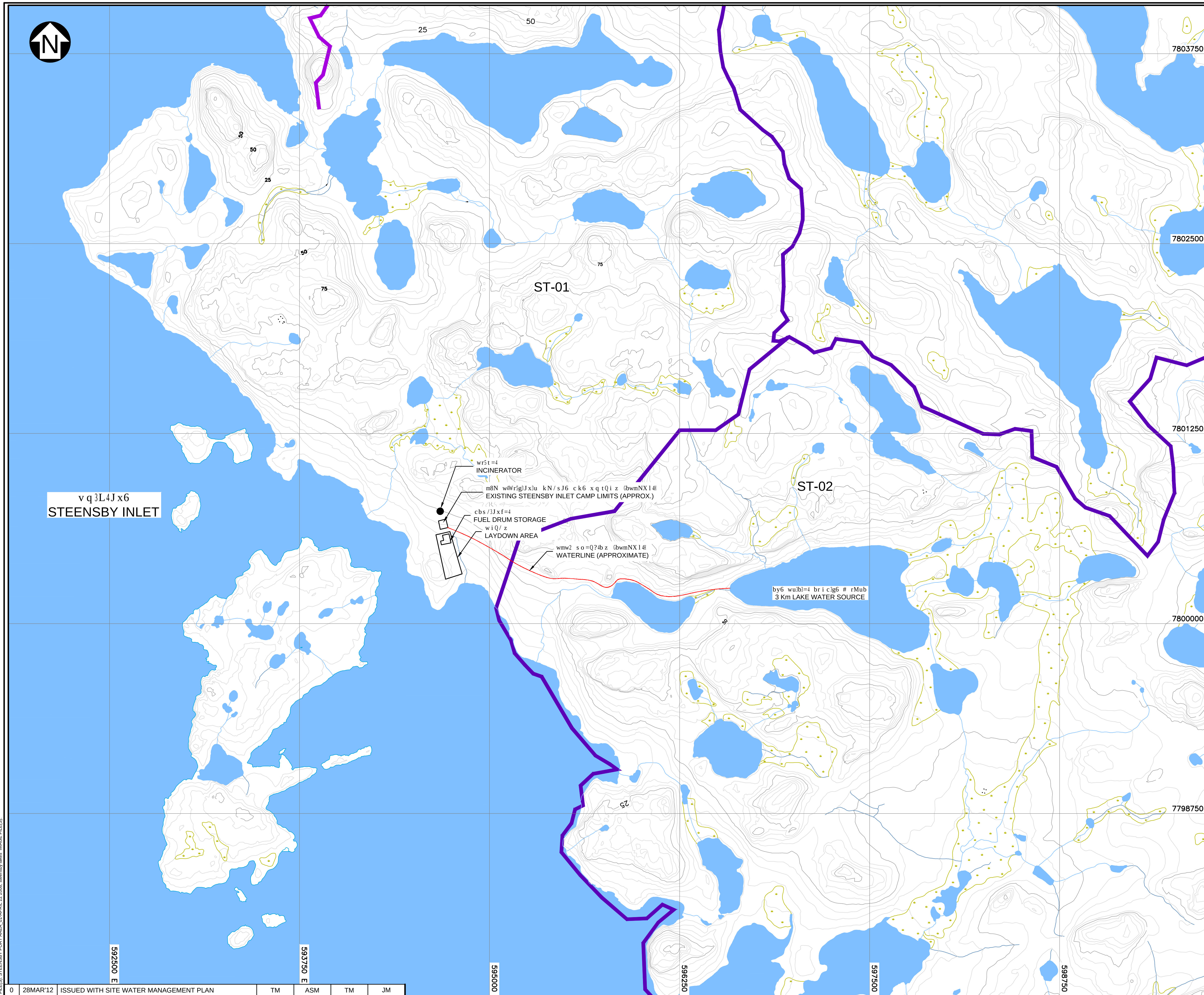
MARY RIVER PROJECT

MILNE INLET AREA CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO. NB102-181/32 | REF NO. NB12-00131

FIGURE 5.3 REV 0



grQ/ q5

LEGEND:

- wu6 WATER
- f4g6FfZM4g6Ff==sJ6 RIVER/STREAM/DRAINAGE
- nCsiz kN WETLAND
- ESTIMATED CATCHMENT AREA
- ST–01 CATCHMENT AREA NAME

CATCHMENT	AREA (km²)
ST–01	13.68
ST–02	21.77
ST–03	1.99

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 17 AND IS IN METRES.
2. CONTOUR INTERVAL IS 5 METRES.
3. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
4. CATCHMENT AREAS CALCULATED WITH MAPINFO.
5.

cspm/4nw5

1. kNax3 tt3ymiz mo4g6 UTM (NAD83) Zone 17
2. tt3ymJ5 ub: xd8i q5 szy4tQ4g5 % ub
3. kNaxoEp5 Eagle Mapping (2005)
4. kNystfb4 x3dt4nz Canarail Consultants Inc
5. s/C4b3=sJ6 ttCs/3ymiz Genivar

SCALE 250 125 0 250 500 750 1000 1250 m

BAFFINLAND IRON MINES CORPRATION

MARY RIVER PROJECT

STEENSBY INLET CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO. NB102-181/32 | REF NO. NB12-00131

FIGURE 5.4 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

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560,000
580,000
600,000
620,000
640,000
7,900,000
7,880,000
7,860,000
7,840,000
7,820,000
7,800,000
N
ANGAJURJUALUK LAKE
MID RAIL DRILL CAMP
PROPOSED RAIL ALIGNMENT
TARIUJAQ ARM
COCKBURN LAKE
AULASIVIK PENINSULA
POTENTIAL HYDRO ELECTRIC SITE
4 2 0 4 8 12 16 20 km
SCALE

LEGEND:

- CATCHMENT BOUNDARY
- WATER
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOUR INVTERVAL IS IN METRES. CONTOUR INTERVAL VARIES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL AUGUST 2010.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

RAILWAY CORRIDOR CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO. NB102-181/32

REF NO. NB12-00131

FIGURE 5.5

REV 0

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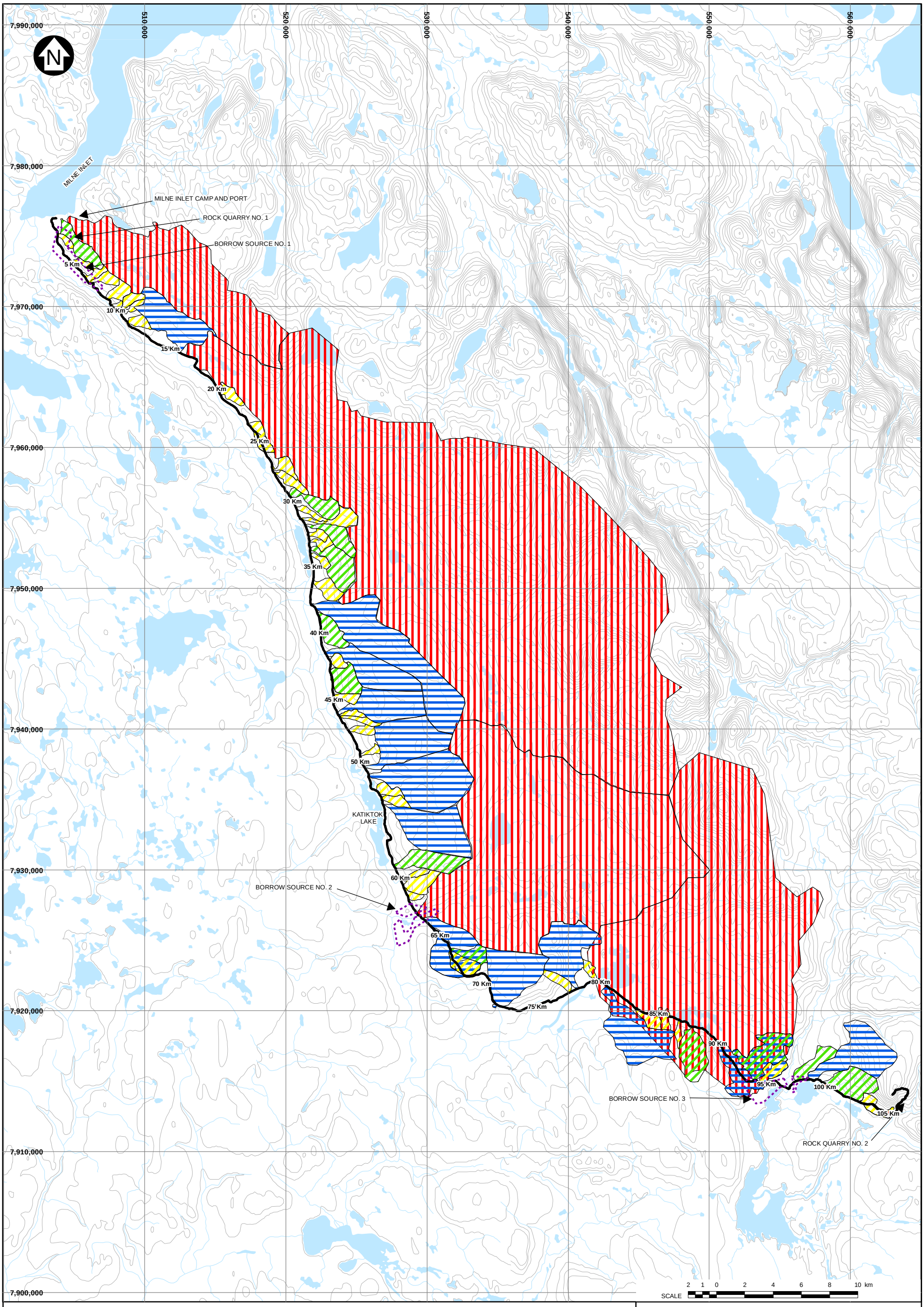

LEGEND:

- WATER
- SMALL CATCHMENT
- MEDIUM CATCHMENT
- LARGE CATCHMENT
- EXTRA LARGE CATCHMENT
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- BORROW SOURCE AND ROCK QUARRIES

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED. (GOVERNMENT OF CANADA, 2006)
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOUR INVTERVAL IS IN METRES. CONTOUR INTERVAL VARIES.
4. MILNE INLET TOTE ROAD SURVEYED BY KNIGHT PIESOLD (2006).
5. CATCHMENT BASED ON JULY 2006 INSPECTIONS.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

MILNE INLET TOTE ROAD CATCHMENT AREAS

Knight Piésold CONSULTING

P/A NO. NB102-181/32

REF NO. NB12-00131

FIGURE 5.6

REV 0

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480,000
500,000
520,000
540,000
560,000
580,000
8,020,000
8,000,000
7,980,000
7,960,000
7,940,000
7,920,000
7,900,000
N

DEPOSIT NO. 1
MINING LEASE 2484
PROPOSED BULK SAMPLE PIT
MRY-10
MRY-9
DEPOSIT NOS. 2, 3, AND 3B
MINING LEASE 2485
MRY-6
MRY-4
MRY-4A
MARY RIVER CAMP
MRY-11
MRY-7A

MILNE INLET CAMP
AND PORT

DEPOSIT NO. 4
MINING LEASE 2483
DEPOSIT NO. 5
MARY RIVER SITE

MILNE INLET
STOCKPILES
MRY-12
MRY-12
LAYDOWN AREA
FUEL STORAGE
MRY-5A
MRY-7
MRY-7A
LAGOON
AIRSTRIP
FUEL FARM
MRY-5
SHANCO CAMP
FUEL STORAGE
LAYDOWN AREA

Angajurjualuk Lake

SCALE 4 2 0 4 8 12 16 20 km

LEGEND:

- WATER
- MINERAL LEASE BOUNDARY
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- EXISTING TRAILS FOR DRILLS
- PROPOSED PIT/STOCKPILE ROAD
- WATER LICENCE MONITORING LOCATION

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES, (2004). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL CONSULTANTS INC.
5. INFRASTRUCTURE, AND WATER LICENCE, MONITORING LOCATIONS PROVIDED BY BAFFINLAND.
6. INFRASTRUCTURE AT MILNE INLET AND MARY RIVER NOT SHOWN FOR CLARITY.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	28MAR'12	ISSUED WITH SITE WATER MANAGEMENT PLAN	TM	ASM	TM	JM

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

SURFACE WATER SAMPLING LOCATIONS

Knight Piésold CONSULTING

P/A NO. NB102-181/32

REF NO. NB12-00131

FIGURE 6.1

REV 0

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APPENDICES

APPENDIX A

SURFACE WATER SAMPLING PROGRAM –
QUALITY ASSURANCE AND QUALITY
CONTROL PLAN, REV. 5

(Pages A-1 to A-65)

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

SURFACE WATER SAMPLING PROGRAM
QUALITY ASSURANCE AND QUALITY CONTROL PLAN

Rev. No.	Revision	Date	Approved
0	Issued in Final	October 25, 2007	KDE
1	Updated for 2008 Field Season	March 31, 2008	KDE
2	Issued in Final	March 31, 2009	JM
3	No change from 2009	March 31, 2010	JM
4	Laboratory Name Change	March 31, 2011	JM
5	Issued in Final	March 31, 2012	JM

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www.baffinland.com

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

SURFACE WATER SAMPLING PROGRAM
QUALITY ASSURANCE AND QUALITY CONTROL PLAN

TABLE OF CONTENTS

PAGE

TABLES

ATTACHMENTS

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

SURFACE WATER SAMPLING PROGRAM
QUALITY ASSURANCE AND QUALITY CONTROL PLAN

SECTION 1.0 - INTRODUCTION

1.1 INTRODUCTION

This Quality Assurance and Quality Control (QA/QC) Plan has been reviewed to fulfill the requirement of Part I, Item 13 of License No. 2BB-MRY1114 issued by the Nunavut Water Board to Baffinland Iron Mines Corporation (Baffinland) on April 8, 2011.

Part I, Item 13 of the Water License states:

> *The Licensee shall annually review the approved Quality Assurance/Quality Control Plan and modify as necessary. Proposed modifications shall be submitted to an Analyst for approval.*

In accordance with the stipulations of the Water License, this Surface Water Quality Sampling Program QA/QC Plan has been prepared following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan* (INAC, 1996). A copy of the guidelines is included in Appendix A.

1.2 QA/QC PLAN OBJECTIVES

For the purposes of this report, QA/QC is defined as:

- ***Quality Assurance*** - System of activities used to achieve quality control.
- ***Quality Control*** - Set of best practice methods and procedures used to ensure quality of data in terms of precision, accuracy and reliability.

The QA/QC best practices outlined in this document are designed to provide guidance to field staff and analytical laboratories in order to maintain a high level of confidence in the water quality data generated from the Mary River Project.

SECTION 2.0 - SAMPLE COLLECTION

2.1 GENERAL

The samples will be collected following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting*

Representative Water Samples in the Field and for Submission of a QA/QC Plan (INAC, 1996). A copy of the guidelines is included in Appendix A.

2.2 WATER QUALITY MONITORING LOCATIONS

The QA/QC Plan addresses the collection of freshwater surface water quality samples related to monitoring programs being carried out in support of Baffinland's Mary River Project, namely:

1. Collection of environmental surface water samples from area lakes, streams and rivers.
2. Collection of effluent samples from the current and future wastewater treatment facilities located at Mary River and Milne Inlet.
3. Collection of drinking water samples from camp potable water sources.
4. Collection of surface water discharges from future ore stockpiles and waste rock dumps.
5. Collection of surface water discharges from future bulk sample open pits.
6. Collection of water samples from fuel berms.
7. Collection of water samples representative of general site drainage.
8. Measurement of water sample field parameters (e.g. pH, conductivity, temperature etc.).

Exact locations and sampling frequency for designated monitoring stations are presented in the Site Water Management Plan (Knight Piésold, 2008).

2.3 SAMPLING METHODS AND EQUIPMENT

A summary of recommended water sample containers, sample volumes, method detection limits (MDL), sample preservatives and maximum sample hold times is presented in Table 2.1. Laboratory parameters such as pH, BOD, nitrite, nitrate, orthophosphate, fecal colliforms, chlorophyll and phenophytin typically have maximum sample storage times varying from 4 to 48 hours. Due to the remoteness of the site, it may not always be possible to get laboratory analysis done within the sample holding time window. During the preparation of this document the analytical laboratories were consulted with respect to maximum sample holding times. As a result, Table 2.1 presents a preferred and a maximum holding time for time sensitive parameters. Every effort will be made to get samples analysed within the preferred holding time window. If this is not possible, then the maximum holding time will apply.

Every effort will be made to prevent accidental freezing of bacteriological water samples (due to on-site climatic conditions) which could affect analytical results for these parameters.

For a complete list of the required sample analyses at each monitoring station, please refer to the Site Water Management Plan (Knight Piésold, 2008).

2.3.1 General Sampling Procedures

Generally, sampling procedures will consist of the following:

1. Sampler will wear a fresh pair of disposable nitrile gloves for each sampling event.
2. Sample bottles and preservative will be stored under clean conditions on site. Sample bottles will have the appropriate volume of preservative added in the field (or alternatively, sample bottles will be supplied by the analytical laboratory with preservatives already added).
3. A fresh sample bottle(s) will be used at each monitoring station. Sample bottles will *not* be re-used.
4. Sampling will be carried out by either: i) rinsing the sample bottle with source water three times before immersing the sample bottle to fill it (after which preservative is added, as required), or ii) if the sample bottles are provided pre-charged with preservatives then it is generally convenient to transfer water samples from the source to the sample bottle using a 1-2L plastic jug. Plastic jugs will be rinsed in the source water three times before filling the sample bottle. A dedicated jug will be used for different sample types (e.g. sewage effluent, fuel contaminated drainage and receiving waters). Sample jugs will be replaced on a regular basis before they become stained.
5. Prior to collecting the sample, the sampling jug will be rinsed in the source water three times. Rinse water will be disposed of so that it does not contaminate the source water where the sample will be collected.
6. Care will be taken to avoid disturbance of sediments and inclusion of disturbed suspended solids in the sample.
7. For samples *not requiring preservatives*, the sample bottle will be rinsed three times with source water before filling the bottle to the top.
8. For samples *requiring preservatives*, the sample bottle will be filled to the top (or to the indicator line marked on the bottle) and securely sealed. Note that for some volatile contaminants (e.g. BTEX), the sample bottle must be filled with zero headspace.
9. Sample details e.g. date, sample ID and analysis will be clearly marked on the bottle in indelible ink.
10. For *dissolved metals* analyses, if possible, the water sample will be filtered in the field immediately after sampling using a 0.45µm disposable filter and syringe. A fresh syringe and filters must be used at each monitoring station. Alternatively, sample filtration can be carried out by the analytical laboratory.
11. All samples will be sealed by ensuring their lids are tightly secured before placing the bottles into the coolers.
12. All samples will be placed in an iced cooler as soon as possible after collection.

2.3.2 Lake Sampling

For monitoring of water quality arising from vertical stratification in lakes, a depth sampler will be used (e.g. a 'Van Dorn' or 'Kemmerer'). Generally, depth samplers consist of a clear polycarbonate sample tube with two spring mounted rubber bungs, one located at each end. The depth sampler is lowered to the correct depth attached to a cord, whereupon a metal weight is released. The weight slides down the cord and strikes a release mechanism button which releases the two bungs which then seal both ends of the tube. The water sample is then pulled back to the surface.

Regardless of the brand, water samplers that are used will be suitable for collection of water samples for ultra low metals analyses i.e. will have acrylic or PVC construction and silicone seals.

For depth sampling, the following considerations will be taken into account to ensure sample QA/QC:

1. Sampling station locations will be dependent upon the monitoring program objectives and the lake dimensions. Map coordinates for all lake sampling station locations will be recorded using a GPS unit.
2. The vertical stratification profile will be determined using a temperature probe equipped with a long cord with metre intervals marked on it.
3. The vertical temperature profile will be established by slowly lowering the temperature probe and recording the temperature change with depth.
4. Depending upon the purpose of the monitoring program, water quality samples may be collected from the different stratified layers. The depth sampler must be slowly lowered in the 'open' position (i.e. to let water enter it) until it reaches the required depth.
5. The depth sampler will be held at this depth for a few minutes to allow flushing of water inside it.
6. The metal weight (messenger) will be released (to activate the closing mechanism) and the depth sampler will be pulled back to the surface. Field measurements can be taken at depth or by filling a bottle with the sampled water and taking measurements from that immediately after sampling.
7. When collecting samples close to the lake bed care must be taken to ensure that the depth sampler does not disturb lake bed sediments (which could contaminate the sample).
8. Depending upon the lake area and depth, multiple sampling stations will likely be required to adequately characterize lake water quality.

2.3.3 River Sampling

Depending upon the size of the water body, river sampling methods are the same as those presented in Sections 2.3.1 and 2.3.2. To avoid inclusion of floating detritus in the sample, the sample bottle must be fully immersed in the river water. Care will be taken to ensure that disturbed sediments are not included in the sample.

When selecting water quality monitoring station locations on rivers, care will be taken where a tributary joins a river, since complete mixing of the two waters may not be achieved within several hundred metres downstream of the confluence (or further). When in doubt, vertical profile monitoring across the river's width using a field parameter such as pH, temperature or conductivity will be used to assess if complete mixing has occurred.

2.3.4 Sampling for Toxicity Testing

Sampling for sub-lethal toxicity testing is a condition of Environmental Effects Monitoring (EEM). Typically, a 4L effluent sample is sufficient. Depending upon the objectives of the toxicity testing, variables that will require confirmation prior to testing include:

- Type of effluent sample to be collected e.g. instantaneous grab sample, or composite sample collected over a period of time
- Type of dilution water to be used by the testing laboratory e.g. standard synthetic laboratory dilution water, receiving water collected upstream of the discharge etc.
- Preferred test organism e.g. *Daphnia magna* or rainbow trout

Brief details concerning laboratory methods are presented in Appendix D. For further details concerning acute lethality testing refer to Environment Canada (2002) and USEPA (2002).

2.4 QA/QC SAMPLES

For monitoring of QA/QC during sample collection and shipping, a set of QA/QC samples will be routinely submitted for analysis. Descriptions of the QA/QC samples that will be used (e.g. field blank, travel blank and field duplicate) are presented on Table 2.2. Ten percent of all samples will comprise QA/QC samples..

In the interest of transparency, the analytical laboratories will also be instructed to report the results of their own in-house QA/QC testing (e.g. results of random replicate analyses of submitted samples).

The results of QA/QC analyses will be routinely reviewed by Baffinland or their designate, and any anomalous results will be promptly investigated with the assistance of the analytical laboratory. Once the reason for the anomalous results is identified, Baffinland will ensure that operating procedures of field staff and/or the analytical laboratory will be altered in order to rectify the problem. Compliance monitoring and data management for water license sampling will be conducted by Baffinland, with the assistance of a designate as required.

2.5 MEASUREMENT OF FIELD PARAMETERS

Measurement of field parameters (e.g. temperature, pH, conductivity, redox potential, or dissolved oxygen, etc.), where warranted, will be carried out for each sample at the time of sampling. The required set of field parameters will vary according to sample type and monitoring objectives. For a complete list of required parameters please refer to the Site Water Management Plan (Knight Piésold, 2008). The exact methods used for monitoring field parameters will depend upon the type of monitoring probes being used. Field staff will read and be familiar with the instruction manual for the equipment being used on site.

Field staff will rinse the monitoring probe three times with the water to be monitored before immersing the probe in the water. Generally, the user will ensure that the probe being used has had sufficient time to equilibrate in the water before the reading is taken. This is generally regarded as the point at which the reading has stabilized.

Field parameter data will be recorded in notebooks, or preferably in a custom form designed for this purpose (see example in Appendix B). A copy of the data should be retained on site.

2.5.1 Monitoring Probe Calibration

Monitoring probes will be stored and calibrated in accordance with manufacturers' instructions. All probes will be calibrated before each sampling event and a written record of the calibration results will be maintained on site. Field staff will ensure that calibration solutions are of the correct specification and that they have not passed their expiry date (if applicable). Monitoring probes will be stored as per manufacturers' recommendations.

SECTION 3.0 - SAMPLE MANAGEMENT

3.1 SAMPLE SHIPPING AND CHAIN OF CUSTODY

Samples will be placed in iced coolers and shipped to the analytical laboratory as soon as possible after collection. Care will be taken to ensure that bottles are stored upright and are packed securely within the cooler. Preferably, leak-proof ice packs will be used for cooling the samples. If loose ice is used then this should be securely sealed in plastic bags to prevent leakage of melt water.

A chain of custody (COC) form will accompany the samples (see example forms presented in Appendix B). At a minimum, the COC form will list:

1. Project name and project assignment number.
2. Address of analytical laboratory, name of contact person and contact details.
3. Contact details and name of sampler.
4. Date and time of sampling.
5. Whether the sample has been filtered, or whether laboratory filtration is required.
6. List of sample I.D.'s, sample type (e.g. lake water, sewage effluent, etc.), number of sample bottles per sample and analysis requested.
7. Urgency of analysis (e.g. rush or normal). For rush samples the analytical laboratory should be notified ahead of time.
8. Whether sample contains preservative and if so, what preservative and when it was added.

SECTION 4.0 - LABORATORY ANALYSIS

4.1 LABORATORY ACCREDITATION

Currently, laboratory analysis of water samples is being carried out by two accredited analytical laboratories. Accutest Laboratories ('Accutest') located in Nepean, Ontario has been carrying out the majority of sample analyses due to its geographical proximity to site (with respect to sample holding times). ALS Laboratory Group ('ALS'), located in Vancouver, BC has been used when ultra low level metals analysis has been required. AquaTox Testing and Consulting Inc. ('AquaTox') located in Guelph, Ontario will provide toxicity testing services. Details on analytical laboratory accreditation are presented in Appendix C.

4.2 ANALYTICAL DETECTION LIMITS

Required analytical laboratory method detection limits for a range of parameters are listed in Table 2.1. It should be noted that on occasion, a loss of analytical sensitivity can be encountered due to excessively high concentrations of parameters within a sample. If this is encountered, Baffinland or their designate will work with the analytical laboratory to try and resolve the problem.

4.3 LABORATORY ANALYTICAL METHODS

Analytical methods used by the analytical laboratories generally conform to the standard methods outlined in *Standard Methods for the Examination of Water and Wastewater* (APHA et al, 1989). For some parameters alternative standard analytical methods are used, as listed in Appendix D.

4.4 ANALYTICAL LABORATORY QA/QC PROCEDURES

Each analytical laboratory carries out their own routine in-house QA/QC checks, which include:

- Use of calibration check standards and drift control standards
- Use of surrogate standards and internal standards
- Replicate analyses on submitted samples
- Use of standard reference materials (SRM's) and matrix spikes

Further details on the analytical laboratories in-house QA/QC protocols are presented in Appendix E.

SECTION 5.0 - DATA MANAGEMENT AND REPORTING

5.1 DATA MANAGEMENT

All water quality data collected by Baffinland or designate from the various environmental programs will be stored electronically in a spreadsheet database (Microsoft Excel) or using alternative software designed specifically for environmental data management.

QA/QC measures relating to data validation will include the following:

1. Designation of a suitable person to act as Water Quality Database Manager (WQDM).
2. Upon receipt, laboratory analytical data will be reviewed by the WQDM to check for completeness, typos, outlying values, etc. The analytical laboratory will be immediately notified of any anomalous results.
3. At a suitable frequency (e.g. once per month) the spreadsheet database should be updated by the WQDM using: i) results provided in electronic format by the analytical laboratories, and ii) copies of the field parameter monitoring records forwarded from site
4. The WQDM will be responsible for ensuring that a third party (e.g. another staff member) carries out a QA/QC check on a minimum of ten percent of newly entered data.

5.2 REPORTING

All documents prepared by Baffinland or their designate for submission to the regulators will be reviewed by senior staff and Baffinland prior to issue, as per the company's standard practice and quality management system.

SECTION 6.0 - REFERENCES

1. APHA *et al*, 1989. Standard Methods for the Examination of Water and Wastewater; AHPA, AWWA and WPCF, 17th ed.

2. Environment Canada, 2002. Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring. http://www.ec.gc.ca/eem/English/MetalMining/Guidance/default.cfm.

3. INAC, 1996. Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "B" Licenses in Collecting Representative Water Samples and the Field and for Submission of a QA/QC Plan. Prepared by Department of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board, July 1996.

4. Knight Piésold, 2008. Baffinland Iron Mines Corporation - Mary River Project - Site Water Management Plan, Ref. No. NB102-00181/10-5, Rev. 1. North Bay: Knight Piésold, 2008.

5. USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms; 5th Ed., USEPA, ref. No. EPA-821-R-02-012.

TABLE 2.1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

SURFACE WATER SAMPLING PROGRAM - QUALITY ASSURANCE AND QUALITY CONTROL PLAN

SUMMARY OF RECOMMENDED WATER SAMPLE VOLUMES, METHOD DETECTION LIMITS, PRESERVATIVES AND SAMPLE STORAGE TIMES

Parameter	Method Detection Limit	Required Sample Bottle	Sample Preservative	Maximum Sample Storage Time	
				Preferred	Maximum
General Chemistry					
Total metals	variable	250mL plastic	0.5mL conc. nitric acid	6 months	-
Dissolved metals[1]	variable	250mL plastic	cool 4°C	7 days	-
Anions	variable	1L plastic	cool 4°C	7 days	-
TSS[4]	3 mg/L	1L plastic	cool 4°C	7 days	-
pH	0.01 pH unit	250mL plastic	cool 4°C	4 hours	14 days
Conductivity	0.2µS/cm	250mL plastic	cool 4°C	28 days	-
Total hardness	0.5mg/L	250mL plastic	cool 4°C	6 months	-
Total acidity / alkalinity	0.5mg/L	500mL plastic	cool 4°C	14 days	-
Nutrients					
BOD_5[8]	5mg/L	1L plastic	cool 4°C	4 hours	7 days
Total ammonia	0.005mg/L	250mL plastic	2mL sulphuric acid, cool 4°C	28 days	-
Nitrate	0.005mg/L	500mL plastic	cool 4°C	48 hours	7 days
Nitrite	0.002mg/L	500mL plastic	cool 4°C	48 hours	7 days
Orthophosphate	0.002mg/L	250mL plastic	cool 4°C	48 hours	7 days
TOC[5]	0.01mg/L	125 ml, glas, amber	2ml HCl acid	28 days	-
Biological					
Chlorophyll	$0.2mg/m^3$	1 L amber glass	cool 4°C	72 hours	3 days[9]
Phenophytin	$0.2mg/m^3$	1 L amber glass	cool 4°C	72 hours	3 days[9]
Sub-lethal Toxicity Testing[7]	N/A	20L plastic tote	cool 4°C	7 days	
Bacterial					
Fecal coliforms	1MPN	125mL sterile plastic or glass	cool 4°C	6hrs	48hrs
Organics					
TPH[2]	1.0 mg/L	500mL brown glass[6]	2mL sulphuric acid	14 days	-
BTEX[3]	0.0005 mg/L	100mL two septum vial[6]	2mL sulphuric acid, cool 4°C	14 days	-

Notes:
1. Sample must be field filtered using a 0.45µm disposable filter and syringe.
2. Total petroleum hydrocarbons.
3. Benzene, toluene, ethyl benzene, xylenes.
4. Total suspended solids.
5. Total organic carbon.
6. Zero sample headspace.
7. Type of test organism selected will depend upon objectives of testing.
8. Biochemical oxygen demand - 5 day test.
9. For samples with pH >7, the sample may be preserved by filtering through a glass fibre filter and storing the filter and residue in an airtight plastic bag in a freezer for up to 3 weeks.

Rev. 1 - Issued for 2010 Field Season

TABLE 2.2

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

SURFACE WATER SAMPLING PROGRAM - QUALITY ASSURANCE AND QUALITY CONTROL PLAN

SUMMARY OF RECOMMENDED FIELD QA/QC WATER SAMPLES

QA/QC Sample	Purpose	Description	Frequency	Prepared By
Field blank	Identification of potential contaminants arising from sample collection. The field blank bottle is prefilled with laboratory deionized water and is handled in the same way as regular sample bottles (i.e., opened and closed during sample collection). The bottle is submitted as a routine sample.	Bottle contains prefilled deionized water. Bottle is handled the same as one would handle regular samples.	Ten percent of all samples collected will be QA/QC.	Field staff
Travel blank	Identification of potential contaminants arising from sample storage, shipping and laboratory handling. The travel blank accompanies the samples to the laboratory but is not taken out into the field, or opened.	Sealed bottle containing deionized water provided by analytical laboratory	Ten percent of all samples collected will be QA/QC.	Analytical laboratory
Field duplicate	Assesses sample variability and precision of laboratory analytical methods	Duplicate sample selected at random.	Ten percent of all samples collected will be QA/QC.	Field staff

Rev. 2 - Issued for 2010 Field Season

ATTACHMENTS

ATTACHMENT A

QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) GUIDELINES FOR USE BY CLASS "B" LICENSEES IN COLLECTING REPRESENTATIVE WATER SAMPLES IN THE FIELD AND FOR SUBMISSION OF A QA/QC PLAN (INAC, 1996)

QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC)

GUIDELINES

FOR USE BY CLASS "B" LICENSEES IN COLLECTING REPRESENTATIVE WATER SAMPLES IN THE FIELD

AND FOR SUBMISSION OF A QA/QC PLAN

JULY 1996

DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS CANADA
WATER RESOURCES DIVISION
AND THE
NORTHWEST TERRITORIES WATER BOARD

Table of Contents

1.0 Introduction and Definitions

The purpose of this guideline is to provide an outline for Licensees to follow when preparing a site-specific Quality Assurance/Quality Control (QA/QC) plan. The QA/QC plan will help ensure that water samples taken in the field maintain a high degree of quality, so that they accurately reflect the physical and chemical nature of the water being tested.

This guideline is divided into three sections:

1) Sample Collection
2) Sample Handling
3) Lab Analysis

It is recognized that there may be different interpretations as to what is covered by "Quality Assurance/Control" due to the fact that certain Licensees have their own laboratories, while others only use commercial laboratories. For licence purposes, "Quality Assurance" and "Quality Control" refer to the following:

Quality Assurance: is the system of activities designed to better ensure that quality control is done effectively; while

Quality Control: is the use of established procedures to achieve standards of measurement for the three principal components of quality: precision, accuracy and reliability.

2.0 Sample Collection

2.1 Location

A QA/QC plan must identify the locations of all sampling stations and the markers used to identify the stations. If the Surveillance Network Program (SNP) of the Water Licence does not specify sampling locations, locations should be chosen with help from an Inspector.

Buoys and landmarks identify sampling stations in tailings ponds and lakes, while sign post positioning usually marks stream sample stations. Stations should be

used repeatedly, with the same personnel and techniques to reduce operational error. The use of Global Positioning System (GPS) to identify Latitude and Longitude for sampling stations is recommended.

2.2 Sampling Equipment

The Plan must include a detailed section on the equipment used for sampling and the rationale behind the choices of equipment. Equipment and bottles should be selected so that they do not contaminate or otherwise alter the concentrations of parameters of interest.

Sampling devices, sample bottles and filtration devices should be constructed of non-metallic material. Most samples are now collected in containers constructed of high density polyethylene plastic. However, there are some exceptions, when testing for oil and grease or phenols glass containers are to be used. When conducting a fish bioassay, plastic drums are used while hydrocarbon based containers are not to be used for the collection of organic samples.

This section should also identify whether new or used bottles are used for each sample analysis. New bottles are preferred, but sample containers may be used repeatedly with proper handling measures.

If old bottles are used, a detailed description should be included, noting how they are maintained, stored and cleaned. Usually, this will closely resemble the product manufacturer's instructions. An example of how bottles should be cleaned is outlined below:

- Rinse well with hot tap water for one minute or more.
- Empty bottle and add 30% HNO_3 to approximately 1/3 container capacity. Shake well for three to four minutes.
- Rinse vigorously with hot tap water for two minutes.
- Rinse thoroughly three times with tap water and three times with distilled water.
- Store with 0.2% HNO_3 for a minimum of one week.
- Rinse again with distilled water at least three times.

Bottles that are to be used for bacteria testing should be acid washed or autoclaved if possible.

Note: Additional information on bottle washing is also available from Water

Resources Division.

2.3 Sampling Methods

This Section will include details on how the samples are collected and the equipment that is to be used for each section.

In lakes and ponds, regular sample bottles are used the majority of the time, but Van Dorn samples are often utilized. The sample or the sample bottle is usually lowered to mid depth and washed three times before collecting the sample on the fourth submersion. Approximately 2% of the sample container capacity should remain to provide for mixing, preservative addition and thermal expansion.

Stream water sampling is usually done by plunging a sample bottle toward the current and allowing it to fill. Once again, the bottle should be rinsed three times before filling and room should be left for preservative addition and mixing.

A glass bottle should be used when sampling for oil and grease with the sample being collected during the first submersion and not rinsed three times first.

This section should also describe how often field blanks and replicate samples are to be collected. Field blanks are samples of distilled/deionized water that are to be treated in exactly the same manner as the other samples. Blanks should therefore be taken to the field and handled and preserved as part of the sample program. They indicate when a sample may be contaminated and are indicative of general sample integrity. Replicate samples (duplicates and triplicates) are two or three samples collected from the same station at the same time. They help to ensure sample precision at the laboratory.

3.0 Sample Handling

3.1 Preservation

After collection, most samples must be preserved in order to prevent chemical or biochemical changes to the sample. The QA/QC plan must describe how samples from each station are to be preserved.

Preservation is generally done by the addition of certain chemicals into the bottle immediately after the sample is collected. **Table 1** is a general guide to preservatives and their appropriate concentrations. The QA/QC plan should contain more detailed information on the concentrations and amount of preservatives that will be used.

3.2 Sample Identification

The plan should include a description of the system used to identify samples. The system must provide positive sample identification and ensure that the identification is maintained. It is advisable to keep a logbook of samples that have already been delivered.

The identification can be maintained by marking the bottle itself or a label, with a water resistant, non-smear felt pen. The information should be clear to persons uninvolved in the sampling and may include such details as company name, sample area, SNP number, time and date.

3.3 Transportation

The section on transportation will describe how sample integrity will be ensured from the time of collection to completion of delivery. Delivery to the lab should be done as soon as possible after the samples have been collected.

Usually, samples are sealed and stored upright in a box with other samples to provide a snug, immobile storage space during transfer. Any samples that require refrigeration for preservation should be kept cool during transport.

4.0 Lab Analysis

4.1 Lab Accreditation

The Licensee will identify in the plan the name of the commercial laboratory that will be conducting the analyses. A letter must be provided from the commercial lab indicating that they are accredited to conduct analyses on each of the required sampling parameters. Ideally, the lab should be accredited by the Canadian Associated for Environmental Analytical Laboratories (C.A.E.A.L.) and should

provide a certificate stating parameters for which they are accredited.

4.2 Detection Limits

Detection limits for the commercial lab should be identified for all parameters and should be reported when any SNP data is submitted.

4.3 Methodology

Descriptions should be included for any methods of analysis used that are not outlined in "Standard Methods for the Examination of Water and Wastewater".

4.4 Reporting Requirements

The Licensee shall outline the number of replicate samples that will be collected and submitted with each SNP report. It is recommended that one set of duplicates or triplicates from an assigned SNP site, as well as the results from field blanks, be submitted with each required SNP report. These will serve as an internal/external check for the Licensee and the commercial lab.

FOR FURTHER INFORMATION, CONTACT THE WATER RESOURCES DIVISION AT:

Box 1500
Yellowknife, NWT
X1A 2R3
(403)669-2651 Phone
(403)669-2716 Fax

Appendix 1
Table 1: General Summary of Special Sampling or Handling Techniques

Determination	Container	Minimum Sample Size (ml)	Preservation	Maximum Storage Recommended
BOD	Sterile polyethylene	1000	Refrigerate 4°C	24 hours
Conductivity	Polyethylene	500	Refrigerate 4°C	28 days
Total Cyanide	Polyethylene	500	Add NaOH to raise pH>12 refrigerate in dark	24 hours
Hardness	Polyethylene	100	Add Conc. HNO_3 to lower pH<2 OR (*) unpreserved	6 months
Metals, General	Polyethylene	250	For dissolved metals filter immediately, add Conc. HNO_3 to pH<2	6 months
Mercury	Glass (rinsed with 1 + 1 HNO_3)	500	Add Conc. HNO_3 or pH<2 or H_2SO_4 + 1 ml of 5% $K_2Cr_2O_7$, refrigerate 4°C	28 days
Nitrogen:				
Ammonia	Polyethylene	500	Analyze as soon as possible or add H_2SO_4 to pH<2, refrigerate OR (*) unpreserved	7 days
Nitrate	Polyethylene	100	Analyze as soon as possible or refrigerate	48 hours
Oil and Grease	Glass or wide-mouth calibrated	1000	Add H_2SO_4 to pH<2, refrigerate	28 days
pH	Polyethylene	—	Analyze immediately	2 hours
Suspended Solids	Polyethylene	—	Refrigerate	7 days
Temperature	Polyethylene	—	Analyze immediately	0
Turbidity	Polyethylene	—	Analyze same day; store in dark up to 24 hours, refrigerate	24 hours
Bacteria	Polyethylene (sterilized)	—	None: Keep cool	6 - 48 hours

(*) Unpreserved = check with lab that will be analyzing the samples

Appendix 2

References:

Gilbert, Andrew (1993). "Echo Bay Mines Ltd. Environmental Laboratory Quality Assurance Plan".

Soniassy, R. (1980). "A Guide for the Collection of Water and Effluent Samples"; pp 1-16; INAC

"Standard Methods for the Examination of Water and Wastewater" (1989); AHPA, AWWA and WPCF, 17th edition.

Water Resources Division, Indian and Northern Affairs Canada (1990). "Generic Quality Assurance (QA) Plan Guidelines for Use by the Licensees in Meeting SNP Requirements for Submission of a QA Plan"; INAC.

ATTACHMENT B

EXAMPLE FORMS

Sample Chain of Custody - 1 page
Record of Water Sample Field Parameter Measurements - 1 page
Field Monitoring Data Form - 1 page
Chain of Custody Record - 1 page

BAFFINLAND MARY RIVER PROJECT

SAMPLE CHAIN OF CUSTODY

FROM: .....

.....

.....

.....

TO: .....

.....

.....

.....

F.A.O. .....

Note:

No.	Sample I.D.	Sampling Date	Sampler	Sample Type	Sample Filtered?	No. of Bottles	Rush?	Analyses																		
								General Chemistry									*Nutrients*						*Bacterial*	*Organics*	
								Metals	Arsenic	Mercury	Anions	TSS	pH	Conductivity	Total Hardness	Total Alkalinity / Acidity	BOD_5	Total ammonia	Nitrate	Nitrite	Orthophosphate	TOC	Faecal colliforms	TPH	BTEX
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8																									
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20																									

BAFFINLAND MARY RIVER PROJECT

Record of Water Sample Field Parameter Measurements

No.	Sample I.D.	Sampling Date	Sampler	*Field Parameters*						Notes
				pH	Temperature (°C)	Conductivity (mS)	Redox (mV)	D.O. (mg/L)		
								mg/L	%	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Baffinland Iron Mines Corporation

DATE AND TIME: _____

FIELD MONITORING DATA FORM

STATION ID: _____

Environmental Department office – 519-397-9092

Site Information

Coordinates: Northing (m): _____ Easting (m): _____ Zone: _____ Datum: _____

Climate: Temp. (°C): _____ Precipitation: _____ Cloud cover (%): _____

Wind speed (kn): _____ Wind direction: _____ Wave height (m): _____

Description: _____

Field Data

Water Quality Meter: _____ Last Calibration: _____

Snow Depth (m): _____ Freeboard (m): _____ Ice Thickness (m): _____ Water Depth (m): _____

No.	Depth (m)	Temp. (°C)	pH		DO			SpC (µS/cm)	Cond. (µS/cm)	Sal.	TDS (g/L)
			(units)	(mV)	(mg/L)	(%)	(ch)				
1											
2											
3											
4											
5											
6											
7											
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30											

Samples Information

Potable Water ☐	**Wastewater** ☐	**Surface Water** ☐
☐ Baffinland DW Micro	☐ Baffinland WW Micro	☐ Baffinland SW Micro
☐ Baffinland DW Chem	☐ Baffinland WW Chem	☐ Baffinland SW Chem
☐ Baffinland DW Metals	☐ Baffinland WW O&G Tot.	☐ Baffinland SW Metals
☐ Baffinland DW THMs		☐ Baffinland SW BTE
		☐ Baffinland SW O&G Tot.

Comments: _____

TECHNICIAN (please print): _____ SIGNOFF: _____

CHAIN OF CUSTODY RECORD

ACCUTEST LABORATORIES LTD.
☐ 146 Colonnade Rd., Unit 8
Ottawa, ON K2E 7Y1
Ph: (613) 727-5692 Fax: (613) 727-5222

☐ 608 Norris Court
Kingston, ON K7P 2R9
Ph: (613) 634-9307 Fax: (613) 634-9308

LABORATORY USE ONLY
Report #: _____

Company Name:	Address:	☐ Fax Results to: _____
Report Attention:	City/Prov: Postal Code:	☐ E-mail Results to: _____
Phone: Ext:	Project # * Quotation #	☐ Copy of Results to: _____
* Waterworks Name:	* Waterworks Number:	*Note that for drinking water samples, all exceedances will be reported where applicable legislation requires.*

Invoice to:
(if different from above)

_____

_____

SAMPLE ANALYSIS REQUIRED

⇦ Indicate: F=Filtered or P=Preserved

Sample ID	* Date/Time Collected	Sample Matrix i.e. Water, Soil, Paint	* Sample Type (see "Codes" below)	* MOE Reportable? Y = Yes N = No	# of Containers	** Service Required R=Rush S=Standard									Criteria Required (i.e. Reg.170, Reg.153, CCME, PWQO etc.)	Laboratory Identification

Sample Type Codes for Drinking Water Systems: **RW** = Raw Water, **RWFC** = Raw Water For Consumption, **TW** = Treated Water at point of entry to distribution, **DW** = Distribution/Plumbing Water
"MOE Reportable" refers to the requirements under the SDWA for immediate reporting of results, which are indicators of adverse water quality, to the Owner/Operator, MOE, and MOH Medical Officer.

Sampled By:	Date/Time:	Relinquished By:	Date/Time:	Comments	**Cooler Temp (°C) on Receipt**
Work Authorized By (signature):	Date/Time:	Received By Lab:	Date/Time:		

*** Indicates a required field.** If not complete, analysis will proceed only on verification of missing information. A quotation number is required, if one was provided.
**** There may surcharges applied to "Rush" service.** Please check with lab prior to submission of samples for rush analysis to confirm availability and pricing.

Page _____ of _____

AFCOCR.1

Copies: White – Sampler, Yellow – Laboratory, Pink – With Report
Please print and submit, to the laboratory, 2 copies of this form with your samples.

ATTACHMENT C

ANALYTICAL LABORATORY ACCREDITATION

ALS Laboratory Group - 2 pages
Exova Accutest Laboratory - 2 pages
Exova Laboratory – 2 pages
Aquatox Testing & Consulting Inc. - 2 pages

ALS LABORATORY GROUP

1.0 SCOPE

This Quality Manual describes the Quality Management System of the ALS Laboratory Group Environmental Division locations in Canada. Where appropriate, it refers to other documents for additional information. Throughout this manual, whenever ALS is used alone, it refers to the Environmental Division of the ALS Laboratory Group in Canada.

2.0 LOCATIONS, ACCREDITATIONS AND RECOGNITIONS

ALS has laboratories across Canada. Addresses and contact information are available by following the links at our web site: www.alsenviro.com.

Labs within our network are accredited or recognized by the following agencies, as appropriate to their fields of testing and geographical sectors.

- Canadian Association for Environmental Analytical Laboratories (CAEAL) – www.caeal.ca
- Standards Council of Canada (SCC) – www.scc.ca
- American Industrial Hygiene Association (AIHA) – IHLAP - www.aiha.org
- American Industrial Hygiene Association (AIHA) – EMLAP – www.aiha.org
- State of Washington Department of Ecology (WADOE) – www.ecy.wa.gov
- United States National Environmental Laboratory Accreditation Program (NELAP) - www.nj.gov/dep/oqa
- British Columbia Provincial Health Officer – EWQA – www.pathology.ubc.ca
- British Columbia Ministry of Environment – EDQA – www.env.gov.bc.ca
- Ontario Ministry of Environment – www.ene.gov.on.ca
- Health Canada Good Manufacturing Practices (GMP) - Establishment License - www.hc-sc.gc.ca

Copies of current certificates and licenses applicable to these programs are available on www.alsenviro.com. Scopes of accreditation and/or program information are available on the web sites linked above.

3.0 TERMS AND DEFINITIONS

The terms and definitions relevant to the national quality management system are described in a nationally controlled file. For instances where local and national documents describe similar terms and definitions, the local document takes precedence.

Refer to:

- Local Master List: DEFINITIONS OF KEY TERMS

EXOVA ACCUTEST LABORATORY

Methods of Quality Control

The objective of the Quality Assurance Program is to ensure that results provided by the laboratory to our clients or regulatory bodies are accurate and precise, as well as consistent over time. Various techniques; statistical, investigative, preventative, administrative, and corrective will be utilized to maximize the reliability of the data.

The analytical services provided by Exova Accutest are based on industry recognized methodologies published by the following:

- AWWA, APHA - "Standard Methods for the Examination of Water and Wastewater", 21st Edition, 2005.
- Ontario Ministry of Agriculture, Food, and Rural Affairs
- Ontario Ministry of the Environment
- ASTM - American Society for Testing Materials
- AOAC "Official Methods of Analysis"
- CCME
- USEPA 500, 600, and SW846 Series Methodologies, and
- other recognized regulatory and industry sources

Certification and Accreditation

Exova Accutest maintains a rigorous program of certification and accreditation from several governing sources. In 1989 the laboratory received accreditation from the Ontario Ministry of Agriculture, Food, and Rural Affairs (**OMAFRA**) to provide analysis of farm soil for the agricultural community.

In 1991 the laboratory received certification from the Canadian Association of Environmental Analytical Laboratories (**CAEAL – now known as CALA**), Registration Number 2602. The Kingston laboratory's registration number is 2970. In 1995, following an independent laboratory audit by CALA, Exova Accutest achieved full accreditation for specific parameters to **ISO 17025** criteria (Registration Number 164).

CALA's web site is: www.cala.ca

Accutest is a Ministry of Transportation for Ontario (**MTO**) approved laboratory for the analysis of chloride content in concrete and an MOE-licenced laboratory for the analysis of drinking water.

Interlaboratory Studies

Exova Accutest regularly takes part in interlaboratory studies. As part of the accreditation programs of both CALA and OMAFRA, the performance of Exova Accutest is monitored through the analysis of unknown quality control samples submitted by an external agency.

EXOVA LABORATORY

EXOVA QUEBEC LABORATORY – QUEBEC CITY, QUEBEC

ACCREDITATION

For toxicity (Rainbow trout and Daphnia magna): **Exova Quebec laboratory is accredited by the *Ministère du Développement Durable, de l'Environnement et des Parcs (MDDEP)*[1] in accordance with the requirements of the international Standard ISO/IEC 17025:2005.**

AQUATOX TESTING & CONSULTING INC.

ACLAE

CAEAL

Canadian Association for Environmental Analytical Laboratories Inc.

Certificate of Accreditation

AquaTox Testing & Consulting Inc.
11B Nicholas Beaver Road, RR#3
Guelph, Ontario

COPY

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

Accreditation No. *A2803* Accreditation Date *January 3, 2005*

Issued on *March 14, 2007* Expiry Date *March 14, 2010*

Chief Executive Officer

ilac-MRA ACLAE CAEAL

This certificate is the property of Canadian Association for Environmental Analytical Laboratories Inc. and must be returned on request; reproduction must follow guidelines in place at date of issue. For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.caeal.ca.

ATTACHMENT D

LABORATORY ANALYTICAL METHODS

ALS Laboratory Group - 3 pages
Exova Accutest Laboratory - 7 pages
Aquatox Testing & Consulting Inc. - 3 pages

ALS LABORATORY GROUP

5.4 TEST METHODS AND METHOD VALIDATION

5.4.1 General

All ALS locations use appropriate methods for all tests performed, including those for estimating uncertainty and statistical techniques for analyzing data. Test methods are documented and include all instructions needed to operate equipment and protect the integrity of samples and analytical results. Test method instructions and support information is kept current and accessible where needed.

Deviations from test methods occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer where applicable. Analytical department supervisors and managers have the authority to approve method deviations for the analysis of samples and to impose appropriate quality control into the analysis. If the deviation is judged to alter the outcome of a test, client acceptance of the deviation will be obtained prior to approval. Documentation follows the same requirements as for data quality and method objective -refer to section 4.9

5.4.2 Selection of Methods

Customers rely on ALS to select test methods that are appropriate to meet their needs and are appropriate for the tests performed. ALS uses the latest versions of published standard methods developed by organizations such as American Public Health Association, United States Environmental Protection Agency, NIOSH, Environment Canada, and other international, regional or regulatory organizations or equipment manufacturers whenever possible. When needed, the standard method will be supplemented with additional instructions to ensure consistency of application and performance. Where an appropriate standard method is not available ALS may develop and validate an in-house test method, or adopt a third party validated method. ALS provides method information to clients upon request and on test reports.

For published reference methods, each ALS location confirms it can properly operate the standard method before introducing the test into the laboratory. If the standard method changes in a manner that may affect test results, the confirmation is repeated.

Unique circumstances may occur where a customer specifies the methodology to be used. The customer will be notified if ALS deems the recommended method is inappropriate or out of date.

5.4.3 Laboratory Developed Methods

When in-house development of a test procedure is needed, qualified individuals are assigned to the planning and development stages of the project. The plan is updated as development progresses and all changes are effectively communicated among all involved.

5.4.4 Non-standard Methods

If it is necessary to use methods not covered by standard methods, customer agreement will be obtained and will include clear specification of their requirements and the purpose of the test. The developed method will be appropriately validated before use.

5.4.5 Validation of Methods

Method validations are conducted to confirm that the methods are fit for their intended use. The validations are as extensive as necessary to meet the needs of the given application. The extent depends on the source of the method. For example, standard methods used for their intended application require a less extensive validation than non-standard methods or standard methods used outside of their intended scope.

All results relating to the validation of a given method, including the procedure used for validation and a statement of whether the method is fit for the intended use are retained in method validation records.

As appropriate, the validation studies performed will verify the range and accuracy of the results obtained, including uncertainty, detection limit, selectivity of the method, linearity, repeatability and/or reproducibility, robustness and/or sensitivity to interference. Measurement uncertainty values are reviewed to ensure they are sufficient to meet customers needs.

5.4.6 Estimation of Measurement Uncertainty

ALS has procedures for estimating measurement uncertainty. The procedures are based on accepted practices of identifying components contributing to uncertainty, compiling data that represents or includes these components, evaluating the data using appropriate statistical calculations, and reporting in a manner that prevents misunderstanding of the result. In those cases where the nature of the test precludes calculation of uncertainty, ALS will at minimum identify the components of uncertainty and make a reasonable estimation where needed. This estimation will be based on knowledge of the performance of the method and validation data.

5.4.7 Control of Data

Automated calculations and data transfer systems are checked in a systematic manner when first programmed and re-verified appropriately when changes are made.

When computers and automated equipment are used for the acquisition, processing, recording, reporting, storage or retrieval of test data, ALS ensures:

- in-house developed software is sufficiently documented and validated
- procedures are implemented for protecting data, including integrity and confidentiality of entry, collection, storage transmission and processing – refer to sections 4.13, 5.1 and 5.10
- computers and automated equipment are maintained to ensure proper functioning and adequate environmental conditions – refer to section 5.1

Refer to:

- Local Master List: METHOD VALIDATION
- Local Master List: LIMS CALCULATIONS AND DATA TRANSFERS
- Local Master List: SOFTWARE DEVELOPED IN-HOUSE

EXOVA ACCUTEST LABORATORY

48h-Single Conc.-Daphnia

ANALYTE	METHOD REFERENCE	MDL	UNITS
hold sample	HOLD C HOLD	0	ug/L

96h-Single Conc-RainTrout

ANALYTE	METHOD REFERENCE	MDL	UNITS
hold sample	HOLD C HOLD	0	ug/L

BIM - BTE - water

ANALYTE	METHOD REFERENCE	MDL	UNITS
Benzene	BTEX in water EPA 8260B	0.5	ug/L
Toluene	BTEX in water EPA 8260B	0.5	ug/L
Ethylbenzene	BTEX in water EPA 8260B	0.5	ug/L
Toluene-d8	surrogates - organics V 8260/8270	1	%

BIM DW Chem

ANALYTE	METHOD REFERENCE	MDL	UNITS
Turbidity	Turbidity - AMTURBE1 C SM2130B	0.1	NTU
Alkalinity as CaCO3	Alkalinity : Auto - AMAPCAE1 SM 2320B	5	mg/L
Cl	Anions by IC - DX-100 SM 4110C	1	mg/L
Colour	Colour - AMCOLSE1 C SM2120C	2	TCU
Cyanide (free)	Cyanide - AMCNTFE8 C SM4500-CNC	0.005	mg/L
F	F Autotitrator C SM4500-FC	0.1	mg/L
N-NO3	NO2/NO3 SKALAR - AMNOXSE1 C SM4500-NO3-F	0.1	mg/L
pH	pH in water : Auto - AMAPCAE1 C SM4500-H+B	1	
SO4	Anions by IC - DX-100 SM 4110C	1	mg/L
TDS (COND - CALC)	solids in water - AMSOLWE1 C SM2540	5	mg/L
Conductivity	Conductivity : Auto - AMAPCAE1 C SM2510B	5	uS/cm
TOC	TOC in water - AMDTOCE1 C SM5310C	0.5	mg/L
DOC	TOC in water - AMDTOCE1 C SM5310C	0.5	mg/L
Total Suspended Solids	solids in water - AMSOLWE1 C SM2540	2	mg/L

BIM DW Metals

ANALYTE	METHOD REFERENCE	MDL	UNITS
Al	ICP-MS PE6100 EPA 200.8	0.01	mg/L
As	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Ba	ICP-MS PE6100 EPA 200.8	0.01	mg/L
Cd	ICP-MS PE6100 EPA 200.8	0.0001	mg/L
Cr	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Cu	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Fe	ICP-MS PE6100 EPA 200.8	0.03	mg/L
Pb	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Mn	ICP-MS PE6100 EPA 200.8	0.01	mg/L
Hg	Hg in water - AMHGCTE1 M SM3112B-3500B	0.0001	mg/L
Se	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Na	ICP metals - AMMICPE8 M SM3120B-3500C	2	mg/L

Hardness as CaCO3	Hardness C SM2340B	1	mg/L
Ca	ICP metals - AMMICPE8 M SM3120B-3500C	1	mg/L
Mg	ICP metals - AMMICPE8 M SM3120B-3500C	1	mg/L
U	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Zn	ICP-MS PE6100 EPA 200.8	0.01	mg/L

BIM DW Micro

ANALYTE	METHOD REFERENCE	MDL	UNITS
Total Coliforms	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL
Escherichia Coli	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL

BIM Soil BTEX/PHCs/O&G/Pb

ANALYTE	METHOD REFERENCE	MDL	UNITS
Benzene	MX BTEX in soil V 8260B	0.05	ug/g
Toluene	MX BTEX in soil V 8260B	0.1	ug/g
Ethylbenzene	MX BTEX in soil V 8260B	0.1	ug/g
m/p-xylene	MX BTEX in soil V 8260B	0.2	ug/g
o-xylene	MX BTEX in soil V 8260B	0.1	ug/g
Toluene-d8	surrogates - organics V 8260/8270	1	%
F1 (C6-C10)	CCME TPH - SOIL CCME	10	ug/g
F2 (C10-C16)	CCME TPH - SOIL CCME	10	ug/g
F3 (C16-C34)	CCME TPH - SOIL CCME	20	ug/g
F4 (C34-C50)	CCME TPH - SOIL CCME	20	ug/g
F1-BTEX (C6-C10)	CCME TPH - SOIL CCME	10	ug/g
Moisture	Organic Moisture C SM2540B	0.1	%
Pb	ICP-MS SOIL PE6100 EPA 200.8	1	ug/g
Oil & Grease - Total	O&G soil - C SM5520D	100	ug/g

BIM SW BTE/O&G/Pb

ANALYTE	METHOD REFERENCE	MDL	UNITS
Benzene	BTEX in water EPA 8260B	0.5	ug/L
Toluene	BTEX in water EPA 8260B	0.5	ug/L
Ethylbenzene	BTEX in water EPA 8260B	0.5	ug/L
Toluene-d8	surrogates - organics V 8260/8270	1	%
Pb	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Oil & Grease - Total	O&G water - AMOGHXE1 C SM5520B	1	mg/L

BIM SW BTEX/PHCs/O&G/Pb

ANALYTE	METHOD REFERENCE	MDL	UNITS
Benzene	BTEX in water EPA 8260B	0.5	ug/L
Toluene	BTEX in water EPA 8260B	0.5	ug/L
Ethylbenzene	BTEX in water EPA 8260B	0.5	ug/L
m/p-xylene	BTEX in water EPA 8260B	1	ug/L
o-xylene	BTEX in water EPA 8260B	0.5	ug/L
Toluene-d8	surrogates - organics V 8260/8270	1	%
F1 (C6-C10)	CCME TPH - WATER O CCME	0.1	mg/L
F2 (C10-C16)	CCME TPH - WATER O CCME	0.1	mg/L
F3 (C16-C34)	CCME TPH - WATER O CCME	0.2	mg/L

F4 (C34-C50)	CCME TPH - WATER O CCME	0.2	mg/L
F1-BTEX (C6-C10)	CCME TPH - WATER O CCME	0.1	mg/L
Pb	ICP-MS PE6100 EPA 200.8	0.001	mg/L
Oil & Grease - Total	O&G water - AMOGHXE1 C SM5520B	1	mg/L

BIM SW Chem

ANALYTE	METHOD REFERENCE	MDL	UNITS
pH	pH in water : Auto - AMAPCAE1 C SM4500-H+B	1	
Conductivity	Conductivity : Auto - AMAPCAE1 C SM2510B	5	uS/cm
Alkalinity as CaCO3	Alkalinity : Auto - AMAPCAE1 SM 2320B	5	mg/L
TDS (COND - CALC)	solids in water - AMSOLWE1 C SM2540	5	mg/L
Turbidity	Turbidity - AMTURBE1 C SM2130B	0.1	NTU
SO4	Anions by IC - DX-100 SM 4110C	1	mg/L
Cl	Anions by IC - DX-100 SM 4110C	1	mg/L
N-NO3	NO2/NO3 SKALAR - AMNOXSE1 C SM4500-NO3-F	0.1	mg/L
NO2 + NO3 as N	NO2/NO3 SKALAR - AMNOXSE1 C SM4500-NO3-F	0.1	mg/L
Total Suspended Solids	solids in water - AMSOLWE1 C SM2540	2	mg/L
Total P	Low Total P C SM4500-PF	0.003	mg/L
Total Kjeldahl Nitrogen	TKN low water - AMTKNLE1 C SM4500-Norg-C	0.1	mg/L
CO3 as CaCO3	Alkalinity : Auto - AMAPCAE1 SM 2320B	2	mg/L
HCO3 as CaCO3	Alkalinity : Auto - AMAPCAE1 SM 2320B	5	mg/L

BIM SW D-Metals Full List

ANALYTE	METHOD REFERENCE	MDL	UNITS
Ca	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Mg	ALS Low Level ICP-MS TOTAL Met	100	ug/L
Na	ALS Low Level ICP-MS TOTAL Met	50	ug/L
K	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Al	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Sb	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
As	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Ba	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Be	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
Bi	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
B	ALS Low Level ICP-MS TOTAL Met	10	ug/L
Cd	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L
Cr	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
Co	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Cu	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Fe	ALS Low Level ICP-MS TOTAL Met	30	ug/L
Pb	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Li	ALS Low Level ICP-MS TOTAL Met	5	ug/L
Mn	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Mo	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Ni	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
Se	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Si	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Ag	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L

Sr	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Tl	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Sn	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Ti	ALS Low Level ICP-MS TOTAL Met	10	ug/L
U	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L
V	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Zn	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Hardness as CaCO3	ALS Low Level ICP-MS TOTAL Met	500	ug/L

BIM SW D-Metals ShortList

ANALYTE	METHOD REFERENCE	MDL	UNITS
Ca	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.1	mg/L
Mg	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.1	mg/L
Na	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.05	mg/L
K	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.01	mg/L
Al	ICP-MS PE6100 EPA 200.8	0.01	mg/L
Fe	ICP-MS PE6100 EPA 200.8	0.03	mg/L
Hardness as CaCO3	Hardness C SM2340B	1	mg/L

BIM SW Micro

ANALYTE	METHOD REFERENCE	MDL	UNITS
Total Coliforms	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL
Faecal Coliforms	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL
Escherichia Coli	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL

BIM SW T-Metals Full List

ANALYTE	METHOD REFERENCE	MDL	UNITS
Ca	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Mg	ALS Low Level ICP-MS TOTAL Met	100	ug/L
Na	ALS Low Level ICP-MS TOTAL Met	50	ug/L
K	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Al	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Sb	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
As	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Ba	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Be	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
Bi	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
B	ALS Low Level ICP-MS TOTAL Met	10	ug/L
Cd	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L
Cr	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L
Co	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Cu	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Fe	ALS Low Level ICP-MS TOTAL Met	30	ug/L
Pb	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Li	ALS Low Level ICP-MS TOTAL Met	5	ug/L
Mn	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Mo	ALS Low Level ICP-MS TOTAL Met	0.05	ug/L
Ni	ALS Low Level ICP-MS TOTAL Met	0.5	ug/L

Se	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Si	ALS Low Level ICP-MS TOTAL Met	50	ug/L
Ag	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L
Sr	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Tl	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Sn	ALS Low Level ICP-MS TOTAL Met	0.1	ug/L
Ti	ALS Low Level ICP-MS TOTAL Met	10	ug/L
U	ALS Low Level ICP-MS TOTAL Met	0.01	ug/L
V	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Zn	ALS Low Level ICP-MS TOTAL Met	1	ug/L
Hardness as CaCO3	ALS Low Level ICP-MS TOTAL Met	500	ug/L

BIM SW T-Metals ShortList

ANALYTE	METHOD REFERENCE	MDL	UNITS
Ca	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.1	mg/L
Mg	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.1	mg/L
Na	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.05	mg/L
K	Alkalis by FAA - LOW AMAMFAE1 SM 3111B-3500B	0.01	mg/L
Al	ICP-MS PE6100 EPA 200.8	0.01	mg/L
Fe	ICP-MS PE6100 EPA 200.8	0.03	mg/L
Hardness as CaCO3	Hardness C SM2340B	1	mg/L

BIM WW Chem

ANALYTE	METHOD REFERENCE	MDL	UNITS
BOD5	BOD5 - AMBODEE1 SM 5210B	1	mg/L
Total Suspended Solids	solids in water - AMSOLWE1 C SM2540	2	mg/L
pH	pH in water : Auto - AMAPCAE1 C SM4500-H+B	1	
Total Kjeldahl Nitrogen	TKN low water - AMTKNLE1 C SM4500-Norg-C	0.1	mg/L
N-NH3	NH3 water low - AMNH3LE1 C SM4500-NH3D	0.02	mg/L
Total P	Low Total P C SM4500-PF	0.003	mg/L
Oil & Grease - Total	O&G water - AMOGHXE1 C SM5520B	1	mg/L

BIM WW Micro

ANALYTE	METHOD REFERENCE	MDL	UNITS
Faecal Coliforms	Bacteria - AMBCOLM1 SM 9222B	0	ct/100mL

BOD5

ANALYTE	METHOD REFERENCE	MDL	UNITS
BOD5	BOD5 - AMBODEE1 SM 5210B	1	mg/L

Chlorophyll/Pheophytin

ANALYTE	METHOD REFERENCE	MDL	UNITS
Chlorophyll-a	Chlorophyll C SM10200H	0.2	mg/m3
Pheophytin-a	Chlorophyll C SM10200H	0.2	mg/m3

Chlorophyll/Pheophytin 2+

ANALYTE	METHOD REFERENCE	MDL	UNITS
Chlorophyll-a	Chlorophyll C SM10200H	0.2	mg/m3

Pheophytin-a	Chlorophyll C SM10200H	0.2	mg/m3

COD

ANALYTE	METHOD REFERENCE	MDL	UNITS
COD	COD - AMCODTE1 C SM5220C	5	mg/L

DOC

ANALYTE	METHOD REFERENCE	MDL	UNITS
DOC	TOC in water - AMDTOCE1 C SM5310C	0.5	mg/L

N-NH3 - water

ANALYTE	METHOD REFERENCE	MDL	UNITS
N-NH3	NH3 water low - AMNH3LE1 C SM4500-NH3D	0.02	mg/L

N-NO2 - Low Water

ANALYTE	METHOD REFERENCE	MDL	UNITS
N-NO2	Low NO2 - Technicon C SM4500-NO2-B	0.005	mg/L

N-NO3 - IC

ANALYTE	METHOD REFERENCE	MDL	UNITS
N-NO3	NO2/NO3 SKALAR - AMNOXSE1 C SM4500-NO3-F	0.1	mg/L

O&G - water - T/M/N

ANALYTE	METHOD REFERENCE	MDL	UNITS
Oil & Grease - Total	O&G water - AMOGHXE1 C SM5520B	1	mg/L
Oil & Grease - Mineral	O&G water - AMOGHXE1 C SM5520B	1	mg/L
Oil & Grease - Non-mineral	O&G water - AMOGHXE1 C SM5520B	1	mg/L

O&G - water Total

ANALYTE	METHOD REFERENCE	MDL	UNITS
Oil & Grease - Total	O&G water - AMOGHXE1 C SM5520B	1	mg/L

Ship: Ott to SteFoy 1x20L

ANALYTE	METHOD REFERENCE	MDL	UNITS
hold sample	HOLD C HOLD	0	ug/L

Ship: Ott to SteFoy 2x20L

ANALYTE	METHOD REFERENCE	MDL	UNITS
hold sample	HOLD C HOLD	0	ug/L

Supply - 20L Cubitainers

ANALYTE	METHOD REFERENCE	MDL	UNITS
hold sample	HOLD C HOLD	0	ug/L

TOC

ANALYTE	METHOD REFERENCE	MDL	UNITS
TOC	TOC in water - AMDTOCE1 C SM5310C	0.5	mg/L

AQUATOX TESTING & CONSULTING INC.

AquaTox Testing & Consulting Inc.
11B Nicholas Beaver Rd.
RR 3
Guelph ON N1H 6H9
Tel: (519) 763-4412 Fax: (519) 763-4419

To:	Cheryl Wray	From:	Lesley Novak, M.Sc.
Company:	Baffinland Iron Ore	☐	For Your Information
Date:	October 15, 2007	☐	For Your Approval
File:	162704515	☐	For Your Review
		x	As Requested

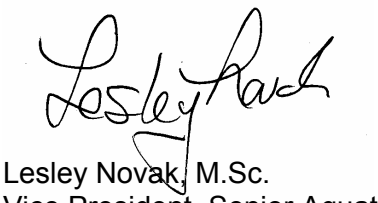
Reference: Toxicity Testing Services

I am pleased to provide you with a quotation for toxicity testing services for wastewater effluent monitoring (Table 1).

AquaTox's laboratory is accredited for all of the tests listed in Table 1. A copy of our SCC/CAEAL Certificate of Accreditation along with our scope of testing (which lists all of the specific tests that we are currently accredited for) can be provided at your request.

We appreciate your past support and look forward to a continued association. Please call me if you have any questions or require additional information.

AquaTox Testing & Consulting Inc.



Lesley Novak, M.Sc.
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QUOTATION NO.: 162704515

CLIENT: Cheryl Wray
Baffinland Iron Ore
cheryl.wray@baffinland.com

PERIOD: October 15th to December 31st, 2008

DESCRIPTION: Toxicity Testing Services

Table 1. Summary of toxicity testing costs.

Test	Method	Unit Cost
48-h single concentration test using *Daphnia magna*	EPS 1/RM/14	$165
96-h single concentration test using rainbow trout	EPS 1/RM/13	$220
48-h multiple concentration (LC50) test using *Daphnia magna*	EPS 1/RM/14	$260
96-h multiple concentration (LC50) test using rainbow trout	EPS 1/RM/13	$385

TERMS AND CONDITIONS:

- Costs do not include collection or transportation of samples to our laboratory.
- Costs are based on turnaround of 15 business days from completion of test.
- Cost excludes applicable taxes (e.g., G.S.T., P.S.T.).
- Toxicity testing services to be provided on an as needed basis.
- AquaTox will provide all sampling materials including pails, lids, liners, coolers, sample bottles, self-adhesive return labels and chain-of-custody forms for all samples (at no additional cost).
- Limitation of Liability: The CLIENT (Baffinland Iron Ore) releases AquaTox Testing & Consulting Inc. (AquaTox) from any liability and agrees to defend, indemnify and hold AquaTox harmless from any and all claims, damages, losses, and/or expenses, direct and indirect, or consequential damages, including but not limited to lawyer's fees and charges and court and arbitration costs, arising out of, or claimed to arise out of, the performance of the services, excepting liability arising from the sole negligence of AquaTox. It is further agreed that the total amount of all claims the CLIENT may have against Aquatox under these Terms and Conditions, including but not limited to claims for negligence, negligent misrepresentation and breach of contract, shall be strictly limited to the lesser of professional fees paid to AquaTox for the services or five hundred thousand dollars ($500,000). No claim may be brought against AquaTox more than two (2) years after the cause of action arose. As the CLIENT's sole and exclusive remedy under these Terms and Conditions any claim, demand or suit shall be directed and/or asserted only against AquaTox and not against any of AquaTox's employees, officers or directors.
- Submission of samples assumes acceptance of these Terms and Conditions

ATTACHMENT E

ANALYTICAL LABORATORY QA/QC PROCEDURES

ALS Laboratory Group - 4 pages
Exova Accutest Laboratory - 2 pages
Aquatox Testing & Consulting Inc. - 3 pages

ALS LABORATORY GROUP

Refer to:

- Local Master List (where applicable): FIELD SAMPLING
- Local Master List (where applicable): SUB-SAMPLING

5.8 HANDLING OF SAMPLES

ALS procedures for sample handling include transportation conditions, receipt, handling, protection, storage, retention, and disposal. The procedures are designed to protect the integrity of the test samples and the interests of the customer and ALS.

ALS requests that our customers use our Chain of Custody (COC) for every shipment of samples. The form includes sufficient space to record field sampling date, time and location of sampling, sample ID and information relating to the integrity of the field sample. COCs are shipped with field supplies, and are also available on the alsenviro.com web site.

Samples are given a unique identification upon receipt. The identification is retained by the sample throughout its life in the laboratory, and ensures samples are not confused either physically or in records or reports. Where appropriate, the system allows for subdivision of test items and transfer within and from the laboratory.

Abnormalities or other departures from specified sampling or transportation procedures are documented. Where there is doubt concerning the integrity of the sample, its identification or suitability for testing, or the requested tests, the customer is consulted for further instructions before proceeding, and the discussion is documented.

All ALS locations have appropriate facilities to securely maintain sample integrity, both before testing and where archiving for future testing is required. Sample storage and handling criteria are recorded in individual test methods. Traceability and monitoring of critical temperatures is maintained and discussed in section 5.6.

Refer to:

- Local Master List: SAMPLE RECEIPT AND LOGIN
- Local Master List: SAMPLE STORAGE

5.9 ASSURING THE QUALITY OF TEST RESULTS

ALS has established quality control (QC) procedures for monitoring the validity of tests performed by its laboratories. Individual test methods specify the in-batch quality control requirements, frequency of use and data quality objectives. Where appropriate, in-batch QC is recorded on control charts to detect trends, statistical techniques are used to monitor method performance, and planned action is taken to correct problems and prevent incorrect results from being reported. In-batch QC tools include reference samples, control samples and standards, verification standards, blanks, duplicates, surrogates and spikes as appropriate to the field of testing.

ALS laboratories participate in an extensive proficiency testing program where available. Where appropriate proficiency testing samples are not available, other monitoring tools are used.

Samples may be maintained for retesting where the integrity of the test result will not be compromised by the additional storage time.

All test data is reviewed and approved prior to release to the customer. The data review process includes manual transcription review, data-set review, inter-parameter relationship evaluation where appropriate to the tests performed, and report review. Manual transcriptions are reviewed for transcription errors. Data set review is conducted by authorized individuals and includes confirmation that quality control criteria are met and that anomalous data are qualified. Report review confirms that requested tests have been carried out and that all report information and formatting is correct for the specific customer.

Refer to:

- Local Master List: DATA QUALITY AND METHOD OBJECTIVES
- Local Master List: RECHECKS
- Local Master List: CONTROL CHARTS
- Local Master List: RELATIONAL CHECKS
- Local Master List: PROFICIENCY TESTING PROGRAMS
- Local Master List: DATA VALIDATION AND AUTHORIZATION

5.10 REPORTING RESULTS

All information listed below is either included in the final report or kept on file at ALS in the case of abbreviated or customized reports, and can be provided upon request.

- Title
- Name and address of the laboratory issuing the report
- Location where each test was conducted
- Unique identification of the test report on each page, and the total number of pages
- Customer name and address
- Identification of test method(s) used
- Unique identification of each sample, description of the sample such as matrix and customer identification, and condition where applicable
- Date of sample receipt
- Date of analysis
- Test results and units
- Report Qualifiers
- Name, function, and signature of the person authorizing the report
- Statement that the results relate only to the samples identified in the report

Other information necessary for the interpretation of results or requested by the customer may also be included in reports, such as test method deviations or exclusions, specific test conditions, uncertainty estimations, date of sampling, location of sampling and other sampling information.

Statements of compliance, opinions and interpretations may be included on test reports for specific analyses. In all such cases, the basis on which they have been made will be documented, and they will be clearly identified in the test report.

ALS obtains subcontract laboratory results in hard or electronic reports. When these results are presented to the customer in ALS reports, the identification of the subcontractor is clearly indicated on the final report.

When test reports are transmitted by telephone, facsimile, e-mail or other electronic means, the procedure for protecting the integrity and confidentiality of data includes:
- only providing results to those individuals specified by the client for each sample submission
- use of a standardized facsimile cover page that relates the procedures to follow if received in error
- use of an e-mail footer that relates the procedures to follow if received in error

It is ALS practice to never disclose information about a client's analysis to a third party without the prior consent of the client, or unless compelled to by law. If we are obligated by law to disclose such information, we will inform the client prior to doing so.

Final results are reported in a manner that minimizes the possibility of misunderstanding or misuse.

Test report amendment(s) are made by issuing a replacement report identifying that a revision was made and describing all changes in the cover page comment section.

Refer to:
- Local Master List: REPORTING TEST RESULTS

6.0 REFERENCES

ISO/IEC 17025:2005(E) General Requirements for the competence of testing and calibration laboratories, Second Edition, 2005-05-15. L:\Quality System Documents\External Documents\17025 (E) 2005.pdf

Program, policy and guidance documents of the following accreditation bodies:
- Canadian Association for Environmental Analytical Laboratories (CAEAL), located at: www.caeal.ca
- Standards Council of Canada (SCC), located at: www.scc.ca
- American Industrial Hygiene Association (AIHA), located at: www.aiha.org
- National Environmental Laboratory Accreditation Conference (NELAC), located at: www.epa.gov/nelac

EXOVA ACCUTEST LABORATORY

In-house QA/QC

Utmost care is taken to provide our clients with analytical data of the highest quality. Exova Accutest maintains several layers of data approval where, at any point in the analytical process, the reviewer has the authority to reject a data set based upon rigid QA/QC protocol. In addition, the following steps are taken during routine analyses, though not limited to:

- Reagent blanks are analyzed within each sample batch;
- Internal standards are used to verify instrument calibration or highlight matrix difficulties;
- All reagents are prepared from ACS or better grade chemicals;
- Laboratory replicate samples and Standard Reference Materials (SRM) are analyzed with each batch;
- All standard, blank, and spike values are catalogued for reference; and
- Travel blanks, field blanks, equipment blanks, and travel spikes are provided on request

Instrumentation

Exova Accutest operates and maintains analytical instruments in a high degree of repair and routine calibration for the tests performed. There are on-hand many gas chromatographs with various detection capabilities (Mass Spec, FID, ECD etc.), ICP-AES, ICP-MS, Flame AA instruments, HPLC, Ion chromatographs and autoanalyzers.

There are multiple units available with ample back-up capability to handle significant workloads.

AQUATOX TESTING & CONSULTING INC.

AQUATOX QA/QC PRACTICES RELATED TO TOXICITY TESTING

It is the policy of AquaTox to provide the highest standards of testing service to its clients by conducting tests in accordance with the required methods and client requirements. AquaTox is committed to good professional practice, quality service and compliance with CAN-P-4D.

AquaTox requires that all personnel concerned with testing activities within the laboratory familiarize themselves with the quality documentation and implement the policy and procedures in their work.

The overall QA objective is to develop and implement procedures for chain-of-custody, laboratory analysis and reporting that will provide accurate data. The purpose of the QA/QC program is to define goals for the level of QA effort; accuracy, precision, and sensitivity of analyses; and completeness, representativeness, and comparability of measurement data from the toxicity testing laboratory.

Quality Assurance (QA) and Quality Control (QC) practices for effluent toxicity tests include aspects of the test that affect the accuracy and precision of the data, including (1) sampling handling and storage, (2) laboratory conditions, (3) test organisms, (4) reference toxicants, and (5) record keeping and data evaluation. Below is a summary of our quality objectives and standard QA/QC practices related to the conduct of our ecotoxicity tests.

Quality Objectives

- To ensure a Quality System that is documented and incorporates adequate review and internal quality control.
- To ensure personnel are adequately supervised and are proficient to carry out assigned activities.
- To ensure test methods and related procedures are validated and incorporate adequate quality control.
- To ensure all equipment, supplies and services are functioning properly and/or meet required specifications.
- To ensure that facilities are adequate to carry out the testing activity.
- To ensure sample management procedures that incorporate adequate procedures for the security, receipt, identification, checking, routing, storage and disposal of all samples.
- To ensure data management procedures that incorporate adequate procedures for the security, recording, calculation, validation, authorization, transmittal, storage and disposal of all test data and related records.
- To ensure workload management procedures that incorporate acceptable turnaround time and verification of resource availability prior to the acceptance of additional testing.

QA/QC Data Related to Individual Toxicity Tests

Test Validity Criteria:

- A test will be considered valid if the test validity criteria stated in the test method are met. Otherwise the test should be repeated.

Reference Toxicant Testing:

- A reference toxicant test will be conducted on the same batch of organisms used for conducting the definitive test.
- Each reference toxicant test will be conducted following the same procedures and conditions used for the test substance(s) although may involve a reduced duration of exposure.

Use of Warning Chart:

- A warning chart will be made available when testing involves test organisms are cultured or tested by AquaTox on a regular basis.

A test result is suspect if it falls outside the warning limits. In this event, a thorough check of the testing conditions is conducted at this time.