MARY RIVER PROJECT
PHASE 2 PROPOSAL

Updated Application for Amendment No. 2 of Type A Water Licence 2AM-MRY1325

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P/A Number:	NB102-181/53-3
Revision Number:	1
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NB102-181/53-3

MARY RIVER PROJECT - PHASE 2 PROPOSAL

UPDATED APPLICATION FOR AMENDMENT NO. 2 OF TYPE A WATER LICENCE 2AM-MRY1325

Rev	Description	Date
1	Updated with Route 3 of North Railway, Revised Water Use and Updated Draft Management Plans	September 17, 2021
0	Issued in Final	May 2, 2019

Knight Piésold CONSULTING

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Abbreviations

the Project	Mary River Project
AEMP	Aquatic Effects Monitoring Plan
ARD	acid rock drainage
AREMA	American Railway Engineering and Maintenance-of-Way Association
Baffinland	Baffinland Iron Mines Corporation
DFO	Fisheries and Oceans Canada
EPP	Environmental Protection Plan
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
Golder	Golder Associates Ltd.
Hatch	Hatch Ltd.
ICRP	Interim Closure and Reclamation Plan
IFC	Issued for Construction
ISO	International Standards Organisation
KP	Knight Piésold Ltd.
Licence	Type A Water Licence 2AM-MRY1325
MBR	Membrane Biological Reactor
ML	metal leaching
MSC	Mine Site Complex
Mtpa	million tonnes per annum
NIRB	Nunavut Impact Review Board
NPC	Nunavut Planning Commission
NWB	Nunavut Water Board
OPEP	Oil Pollution Emergency Plan
PAG	Potentially Acid Generating
PSC	Port Site Complex
PWSP	Polishing Waste Stabilization Pond
QA	Quality Assurance
QC	Quality Control
RBC	Rotating Biological Contactor
ROM	Run of Mine
SNP	Surveillance Network Program
STP	Sewage Treatment Plant
TARP	Trigger Action Response Plans
TSD	Technical Supporting Document
WMP	Water Management Plan
WRF	waste rock facility
WWTF	wastewater treatment facility

1.0 INTRODUCTION

1.1 OVERVIEW

Baffinland Iron Mines Corporation (Baffinland) requires a second amendment to its Type A Water Licence 2AM-MRY1325 (the Licence; Nunavut Water Board (NWB), 2015) to support the Phase 2 Proposal at the Mary River Project (the Project). The Mary River Project is an operating iron ore mine located in the Qikiqtani Region of Nunavut (Figure 1.1). Baffinland is the owner and operator of the Project. The Phase 2 Proposal is described in Section 1.2.

An initial application for a second amendment was submitted to the NWB in September 2018 (KP, 2018a), and a revised application was submitted in May 2019 (KP, 2019a). This current application reflects a major project change adopted by Baffinland in late 2019 with the adoption of an alternate segment (referred to as "Route 3") of its proposed North Railway, in response to community feedback. The Route 3 segment of railway relative to the original alignment is shown on Figure 1.2. It is described further in Section 2.3. Item 10 of Part B (General Conditions) of the Licence states:

> *"The Licensee shall notify the NWB of any major or significant changes in development plans, phase, or conditions associated with the Project, including commencement of the full Operations Phase and other phases associated with the Project, at least sixty (60) days prior to carrying such changes."*

The Phase 2 Proposal represents a significant modification to the Project (Nunavut Planning Commission, 2018).

Also relevant to this application to amend the Licence, Item 12 of Part B (General Conditions) of the Licence states:

> *"The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted for approval/acceptance, cannot be undertaken without subsequent written Board approval and/or direction. The Board may alter or modify a Plan if necessary to achieve the objectives of the Licence of other regulatory instruments. For plans submitted for Board approval, the Board will notify the Licensee in writing of the Board's approval, rejection or alteration of the Plan. Plans or drawings submitted to the Board for review and/or comments do not necessarily require Board approval prior to implementation; however, the Board may request revisions to those Plans, as required."*

Part G of the Licence (Conditions Applying to Modifications) describes the process to seek and implement modifications to aspects of the Project authorized under the Licence. The Phase 2 Proposal cannot be implemented consistent with the terms of the current Licence (Part G, Item 1). As such, Baffinland is seeking written approval from the Board, in accordance with Part G, Item 2 of the Licence. Part G, Item 3 outlines the information to be provided to the Board when seeking such approval.

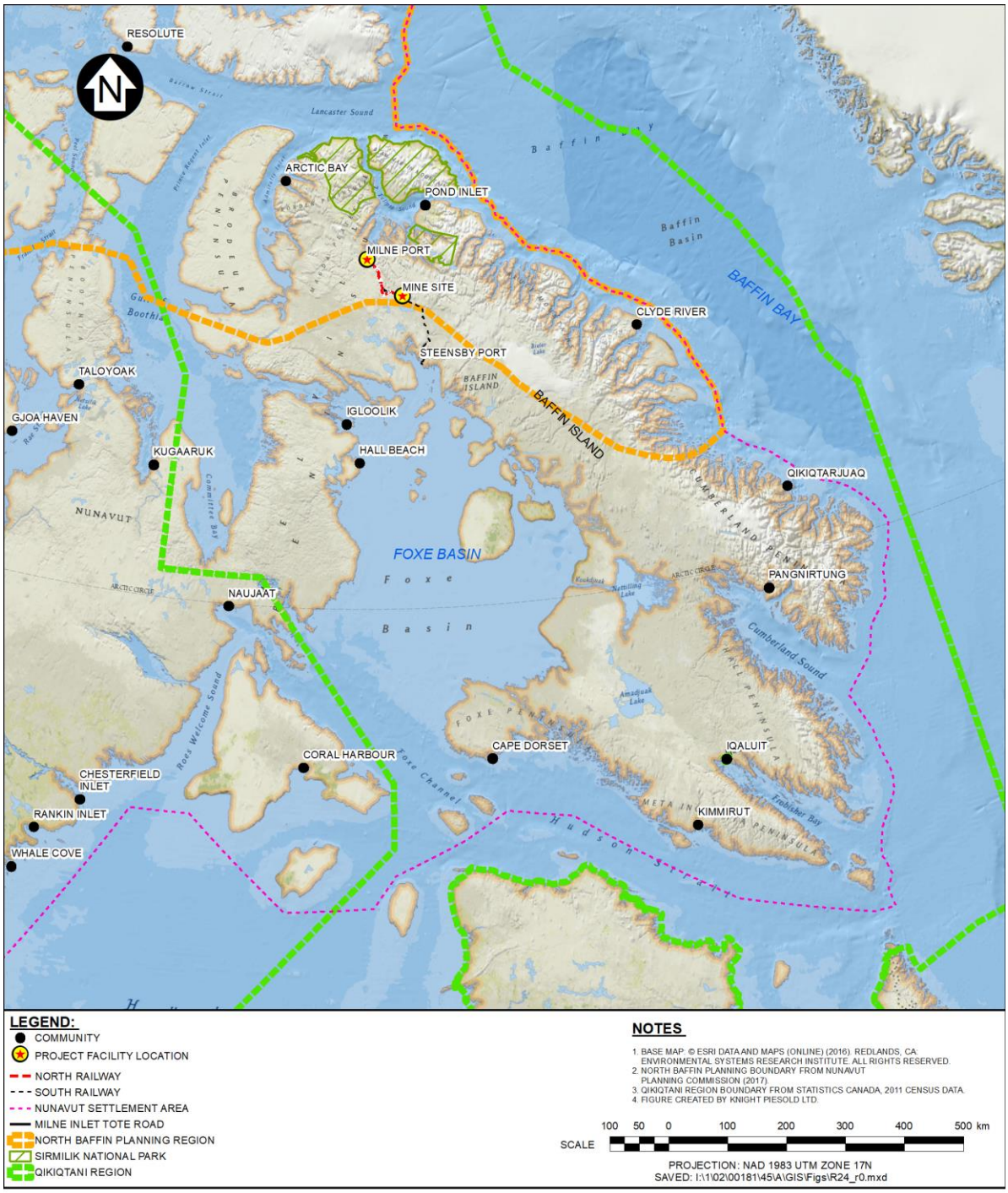

Figure 1.1 Project Location Map

"3. Applications for modifications shall contain:

a. A description of the facilities and/or works to be constructed;

b. The proposed location of the structure(s);

c. Identification of any potential impacts to the receiving environment;

d. A description of any monitoring required, including sampling locations, parameters measured and frequencies of sampling;

e. Schedule for construction;

f. Drawings of engineered structures stamped by a Professional Engineer; and

g. Proposed sediment and erosion control measures."

This document describes the activities associated with the Phase 2 Proposal, including required modifications to existing infrastructure currently authorized under the Licence and new infrastructure and/or facilities that are designed to contain, withhold, divert, or retain water and/or waste. Information has been provided at a conceptual level for all relevant aspects of the Phase 2 Proposal to support amending the scope of the Licence. In select instances, detailed engineering drawings will be provided to the Board for approval prior to implementation of those same project components, in accordance with the requirements of the current Licence.

An executive summary of the application is presented as Attachment 1, and the amendment application is included as Attachment 2.

1.2 ABOUT THE PHASE 2 PROPOSAL

As part of the regulatory approval process, Baffinland submitted a Final Environmental Impact Statement (FEIS) to the NIRB, which presented in-depth analyses and evaluation of potential environmental and socioeconomic effects associated with the Project (Baffinland, 2012).

In 2012, NIRB issued Project Certificate No. 005 which provided approval for Baffinland to mine 18 million tonnes per annum (Mtpa) of iron ore, construct a railway to transport the ore south to a port at Steensby Inlet which operates year-round, and to ship the ore to market (NIRB, 2012). The Project Certificate was subsequently amended to include the mining of an additional 4.2 Mtpa of ore, trucking this quantity of ore by an existing road (the Tote Road) north to an existing port at Milne Inlet, and shipping the ore to market during the open water season (NIRB, 2014). The total approved iron ore production was increased to 22.2 Mtpa (4.2 Mtpa transported by road to Milne Port, and 18 Mtpa transported by rail to Steensby Port). This is now considered the Approved Project. The 18 Mtpa Steensby rail project has not yet been constructed, however 4.2 Mtpa of iron ore is being transported north by road to Milne Port currently. In April 2018, Baffinland submitted a request for a second amendment to Project Certificate No. 005 to allow for a short-term increase in production and transport of ore via road through Milne Port from the current 4.2 Mtpa to 6.0 Mtpa (Stantec Consulting Ltd., 2018). NIRB (2018a) approved this activity by issuing Amendment No. 2 of Project Certificate No. 005 to Baffinland on October 20, 2018. NIRB issued Amendment No. 3 on June 18, 2020 (NIRB, 2020). This third amendment extended the 6.0 Mtpa operation to December 31, 2021.

The Phase 2 Proposal involves increasing the quantity of ore shipped through Milne Port to 12 Mtpa, via the construction of a new railway running adjacent to the existing Tote Road (called the North Railway; Figure 1.2). The total mine production will increase to 30 Mtpa with 12 Mtpa being transported via the North Railway to Milne Port and 18 Mtpa transported via the South Railway to Steensby Port. Construction of the North Railway is expected to take approximately two years (Section 2.1). Shipping from Milne Port will increase to 12 Mtpa once the North Railway is fully operational. Construction of the South Railway and Steensby Port will also commence once the North Railway is fully operational with commissioning and a gradual increase in mine production to 30 Mtpa about four years later. Shipping of 18 Mtpa from Steensby Port will begin once the South Railway has been constructed and fully operational.

Phase 2 also involves the development of additional infrastructure at Milne Port, including a second ore dock (Figure 1.3). Shipping at Milne Port will continue to occur during the open water season and may extend into the shoulder periods when the landfast ice is not being used to support travel and harvesting by Inuit. Various upgrades and additional infrastructure will also be required at the Mine Site and along both the north and south transportation corridors to support the increase in production and construction of the two rail lines (Figure 1.4).

Facilities associated with the South Railway and Steensby Port have yet to be built. Issued for Construction (IFC) drawings and other required submissions will be submitted to the Board in accordance with Part B, Item 10 of the Licence, prior to construction of these project components.

1.3 PROPOSED CHANGES TO THE LICENCE SCOPE

The Phase 2 Proposal will involve an increase in the intensity of use of approved activities and an expansion of existing infrastructure. There are no new types of activities associated with the Phase 2 Proposal; for example, the Phase 2 Proposal includes a new North Railway, but the existing licence contemplates the South Railway. With respect to mining, while the annual production rate will increase, there is no change to the mine plan; the same orebody will be mined at a different rate and schedule. As such, the current Licence already contains the mechanisms and provisions to regulate the Phase 2 Proposal, with only modest modifications to the Licence required.

Part A, Item 1 of the current Licence presents a bulleted list describing the scope of the Licence. This scope is presented in Table 1.1 along with proposed modifications that are part of the Phase 2 Proposal.

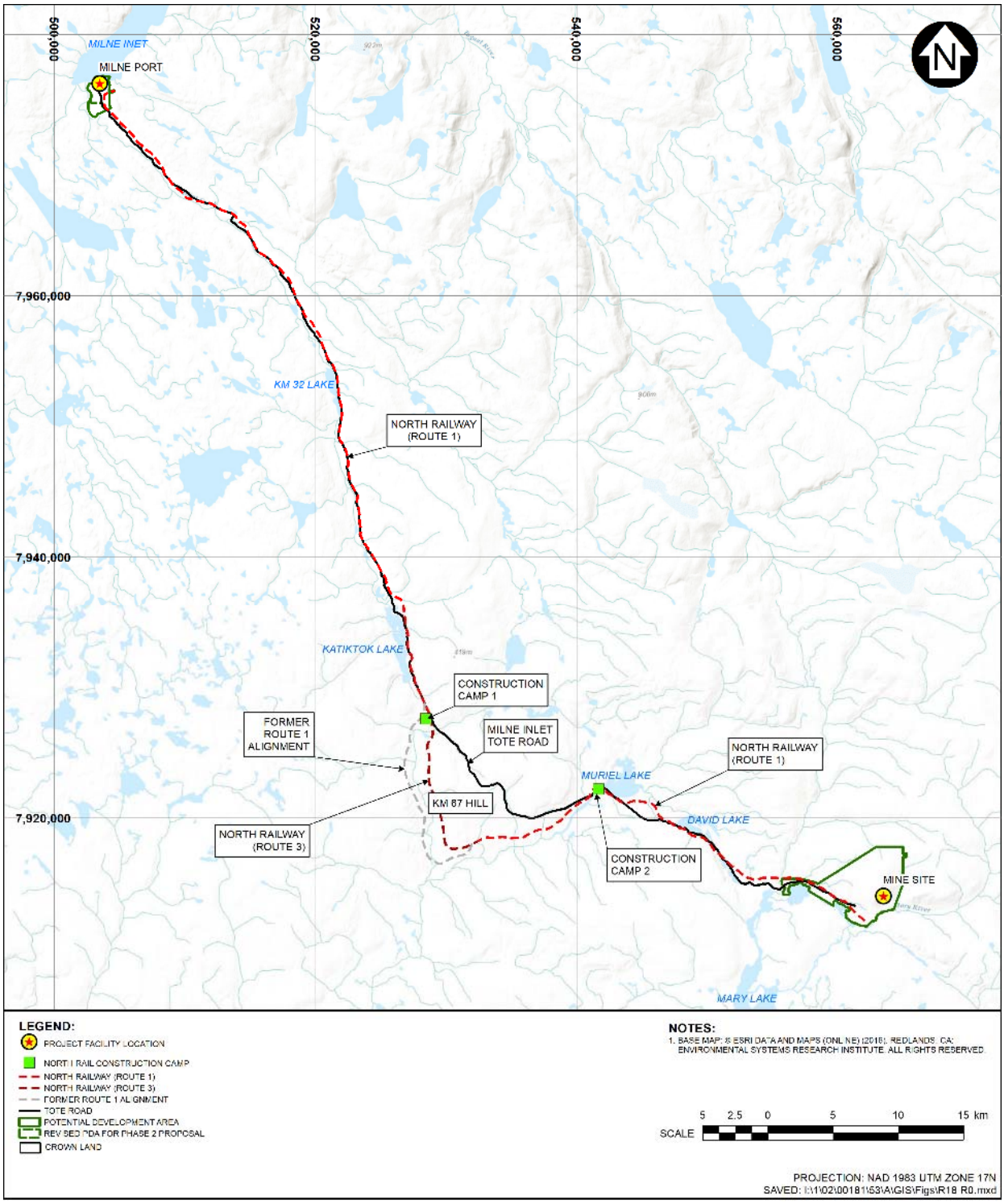

Figure 1.2 North Railway Location

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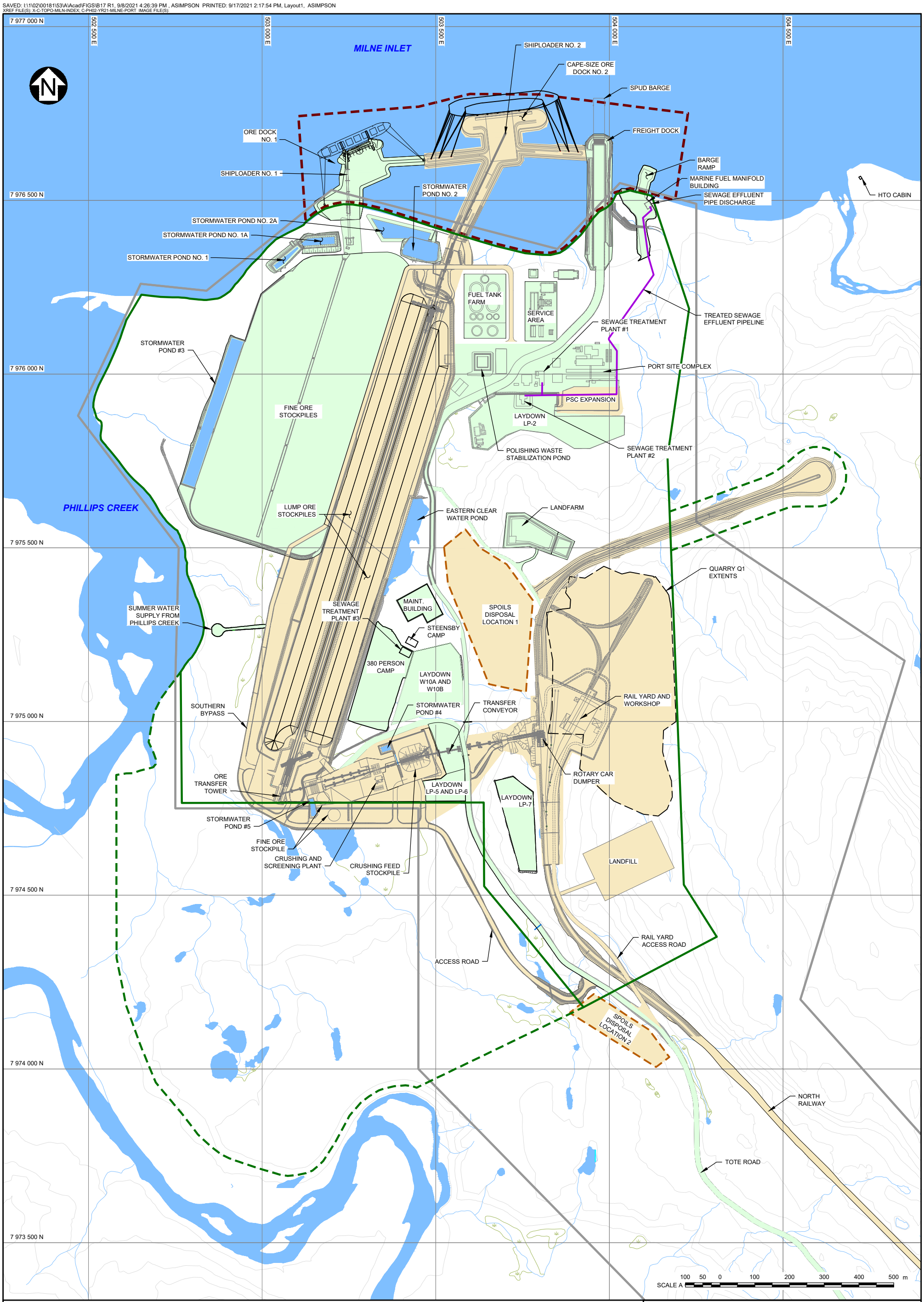


LEGEND:

- WATER
- SPOILS DISPOSAL LOCATION
- TREATED SEWAGE EFFLUENT PIPELINE
- QUARRY EXTENTS
- ROAD
- APPROVED INFRASTRUCTURE
- ADDITIONAL PHASE 2 PROPOSAL INFRASTRUCTURE
- COMMERCIAL LEASE BOUNDARY
- PROJECT DEVELOPMENT AREA
- PROJECT DEVELOPMENT AREA EXPANSION FOR PHASE 2 PROPOSAL
- FORESHORE LEASE BOUNDARY / MARINE PDA

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. CONTOUR INTERVAL IS 10 METRES.
4. PROPOSED MILNE PORT INFRASTRUCTURE PROVIDED BY HATCH APRIL, 2019.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	RAC	AS	SRA

BAFFINLAND IRON MINES CORPORATION

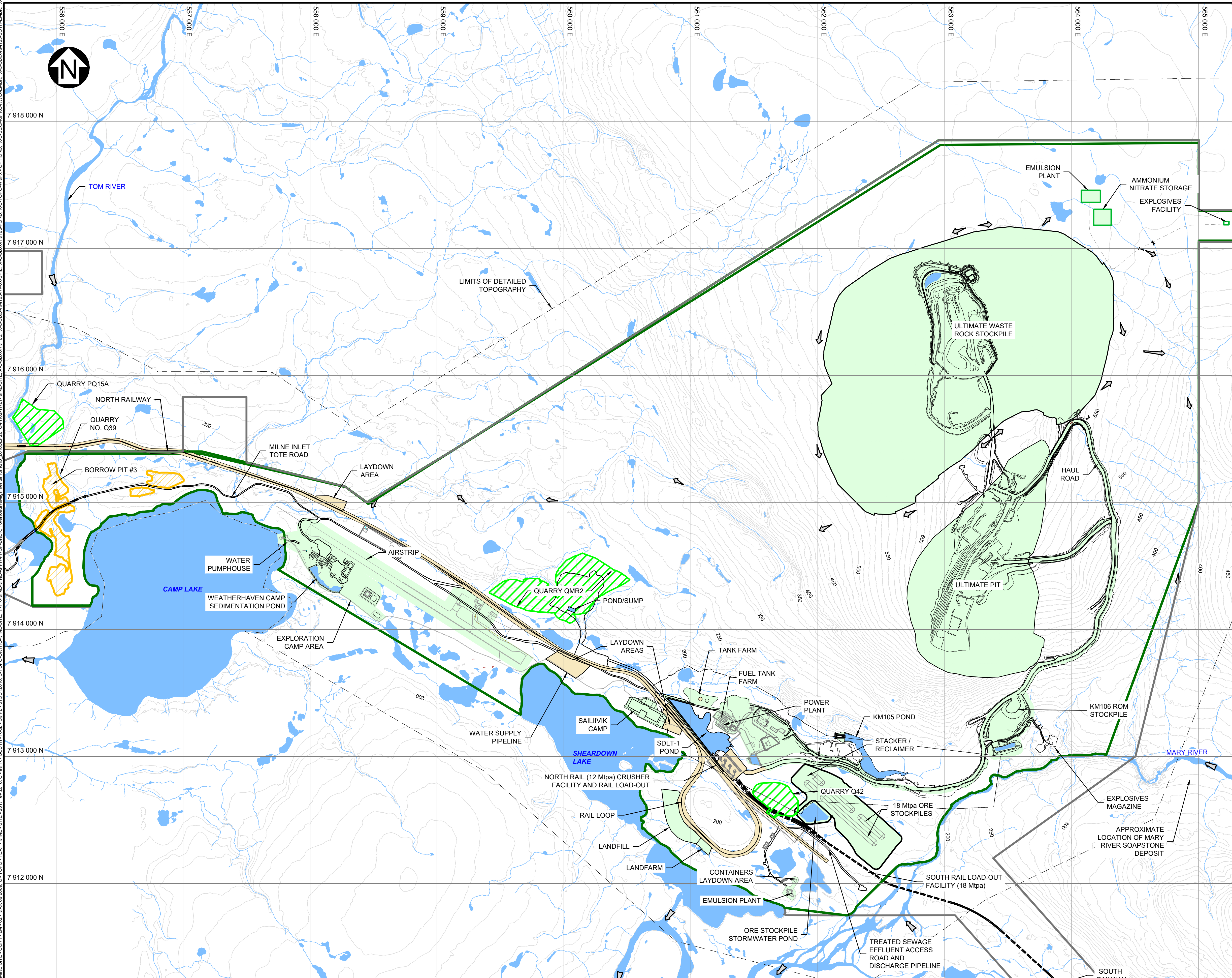
MARY RIVER PROJECT

PHASE 2 PROPOSAL
MILNE PORT LAYOUT

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/53	3

FIGURE 1.3 REV 1



LEGEND:

- APPROVED INFRASTRUCTURE
- ADDITIONAL PHASE 2 PROPOSAL INFRASTRUCTURE
- EXISTING BORROW AREA
- QUARRY
- WATER
- MILNE INLET TOTE ROAD
- COMMERCIAL LEASE BOUNDARY
- PROJECT DEVELOPMENT AREA
- RAILWAY
- FLOW DIRECTION

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 10 METRES.
4. MINE SITE INFRASTRUCTURE BASED ON HATCH DRAWING NO. H353004-00000-220-272-0005-0001.
5. UPGRADED 2018/2019 HAUL ROAD AND KM106 STOCKPILE PROVIDED BY BAFFINLAND.

SCALE A 300 150 0 500 1000 1500 m

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PHASE 2 PROPOSAL
MINE SITE LAYOUT
FINAL YEAR OF MINING

Knight Piésold CONSULTING

P/A NO. NB102-181/53 | REF NO. 3

FIGURE 1.4 REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	RAC	AS	SRA

Table 1.1 Proposed Modifications to the Scope of the Current Water Licence

Item No.	Scope of Current Water Licence (NWB, 2015)	Proposed Modifications (Phase 2 Proposal)
1	Water supply for domestic uses and industrial purposes at the Milne Port (Milne Inlet) Site, Mine (Mary River) Site, Steensby Port (Steensby Inlet) Site and the railway camps	Water use for domestic and industrial purposes will be increased to 750 m^3/day from Milne Port's two approved water sources, and a third water source (KM27 Lake) is proposed. The Mine's daily maximum water use of 657.5 m^3/day during construction has been adopted for the operation phase.
2	Site drainage and surface water management for the Milne Port, Mine Site, Steensby Port, and relevant minor project sites	Modifications to site drainage and surface water management at Milne Port and the Mine Site
3	Sewage Treatment Facilities for the Milne Port camp, the Mine Site exploration, construction, and permanent camps; the Steensby Port construction and permanent camps; and the railway camps	No change
4	Oily water treatment facilities for wastewater and oily storm water treatment for maintenance facilities and fuel storage berms at the Milne Port Site, the Mine Site and Steensby Port Site	Additional oily water treatment facilities within the rail maintenance facility proposed at Milne Port
5	Storage and management of hazardous materials at the Milne Port Site and Mine Site	No change; duplicated under Item No. 8
6	Landfarm facilities for the deposition and treatment of hydrocarbon contaminated snow and soil at the Milne Port Site, the Mine Site, and Steensby Port Site	No change
7	Fuel tanks, dispensing storage facilities and associated secondary containment areas or berms for Bulk Fuel Storage Facilities and day tanks at the Milne Port, the Mine Site, and the Steensby Port Site	Bulk fuel storage quantities will increase: two additional 15 ML tanks will be added to the Mine Site tank farm that are being constructed under the current Licence
8	Containment areas for temporary storage of hazardous/ nonhazardous waste (waste transfer areas) and new product storage for drums and totes at Milne Port, the Mine Site, and Steensby Port	No change
9	Ongoing decommissioning of existing and historic camp infrastructure (Fuel bladder farm and ancillary facilities and more) at the Milne Port Site	Historic camp infrastructure and fuel bladder farm have already been decommissioned; this item can be removed from the scope of the licence
10	Explosives storage and explosives manufacturing facilities at the Mine Site and Steensby Port Site	Additional temporary explosives storage facilities to support construction
11	Waste sorting facilities and temporary storage of hazardous wastes at the Mine Site	Waste sorting facilities and temporary storage of hazardous wastes will occur at Milne Port
12	Landfills for disposal of solid waste at the Mine Site and Steensby Port Site	A new landfill will be constructed in an exhausted quarry at Milne Port once construction is complete

Item No.	Scope of Current Water Licence (NWB, 2015)	Proposed Modifications (Phase 2 Proposal)
13	Incinerator Systems for camp and combustible wastes at the Milne Port Site, the Mine Site, Steensby Port Site, and railway construction camps	No change
14	Waste rock stockpile and waste rock pile runoff management at the Mine Site	No change
15	Ore Stockpile runoff management at the Mine Site and Steensby Port Site	Water management facilities at the Mine Site and Milne Port will be upgraded to accommodate expanded ore crushing pads, stockpiling areas and rail loading and offloading facilities
16	Secondary Containment for fuel storage and hazardous materials (if any) at each rail camp location	No change
17	Waste disposal facilities for each proposed camp along the railway corridor	All waste generated by temporary camps along the North Railway during its construction will be disposed of in existing waste management facilities
18	Watercourse crossings including pipelines, jetties, bridges; roads associated with channels; and bank alterations, culverts, spurs, erosion control, and artificial accretion	The North Railway will require the installation of bridges and culverts, bank alterations, and erosion control measures
19	Flood control, diversions, alteration of flow or storage by means of dykes or dams	The North Railway will involve infilling of select streams intersected by deep rock cuts. The upstream portion of the infilled streams will be diverted to an adjacent stream.
20	Ongoing inspection and maintenance of all water course crossings and associated infrastructure	No change
21	Tote Road (approximately 100 km all-weather road), which extend from the Mine Site to Milne Port Site in its current form except for routine maintenance and minor upgrades for the transportation of equipment during the Construction Phase of the project	The tote road will also be re-aligned between rail chainages km 83+900 and km 85+620. The tote road will be adjacent to the railway along this section to avoid two additional crossings. Where the North Rail will invariably cross the Tote Road, the road has been realigned to achieve a perpendicular grade crossing.
22	Ongoing activities in support of engineering and scientific studies for the Project	No change
23	Ongoing maintenance to existing project infrastructure	No change
24	299 m^3/day of Water for domestic and industrial purposes during construction activities occurring at Milne Port and related to the Early Revenue Phase (ERP) of the wider Mary River Project including earthworks, laydown areas, concrete and production	The Licence currently permits 367.5 m^3/day of water to be used for domestic and industrial purposes during the construction and operation phases. This will be increased to 750 m^3/day to account for periodic short-term spikes in daily water use.
25	Continued operation of the Matrix Camp (Camp) erected in 2013 for construction activities and expansion of the camp to support additional manpower of up to 350 persons during site preparation work but less than 225 persons during the construction of infrastructure at Milne Port	The number of beds at Milne Port will increase to 1,041 beds during the construction period; reducing to 716 permanent beds during the operation phase. The Matrix Camp has been removed.

Item No.	Scope of Current Water Licence (NWB, 2015)	Proposed Modifications (Phase 2 Proposal)
26	Construction and eventual operation of an additional Waste Stabilization Pond at Milne Inlet (Milne Port)	No change
27	Construction of ore stockpile areas and associated sedimentation ponds, permanent ore dock, ship loading facilities and associated earthworks activities, ore reclaiming conveying equipment, at Milne Inlet (Milne Port)	Additional rail ore unloading, crushing, and screening facilities will be constructed; the existing ore stockpile area will be expanded; additional ore reclaiming and conveying equipment, and a second ore dock with its own shiploader will be installed
28	Deposit of Waste during construction activities	No change. Additional construction waste will be generated from an additional construction phase.
29	Water use from specified sources or waterbodies for dust suppression or control along the Tote Road during the Early Revenue Phase	This item overlaps with Item 38, which is better worded to reflect the conclusion of the Early Revenue Phase. This item can be removed from the scope of the licence.
30	Management of ore stockpile runoff at the Milne Port Site	Ore stockpile runoff management facilities will be expanded to accommodate larger ore stockpiles and the relocation of ore crushing and screening operations from the Mine Site to Milne Port
31	Recommissioning of an existing Rotating Biological Contactor (RBC) type Sewage Treatment Plant located at the Milne Port Site	No longer applicable; the RBC Sewage Treatment Plant was decommissioned. This item can be removed from the scope of the licence.
32	Construction of an additional Polishing Waste Stabilization Pond (PWSP) to treat off-specification effluent as allowed and described above under the cope of Type B Licence No. 8BC-MRY1416. The PWSP will be of similar capacity and design specifications to the one constructed in 2013.	No change
33	Relocation of the treated sewage effluent discharge, from a location north of the old airstrip to north of the Milne Tank Farm	Further relocation of the discharge to an area near the freight dock was approved as part of Modification Request #7. No further modifications are proposed as part of the Phase 2 Proposal.
34	Additional fuel storage to include the installation of two 100,000 L marine diesel tanks	No change
35	Construction of a 4 million tonne ore stockpile pad, associated drainage structures, and two (2) settling or sedimentation ponds	This item overlaps with items 27 and 30 above. The ore stockpile will be expanded to 7.8 Mt. Additional stormwater ponds will collect runoff from the larger stockpile.
36	Construction and operation of an ore dock and ore loading system as allowed under the scope of Licence No. 8BC-MRY1416, and additional ancillary buildings, and maintenance facilities required for the shipment of iron ore	A second ore dock and associated ore loading system will be constructed

Item No.	Scope of Current Water Licence (NWB, 2015)	Proposed Modifications (Phase 2 Proposal)
37	Tote Road (approximately 100-kilometre, all-weather road), which extends from the Mine Site to the Milne Port Site in its current form except for routine maintenance and minor upgrades being required primarily for the purpose of safety and ensuring compliance with applicable safety regulations under the Mine Health and Safety Act and relevant regulations intended to support the safe transportation of equipment during construction and transportation of ore extracted under the Early Revenue Phase of the Project	This item overlaps with Item 21 above. Modifications to the Tote Road are proposed as described under Item 21.
38	Withdrawal of up to 1,500 m^3/day of water from several specific waterbodies located along the Tote Road, for use in dust suppression or control	This item overlaps with Item 29 above. An updated list of 21 dust suppression water sources are proposed, and the daily maximum water use will increase to 7,700 m^3/day.
39	Extended use, beyond timeframe previously anticipated, for some infrastructure and/or facilities established for the Project, such as camps, buildings, fuel and transitional fuel storage facilities	No change
40	Use of transitional fuel storage facilities	The bladder tank farms used in exploration have been removed from site. This item can be removed from the scope of the licence.
41	Discharge of treated sewage effluent onto land during the winter months in accordance with the relevant terms and conditions included in the licence	No change

1.4 CONTENTS OF THIS APPLICATION

This report forms Part 1 of the application, with three other parts described below. As with the original Application (KP, 2018a) and updated Application (KP, 2019a), the following Sections of this Application (Revision 1 to KP, 2019a) address the following corresponding Parts of the Licence:

- Section 2 - Part D Conditions Applying to Construction and Operations
- Section 3 - Part E Conditions Applying to Water Use and Management
- Section 4 - Part F Conditions Applying to Waste Disposal and Management
- Section 5 - Part H Conditions Applying to Emergency Response and Contingency Planning
- Section 6 - Part I Conditions Applying to General and Aquatic Effects Monitoring
- Section 7 - Part J (Conditions Applying to Abandonment, Reclamation and Closure) and Part C (Conditions Applying to Security)

Section 8 summarizes the status of management plans required under the Type A Water Licence, while Section 9 describes future submissions to the NWB and associated timeframes. Table 1.2 lists the main attachments to this document. A track-changes version of this document has been included in Attachment 2 so that reviewers can understand the changes since Revision 1 was issued in 2019.

Table 1.2 Attachments to this Application

Attachment No.	Attachment Title
PART 1	MAIN REPORT (This report)
PART 2	APPLICATION AND PROPONENT INFORMATION
1	Executive Summary
2	Application for Water Licence Amendment
3	Application Concordance
4	Regulatory Correspondence
5	Compliance Report
6	Proponent Information
PART 3	TECHNICAL INFORMATION
7	Design Criteria
8	Geotechnical Studies
9	Geochemical Evaluations
10	North Railway Detailed Figures
11	North Railway Design
12	Road Modifications
13	Watercourse Crossings
14	Mine Site Material Handling and Water Management
15	Port Site Material Handling and Water Management
16	Detailed Water Withdrawal Plan
17	Mine Site Fuel Tank Farm
18	Water Supply and Sewage
19	Landfarm Operation Maintenance and Monitoring Manual
PART 4	MANAGEMENT PLANS
20	Emergency Response Plan
21	Spill Contingency Plan
22	Surface Water and Aquatic Ecosystems Management Plan
23	Fresh Water Supply, Sewage and Wastewater Management Plan
24	Waste Management Plan
25	Draft Hazardous Materials and Hazardous Waste Management Plan

Attachment No.	Attachment Title
26	Borrow Pit and Quarry Management Plan
27	Blasting Management Plan
28	Aquatic Effects Monitoring Plan
29	Environmental Protection Plan
30	Interim Closure and Reclamation Plan
31	Sampling Program - Quality Assurance and Quality Control Plan
32	Phase 1 Waste Rock Management Plan
33	Life-of-Mine Waste Rock Management Plan

In Baffinland's response to technical comments received during the NIRB's reconsideration process, the Company committed to providing a Supplemental Information Package by May 1, 2019. Baffinland subsequently decided in consultation with the NWB to submit an updated application instead, so that all relevant materials that form the application are under one submission. The current document is Revision 1 of the May 1, 2019 updated application, further revised to reflect the selection of Route 3 along the Railway, as well as updates from ongoing engineering design work.

1.5 UPDATED MINE SITE WATER MANAGEMENT PLAN

This application presents designs for various water management facilities associated with the Phase 2 Proposal. Separate from this, Baffinland has undertaken water management planning at its Mine Site to address erosion and sedimentation issues associated with the current operations. Baffinland submitted Modification Request No. 13 (Baffinland, 2021) for its Mine Site Water Management Plan (WMP; KP, 2021a) including detailed design and issued for construction drawings for the first major component of the WMP (KM105 Pond; KP, 2021b) on June 30, 2021. The NWB approved the Mine Site WMP and KM105 Pond design on August 16, 2021 (NWB, 2021). Design of the other major water management facilities identified in the WMP is ongoing. The Mine Site WMP accounts for the Phase 2 Proposal and can also be implemented independent of the Phase 2 Proposal.

2.0 CONSTRUCTION AND OPERATIONS (PART D)

2.1 OVERVIEW OF CHANGES

An overview of the Phase 2 Proposal is provided in Section 1.2. The Phase 2 Proposal involves construction of the following additional permanent infrastructure:

Mine Site

- Expanded crusher pad and rail ore loading facilities
- Two additional 15 ML fuel tanks at the Mine Site

Northern Transportation Corridor

- North Railway
- Minor realignments of the Tote Road to accommodate the North Railway
- Quarry development

Milne Port

- Second ore dock
- Larger ore stockpiles
- Shiploading infrastructure

The following features will form part of construction activities for the Phase 2 Proposal:

- Temporary construction camps at km 62.8 and km 79.4 of the Tote Road
- 30 quarries (27 quarries not previously permitted)

A high-level construction schedule for the North Railway is presented as Table 2.1.

Baffinland believes that the terms and conditions of the existing Water Licence 2AM-MRY-1325 are satisfactory to cover the scope of proposed amendments under the Phase 2 Proposal.

2.2 APPLICABLE MANAGEMENT PLANS

The following approved management plans relate to the items discussed in this section:

- Surface Water and Aquatic Ecosystem Management Plan
- Borrow Pit and Quarry Management Plan
- Quarry specific management plans
- Phase 1 Waste Rock Management Plan

Draft updates to the first two these plans are presented as Attachments 22 and 26, for approval by the NWB in accordance with Items 1 and 2 of Part E of the Licence. Quarry specific management plans will be developed and submitted for approval prior to development of specific quarries. Baffinland's latest update to its Phase 1 Waste Rock Management Plan, committed to during NIRB technical meetings in April 2019, is presented as Attachment 32.

Table 2.1 High-level Construction Schedule for the Phase 2 Proposal

Task/Component	Mobilization		Year 1				Year 2			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Delivery of equipment and supplies										
Quarrying operations										
Construction camp construction										
Construction camp operation										
Temporary access roads										
Embankment earthworks										
Bridge construction										
Rail superstructure and other facilities										
Port material handling facilities										
Mine material handling facilities										

2.3 NORTH RAILWAY

The North Railway connecting the Mine Site and Milne Port is the most substantial infrastructure component associated with the Phase 2 Proposal. The railway will be 106 km in length, and most of the length of the railway embankment will be constructed adjacent to the Tote Road. However, a 20 km section of the railway was originally designed to deviate from the Tote Road alignment due to steep topography. This proposed deviation has been revised based on the results of community consultations and engineering study. This revised deviation is referred to as “Route 3” and is shown on Figure 1.2. This new route is approximately 16 km in length.

The construction of the railway is estimated to take two years (Table 2.1). The construction of the railway will require multiple laydown sites, temporary construction camps, and quarries for aggregate. The facilities and activities required for the construction and operation of the North Railway include:

- Construction of railway including embankments, signaling equipment and communication towers, water crossings, and level crossings with the Tote Road
- Construction and use of multiple laydown areas, shelters, and small equipment shops at each laydown
- Construction and operation of two temporary construction camps at km 40 and km 85
- Exploitation and closure of up to 35 quarries along the North Railway corridor
- Ongoing inspection and maintenance of the railway embankment, railway, signaling, and communication equipment
- Transportation of iron ore by trucks and by railway to Milne Port

A detailed description of the facilities and activities listed above is provided in Section 3.2 of Technical Supporting Document (TSD) 2 (technical supporting document) Project Description (Baffinland, 2018). Railway design criteria, civil design criteria, and the geotechnical design basis are presented in Attachment 7 (Hatch, 2017a; 2018a; and 2018b). Detailed layouts of the North Railway are presented as Attachment 10. Rail design drawings are included in Attachment 11.

2.4 TOTE ROAD REALIGNMENTS AND ACCESS ROADS

In general, the Tote Road alignment will remain unchanged, however some upgrades and minor realignments will be required to facilitate railway crossings. The railway will cross the existing Tote Road at eight locations and an additional 1.8 km length of Tote Road will be required to establish these railway crossings. The proposed updates are identified in Section 3.2 of TSD 2 Project Description. The use of the Tote Road as envisioned for the Phase 2 Proposal is detailed in Section 3.1 of the Project Description.

Attachment 12 provides drawings detailing the Tote Road modifications, including:

- Grade crossings at eight locations, so that the road crosses perpendicular to the railway
- Relocation of the Tote Road from Rail CH 83+900 to 85+620 (north of Muriel Lake)

In addition, a large number of short access roads will be constructed including:

- **Milne Port -** A 2.7 km south bypass access road will be constructed around the circumference of the ore stockpiles along the south and west sides (Figure 1.3).
- **Northern Transportation Corridor -** A number of short access roads up to 500 m in length will be constructed to access quarries, explosives storage areas, and laydown areas. In addition, more than

50 short access roads will be constructed to temporarily access the rail alignment from different locations along the Tote Road. These access roads are shown on detailed railway figures presented as Attachment 10. Additional minor access roads will likely be required to connect the Tote Road to the railway right-of-way during construction.

- **Mine Site -** In addition to minor realignments of the Tote Road, described in Attachment 12, the mine haul road will be extended from the current crusher pad area to the new crusher pad area and rail load-out area servicing the North Railway (Figure 1.4).

Access roads and haul roads will be constructed in accordance with the design criteria and construction methodologies presented in Attachment 7 (Hatch, 2018a). Crossings associated with these access roads are included in the Tote Road crossing list referenced in Section 2.5.

2.5 WATERCOURSE CROSSINGS AND DIVERSIONS

2.5.1 NORTH RAILWAY CROSSINGS

Construction of the North Railway and the upgrades to Tote Road will result in many watercourse crossings. Detailed layouts of the North Railway showing the crossings are presented in the detailed railway figures in Attachment 10. The watercourses identified in these attachments reflect the proposed Route 3 railway alignment subsequent to submission of previous water licence amendment applications (KP, 2018a and KP, 2019a).

The North Railway will be constructed mostly adjacent to the Tote Road and will cross an estimated 502 streams, ponds, and drainages along the North Railway. An assessment of the interactions of the Phase 2 Proposal with fish habitat is provided as Attachment 13.1 (North/South Consultants Inc., 2021). The results of supplemental fisheries surveys conducted during the 2018 open water season are presented in Attachment 13.2 (North/South Consultants Inc., 2019). Most crossings located on streams and ponds (approximately 70%) are confirmed as not fish-bearing (Table 2.2). Just over one-half (261) of the total crossings (502) are located on streams and ponds.

Table 2.2 Fish Presence at Stream Crossings and Ponds Along the North Railway

Habitat Quality	Species	
	Arctic Char	Ninespine Stickleback
Not Fish-bearing (by species)	178	222
Marginal	14	12
Important	69	27
Totals	**261**	**261**

In total 178 stream and pond crossing sites were classified as not fish-bearing for Arctic char. These sites are not expected to support Arctic char due to the presence of permanent downstream barriers, the lack of connectivity to overwintering habitat, and the absence of a stream channel at the site (i.e., sites are not aquatic habitat). Important Arctic char habitat was identified at 69 sites with established seasonal connectivity to overwintering habitats. The remaining 14 sites may potentially support Arctic char under

higher flow conditions; however, some of these sites may never be accessible due to the presence of soft barriers, such as sub-surface flows and high gradients.

In total 222 stream and pond crossing sites were classified as not fish-bearing for ninespine stickleback. Only 27 sites were identified as fish-bearing for ninespine stickleback (North/South Consultants Inc., 2021). The remaining 12 sites may potentially support ninespine stickleback based on observed habitat conditions. Most ninespine stickleback habitat along the rail corridor is distributed within approximately 20 km of the Mary River mine site. Ninespine stickleback prefer different habitat types than Arctic char, favouring little to no flow over fine substrates, and are thus more frequently observed in lakes/ponds.

Corrugated steel pipe culverts are proposed at most water crossings along the North Railway (Attachment 13.1). Culverts will be designed in accordance with American Railway Engineering and Maintenance-of-Way Association guidelines (AREMA, 2018) and the railway design criteria for the Project (Hatch, 2017a; Attachment 7). Culvert diameters will range from 0.6 m to 1.8 m and be covered with a minimum of 1 m of fill. Attachment 13.1 provides a list of the railway crossings. Typical culvert details for the railway are provided in Attachment 13.4. Typical culvert details at the Milne Port are shown in Attachment 13.5.

Plate arch culverts are proposed at 13 locations on the North Railway as shown in Table 2.3. These locations are under investigation by Hatch due to ground conditions. Massive ice is a stability concern for plate arch culverts and may require specialized structural footings or an alternative crossing design. Arch culvert design information is provided in Attachment 13.6.

Railway bridges are proposed at four crossings on the same rivers as existing bridges on the Tote Road. Bridge spans are based on the existing normal flow riverbank. Attachment 13.7 presents the hydraulic report associated with the bridge designs. Attachment 13.8 presents preliminary drawings of the four railway bridges and bridge crossing details. Bridge designs will be based on the 1:200 year 24-hour storm, sufficiently conservative to account for climate change induced increases in precipitation and runoff (TSD 6 Climate Change Assessment). Temporary cofferdams will be used in the construction of the bridges to isolate areas in which bridge piers will be constructed.

2.5.2 NORTH RAILWAY POND ENCROACHMENTS AND INFILLINGS

A total of 31 lake/pond encroachments/infilling sites were assessed along the rail alignment (Attachment 13.2; North/South Consultants Inc., 2021). Nine were identified as fish-bearing in 2018. The fishless ponds were of insufficient depth for overwintering (generally less than 2 m maximum depth) and were completely isolated from other waterbodies.

2.5.3 NORTH RAILWAY STREAM DIVERSIONS

In areas where the rail alignment is cut into the terrain, it is not feasible to pass streams across the rail alignment. The previous railway alignments involved substantially more cuts in rock than is now proposed, necessitating stream diversions at 27 locations. This has now been reduced to diversions at 15 locations, 5 of which are in fish-bearing habitat (North/South Consultants Inc., 2021). Fish-bearing habitat is present downstream of the 10 diversions located at not fish-bearing locations.

Table 2.3 Status of Arch Culverts

No.	Site ID	Rail/Road Chainage (m)	No. Barrels	Fish Bearing	Ground Conditions	Drawings
1	CV-29-2	29476	1	Yes	Ice poor	Attachments 13.6a and 13.6c
2	CV-35-2	35289	2	Yes	Ice poor	
3	CV-47-1	47680	1	Yes	Massive Ice	
4	CV-47-2	47787	1	Yes	Massive Ice	
5	CV-48-4	48665	2	Yes	Ice poor	
6	CV-77-2	77275	1	Yes	Ice Poor	
7	CV-84-1	83799	2	Yes	Ice poor	Attachments 13.6b and 13.6c
8	CV-86-2	86378	3	Yes	Massive Ice	
9	CV-96-1	96334	2	Yes	Massive Ice	
10	BG-14-1C	Road	1	Yes	Massive Ice	
11	CV-104-5	104563	1	Yes	Massive Ice	
12	M-Culv-3A (CV-107-4)	107324	1	Yes	TBC Ice poor/ Massive Ice)	
13	M-Culv-3B (CV-186)	Road	1	Yes	Massive Ice	

The effects of diverting streams in terms of hydrology, fish passage, and impacts to fish habitat of the remaining diversions will be forthcoming in hydrological modelling and fish habitat quantification reports that Baffinland intends to issue to DFO with a future application for a *Fisheries Act* Authorization. Baffinland will be implementing mitigation measures on a crossing-by-crossing basis to reduce flow velocities. Potential velocity reduction measures include additional culvert barrels, channel widening, construction of habitat features, regrading, and channel stabilization.

2.5.4 NEW AND MODIFIED CROSSINGS ON THE TOTE ROAD

A total of 35 new or modified culvert crossings on the Tote Road will occur as the result of minor road realignments (Attachment 13.2). Seven of the 18 total stream and pond sites are in fish bearing habitat (North/South Consultants Inc., 2021). The installations will be consistent with direction previously received from DFO in the fisheries authorization and letters of advice.

No changes to the Southern Railway watercourse crossings are proposed beyond that presented in the original Type A Water Licence application and addressed in the current scope of the Licence.

2.6 ORE DOCK AND ASSOCIATED INFRASTRUCTURE

Baffinland will construct a second ore dock at Milne Port capable of berthing Cape size ore carriers, as part of the Phase 2 Proposal (Figure 1.3). The dock face will be positioned parallel to the seabed contours. To construct the second ore dock it may be necessary to dredge sediments/soft material on the ocean floor beneath the dock embankment. Localized removal of the upper layer of unsuitable substrate material is

anticipated within the confined limits of the sheet pile enclosure. The materials will be transported and disposed with consideration of mitigation design considerations taken to reduce the potential for environmental impacts. The materials may be suctioned and pumped directly to a disposal area located either on land or within a silt curtain confined water lot area, behind the ore dock that will no longer be connected to Milne Inlet. Design shall include consideration of an outlet for stormwater release, if required. Further detail regarding the ore dock, including dock construction methodology is presented in Section 4.2 and Appendix F of TSD 2 Project Description. Information provided is preliminary and is subject to change upon completion of detailed design. Once detailed design has been completed, final details will be provided to the NWB.

A second shiploader will be constructed to fill vessels berthing at the new Cape size dock with ore from the lump ore stockpile. A bucket wheel reclaimer will be used to reclaim ore from the stockpile to feed the shiploader. Details regarding the shiploading system are provided in Section 4.3 of TSD 2 Project Description.

The existing ore stockpiles at Milne Port will be expanded and reorganized to accommodate the second dock and shiploader. Ore will arrive from the Mine Site and will undergo secondary ore crushing at Milne Port, where it will be sorted into lump ore and fine ore.

Water management related to the ore stockpiles at Milne Port is discussed in Section 4.4.

2.7 QUARRIES

2.7.1 LIST OF PROPOSED QUARRIES

Table 2.4 lists the approved and proposed quarries that may be used to supply aggregate for construction of the Phase 2 Proposal, mainly the North Railway. Quarry locations are shown on Figure 2.1, as well as the detailed railway figures (Attachment 10).

Existing licensed borrow areas between Milne Port and the Mine Site will continue to be used during the life of the Project for various purposes. Aggregate material required for the Tote Road maintenance and upgrades will be extracted from existing quarry sites that have been identified along the Tote Road and new quarry sites along the North Railway depending on proximity to work being completed. One additional borrow area (Rail Sand Pit) is proposed, located at approximately railway chainage km 59.6. Sand will be extracted from this location during the operation phase for rail maintenance. There may be times that sanding of the railway track is required to assist the locomotives with traction when ascending slopes. Between 5,000 to 10,000 m^3 of material may be required annually from this source. Quarry-specific management plans will be submitted to the NWB under the Licence prior to the development of the above-noted quarry and borrow sources.

A total of 79 proposed quarries are also located along the South Railway and at Steensby Port. These quarries are part of the Approved Project, and quarry-specific management plans will be submitted to the NWB under the Licence prior to their development.

Table 2.4 Proposed Quarries

Quarry No.	Railway Chainage	Material	Available Volume (m^3)	Approximate Footprint (ha)	UTM Easting	UTM Northing
Q1[1]	CH2000	Granitic Gneiss	400,000	33.6	504070	7974944
PQ5	CH5000	Granitic Gneiss	700,000	67.3	505764	7972642
Q4	CH7200	Granitic Gneiss	10,000	0.8	507438	7970518
Q6	CH7800	Granitic Gneiss	6,500	0.6	507804	7969988
Q10	CH11800	Granitic Gneiss	80,000	1.0	510638	7967431
Q11	CH14900	Limestone	5,000	0.4	513679	7966223
Q13	CH16200	Limestone	308,000	7.9	514295	7965314
PQ2B	CH22000	Limestone	176,000	23.7	517664	7961973
PQ2A	CH28900	Limestone	308,000	23.5	521827	7955356
PQ4A	CH41600	Limestone	265,000	9.6	523646	7942901
PQ4B	CH42500	Limestone	180,000	12.9	523651	7941894
PQ5A	CH45700	Limestone	240,000	22.9	525359	7938861
PQ5B	CH46800	Limestone	500,000	43.9	525986	7937802
Q23	CH48600	Limestone	5,000	0.6	525909	7936604
Q24	CH51250	Limestone	45,000	4.9	527063	7934336
PQ6A	CH56200	Limestone	900,000	21.4	528552	7929786
PQ6B	CH57100	Limestone	675,000	20.8	528900	7928994
Rail Sand Pit	CH58000	Glacial till	150,000	8.0	528498	7927790
PQ2	CH61000	Limestone	500,000	18.8	527843	7926119
PQ10A	CH70000	Limestone	237,000	11.8	531568	7917522
PQ10B	CH70400	Limestone	177,000	8.7	531982	7917635
PQ12A	CH78900	Limestone	310,000	23.4	539072	7921210
PQ12B	CH79700	Limestone	415,000	12.3	539876	7921782
PQ13	CH82100	Limestone	180,000	46.0	542584	7923675
PQ14A	CH92500	Limestone	80,000	4.7	550836	7917829
PQ14B	CH92900	Limestone	430,000	9.1	550983	7917407
PQ15A	CH98700	Limestone	80,000	5.8	555853	7915626
PQ15B	CH98000	Limestone	440,000	4.6	555270	7915586
QMR2[1]	CH103000	Diorite	400,000	28.4	559982	7914260
Q42	CH105300	Diorite	125,000	6.9	561673	7912667

Note(s):

1. Existing approved quarry with an existing quarry management plan.
2. The Rail Sand Pit is expected to be used during rail operations only, extracting 5,000 to 10,000 M^3 of sand and gravel annually.

500,000
510,000
520,000
530,000
540,000
550,000
560,000
570,000
580,000
7,970,000
7,960,000
7,950,000

MILNE INLET
MILNE PORT
Q1
PQ5
Q4
Q6
PHILLIPS CREEK
Q10
Q11
Q13
PQ2B
PQ2A
KM 32 LAKE
PQ4A
PQ4B
PQ5A
PQ5B
Q23
Q24
KATIKTOK LAKE
PQ6A
PQ6B
RAIL SAND PIT
PQ2
PQ10A
PQ10B
RAVN RIVER
PQ13
MURIEL LAKE
DAVID LAKE
PQ14A
PQ14B
PQ12B
PQ12A
PQ15A
PQ15B
QMR2 (Q41)
Q42
MINE SITE
CAMP LAKE
MARY RIVER
MARY LAKE

SCALE 2.5 1.25 0 2.5 5 7.5 10 km

LEGEND:

- PROJECT FACILITY LOCATION
- QUARRY LOCATIONS
- NORTH RAILWAY
- MILNE INLET TOTE ROAD
- RIVER/STREAM
- POTENTIAL DEVELOPMENT AREA
- LAKE

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	AMH	AS	SRA

NOTES:

1. COORDINATE GRID IS IN KILOMETRES.
   COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N.
2. BASE MAP/IMAGERY: © ESRI AND DATA (ONLINE) SERVICE LAYERS (2017). REDLANDS, CA: ENVIRONMENTAL SYSTEM RESEARCH INSTITUTE. ALL RIGHTS RESERVED.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PROPOSED QUARRY LOCATIONS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/53	3

FIGURE 2.1 REV 1

SAVED: I:\1\02\00\181\53A\GIS\Figs\1832 R1.mxd; Sep 17, 2021 2:01 PM, asimpson

2.7.2 ARD/ML TESTING

Of the 30 planned quarries to be used to construct the North Railway and other Phase 2 Proposal infrastructure, 22 are located in sedimentary rocks (limestone or sandstone), both of which have a high buffering capacity, and present no Acid Rock Drainage (ARD) risk (Hatch Ltd., 2017b; AMEC, 2010). One of the above quarries is sand and gravel, and the remaining seven quarries are in granitic gneiss or diorite, both of which have a low sulphide content, making them unlikely candidates for producing ARD (AMEC, 2010).

Geochemical evaluations completed on quarries along the North Railway are presented in Attachment 9. A total of 76 samples have been analyzed to date (KP, 2007; AMEC, 2010; Hatch, 2017b and 2019), and none of the samples are potentially acid-generating (KP, 2019b). Additionally, most of the samples have low to no potential for Metal Leaching (ML), given the neutral to alkaline nature of the tested material. Though some samples did demonstrate some elevated concentrations of metals above CEQG-PAL (Canadian Council of Ministers of the Environment, 2019), this was primarily under acidic laboratory conditions and is not indicative of field conditions (KP, 2019b).

Results, to date, of geochemical testing for ARD/ML of quarries along the South Railway, indicate that quarry materials have low potential for acid generation and metal leaching (ML) (Baffinland, 2012).

The tested and untested quarries will be subject to additional geotechnical and geochemical investigation as the Project proceeds. Baffinland's Borrow Pit and Quarry Management Plan (Attachment 26) includes an ARD testing protocol as an appendix. Based on geochemical testing completed to date, as well as established protocols for testing prior to quarrying (applicable also to rock cuts), the risk of these activities generating ARD/ML is low. In the unlikely instance that ARD/ML issues are identified at a quarry, Baffinland will avoid using the quarry.

There may be less flexibility if ARD/ML issues are identified at rock cuts. Options to reroute the railway to avoid an ARD/ML rock cut will be considered. If the railway cannot be realigned to avoid a potential ARD/ML rock cut, other mitigation measures will be evaluated to prevent the release of adverse quality runoff. ARD/ML rock excavated from such areas will not be used as embankment fill, and the rock will be disposed of in a suitable fashion (including possible disposal with potentially acid generating (PAG) waste rock in the waste rock stockpile at the Mine Site). Any exposed faces of ARD/ML rock at such rock cuts will be managed according to site specific conditions. Options may range from do-nothing (if exposed faces are limited and/or runoff from the faces is not of adverse quality) to covering the exposed faces with non-PAG/ML material to placing limestone within seepage paths to increase pH of the runoff and precipitate metals (KP, 2018b).

2.7.3 FUTURE QUARRY-SPECIFIC MANAGEMENT PLANS

A Borrow Pit and Quarry Management Plan approved under the current Licence identifies its overarching quarry management practices and principles (Attachment 26). A draft update of this plan for the Phase 2 Proposal is presented as Attachment 26. In accordance with Part D, Item 6 of the Licence, Baffinland will submit individual quarry management plan prior to the development of a selected quarry site, provided that the approved Borrow Pit and Quarry Management Plan does not adequately address the development of a given borrow pit or quarry.

2.8 LAYDOWN AREAS

A total of 32 laydown areas will be established to support construction of the Phase 2 Proposal (Table 2.5). This includes 26 laydown areas to be located along the North Railway, one laydown area at Milne Port, and five laydown areas at the Mine Site. Several laydown areas at Milne Port and the Mine Site have been previously approved. The laydown areas are shown on Figure 2.2 and on the detailed railway figures (Attachment 10).

The laydown areas will be constructed by filling directly over undisturbed ground, including filling in low-lying areas that collect water. The laydown areas will be constructed utilizing blasted rock with granular topping to a total maximum thickness of 1 m. Fill will be sourced from existing quarries and borrow pits and those proposed under this application (Section 2.7).

Table 2.5 Proposed Laydown Areas

Laydown Area	Approximate Location		Area (ha)	Easting	Northing
	Road km	Rail Chainage			
LD-1	Milne Port		3.4	504032	7974598
LD-2	km2.1	CH2200	2.6	504049	7974015
LD-3	km2.7	CH3000	2.0	504492	7973629
LD-4	km3.7	CH4000	2.8	504913	7972741
LD-5	km5.0	CH5700	1.5	505809	7971792
LD-6	km5.6	CH5400	1.0	506309	7971592
LD-7	km11.7	CH12000	1.6	510802	7967353
LD-8	km16.6	CH16400	0.6	514586	7965208
LD-9	km20.9	CH21000	0.4	517314	7961896
LD-10	km30.8	CH31000	1.2	521698	7953050
LD-11	km39.1	CH39000	1.0	522987	7945107
LD-12	km43.7	CH44000	2.5	524033	7940555
LD-13	km52.4	CH529000	2.0	527204	7932775
LD-14	km52.7	CH530000	0.3	527169	7932595
LD-15	km56.6	CH57000	1.7	528177	7928987
LD-16	km56.6	CH57000	1.5	528241	7929131
LD-17	km56.6	CH57000	2.3	528353	7929018
LD-18	km56.6	CH57000	1.7	528318	7929012
LD-19	km57.4	CH58000	1.9	528375	7928223
LD-20	On Rail Line Only		3.5	529262	7916527
LD-21	km74.1	CH84000	2.0	540501	7921431
LD-22	km75.9	CH86000	2.5	542504	7921907
LD-23	km76.8	CH86500	1.5	542999	7921484
LD-24	km76.8	CH86500	0.3	543186	7921431
LD-25	km81.2	CH92000	1.7	547058	7919695
LD-26	km90.9	CH101500	2.5	554771	7914864

Laydown Area	Approximate Location		Area (ha)	Easting	Northing
	Road km	Rail Chainage			
LD-27	km91.2	CH101000	2.8	555311	7914686
LD-28	km92.3	CH102000	1.7	556192	7915289
LD-29	Mine Site		1.5	558174	7914997
LD-30	Mine Site		2.3	560010	7913726
LD-31	Mine Site		1.4	560886	7913354
LD-32	Mine Site		1.7	560829	7913258

2.9 CONSTRUCTION CAMPS

The camps that are currently at Milne Port, along with the construction and operation phase camp occupancies, are presented in Table 2.6.

Table 2.6 Milne Port Camp Occupancies

Camp/Facility	Current	Phase 2 Construction	Phase 2 Operation
Milne Port			
Port Site Complex	120	480	330
Steensby Camp	25	25	0
Construction Camp	386	536	386
Total Beds	531	1041	716
North Railway Temporary Camps			
Camp 1	0	150	0
Camp 2	0	150	0
Total Beds	0	300	0
Mine Site			
Mine Site Complex	210	0	0
Sailiivik Camp	800	800	800
Temporary Construction Camp	0	150	0
Total Beds	1,010	950	800

500,000
510,000
520,000
530,000
540,000
550,000
560,000
570,000
580,000
7,970,000
7,960,000
7,950,000

MILNE INLET
MILNE PORT
LD-01
LD-02
LD-03
LD-04
LD-05
LD-06
PHILLIPS CREEK
LD-07
LD-08
LD-09
LD-10
KM 32 LAKE
LD-11
LD-12
KATIKTOK LAKE
LD-13
LD-14
LD-15
LD-16
LD-17
LD-18
LD-19
LD-20
RAVN RIVER
MURIEL LAKE
DAVID LAKE
LD-21
LD-22
LD-23
LD-24
LD-25
LD-26
LD-27
LD-28
LD-29
LD-30
LD-31
LD-32
CAMP LAKE
MINE SITE
MARY RIVER
MARY LAKE

SCALE 2.5 1.25 0 2.5 5 7.5 10 km

LEGEND:

- PROJECT FACILITY LOCATION
- LAYDOWN AREA LOCATIONS
- NORTH RAILWAY
- MILNE INLET TOTE ROAD
- RIVER/STREAM
- POTENTIAL DEVELOPMENT AREA
- LAKE

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	RAC	AS	SRA

NOTES:

1. COORDINATE GRID IS IN KILOMETRES.
   COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N.
2. BASE MAP/IMAGERY: © ESRI AND DATA (ONLINE) SERVICE LAYERS (2017). REDLANDS, CA: ENVIRONMENTAL SYSTEM RESEARCH INSTITUTE. ALL RIGHTS RESERVED.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PROPOSED LAYDOWN AREA LOCATIONS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/53	3

FIGURE 2.2 REV 1

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The camp components at Milne Port associated with the Phase 2 Proposal (this application) include an expansion of the Port Site Complex (PSC) to 330 beds (210 beds will be relocated from the Mine Site to add to the existing 120 beds). The total number of beds at Milne Port will peak at 1,041 during construction of the Phase 2 Proposal, and this will be reduced to 716 beds during operation with the removal of the Steensby Camp.

Three temporary camps (150 beds each) will be used during the construction of the north railway. These camps will be positioned at Tote Road km 62.8 / rail CH58,300 (Rail Camp 1) and km 79.4 / CH85,300 (Rail Camp 2) and at the Mine Site. The quantities of water required for these camps is within the allowable water draw from Camp Lake under the current Licence. Water will be trucked from approved domestic water sources to storage tanks, with a daily water supply usage of 34 m^3.

Water supply to the camps is discussed in Sections 3.4 and 3.7. Sewage treatment and disposal is discussed in Section 4.7.

2.10 PERMANENT CAMPS

The camps to be added and removed at Milne Port as the result of the Phase 2 Proposal are described in Section 2.9 and in Table 2.6. At the end of the construction phase, two camps will remain: the 386-bed camp that was constructed at Milne Port through a modification request under the current Licence, and the PSC expanded to 330 beds.

An 800-person camp was constructed at the Mine Site in 2018 through a modification request under the current Licence (the approved capacity of camps at the Mine Site is 1,200 beds). This will meet the needs of the 12 Mtpa North Railway operation.

Water supply to the camps is discussed in Sections 3.4 and 3.7. Sewage treatment and disposal is discussed in Section 4.7.

2.11 SEDIMENT AND EROSION CONTROL MEASURES

Baffinland will implement the water management features to convey water around or through the laydown areas. Sediment and erosion control measures to address sedimentation concerns (check dams, rip rap, silt fences, etc.) will be implemented during construction in accordance with Baffinland's Environmental Protection Plan (EPP; Attachment 29) and Surface Water and Aquatic Ecosystem Management Plan (Attachment 22).

Similarly, the quarries proposed as part of the Phase 2 Proposal will have plans for ditches, diversions and ponds (as required) in their respective quarry management plans to be submitted to the NWB prior to their development.

3.0 WATER USE AND MANAGEMENT (PART E)

3.1 OVERVIEW OF CHANGES

As part of the Phase 2 Proposal, Baffinland has revised its proposed water withdrawal sources and volumes with the preparation of a Detailed Water Withdrawal Plan (Sections 3.3 to 3.5 and Attachment 16). Water management at Milne Port will be updated to account for the larger stockpiles and new crusher at the Port (see Section 3.6).

3.2 APPLICABLE MANAGEMENT PLANS

There are two approved management plans that relate to water use and management:

- Surface Water and Aquatic Ecosystem Management Plan
- Freshwater Supply, Sewage and Wastewater Management Plan

Draft updates to these plans, presented as Attachments 22 and 23, are being submitted to the NWB for approval in accordance with Items 1 and 2 of Part E of the Licence.

3.3 CONSTRUCTION PHASE WATER USE

Table 3.1 lists the approved and proposed construction phase water sources and volumes of water to be used for domestic and industrial purposes. An increase in the daily water use from sources supplying Milne Port is proposed, as well as a new source (KM27 Lake) as a potential alternate to KM32 Lake.

Table 3.1 Construction Phase Water Sources

Site	Water Station ID	Source	Authorized Water Use Volume (m^3/day)	Proposed Water Use Volume (m^3/day)
Milne Port (Milne Inlet)	MP-MRY-2	Phillips Creek (summer)	367.5	750
	MP-MRY-2	KM32 Lake		
	WS27.1a,b,c	KM27 Lake	n/a	
Mine Site (Mary River)	Camp Lake	Camp Lake	657.5	No change
Steensby Port (Steensby Inlet)	ST 347 km Lake	ST 347 km Lake	435.8	No change
	3 km Lake	3 km Lake		
Ravn River	Camp Lake	Camp Lake	145.2	No change
Mid-Rail	Nivek Lake (summer)	Nivek Lake (summer)	79.5	No change
	Ravn Camp Lake (winter)	Ravn Camp Lake (winter)		
Cockburn North (Tunnels Camp)	Cockburn Lake	Cockburn Lake	101.4	No change
Cockburn South Camp	Cockburn Lake	Cockburn Lake	111.1	No change

The proposed changes to construction water use have been assessed in the Detailed Water Withdrawal Plan presented as Attachment 16.

Four bridges are proposed on the North Railway, as identified in Table 3.2 and described further in Section 2.5.1 and Attachment 13.8. Bridge construction activities within the streambed (installation of steel pile piers) will be undertaken in winter. Water will be used to construct winter road access onto the streambed and an ice pad on the streambed. This will provide the piling machine with safe access and an adequate working surface within the streambed to install the steel piles.

One-time winter water withdrawals of 2,000 m3 per bridge location (8,000 m^3 in total) will be required to construct the winter roads and working pads. The bridge locations and potential water sources and volumes are presented in Table 3.2.

Table 3.2 Winter Road Construction Water Sources and Volumes

Bridge	Location/Waterbody	Potential Lake Sources	Maximum Volume (m^3)
Bridge #15.913	Phillips Creek northern tributary	KM32 Lake	2,000
Bridge #59.400	Ravn River	Katiktok Lake or Muriel Lake	2,000
Bridge #82.340	Ravn River downstream Muriel Lake	Muriel Lake	2,000
Bridge #98.534	Tom River	Camp Lake	2,000

Winter water withdrawals will be undertaken in accordance with guidance provided in Baffinland's Fresh Water Supply, Sewage and Wastewater Management Plan (Attachment 23) and DFO's guideline for winter withdrawals (DFO, 2011).

3.4 OPERATION PHASE WATER USE

Table 3.3 lists the approved and proposed operation phase water sources and volumes of water to be used for domestic and industrial purposes.

Table 3.3 Operation Phase Water Sources

Site	Water Station ID	Source	Authorized Water Use Volume (m^3/day)	Proposed Water Use Volume (m^3/day)
Milne Port	MP-MRY-2	Phillips Creek	367.5	750
	MP-MRY-3	KM32 Lake	367.5	
	WS27.1	KM27 Lake	n/a	
Mine Site (Mary River)	Camp Lake	Camp Lake	355.4	657.5
Steensby Port	ST 347 km Lake	ST 347 km Lake	243.6	No change
	3 km Lake	3 km Lake		

The same changes to construction water use will be carried forward into the operation phase. This includes increasing the water use at Camp Lake during the operation phase to equal the currently approved volume during construction (657.5 m^3/d).

The proposed changes to operation phase water use have been assessed in the Detailed Water Withdrawal Plan presented as Attachment 16.

Expansions of the potable water treatment plants at Milne Port and the Mine Site will be required over time to meet increased volume requirements (Section 3.7).

3.5 DUST SUPPRESSION WATER USE

Additional dust suppression water sources along the Northern Transportation Corridor are proposed as part of the construction and operation phases of the Phase 2 Proposal. Table 3.4 lists the approved water sources and volumes identified in Table 2-3 of Part E, Item 25 of the Licence, along with the additional water sources and revised daily volumes.

Of the approved water sources, Baffinland proposes to increase the volumes at four sources, CV078, BG50, BG32, and Camp Lake. Thirteen new water sources have been identified. An assessment of the new and revised water sources is presented in Attachment 16 (Detailed Water Withdrawal Plan). All water intakes will be equipped with fish screens in accordance with DFO's fish screen guideline (DFO, 2020), as described in the Fresh Water Supply, Sewage and Wastewater Management Plan (Attachment 23).

3.6 SITE WATER MANAGEMENT

Site water management is described below. Further detail on the management of ore stormwater is provided in Section 4.4, and sewage disposal is described in Section 4.7. Existing site drainage plans require alteration to accommodate the additional infrastructure at both the Mine Site and at Milne Port. Water management plans for the Mine Site and Milne Port are presented as Attachments 14.2 and 15.3, respectively. Changes to the mine water management plan presented as Attachment 14.2 have occurred since the document was prepared; some elements have been constructed and other elements have been superseded by the Mine Site WMP described in Section 1.5.

Water management facilities at the Mine Site will be modified to account for changes to the crusher pad associated with the 12 Mtpa North Rail operation. A new crusher pad will be constructed along with a new stormwater pond. A stream diversion will be required to divert water away from the crusher pad. Fish are not present within the section of stream (referred to as Sheardown Lake Tributary 12 in the FEIS) that will be affected by the diversion. IFC drawings of the crusher and screening pad and pond are included as Attachment 15.1.

Similarly, water management at Milne Port will undergo changes to accommodate larger ore stockpiles and new facilities associated with ore crushing and the North Railway. The proposed new infrastructure at the Milne Port to crush, screen, stockpile and transfer the ore to ships, and associated water management measures, are shown in Attachment 15.

No change to the mine effluent stormwater final discharge points at Milne Port are proposed. An additional ore stormwater pond will result in an additional final discharge point at the Mine Site (Sections 4.4 and 6.2).

Table 3.4 Approved and Proposed Dust Suppression Water Sources

Water Take Station (Source)	Former Water Take Station ID	Coordinates		Authorized Water Use	Proposed Water Use
		Northing (m)	Easting (m)	(m^3/day)	(m^3/day)
MP-MRY-2	MP-MRY-2	7,975,254	502,829	212	1,630
WS9.2	CWP1	7,970,255	507,506	-	880
WS13.3	CWP2	7,967,146	510,978	-	880
WS17.4	CV-128	7,965,895	513,545	579.5	1,870
WS20.5	CWP3	7,963,837	515,248	-	880
WS23.3	CWP4	7,962,497	516,439	-	880
WS27.1	CWP5	7,958,644	518,956	-	2,290
MP-MRY-3	MP-MRY-3	7,953,730	521,543	364	2,750
WS37.0	CV099[1]	7,949,681	521,736	110	880
WS42.0	CWP6	7,944,964	522,956	-	880
WS45.0	CWP7	7,942,167	523,240	-	880
WS47.1	-	7,940,242	523,994	-	880
WS52.9	Katiktok Lake	7,935,964	525,838	318	1,500
WS63.5A	BG50	7,926,846	529,334	150	880
WS63.5B	-	7,926,600	528,950	-	1,000
WS79.9	CV217	7,922,158	542,219	130	1,870
WS80.3	Muriel Lake	7,922,158	542,219	212	880
WS87.7	David Lake	7,919,396	547,885	132	1,540
WS94.0	CWP12	7,915,383	552,300	-	400
WS97.0	CV223	7,914,691	555,818	135	2,200
Camp Lake	Camp Lake	7,914,684	557,793	86	1,000

Note(s):

1. WS37.0 is located on Phillips Creek located near the former CV099 but is on a different waterbody.

Similarly, the quarries proposed as part of the Phase 2 Proposal (Section 2.6) will have plans for ditches, diversions and ponds (as required) in their respective Quarry Management Plans that will be submitted to the NWB prior to their development.

Best management practices are incorporated into the design of these site drainage features in accordance to Part F, Item 27 of the Licence.

3.7 WATER SUPPLY INFRASTRUCTURE

Baffinland built a new water treatment plant at Milne Port for the 380-person camp that the NWB approved in early 2019 (Section 2.9). As part of the Phase 2 Proposal and this application, the existing water treatment plant servicing the Port Site Complex will be upgraded to accommodate the increase in the number of beds from 120 to 330 persons (see the Milne Port water and sewage process flow diagram presented as Attachment 18.2). Details on this component will be submitted to the NWB in the future (Section 9).

As described in Sections 2.9 and 2.10, the 800-bed Sailiivik Camp was constructed at the Mine Site in 2018 as part of the Approved Project. No additional water supply infrastructure at the Mine Site is required as part of this application. A current water and sewage process flow diagram for the Mine Site is presented as Attachment 18.1.Updated Block Flow Diagrams

Updated area water balance block flow diagrams for the Mine Site and Milne Port are included as Attachments 14.3 and 15.4, respectively. Updates to these diagrams will be completed and submitted annually for information to the NWB as part of the annual report in accordance with Part E, Item 10 of the Licence.

4.0 WASTE DISPOSAL AND MANAGEMENT (PART F)

4.1 OVERVIEW OF CHANGES

An expansion of current solid waste management facilities will not be required for the Phase 2 Proposal, however a new landfill will be constructed at Milne Port following construction.

Details regarding the proposed changes are provided below.

4.2 APPLICABLE MANAGEMENT PLANS

Four approved management plans relate to waste disposal and management:

- Waste Management Plan
- Phase 1 Waste Rock Management Plan
- Life of Mine Waste Rock Management Plan
- Hazardous Materials and Waste Management Plan

Draft updates of the Waste Management Plan and Hazardous Materials and Waste Management Plan for the Phase 2 Proposal are presented as Attachments 24 and 25, in accordance with Items 1 and 2 of Part E of the Licence.

4.3 WASTE ROCK

Waste rock management is described in a Phase 1 Waste Rock Management Plan (Attachment 32) and a Life-of-Mine Waste Rock Management Plan (Attachment 33).

Baffinland has identified water quality issues associated with the waste rock facility (WRF) in mid-2017 and has implemented several actions, including the installation of a water treatment plant in June 2018. The runoff water quality issue is being addressed as part of current operations under the conditions of the Licence, including the implementation of an updated Phase 1 Waste Rock Management Plan (Attachment 32). This revised Phase 1 Waste Rock Management Plan addresses both the water quality issues associated with the WRF and the higher production rate associated with the Phase 2 Proposal.

The production of waste rock will be accelerated with the development of Phase 2. The Key Facts table (Appendix C of TSD 2 Project Description) provides an updated waste rock production schedule.

4.4 ORE STOCKPILE STORMWATER

Larger stockpiles and rail loading/unloading facilities at both the Mine Site and Milne Port will necessitate additional water management features to be installed. A discussion of Milne Port and the Mine Site is provided below.

At Milne Port, the existing stormwater ponds collecting runoff from the ore stockpile area include Stormwater Ponds No. 1/1A, No. 2, and No. 3. These ponds will be insufficient to contain the larger volume of runoff associated with the larger ore stockpiles. Ditching along the east and west perimeter of the lump ore stockpile will contain runoff from the lump ore stockpile. The perimeter ditching will have sumps and the effluent will be discharged by pumping at the current effluent discharge point at Milne Inlet, provided it

meets discharge criteria. Two other ponds (Stormwater Ponds No. 4 and 5) will be constructed near the crusher feed stockpile and the fines stockpile and will discharge to Milne Inlet via the final discharge points associated with the existing stormwater ponds.

At the Mine Site, current road haul stockpiles will be expanded for the North Railway adjacent to the present location and will have a new stacking conveyor and rail loading facility. A new stormwater pond for the primary crushing pad will be constructed. A new stormwater discharge pipeline will be installed to join the new stormwater pond to the combined stormwater and sewage outfall. No change to the outfall location is proposed. Once the North Railway crusher pad and pond are operational, the existing crusher pad and stormwater pond associated with the ERP operation will be decommissioned.

4.5 WASTE GENERATION AND SOLID WASTE MANAGEMENT FACILITIES

Baffinland currently operates a landfill at the Mine Site and incinerators at both the Mine Site and Milne Port. Table 4.1 identifies the existing solid waste management facilities, and modifications or additions required for the Phase 2 Proposal. A new landfill will be constructed in the exhausted Quarry Q1 at Milne Port following completion of construction activities.

Table 4.1 Modifications and Additions to Existing Solid Waste Management Facilities

Location/Facility	Modification or Addition
Milne Port	
Incinerators	No modification required
Landfill (new)	A landfill will be constructed within the boundaries of Quarry Q1 at Milne Port following construction of the Phase 2 Proposal
Northern Transportation Corridor	
Construction camps	All solid wastes will be transported to existing facilities at the Mine Site or Milne Port for disposal
Mine Site	
Incinerator	No modification required
Landfill	No change; in 2018 the existing landfill reached its initial design capacity, and a modification request was submitted to and approved by the NWB for the staged expansion to the landfill. This proposed expansion will be sufficient to accommodate the Phase 2 Proposal.

During construction, most waste generated by the mobile rail construction camps will be non-hazardous and combustible, and, will be directed to one of the existing incinerators at the closer of Milne Port or the Mine Site. Waste will be collected from the camps regularly to not accumulate significant volumes of waste that may attract wildlife. Non-hazardous waste not suitable for incineration generated by the mobile camps will be directed to the landfill at the Mine Site, as the new landfill at Milne Port will not be constructed right away.

The facilities for the storage of hazardous waste will remain unchanged. Any hazardous wastes generated at the camps will be transported to existing hazardous waste storage facilities at Milne Port or the Mine Site. Hazardous waste will be shipped off site for disposal at licenced facilities. Handling, storage and

transportation of these wastes will be in accordance with the Transportation of Dangerous Goods Regulations (Transport Canada, 2017).

The expected volumes of waste generated including disposal method, are provided in Table 4.2.

Table 4.2 Projected Waste Quantities

Project Site	Type of Waste	Disposal Method	Volume
Mine Site	Treated sewage	Land discharge reporting to the Mary River	360 m^3/day
	Combustible non-hazardous waste	Incineration	1,100 m^3/year
	Non-combustible non-hazardous waste	Landfill	7,500 m^3/year
Milne Port	Treated sewage	Land discharge reporting to Milne Inlet	240 m^3/day
	Combustible non-hazardous waste	Incineration	1,100 m^3/year
	Non-combustible non-hazardous waste	Landfill	7,500 m^3/year
	Hazardous waste	Storage and disposal at licenced facility and shipped off site	1,200 m^3/year
Temporary Camps	Treated sewage	Stored and trucked to Mine Site or Milne Port sewage treatment plant	34 m^3/day
	Combustible non-hazardous waste	Trucked to Mine Site or Milne Port Incinerator	192 m^3/year

As with its current operations Baffinland will continue to make efforts to minimize waste by reusing and repurposing equipment and materials when possible.

4.6 OILY WATER TREATMENT FACILITY

Baffinland operates oily water treatment units as part of the truck wash facilities located within the maintenance facilities at both the Mine Site and Milne Port.

Rail maintenance facilities (rail workshop and locomotive workshop) will be added at Milne Port (Attachments 11.6 and 11.7). The facilities will be consistent with the design of oily water treatment facilities at the Mine Site. The oily treatment facility will collect oily water from the workshops and areas that may have come into contact with grease, oil or fuel. Discharges from the oily water treatment facility will meet effluent quality limits prescribed in the Licence in Table 6 (Part F, Item 20 and Table 3.11 of the FWSWMP).

4.7 SEWAGE DISPOSAL

Water and sewage schematics for the Mine Site and Milne Port are presented as Attachments 18.1 and 18.2.

The Mine Site currently has one Membrane Biological Reactor (MBR) Sewage Treatment Plant (STP) operational that services the Sailiivik Camp. Treated sewage effluent from the camp will continue to be land discharged at the same location, reporting to Mary River. The existing treated sewage effluent pipeline and outfall is shown on Figure 1.4.

Two MBR STPs currently operate at Milne Port: STP#1 services the Port Site Complex (PSC) and STP#3 services the 386-bed camp. To support construction, a third plant (STP#2) that previously serviced the Mine Site Complex (MSC) will be relocated to Milne Port when the MSC buildings will be combined with the Port Site Complex (PSC). At the end of the construction phase, Baffinland expects to remove the 386-bed camp from site along with STP#3. Treated effluent will be monitored to ensure it meets applicable discharge criteria as specified in the Licence Part 5, Item 18, Table 5 prior to discharge. Treated sewage effluent will be discharged to Milne Inlet from the final discharge point shown on Figure 1.3, and Attachment 18.3).

The existing and planned sewage treatment plants at both Milne Port and the Mine Site will have sufficient capacity to treat the sewage from the temporary camps. Sewage will be held in holding tanks and then transported by truck to one of the sewage treatment plants at Milne Port or at the Mine Site. Waste will be trucked regularly to the incinerator at either Milne Port or the Mine Site. Sewage holding tank details are provided as Attachment 18.4.

4.8 LANDFILL AT MILNE PORT

The proposed landfill at Milne Port will be constructed within the exhausted Quarry Q1 following construction, as shown on Figure 1.3. The Milne Port landfill will be designed based on the design of the existing landfill at the Mine Site (KP, 2008) and consistent with the *Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories* (Ferguson, Simek Clark, 2003). As with the existing landfill at the Mine Site, the new landfill at Milne Port will only receive non-hazardous waste that cannot be incinerated. The area method will be used for waste disposal wherein a low height berm will be constructed along up to two sides of the landfill site (or alternatively against a quarry face), and then waste will be disposed of against the berms and directly onto the ground downstream of the berms. Sand and gravel will be used as the cover material. In order to achieve permafrost encapsulation in the landfill following closure, the final cover will be thicker than the active layer. Appropriate surface water, erosion and sediment control measures will be implemented during operations. The landfill is not expected to significantly change the quality of surface waters in the area due to the inert nature of the waste and small landfill footprint. Because the landfill will be positioned within a rock quarry, no groundwater monitoring is proposed.

A design report including an operations and maintenance manual will be submitted to the NWB in approximately June 2020 in accordance with Part G of the Water Licence.

4.9 RAIL CONSTRUCTION SOIL SPOILS

The railway will be constructed using a combination of cut and fill, with material gained from cuts filling the lower lying areas along the alignment. Most cuts will be into rock, to minimize cuts in soils, particularly ice-rich soils, to avoid inducing thermal changes and causing geotechnical instability issues. Soil spoils generated at the Milne Port will be placed in designated areas, as shown on Figure 1.3. Soil spoils generated during railway construction along the alignment will be disposed of in quarries, which are shown on the detailed railway figures (Attachment 10).

Table 4.3 provides a breakdown of the estimated volume of soil spoils generated in 10 km increments. An estimated 1.85 Mm^3 of soil spoils will be generated during construction of the North Railway; approximately 960,000 m^3 of soil spoils will be generated along the rail alignment and approximately 880,000 m^3 will be generated during quarry development. Approximately 230,000 m^3 of the

material along the proposed railway alignment is classified as Type 1, which consists of all soft waste that is not suitable for fill and may be susceptible to creep or flow (i.e., ice rich soils in summer, soils with high silt/clay content, etc.). The remaining 730,000 m^3 (approx.) of material will be frozen material or bedrock that will require drilling and blasting before excavation.

Table 4.3 also summarizes the proposed soil spoil disposal sites (borrow areas and quarries). There is approximately 5.5 Mm^3 of available storage and therefore it is expected that all the soil spoils generated along the railway can be placed in borrow pits and quarries. This approach will most likely avoid the use of dedicated disposal sites that would occupy additional land.

The soil spoils will require disposal at locations and in a manner that does not result in runoff of sediment-laden water. The following disposal criteria will be applied to reduce the potential for sediment laden runoff to report to water bodies and to ensure long-term stability of these materials:

- Soil spoils will be placed in designated locations at the Milne Port and in exhausted quarries and borrow pits along the Tote Road. Historic quarries and borrow areas represent an existing disturbed footprint with limited future use and potential instability due to alterations of the existing thermal gradient. As such, these sites are ideal for soil spoil storage, provided they will not be used for other purposes during construction.
- In all instances, as a standard condition of land-use approvals, disposed overburden materials will be placed >31 m from a surface water body.
- Disposal locations will be approved by the appropriate construction personnel (i.e., engineer, construction superintendent, foreman, etc.) who have been given such authority, to avoid unauthorized and indiscriminate disposal.
- Disposal locations will be located well away from the railway embankment.
- Stockpiles will be designed with minimal slopes that are physically stable.
- Overburden spoils generated during construction will not be re-used without prior approval by the supervising engineer.
- Overburden soils will be transported directly to the disposal site, without short-term storage and re-handling.

Sediment and erosion control measures will be implemented as identified in the Surface Water and Aquatic Ecosystem Management Plan (Attachment 22) to prevent runoff of sediment and to possibly divert runoff away from the disposed material.

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TABLE 4.3

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT - PHASE 2 PROPOSAL

UPDATED APPLICATION FOR AMENDMENT NO.2 OF TYPE A WATER LICENCE 2AM-MRY1325
SOIL SPOILS GENERATION AND STORAGE SUMMARY

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Chainage (km)	Spoil Volume Generation				Spoil Volume Storage			Additional Storage Requirement (m^3)
	Railway - Type 1 Excavation[2] (m^3)	Railway - Type 2 Excavation[3] (m^3)	Quarry - Type 1/2 Excavation (m^3)	Total Spoils Generated[4] (m^3)	Available Borrow Storage[5] (m^3)	Available Quarry Storage[6] (m^3)	Total Available Spoils Storage (m^3)	
Port Site (0)[7]	34,000	136,000	0	170,000	93,899	0	93,899	76,101
0 to 10	77,127	71,973	6,699	155,799	67,139	1,017,173	1,084,312	0
10 to 20	6,530	47,925	63,562	118,016	56,181	96,962	153,143	0
20 to 30	9,567	39,553	44,053	93,173	56,645	233,079	289,724	0
30 to 40	15,120	67,101	69,124	151,345	0	54,478	54,478	96,867
40 to 50	10,557	49,845	55,086	115,487	0	458,560	458,560	0
50 to 60	11,468	40,970	75,149	127,586	29,857	518,767	548,624	0
60 to 70	1,858	11,654	195,540	209,052	102,897	749,117	852,014	0
70 to 80	6,865	38,144	87,549	132,559	14,664	1,140,654	1,155,318	0
80 to 90	4,328	15,066	71,306	90,699	0	0	0	90,699
90 to 100	20,404	121,521	84,489	226,414	155,819	284,905	440,724	0
100 to 110	15,369	91,387	78,203	184,958	0	345,485	345,485	0
Mine Site (110)	18,825	0	51,237	70,062	0	0	0	70,062
TOTAL	**232,016**	**731,138**	**881,996**	**1,845,150**	**577,101**	**4,899,180**	**5,476,281**	**333,729**

I:\1\02\00181\53\A\Data\Work Files\WF01 - Soil Spoils Volume Estimates\[Soil Spoils Disposal Summary - For Report 3 Rev 0.xlsx]Table 4.3- Spoil Summ

NOTES:

1. ALL SOIL SPOIL STORAGE LOCATIONS ARE WITHIN THE SAME 10 km INCREMENT AS THE SOILS SPOIL GENERATION ESTIMATE.
2. TYPE 1 EXCAVATION CONSISTS OF ALL SOFT WASTE THAT IS NOT SUITABLE FOR FILL AND MAY BE SUSCEPTIBLE TO CREEP OR FLOW (I.E. ICE RICH SOILS IN SUMMER, SOILS WITH HIGH SILT/CLAY CONTENT, ETC.).
3. TYPE 2 EXCAVATION CONSISTS OF ALL WASTE THAT IS NOT SUITABLE FOR FILL AND IS DRILLED AND BLASTED, INCLUDING ICE RICH SOILS IN THE WINTER MONTHS.
4. REQUIRED SPOIL VOLUME AT PORT SITE AND BY CHAINAGE PROVIDED BY HATCH VIA EMAIL ON APRIL 8, 2019.
5. AVAILABLE STORAGE AREA AT PORT PROVIDED BY HATCH VIA EMAIL ON APRIL 8, 2019. AVAILABLE STORAGE AREA ALONG TOTE ROAD ESTIMATED BY KP. AVAILABLE STORAGE VOLUME ESTIMATED BY KP, ASSUMING EACH AREA IS 1 m DEEP.
6. AVAILABLE STORAGE AREA ESTIMATED BY KP BASED ON CURRENT INFORMATION. AVAILABLE STORAGE VOLUME ESTIMATED BY KP, ASSUMING EACH AREA IS 1 m DEEP.
7. TOTAL EXCAVATION VOLUME PROVIDED. 20% ASSUMED TO BE TYPE 1 EXCAVATION AND 80 % ASSUMED TO BE TYPE 2 EXCAVATION, BASED ON REVIEW OF QUANTITIES ALONG RAILWAY.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
1	17SEP'21	ISSUED WITH REPORT NB102-181/53-3	CWM	CAP

5.0 EMERGENCY RESPONSE AND CONTINGENCY PLANNING (PART H)

5.1 OVERVIEW OF CHANGES

Changes to the Project relevant to emergency response and contingency planning include the addition of two 15 ML fuel tanks to the planned Mine Site fuel farm that will be constructed under the current Licence. Temporary explosives storage facilities will also be placed at key locations along the North Railway.

5.2 APPLICABLE MANAGEMENT PLANS

The following management plans relate to emergency response and spill contingency measures:

- Emergency Response Plan
- Spill Contingency Plan
- Oil Pollution Emergency Plan (OPEP)
- Railway Emergency Response Plan

The first two plans are regulated under the Licence. Updates to the first two of these plans for the Phase 2 Proposal are presented as Attachments 21 and 22; these are submitted to the NWB for approval in accordance with Item 1 of Part H of the Licence. A Railway Emergency Response Plan was recently prepared by Baffinland for the North Railway.

5.3 FUEL TANKS

Under the current Licence, Baffinland constructed a second fuel tank farm and a 15 ML tank at the Mine Site. The fuel tank farm was built to accommodate a second 15 ML fuel tank and a third 8.2 ML tank as part of the Phase 2 Proposal, bringing the Mine Site fuel storage capacity to 38.2 ML. Details regarding the expansion of Mine Site fuel storage is provided in Section 2.8 of the Project Description. IFC Drawings for the second 15 ML tank at the Mine Site tank farm are provided as Attachment 17. Drawings for the 8.2 ML tank will be submitted to the NWB as a construction notification prior to its construction.

Mobile fuel trucks will supply fuel to the construction camps along the northern transportation corridor. Mobile double-walled fuel tanks will also be positioned at laydown areas or near construction work fronts during rail construction.

5.4 EXPLOSIVES MANUFACTURING AND STORAGE

Phase 2 requires the expansion of ammonium nitrate storage and explosives magazine storage facilities to support rail construction. Temporary storage of magazines will be required at three locations along the northern transportation corridor. This includes magazine storage facilities at km 13, km 48.9, and km 75. Existing magazine storage facilities are located at km 7, km 63, and km 97. Table 5.1 outlines the maximum cumulative quantities of explosives and ammonium nitrate Baffinland intends to store at the Mary River Project, including the quantities needed to support construction of the Phase 2 Proposal.

Table 5.1 Maximum Cumulative Quantities of Explosives and Ammonium Nitrate

Storage Location	Material	Purpose	Storage Container	Maximum Quantity (kg)
Milne Port	AN	Temporary storage between unloading and transport to km97 storage	Seacans	15,000,000
km 7 (existing/proposed)	Prepackaged explosives, boosters, detonators	Store explosives and hardware	Magazines/Bulk Truck	6,000/10,000
Explosives Area No. 1 - km 13 (proposed)			Magazines	200,000
Explosives Area No. 2 - km 52.4 (proposed)			Magazines	200,000
Explosives Area No. 3 - km 59.3 (proposed)			Magazines	200,000
Explosives Area No. 4 - km 63 (existing)			Magazines	300,000
Explosives Area No. 5 - km 78.2 (proposed)			Magazines	200,000
Explosives Area No. 6 - km 97 (existing)	AN	Storage for plant	Seacans	15,000,000
Mine site (existing)	Prepackaged	Open pit mining	Magazines	132,000
	Emulsion	Open pit mining	ISO tank in plant	35,000
	Detonators	Open pit mining	Magazines	110,000 units
	AN	Emulsion manufacture	Totes on plant conveyor	8,000
			Seacans	200,000
Explosives trucks (2)	Emulsion	Rail construction	Explosives truck	10,000
Explosives trucks (2)	Emulsion	Open pit mining		10,000
	AN			4,000

A heating facility for emulsion trucks will also be constructed south of Milne Port. The heating facility does not include a wash bay, therefore there is no anticipated contact with water and the trucks while within the building. The location of these features is shown on the North Railway detailed figures in Attachment 10.

6.0 GENERAL AND AQUATIC EFFECTS MONITORING (PART I)

6.1 APPLICABLE MANAGEMENT PLANS

The following management plans relate to monitoring:

- Aquatic Effects Monitoring Plan (AEMP)
- Environmental Protection Plan (EPP)
- Fresh Water Supply, Sewage and Wastewater Management Plan
- Surface Water Sampling Program - Quality Assurance and Quality Control (QA/QC) Plan

The AEMP is designed to monitor the aquatic ecosystem in the immediate area of the Mine Site that may be affected by multiple stressors (i.e., effluent discharges, dust deposition, sedimentation). The Phase 2 Proposal does not meaningfully change the footprint and hence the potentially affected aquatic receiving environment. Therefore, the AEMP is expected to be adequate as is to continue to monitor the effects of the Project on the aquatic environment without meaningful changes. Draft updates of the first two of these plans for the Phase 2 Proposal are presented as Attachments 27 and 28. The Fresh Water Supply, Sewage and Wastewater Management Plan is presented as Attachment 23. The Surface Water Sampling Program QA/QC Plan, which is unchanged for the Phase 2 Proposal, is presented as Attachment 31.

6.2 POTENTIAL NEW MONITORING STATIONS

Baffinland has identified that changes will be required to Part I of the Licence and its accompanying Schedule I as a result of the Phase 2 Proposal. Tables 6.1 and 6.2 identifies the new infrastructure for which Baffinland anticipates monitoring stations may be required in an amended Licence for Milne Port and the Mine Site, respectively. These additional stations would need to be incorporated into Tables 13 to 15 in Schedule I.

Not included in Table 6.1 are monitoring stations that will need to be established downgradient of the various new quarries. These monitoring stations will be identified in future quarry-specific management plans developed and filed with the NWB in accordance with Part D, Item 6.

In accordance with Part I, Item 6, Baffinland will confirm the locations of newly proposed monitoring stations through GPS coordinates with an inspector. Signs will also be posted to identify the new monitoring stations in accordance with Part I, Item 9 of the Licence.

Existing and proposed SNP monitoring stations at Milne Port and the Mine Site are shown on Figures 6.1 and 6.2, respectively. Additions and modifications to the SNP are shown in green. New stations are proposed at new water management facilities and a new camp water supply at Milne Port (Table 6.1 and Figure 6.1). There are no new SNP stations proposed at the Mine Site, as no new water management facilities are required (Table 6.2 and Figure 6.2).

Table 6.1 Proposed Revisions to the Milne Port SNP Stations

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MP-MRY-2	Freshwater Intake at Phillips Creek (Summer)	Regulated	Construction Operations Closure	Group 1	Record Daily Report Monthly	Unchanged
MP-MRY-3	Freshwater Intake from KM32 Lake	Regulated	Construction Operations Closure	Group 1	Record Daily Report Monthly	KM32 Lake is used as a year-round source of water
WS27.1a,b,c	Freshwater Intake from KM27 Lake	Regulated	Construction Operations Closure	Group 1	Record Daily Report Monthly	New station
MP-01 MP-01B	Milne Port Sewage Treatment Facilities	Regulated	Construction Operations	Groups 1, 2	Monthly	No change
				Group 3	Annually	
MP-01A	Milne Port Polishing Waste Stabilization Pond (PWSP)	Regulated	Construction Operations	Groups 1, 2	Once prior to discharge and monthly	No change
				Group 3	Annually	
MP-02	Milne Port Maintenance Shop Oily Water / WWTF	Regulated	Construction Operations	Groups 1 and 4	Monthly	No change
MP-03	Milne Port Bulk Fuel Storage Facility Stormwater	Regulated	Construction Operations	Groups 1~~, 4~~ and 5	Daily Flow Monthly	No change; monitoring parameters should not include Group 4
MP-04	Milne Port Landfarm Facility Stormwater	Regulated	Construction Operations Closure	Groups 1 and 5 ~~Plus TSS~~	Daily Flow Monthly	No change; TSS is included in the Group 5 monitoring group

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MP-04A	Milne Port Contaminated Snow Dump	Regulated	Construction Operations Closure	Groups 1 and 5	Monthly	Active station not currently included in water licence Table 13
MP-05	Milne Port Ore Stockpile Sedimentation Pond (East)	Regulated	Construction Operations	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MP-06	Milne Port Ore Stockpile Settling Pond (West)	Regulated	Construction Operations	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MP-07	Milne Port Ore Stockpile Stormwater Pond No. 3	Regulated	Construction Operations	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MP-08	Milne Port Ore Stockpile Stormwater Pond No.4	Regulated	Construction Operations	Groups 1 and 7	Monthly during summer	New station at ore crusher feed stockpile stormwater pond
				Group 3	Annually	
MP-09	Milne Port Ore Stockpile Stormwater Pond No.5	Regulated	Construction Operations	Groups 1 and 7	Monthly during summer	New station at ore fines stockpile stormwater pond
				Group 3	Annually	
MP-10A	Lump Ore Stockpile Perimeter Ditching East	Verification	Construction Operations	Groups 1 and 7	Monthly during summer	New perimeter ditching pond - not a final discharge point
				Group 3	Annually	
MP-10B	Lump ore stockpile perimeter ditching West	Verification	Construction Operations	Groups 1 and 7	Monthly during summer	New perimeter ditching pond - not a final discharge point
				Group 3	Annually	
MP-11	Milne Port Rail Maintenance Shop Oily Water/WWTF	Regulated	Construction Operations	Groups 1 and 4	Monthly	New oily water treatment facility

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MP-12	Milne Port Landfill	Regulated	Construction Operations Closure	Groups 1 and 6	Daily Monthly	New station; final location to be determined
MP-C-A	Surface discharge downstream of construction area at Milne Port	Verification	Construction	Groups 1 and 8	During periods of flow and following significant precipitation events, on a monthly basis	No change
MP-C-B						
MP-C-D						
MP-C-E						
MP-C-F						
MP-C-H						
MP-C-J						
MP-C-K						

Note(s):

1. Baffinland recommends the addition of SNP Station MP-04a, as the contaminated snow dump is a containment area separate from the landfarm.

Table 6.2 Proposed Revisions to the Mine Site SNP Stations

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MS-MRY-1	Freshwater Intake from Camp Lake	Regulated	Construction Operations Closure	Group 1	Record daily	No change
MS-01 MS-01B	Mine Site Sewage Treatment Facilities	Regulated	Construction Operations	Groups 1 and 2	Monthly	No change
				Group 3	Annually	
MS-01A	Mine Site Polishing/Waste Stabilization Pond (PWSP)	Regulated	Construction Operations	Groups 1 and 2	Once prior to discharge and monthly thereafter	No change; not yet constructed
				Group 3	Annually	
				Group 3	Annually	
MS-02	Mine Site Maintenance Shop Oily Water WWTF	Regulated	Construction Operations	Groups 1 and 4	Monthly	No change
MS-MRY-04	Exploration Camp Sewage Treatment Facility	Regulated	Construction Operations Closure	Groups 1 and 2	Monthly	No change
				Group 3	Annually	
MS-MRY-4A MS-MRY-4B MS-MRY-4C	Exploration Camp Polishing/Waste Stabilization Ponds (PWSP)	Regulated	Construction Operations	Groups 1 and 2	Once prior to discharge and monthly thereafter	No change
				Group 3	Annually	
MS-03 MS-03B	Mine Site Bulk Fuel Storage Facility Stormwater	Regulated	Construction Operations	Groups 1 and 5	Daily flow monthly	No change
MS-04	Mine Site Fuel Unloading Station Stormwater	Regulated	Construction Operations	Groups 1 and 5	Daily flow monthly	No change
MS-05	Mine Site Landfarm Facility Stormwater	Regulated	Construction Operations	Groups 1 and 5 plus TSS	Daily flow monthly	No change; not constructed yet
MS-05A	Mine Site Contaminated Snow Dump	Regulated	Construction Operations	Groups 1 and 4	Monthly	New station; not constructed yet

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MS-MRY-6	Exploration Camp Bulk Fuel Storage Facility (Bladder Farm) Stormwater	Regulated	Construction Operations	Groups 1 and 5	Daily flow monthly	No change
MS-06	Ore Stockpile Pond Stormwater	Regulated	Operations Closure	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-07	Run of Mine Ore Stockpile Pond Stormwater	Regulated	Operations Closure	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-08	Waste Rock Stockpile West Pond	Regulated	Operations Closure	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-09	Waste Rock Stockpile East Pond	Regulated	Operations Closure	Groups 1 and 7	Monthly during summer	No change; not constructed yet
				Group 3	Annually	
MS-10	SDLT-1 Pond Ore Stockpile Stormwater	Regulated	Operation	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-11	KM105 Pond Stormwater	Regulated	Operation	Groups 1 and 8	Monthly during summer	No change
MS-12	Weatherhaven Camp Stormwater	Regulated	Operation	Groups 1 and 8	Monthly during summer	No change
MS-13	Explosives Magazine Pond	Regulated	Operation	Groups 1 and 8	Monthly during summer	No change
MS-14	Quarry QMR2 Pond/Sump	Regulated	Operation	Groups 1 and 8	Monthly during summer	No change
MS-MRY-09	Deposit No.1 surface water drainage	Verification	Construction Operations	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-MRY-10	Deposit No.1 surface water drainage	Verification	Construction Operations Closure	Groups 1 and 7	Monthly during summer	No change
				Group 3	Annually	
MS-MRY-13A & MS-MRY-13B	Mine Site Non-Hazardous Waste Landfill Facility - Downstream Surface Water Drainage	Verification	Construction Operations Closure	Groups 1 and 6	Daily Monthly	No change

SNP Station	Description	Category	Project Phases	Monitoring Parameters	Frequency	Status and Proposed Changes for Phase 2 Proposal
MS-C-A	Surface discharge downstream	Verification	Construction	Groups 1 and 8	During periods of flow and following significant precipitation events, on a monthly basis	No change
MS-C-B						
MS-C-C						
MS-C-D						
MS-C-E						
MS-C-F						
MS-C-G						
MS-C-H						

SAVED: I:\1\02\00181\53\A\Acad\FIGS\B18 R1, 9/8/2021 4:19:02 PM , ASIMPSON PRINTED: 9/17/2021 2:18:29 PM, Layout1, ASIMPSON
XREF FILE(S): X-B-SI~~-MONI-LOCA-2019; X-N-TOPO-BASE-LAND-USE~~CLAS; C-PH02-YR21-MILNE-PORT; X-C-TOPO-MILN-INDEX IMAGE FILE(S):

502 500 E
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503 500 E
504 000 E
504 500 E
7 977 000 N
7 976 500 N
7 976 000 N
7 975 500 N
7 975 000 N

MILNE INLET
PHILLIPS CREEK

SHIPLOADER NO. 2
CAPE-SIZE ORE DOCK NO. 2
ORE DOCK NO. 1
SHIPLOADER NO. 1
FREIGHT DOCK
BARGE RAMP
MARINE FUEL MANIFOLD BUILDING
SEWAGE EFFLUENT PIPE DISCHARGE
HTO CABIN
STORMWATER POND NO. 2
STORMWATER POND NO. 2A
STORMWATER POND NO. 1A
STORMWATER POND NO. 1
STORMWATER POND #3
NEW CONVEYOR BERM
FINE ORE STOCKPILES
LUMP ORE STOCKPILES
EASTERN CLEARWATER POND
PORT SITE WEATHERHAVEN CAMP
PORT SITE COMPLEX
PSC EXPANSION
LAYDOWN LP-2
FUEL TANK FARM
SERVICE AREA
TREATED SEWAGE EFFLUENT PIPELINE
LAND FARM
SNOW DUMP
QUARRY Q1 EXTENTS
MAINT. BUILDING
SPOILS DISPOSAL LOCATION 1
SUMMER WATER SUPPLY FROM PHILLIPS CREEK
380 PERSON CAMP
LAYDOWN W10A AND W10B
ROTARY CAR DUMPER
RAILYARD AND WORKSHOP
SOUTHERN BYPASS
STORMWATER POND #4
CRUSHING FEED STOCKPILE
CRUSHING AND SCREENING PLANT
ORE TRANSFER TOWER
TRANSFER CONVEYOR
FINES STOCKPILE AREA
LAYDOWN LP-7
STORMWATER POND #5
FUEL CONTAINMENT BERM
HAZARDOUS WASTE BERM
MAINTENANCE BUILDING
MAINTENANCE BUILDING
TREATED SEWAGE EFFLUENT PIPELINE
LANDFILL
TOTE ROAD (OLD ALIGNMENT)
SPOILS DISPOSAL LOCATION 2
POLISHING WASTE STABILIZATION POND
ACCOMMODATION COMPLEX
WASTE MANAGEMENT BUILDING
SEWAGE TREATMENT FACILITY

MP-C-A
MP-C-B
MP-C-D
MP-C-E
MP-C-F
MP-C-H
MP-C-J
MP-C-K
MP-01
MP-01A
MP-02
MP-03
MP-04
MP-04A
MP-05
MP-06
MP-07
MP-08
MP-09
MP-10A
MP-10B
MP-11
MP-12
MP-MRY-2
MP-HWB-1
MP-HWB-2
MP-HWB-3
MP-HWB-4
PWSP-No. 1

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED MILNE PORT INFRASTRUCTURE PROVIDED BY HATCH MAY 25, 2018.
4. CONTOUR INTERVAL IS 2.5 m.

LEGEND:

- WATER
- SPOILS DISPOSAL LOCATION
- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- WASTE STORAGE AREA
- ROAD
- REGULATED SURVEILLANCE NETWORK PROGRAM (SNP) STATION
- VERIFICATION SNP STATION
- COMMERCIAL LEASE BOUNDARY
- PROJECT DEVELOPMENT AREA (PDA)
- PDA EXPANSION FOR PHASE 2 PROPOSAL
- FORESHORE LEASE BOUNDARY / MARINE PDA
- RIVER/STREAM/DRAINAGE
- TREATED SEWAGE EFFLUENT PIPELINE

SCALE A: 100 50 0 100 200 300 400 500 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	RAC	AS	SRA

BAFFINLAND IRON MINES CORPORATION

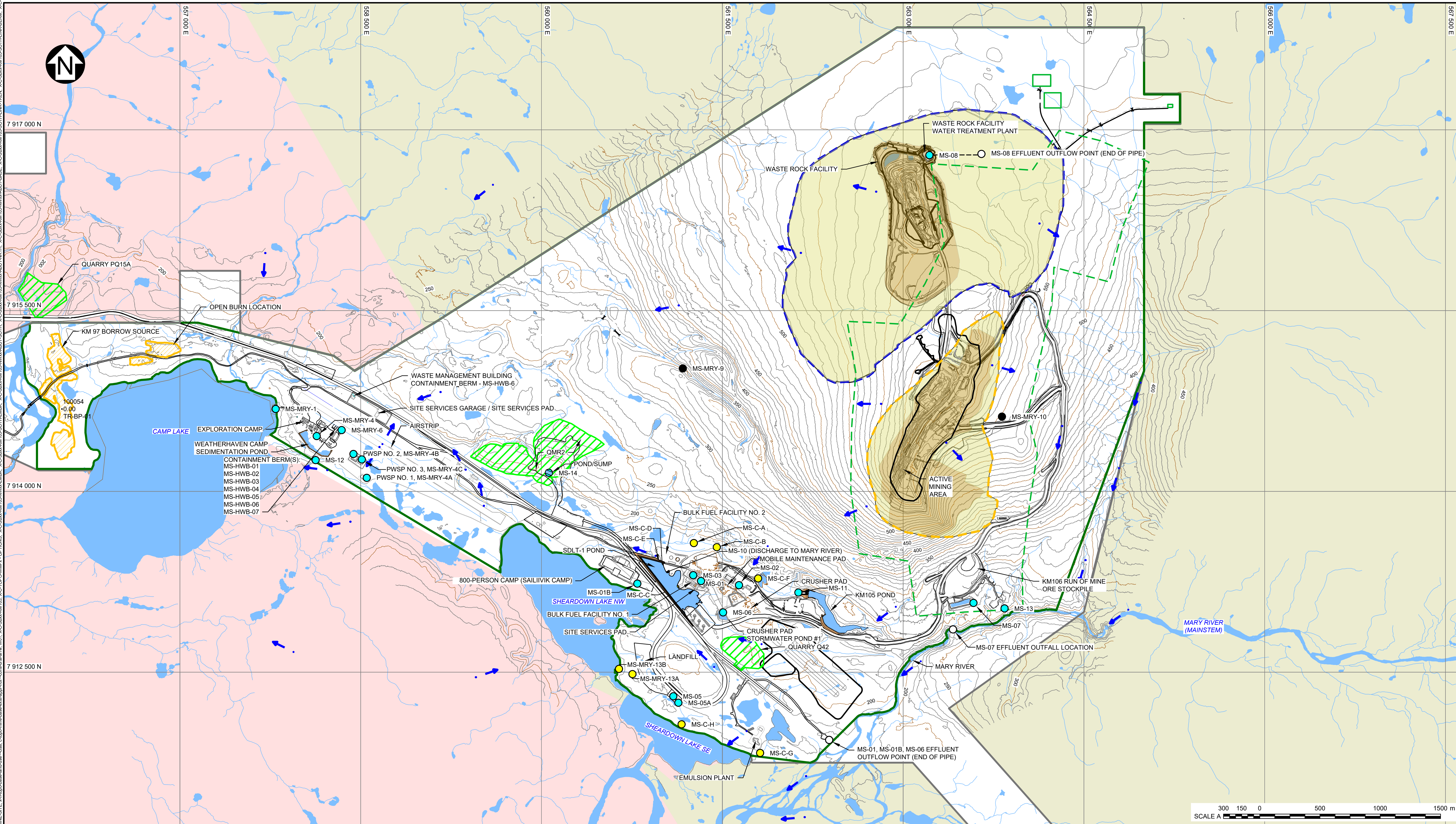
MARY RIVER PROJECT

PHASE 2 PROPOSAL MILNE PORT LAYOUT SHOWING WATER LICENCE MONITORING STATIONS

Knight Piésold CONSULTING

P/A NO. NB102-181/53 | REF NO. 3

FIGURE 6.1 | REV 1



LEGEND:

- EXISTING BORROW AREA
- QUARRY
- INUIT OWNED LAND SURFACE AND SUBSURFACE
- INUIT OWNED LAND SURFACE ONLY
- WATER
- QIA SURFACE COMMERCIAL LEASE BOUNDARY
- POTENTIAL DEVELOPMENT AREA BOUNDARY
- ULTIMATE DEPOSIT NO. 1 PIT LIMITS
- ULTIMATE WASTE ROCK STOCKPILE LIMITS
- CONTOUR
- REGULATED SURVEILLANCE NETWORK PROGRAM (SNP) STATION
- VERIFICATION SNP STATION
- INACTIVE SNP STATION
- EFFLUENT OUTFLOW POINT (END OF PIPE)
- DRAINAGE DIRECTION

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. DETAILED WATER FROM EAGLE MAPPING (2005). CONTOUR PROVIDED BY BAFFINLAND (2019) INTERVAL IS 10 m.
3. CURRENT MINE AREA FROM THE WASTE DUMP TO THE CRUSHER PAD, AND DITCHES ALONG THE HAUL ROAD PROVIDED BY BIM (MARCH 12, 2018).
4. ALL OTHER SITE INFRASTRUCTURE PROVIDED BY HATCH (AUGUST 2, 2016). AND SIMPLIFIED BY KP STAFF (JAN, 2018).

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	17SEP'21	ISSUED WITH REPORT	RAC	AS	SRA

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PHASE 2 PROPOSAL
MINE SITE LAYOUT SHOWING
WATER LICENCE MONITORING STATIONS

Knight Piésold CONSULTING

P/A NO. NB102-181/53 | REF NO. 3

FIGURE 6.2 | REV 1

6.3 CATEGORIZATION OF MONITORING STATIONS

Baffinland proposes to categorize the monitoring stations associated with the SNP as follows:

- **Regulated Monitoring -** occurs at Monitoring Program Stations in licences or regulations. It includes discharge limits that must be achieved to maintain compliance with water licence or regulation (i.e., Metal Mining Effluent Regulations). Enforcement action may be taken if discharge limits are exceeded.
- **General Aquatic Effects Monitoring -** described in the Aquatic Effects Monitoring Plan (AEMP) approved by the NWB, this monitoring is subject to compliance assessment to confirm sampling is carried out using established protocols, including quality assurance/quality control provisions, and addresses identified issues.
- **Verification Monitoring Program -** to be carried out for operational and management purposes by Licensee. Monitoring parameters may vary between locations. Monitoring parameters and locations are internal for Licensee.

Proposed categorization of SNP monitoring stations under the Licence as “regulatory” or “verification” are shown in Tables 6.1 and 6.2. General Aquatic Effects Monitoring stations are presented in the AEMP.

7.0 ABANDONMENT, RECLAMATION AND CLOSURE (PART J)

7.1 OVERVIEW OF CHANGES

The Phase 2 Proposal involves the construction and operation of additional infrastructure that requires incorporation into the Interim Closure and Reclamation Plan (ICRP). The reclamation security estimate will also increase once the additional project components have been constructed.

7.2 INTERIM CLOSURE AND RECLAMATION PLAN

A draft update of the ICRP is included as Attachment 30, in accordance with Part J, Item 2 of the Licence.

7.3 SECURITY

An updated draft reclamation security estimate is presented in the draft update of the ICRP (Attachment 30).

In accordance with Part C of the Licence, Baffinland will update the security requirements for the Project annually, with necessary adjustments accounted for in the results of the Annual Security Review process. The annual review process has been established by the NWB in recognition of the phased approach adopted by Baffinland for the implementation of the Mary River Project.

8.0 ENVIRONMENTAL MANAGEMENT PLANS

Table 8.1 identifies the existing Environmental Management Plans currently required under the Licence, and those that have been updated in draft for the Phase 2 Proposal and are provided as attachments to this Application.

Table 8.1 Status of Management Plans Required Under the Type A Water Licence

Type A Water Licence Requirement	Plan (Document No.)	Current Approved Version	Draft Updates for Phase 2 Proposal	File Location
Part B, Item 14a Part H, Items 1, 6, 7 and 9	Emergency Response Plan (BAF-PH1-840-P16-0002)	Rev 5 December 2020	May 2019	Attachment 20
Part B, Item 14b Part H, Items 1, 6, 7 and 9	Spill Contingency Plan (BAF-PH1-830-P16-0036)	Rev 6, February 2021	May 2019	Attachment 21
Part B, Item 14c Part E, Item 2	Surface Water, Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026)	Rev 7, March 2021	September 2021	Attachment 22
Part B, Item 14d Part E, Item 1	Fresh Water Supply, Sewage, and Wastewater Management Plan (BAF-PH1-830-P16-0010)	Rev 8, March 2021	April 2020	Attachment 23
Part B, Item 14e Part F, Item 1	Waste Management Plan (BAF-PH1-830-P16-0028)	Rev 8, March 2020	September 2021	Attachment 24
Part B, Item 14q Part F, Item 4	Hazardous Materials and Hazardous Waste Management Plan (BAF-PH1-830-P16-0011)	Rev 5, March 2017	April 2020	Attachment 25
Part B, Item 14i Part D, Item 5a	Borrow Pit and Quarry Management Plan (BAF-PH1-830-P16-0004)	March 2014	September 2021	Attachment 26
Part E, Item 24	Blasting Management Plan (BAF-PH1-830-P16-0003)	April 2013	May 2020	Attachment 27
Part I, Item 2	Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039)	Rev 1, April 2015	September 2021	Attachment 28
Part I, Item 3	Environmental Protection Plan (BAF-PH1-830-P16-0008)	Rev 2, April 2021	May 2020	Attachment 29
Part J, Item 2	Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012)	Rev 5, October 2018	September 2021	Attachment 30
Part I, Item 16	Sampling Program - Quality Assurance and Quality Control Plan (BAF-PHI-830-P16-0001)	Rev 4, March 2021	No update required	Attachment 31
Part B, Item 14s Part D, Item 5h Part F, Item 2	Phase 1 Waste Rock Management Plan (BAF-PH1-830-P16-0029)	Rev 4, June 2021	No changes	Attachment 32
Part B, Item 14f Part F, Item 2	Life of Mine Waste Rock Management Plan (BAF-PH1-830-P16-0031)	April 2014	No change	Attachment 33

Type A Water Licence Requirement	Plan (Document No.)	Current Approved Version	Draft Updates for Phase 2 Proposal	File Location
Individual Quarry Management Plans[1]				
	Borrow Source Management Plan - km 2 (BAF-PH1-830-P16-0030)	October 2014	No change	n/a
	Borrow Source Management Plan - km 97 (BAF-PH1-830-P16-0032)	October 2014	No change	n/a
	Borrow Source Management Plan - km 104 (BAF-PH1-830-P16-0035)	March 2014	No change	n/a
	Quarry Management Plan D1Q1 (H349000-4200-07-245-0001)	October 2013	No change	n/a
	Quarry Management Plan D1Q2 (H349000-4200-07-245-0002)	October 2013	No change	n/a
Part B, Item 14j Part D, Item 5b	Quarry Management Plan Q1 (H349000-1000-07-126-0013)	March 2013	No change	n/a
	Quarry Management Plan Q11 (H349000-3000-07-245-0002)	October 2013	No change	n/a
	Quarry Management Plan Q19 (H349000-3000-07-245-0003)	October 2013	No change	n/a
	Quarry Management Plan Q7 (H349000-3000-07-245-0001)	October 2013	No change	n/a
Part B, Item 14k Part D, Item 5c	Quarry Management Plan QMR2 (BAF-PH1-830-P16-0040)	September 2014	No change	n/a
Part B, Item 14l Part D, Item 5d	Quarry Management Plan – Quarry QS2	January 2012	No change	n/a
Part B, Item 14m Part D, Item 5e	Quarry Management Plan - Quarry Q7 + 500	January 2012	No change	n/a
Part B, Item 14n Part D, Item 5f	Quarry Management Plan - Quarry Q133 +500	January 2012	No change	n/a
Part B, Item 14o Part D, Item 5g	Quarry Management Plan - Quarry Q77 +200	February 2012	No change	n/a

Note(s):

1. Part D, Item 6 requires Baffinland to submit for review an addendum to the Borrow Pit and Quarry Management Plan, or to site-specific Quarry Management Plans if not adequately addressed by the Borrow Pit and Quarry Management Plan.

   "The licensee shall submit to the board for review, an addendum to the plan referred to in Part D, Item 6a for any quarry site selected for future development that the plan does not adequately address. If the content of the existing quarry plan referred to under Part D, Item 6a, does not adequately address the proposed activities for the management requirements of the selected quarry site, the licensee shall submit to the board for approval, a site-specific quarry management plan."

Items 1 and 2 of Part E and Item 1 of Part H of the Licence specify the requirements for filing updates to the management plans with upcoming annual reports. Baffinland has provided updated management plans as indicated in Table 8.1, presented as Attachments 20 to 33. These management plans incorporate the relevant elements of the Phase 2 Proposal and remain in draft. Since the previous application submitted in May 2019, these plans have been further revised as follows:

- Formatting has been revised to be consistent with the latest International Standards Organisation (ISO) standard for environmental management systems (ISO 14001:2015)
- A section on the incorporation of Inuit Qaujimajatuqangit, including the future adoption of Inuit objectives
- Incorporation of an adaptive management section and checklist, adaptive management measures, and for some plans, the development of Trigger Action Response Plans (TARPs) and an annual review process

A subset of these plans has been updated in collaboration with the QIA. All plans will be updated as described above and will replace the current operational versions of these plans (Table 8.1) once the Phase 2 Proposal has been approved and the water licence has been amended.

9.0 FUTURE SUBMISSIONS TO THE NWB

Table 9.1 lists the future submissions to the NWB in support of this application for an amendment to the Licence amendment, and when these submissions will be provided.

Table 9.1 Timelines for Future Submissions to the NWB

Project Component	Additional Information	Timeline
Milne Port Landfill	Construction plan and schedule, design report with IFC drawings and operation and maintenance manual	Post-construction of the Phase 2 Proposal and 60 days prior to landfill construction
New and Modified Quarries	New and/or updated quarry-specific management plans	Prior to quarry development
Construction Plan and Schedule	Construction plan and construction schedule for water works (SIG Table 5, Item 46d)	60 days prior to construction

10.0 REFERENCES

AMEC Earth & Environmental (AMEC), 2010. Technical Memorandum to: Greg Wortman and Doron Golan. Re: *Baffinland Mary River Project - Trucking Feasibility Study, Interim ML/ARD Assessment of Tote Road Quarry and Borrow Pit Samples*. December 10. Mississauga, Ontario. Project No. TC101510. File No. 017.

American Railway Engineering and Maintenance-of-Way Association (AREMA), 2018. *Manual for Railway Engineering*.

Baffinland Iron Mines Corporation (Baffinland), 2012. *Mary River Project - Final Environmental Impact Statement*. February.

Baffinland Iron Mines Corporation (Baffinland), 2018. *Addendum to the Final Environmental Impact Statement - Mary River Project - Phase 2 Proposal - NIRB File No. 08MN053*. August 2018, Revised September 2018.

Baffinland Iron Mines Corporation (Baffinland), 2021. Letter to: Assol Kubeisinova, Nunavut Water Board. *Re: Modification Request No. 13 - Mine Site Water Management Plan - Mary River Project, Water Licence 2AM-MRY1325*. June 30.

Canadian Council of Ministers of the Environment, 2019. *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

Fisheries and Oceans Canada (DFO), 2020. *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater*. Retrieved from: https://www.dfo-mpo.gc.ca/pnwppe/codes/screen-ecran-eng.html (accessed March 2021).

Ferguson Simek Clark Engineers & Architects, 2003. *Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT*. April 21. Yellowknife, NWT. Ref. No. FSC. Project No: 2001-1330.

Fisheries and Oceans Canada (DFO), 2011. *Fish Screen Design Criteria for Flood and Water Truck Pumps*. December 12.

Fisheries and Oceans Canada (DFO), 2020. *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater*. Retrieved from: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html (accessed March 2021).

Hatch Ltd. (Hatch), 2017a. *Baffinland Iron Mines Corporation - Mary River Expansion Project - Design Criteria - Railway Design Criteria and Design Rational*. November 28. Ref. No. H353004-39000-224-210-0001, Rev 0.

Hatch Ltd. (Hatch), 2017b. Project Memo. Re: *Baffinland Iron Mines Corporation - Mary River Project - Geotechnical Investigations - Acid Rock Drainage Assessment*. September 6. Ref. No. H353004.

Hatch Ltd. (Hatch), 2018a. *Baffinland Iron Mines Corporation - Mary River Expansion Project - Design Criteria - Civil Design Philosophy*. March 12. Ref. No. H353004-00000-200-210-0001, Rev 2.

Hatch Ltd. (Hatch), 2018b. *Baffinland Iron Mines Corporation - Mary River Expansion Project - Design Criteria - Geotechnical Design Criteria*. July 5. Ref. No. H353004-00000-229-210-0001, Rev 0.

Hatch Ltd. (Hatch), 2019. *Borrow Source Investigation Factual Data Report.* April 26. Ref No. H353004-30000-229-230-0002, Rev 0.

International Standards Organisation (ISO), 2015. *ISO 14001:2015 Environmental Management Systems - Requirements with Guidance for Use*.

Knight Piésold Ltd. (KP), 2007. Memorandum to: Rodney Cooper. Re: *Preliminary Results of Phase I Geochemical Characterization Program*. March 16. North Bay, Ontario. Ref. No. NB07-00232 (NB102-181/4).

Knight Piésold Ltd. (KP), 2008. *Bulk Sampling Program, Landfill Design and Operations.* March 31. North Bay, Ontario. Ref. No. NB102-181/10-9, Rev 1.

Knight Piésold Ltd. (KP), 2018a. *Baffinland Iron Mines Corporation - Mary River Project - Phase 2 Proposal - Application to Amend Type A Water Licence 2AM-MRY1325*. September 26. North Bay, Ontario. Ref. No. NB102-181/45-2, Rev 4.

Knight Piésold Ltd. (KP), 2018b. *Technical Supporting Document No. 13 Surface Water Assessment.* Prepared for Baffinland Iron Mines Corporation for the Mary River Project - Phase 2 Proposal. October 3. North Bay, Ontario. Ref. No. NB102-181/39-8, Rev 4.

Knight Piésold Ltd. (KP), 2019a. *Mary River Project - Phase 2 Proposal - Updated Application for Amendment No. 2 of Type A Water Licence 2AM MRY1325*. May 2. North Bay, Ontario. Ref. No. NB102-181/53-3, Rev 0.

Knight Piésold Ltd. (KP), 2019b. Memorandum to: Lou Kamermans. Re: *Mary River Project - Phase 2 Proposal - Summary of Geochemistry Testing of Rock and Overburden Samples Representative of Quarries, Borrow Pits and Rock Cuts Along the North Railway*. March 22. North Bay, Ontario. Ref. No. NB19-00237 (NB102-181/53).

Knight Piésold Ltd. (KP), 2021a. *Mary River Project - Mine Site Water Management Plan*. June 30. North Bay, Ontario. Ref. No. NB102-181/63-1, Rev 2.

Knight Piésold Ltd. (KP), 2021b. Letter to: Allan Knowlton, Baffinland Ion Mines Corporation. Re: *KM105 Sedimentation Pond Design Brief and Issued for Construction Drawings*. June 28. Ref. No. NB21-00655 (NB102-181/71).

North/South Consultants Inc., 2019. *Baffinland Iron Mines Corporation - Mary River Project - Phase 2 Proposal - North Railway Freshwater Habitat Survey: 2018*. April. Prepared for Baffinland Iron Mines Corporation.

North/South Consultants Inc., 2021. Technical Memorandum. Re: *Mary River Phase 2 Proposal Update: Project Infrastructure Interactions with Fresh Water Streams and Ponds*. March 17. Prepared for Baffinland Iron Mines Corporation.

Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB), 2012. *Detailed Coordinated Process Framework for NIRB Reviews and NWB Licensing.* Retrieved from: https://www.nwb-oen.ca/sites/default/files/cms_uploads/120424-NIRB%20and%20NWB%20Detailed%20Coordinated%20Process%20Framework-OEDE.pdf

Nunavut Impact Review Board (NIRB), 2014. *In the matter of the Nunavut Land Claims Agreement, Nunavut Land Claims Agreement Act, S.C., 1993, c. 29 Article 12, Part 5 And In the matter of an application by Baffinland Iron Mines Corporation for development of the Mary River Project Proposal in the Qikiqtani Region of Nunavut - NIRB Project Certificate No. 005.* May 28. Amendment No. 1.

Nunavut Impact Review Board (NIRB), 2018a. *In the matter of the Nunavut Land Claims Agreement, Nunavut Land Claims Agreement Act, S.C., 1993, c. 29 Article 12, Part 5 And In the matter of an application by Baffinland Iron Mines Corporation for development of the Mary River Project Proposal in the Qikiqtani Region of Nunavut - NIRB Project Certificate No. 005.* October 30. Amendment No. 2.

Nunavut Impact Review Board (NIRB), 2020. *In the matter of the Nunavut Land Claims Agreement, Nunavut Land Claims Agreement Act, S.C., 1993, c. 29 Article 12, Part 5 And In the matter of an application by Baffinland Iron Mines Corporation for development of the Mary River Project Proposal in the Qikiqtani Region of Nunavut - NIRB Project Certificate No. 005.* June 18. Amendment No. 3.

Nunavut Planning Commission (NPC), 2018. Letter. Re: *NPC File No 148420 Mary River Phase 2 Expansion Project*. May 29. Cambridge Bay, Nunavut.

Nunavut Water Board (NWB), 2015. *Mary River Project - Water Licence 2AM-MRY1325 - Amendment No. 1*. July 30.

Nunavut Water Board (NWB), 2021. Letter to: Christopher Murray and Connor Devereaux, Baffinland Iron Mines Corporation. Re: *Type "A" Licence No. 2AM-MRY1325 Type "A"; Mary River Project, Baffinland Iron Mines Corporation; Modification No. 13 - Mine Site Water Management Plan*. August 16.

Stantec Consulting Ltd., 2018. *Mary River Modification Application - Production Increase, Fuel Storage, and Milne Port Accommodations*. April 23. Project No. 121414789.

Transport Canada, 2017. *SOR/2017-253: Transportation of Dangerous Goods Regulations*.

11.0 CERTIFICATION

This report was prepared and reviewed by the undersigned.

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Approval that this document adheres to the Knight Piésold Quality System: