Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2AM-MRY1325

December 20, 2018

Our file - Notre référence
CIDM#1236499

Ida Porter
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
sent via email: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's Final Submission for the 2019 Annual Security Review for Baffinland Iron Mines Corporation's Mary River Project, Water Licence 2AM-MRY1325 Amendment No. 1

Dear Ms. Porter,

The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) presents this submission for the Nunavut Water Board's consideration, as follow-up to discussions held during the Annual Security Review (ASR) teleconference held on December 13, 2018 for Baffinland Iron Mines Corporation's (Baffinland) Mary River Project. Comments have been provided pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

On December 3, 2018, we submitted our reclamation estimate prepared by SNC-Lavalin. However, with this submission we are including a revised estimate with a memo on unit rates and a revised report prepared by SNC-Lavalin. This letter outlines corrections to our reclamation estimate; discusses further evidence produced by Baffinland for their contractor rates; presents our revised reclamation estimate; and comments on modifications to the security amount for the project after this ASR. The final section compiles recommendations for the previous sections.

Corrections to estimate

The SNC-Lavalin 2019 RECLAIM Marginal Estimate was found in Appendix B of Annex A, the "Report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325". Changes to the estimate were necessary to correct for the mis-assignment of one laydown and two of Baffinland's responses.

1) **Mis-assignment of laydown L9 –** Baffinland's 2019 workplan includes the construction of laydown L9 next to km 60 of the Tote Road, on Crown land. In the December 3rd estimate, this laydown was assigned to Inuit owned land. The correction is displacing the cost of grading and contouring a surface equivalent to laydown L9 (92 500m^2) from Inuit owned liability to Crown liability.
2) **Crusher pad expansion –** Baffinland has clarified that only the crusher pad sedimentation pond expansion footprint would need the "Grade and Re-contour with Liner" rate. Therefore in the revised estimate the crusher pad expansion footprint was changed to the "Grade and Re-contour" rate. This is on Inuit owned land.
3) **Items attributed to type B licence** – Items attributed to the type B water licence in Baffinland's estimate were not included in our original estimate. Since Baffinland has clarified that they are covered by the type A water licence, costs for the items have been included in the revised estimate. They are on Inuit owned land.

Unit rates

CIRNAC's previous estimates used unit rates developed by Baffinland in 2014, after each year's evaluation concluded that there had been no material changes since 2014. During this ASR, Baffinland used different unit rates, developed using blended labour and machinery rates updated with current contractor rates.

SNC-Lavalin's evaluation of the new rates proposed by Baffinland is detailed in their memo included as Annex B. They conclude the unit rates presented in Table 1-2 of the 2019 Marginal Closure and Reclamation Financial Security Estimate are representative.

The new unit rates were applied to both the reconciled Global 2018 estimate and the Marginal 2019 estimate. This results in a decrease of $6 003 513 and $1 771 230 in the respective estimates.

Revised estimate

Incorporating the corrections and revised unit rates into the estimate changes the final values, as summarized in Table 1 below. Highlights from the revised RECLAIM model summary sheets are presented in Annex A, Annex C is SNC-Lavalin's revised report with more details, and the excel RECLAIM files form part of this submission.

Table 1: Reclamation estimates for 2019 ASR using updated rates

Estimate	Total	Inuit owned liability	Crown liability
Reconciled 2018 Global	$ 69 348 915	$ 68 148 693	$1 200 222
Marginal 2019	$ 37 904 833	$37 656 255	$248 578
Global 2018 + Marginal 2019	$ 107 253 748	$105 804 948	$1 448 801

Mid-year modifications to security amount set during ASR

Baffinland and the Qikiqtani Inuit Association (QIA) regularly hold discussions on reclamation costs associated with the land lease, which CIRNAC respects and encourages. We would like to make sure the water licence and ASR process prescribed by it are also being respected. In both 2017 and 2018, discussions outside the ASR process resulted in Baffinland posting a different amount of security with the QIA than that set by the Board in its ASR decision letters. In 2017 the details of that summer's negotiations were shared during the next ASR. In 2018, the final amounts agreed to were shared with the Board, but no details were provided.

During the December 13, 2018 teleconference, Baffinland stated they were planning an addendum to the 2019 workplan and expected it would require a modification to the amount of security to be posted. We understood this addendum was scheduled for June 2019 and would include 3 components:

i. Work/equipment associated with the current licence
ii. Work/equipment that might be permitted under a Phase 2 project certificate reconsideration
iii. Work/equipment that might be permitted under a Phase 2 water licence amendment

The total amount of security for the Mary River project, as well as how it is split between land owners is set through the ASR, as described in water licence 2AM-MRY1325 amendment #1. Should a modification of this amount be warranted between yearly reviews, Part C Item 3 of the licence provides a means to change the security amount.

The ASR is to discuss incremental posting of security for the project as permitted in water licence 2AM-MRY1325 amendment #1. There is no place in this process for security for work considered for Phase 2, which is not yet authorized.

Alternative processes to incremental posting of security other than the ASR were touched on during the teleconference. CIRNAC finds the present process onerous and is of the opinion its effectiveness could be improved. We hope to engage dialogue with other parties to ensure the Mary River project is adequately secured in an efficient manner that works for all parties.

Recommendations

Based on the information exchanged during this ASR, CIRNAC's reclamation cost estimate for the Mary River project as updated in the 2019 workplan is $107 253 748. We recommend this as the global security amount for the project.

Presently CIRNAC holds $1 298 555 in financial security for reclamation purposes under water licence 2AM-MRY1325 amendment #1. We recommend this value be increased to $1 448 801 based on additional costs due to laydown L9.

For further modifications to security after the ASR, CIRNAC recommends:

1) Any modification to the total amount of security for the project, including a possible workplan addendum, be done through a Board process as outlined in the water licence.
2) Security for work associated with Phase 2 be discussed with the proposed water licence amendment.

CIRNAC appreciates the opportunity to participate in this annual security review. If there are any questions or concerns, please contact Bridget Campbell at (867) 975-4242 or bridget.campbell@canada.ca.

Sincerely,

Sarah Forté

Sarah Forté
Water Management Specialist

CC:
Christopher Murray, Environmental & Regulatory Compliance Manager, Baffinland Iron Mines Corporation
Fai Ndofor, Regulatory Manager, Qikiqtani Inuit Association

Annex A

Compilation table of summary sheets
from revised RECLAIM estimates

		Reconciled 2018 Global			Marginal 2019			Global 2018 + Marginal 2019		
		Total	IOL Liability	Crown Liability	Total	IOL Liability	Crown liability	Total	IOL Liability	Crown Liability
CAPITAL COSTS										
OPEN PIT	Mary River Mine Pit	$4 808 916	$4 692 698	$116 218	$3 477 111	$3 477 111		$8 286 027	$8 169 809	$116 218
BUILDINGS AND EQUIPMENT	Mine Site Waste Rock Pile	$283 750	$283 750					$283 750	$283 750	
	Mine Site	$11 894 285	$11 894 285		$2 874 355	$2 874 355		$14 768 640	$14 768 640	
	Milne Port	$7 273 581	$7 273 581		$372 171	$372 171		$7 645 753	$7 645 753	
	Tote Road	$2 127 100	$1 774 085	$353 015	$429 625	$291 483	$138 141	$2 556 725	$2 065 568	$491 156
	Project Wide	$724 684	$724 684					$724 684	$724 684	
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT		$2 900 946	$2 850 739	$50 207	$3 508 400	$3 508 400		$6 409 346	$6 359 139	$50 207
SURFACE AND GROUNDWATER MANAGEMENT		$1 358 346	$1 334 838	$23 509				$1 358 346	$1 334 838	$23 509
INTERIM CARE AND MAINTENANCE		$2 792 145	$2 743 821	$48 324				$2 792 145	$2 743 821	$48 324
	SUBTOTAL	**$34 163 753**	**$33 572 481**	**$591 272**	**$10 661 662**	**$10 523 520**	**$138 141**	**$44 825 415**	**$44 096 001**	**$729 414**
	PERCENT OF SUBTOTAL		**98.3%**	**1.7%**		**98.1%**	**1.9%**		**98.4%**	**1.6%**
INDIRECT COSTS										
MOBILIZATION/DEMOBILIZATION		$23 273 544	$22 870 749	$402 795	$20 049 605	$20 049 605		$43 323 149	$42 920 354	$402 795
POST-CLOSURE MONITORING AND MAINTENANCE		$1 560 000	$1 533 001	$26 999	$3 430 000	$3 392 244	$37 756	$4 990 000	$4 925 245	$64 755
ENGINEERING	4%	$1 332 386	$1 309 327	$23 060	$415 805	$407 775	$8 030	$1 748 191	$1 717 102	$31 090
PROJECT MANAGEMENT	9%	$3 211 393	$3 155 813	$55 580	$1 002 196	$982 842	$19 354	$4 213 589	$4 138 655	$74 934
BONDING/INSURANCE	2%	$63 275	$671 450	$11 825	$213 233	$209 115	$4 118	$896 508	$880 565	$15 943
CONTINGENCY	15-20%	$5 124 563	$5 035 872	$88 691	$2 132 332	$2 091 153	$41 179	$7 256 895	$7 127 026	$129 870
SUBTOTAL		**$35 185 162**	**$34 576 212**	**$608 950**	**$27 243 171**	**$27 132 734**	**$110 437**	**$62 428 333**	**$61 708 946**	**$719 387**
TOTAL COSTS		**$69 348 915**	**$68 148 693**	**$1 200 222**	**$37 904 833**	**$37 656 255**	**$248 578**	**$107 253 748**	**$105 804 948**	**$1 448 801**

Annex B

SNC-Lavalin memorandum
2018 Unit Rates Update

SNC-LAVALIN INC.

5500 des Galeries Blvd., Suite 200
Quebec (Qc)
Canada G2K 2E2
Tel: (418) 621-5500
Fax: (418) 621-8887

Memorandum

Certifiée ISO 9001

TO :	Sarah Forte, Wajid Dadouda, Ian Parsons	**DATE :**	December 20, 2018
C.C. :			
FROM :	Denis Vachon, Martine Paradis	**REF. :**	658342-3000-4GER-0002_00
SUBJECT :	2018 Unit Rates Update and Revised Report		

This memorandum provides a summary of the documents reviewed by SNC-Lavalin Inc. (SNC-Lavalin) to validate if the 2018 blended unit rate updates for labour and equipment performed by Baffinland Iron Mines Corporation (Bafffinland) during their 2019 marginal closure and reclamation financial security estimate are representative and should be used in the cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325 by SNC-Lavalin. Unit rate update was the largest discrepancy between Baffindland and SNC-Lavalin conciliation cost review.

1.0 Available Documents

Review and evaluation of unit costs are based on the following documents that were made available to SNC-Lavalin on December 14, 2018:

- 2019 Marginal Closure and Reclamation Financial Security Estimate, November 1, 2018;
- Baffinland Iron Mines Corporation Responses to intervener submissions 2019 ASR, December 10, 2018;
- Baffinland Iron Mines Corporation 2019 Annual Security Review summary presentation, December 13, 2018;
- Appendix C: 2014 Complete Project Financial Security Assessment Report Rev.1, October 31, 2014.

2.0 Unit Rates Basis of Estimate

The assessment started with the review of the methodology used in the report named Appendix C: *2014 complete project financial security assessment report Appendix C.* In the section 6 of the Appendix C, a detailed description of the development of unit costs from a “First Principles Approach” was provided. The report asserts:

- Rates reflect work to be conducted by a 3rd Party Contractor on the basis of a 10-hour workday;
- Labour rates developed were inclusive of base wages + social burdens, overtime premiums, small tools, PPE and consumables + contractor overhead & profit;
- The labour portion of the contractor crew rate was based on $100 per hour. This amount excludes worker travel and accommodations (camp & camp catering);

- The equipment rate was based on an assessment of fleet requirements for dozers, trucks, shovels, graders, etc. and was averaged to $150 per hour. The equipment cost includes ownership, rental, depreciation of equipment and operating costs related to fuel, lubricants, consummates and repairs;
- Fuel was set at $0.97 per litre and it was noted in several instances that equipment "will be purchased at 50% of the original cost".

2.1 Verification of 2014 Unit Rate

In the section 7 of the Appendix C, a detailed description of the equipment quantity and sizing used to develop each of the major unit rates along with assumed fuel consumption was provided.

2.1.1 Fill Application Unit Rate

To verify the validity of the assumptions and methodology, SNC-Lavalin reviewed the build-up for the unit rate of Fill Application of $44.37/m^2.

For the review, SNC-Lavalin used its internal database of equipment capacities and costs which it regularly compares to contractor quote and publications such as Quebec Ministry of Transport "Taux de machinerie lourde" which gives operating costs of heavy civil equipment (trucks, shovels, dozers, etc.). These publications are applicable to Northern Jurisdictions and included a provision to increase the material and operating portion of equipment rental / ownership and operations to a maximum of 60% depending on remoteness of the site above 55th parallel.

Our review found that:

- The selection of CAT 385 Excavator paired with CAT740 Haul truck was not reasonable as the excavator is oversized with regards to the capacity of the truck;
- It was reported that 1.54 trucks were required and it is assumed that this was rounded up to 2 trucks in operation but not confirmed;
- The 30 L/hr consumption reported for a CAT 385 is incorrect and should be closer to 90 L/hr;
- The operating cost of $161.53/hr is too low and should be closer to $300/hr if cost of ownership, fuel and lubricants is taken into account;
- The "all-in" crew rate (combine labour rate and blended equipment rate) associated with excavating, hauling, spread & compaction for this activity is also closer to $200 per hour and not the $250 hourly rate used in the document Appendix C.

The methodology used in the document Appendix C appears to have flaws with respect to equipment quantity and mix, capacities and operating costs. SNC-Lavalin performed its own self-evaluation for the Fill Application rate based on:

- The same parameters provided in the document Appendix C for haul distance;
- Current 2018 labour rates;
- Current 2018 equipment pricing;
- Fuel rate of $0.97 per litre;
- 2 x 35Ton trucks in operation;

- 325 or 330 Excavator;
- D7;
- Compactor;
- 928 loader;
- Sub-contract rate of $18.70 per ton for blasting and crushing of rock to perform aggregate suitable for fill material.

Unit cost of $58.60 per m^3 of fill, or ~$39 per m^2 (based on reported average depth of 1.5 m) was calculated.

In this verification, $39/$m^2$ for fill material is approximately 12% lower than the rate proposed in the document Appendix C in 2014. Accounting for escalation, it would appear that the 2014 unit rate proposed in the document Appendix C were 20% overstated.

The difference in the unit rate does not appear to be related to total hours associated with the development of unit rates but rather conservative assumptions with respect to the labour rate and blended equipment rate.

2.1.2 Demolition and Disposal of Buildings and Dismantling of Equipment

Spot checks have been performed for the proposed hours for demolition and disposal of buildings and dismantling of equipment. The review demonstrates that the installation hours used are reasonable.

3.0 Unit Rates Recommendations

In the 2019 marginal closure and reclamation financial security estimate, Baffindland proposed to reduce the labour rate used previously to $75 and the blended equipment rate to $125 resulting in a combined “all-in” crew rate of $200 per hour. Based on the results of the analysis in the previous section, the proposed reduction in the in Table 1-2 of the document 2019 Marginal Closure and Reclamation Financial Security Estimate (2019 Marginal Closure) is reasonable and they respect the following conditions:

- Contractor travel (mobilization of workers) for direct and indirect staff is excluded from the blended rate and estimated separately in the indirect costs;
- Accommodations (camp and catering) for contractor direct and indirect staff is excluded from the blended rate and estimated separately in the indirect costs;
- Mobilization & Demobilization of the equipment is excluded from the blended rate and included in the indirect costs.

4.0 Conclusion

Based on the unit rate validation, the new unit rate provided by Baffinland in Table 1-2 of the document 2019 Marginal Closure was applied by SNC-Lavalin to update the global and marginal mine reclamation cost estimate using RECLAIM v.7 model.

Unit rates used by Baffinland for the 2019 marginal estimate are lower than the one reported in the Table 1-2 of the document 2019 Marginal Closure. Based on our validation, SNC-Lavalin agree using unit rate provided by Baffinland in Table 1-2.

A revised report in Attachment of this memo (Revised report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325) include the revised cost estimate.Others conclusions and recommendations of SNC-Lavalin review remain the same:

- Reclamation criteria were not reflected in Baffinland's estimate as:
  - Validation studies for the reclamation strategy of the waste rocks pile, studies about the effects of global warming on the waste rock pile, and additional contingency regarding a proper cover or design;
  - Mitigation for dust emissions;
  - Studies to develop a strategy to provide a cover for vegetation growth;
  - Cost to operate and maintain passive system and cost for water treatment system; and
  - Cost to stabilize sediment ponds/water management ponds and sludge management.
- SNC-Lavalin increase from 12,5% to 20% the contingency in the Marginal cost to address the uncertainty associated with acid rock drainage at the waste rock pile; however the best practice would be to add those elements to the direct cost of the Security estimate instead of increasing the contingency.

Prepared by

Denis Vachon
Mining Environment Specialist
Mining & Metallurgy

Verified by:

Martine Paradis, M.Sc. PMP
Mining Environment Senior Specialist
Mining & Metallurgy

Attachment: Revised report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325658342-3000-4GER-0001-01

Annex C

SNC-Lavalin revised report
Report of mine reclamation cost estimate update
for the 2019 Annual Security Review process
for the type A Water Licence 2AM-MRY1325

SNC·LAVALIN

Mary River Project

Report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325

Crown-Indigenous Relations and Northern Affairs Canada

Mining & Metallurgy

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Proposal > Rev. 01
Internal ref. 658342-3000-4GER-0001

SNC-LAVALIN INC.
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Quebec, December 20, 2018

Mr. Wajid Daouda
Senior Engineer
Majors Projects – Resource Management
Nunavut Regional Office
Crown-Indigenous Relations and Northern Affairs Canada
P.O. Box 100
Iqualuit, NU, X0A 0H0

Subject: Mary River Project
Revised report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325
Our file: 658342-3000-4GER-0001-01

Mr. Daouda,

We are pleased to submit the revised report version 01 mentioned in the above subject.

Do not hesitate to communicate with us should you have further questions regarding the content of this report.

Truly yours,

SNC-LAVALIN INC.

Martine Paradis, M.Sc. PMP
Mining Environment Senior Specialist
Mining and Metallurgy

MP/sh

CC. Karola Toth, Project Manager

List of Revisions

Revision				Revised pages	Remarks
#	Prep.	App.	Date		
PB	DV / PL / AL	MP	2018-11-27	All	
00	DV / PL	MP	2018-12-03	All	
01	DV / PL	MP	2018-12-20	All	Changes in unit rates

Notice to Reader

This document contains the expression of the professional opinion of SNC-Lavalin Inc. ("SNC-Lavalin") as to the matters set out herein, using its professional judgment and reasonable care. It is to be read in the context of the agreement (the "Agreement") signed between SNC-Lavalin and Crown-Indigenous Relations and Northern Affairs Canada (the "Client") and the methodology, procedures and techniques used, SNC-Lavalin's assumptions, and the circumstances and constraints under which its mandate was performed. This document is written solely for the purpose stated in the Agreement, and for the sole and exclusive benefit of the Client, whose remedies are limited to those set out in the Agreement. This document is meant to be read as a whole, and sections or parts thereof should thus not be read or relied upon out of context.

SNC-Lavalin has, in preparing estimates, as the case may be, followed accepted methodology and procedures, and exercised due care consistent with the intended level of accuracy, using its professional judgment and reasonable care, and is thus of the opinion that there is a high probability that actual values will be consistent with the estimate(s). Unless expressly stated otherwise, assumptions, data and information supplied by, or gathered from other sources (including the Client, other consultants, testing laboratories and equipment suppliers, etc.) upon which SNC-Lavalin's opinion as set out herein are based have not been verified by SNC-Lavalin; SNC-Lavalin makes no representation as to its accuracy and disclaims all liability with respect thereto.

To the extent permitted by law, SNC-Lavalin disclaims any liability to the Client and to third parties in respect of the publication, reference, quoting, or distribution of this report or any of its contents to and reliance thereon by any third party

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1.0 INTRODUCTION

SNC-Lavalin Inc. (SNC-Lavalin) has been retained by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to participate in the 2019 Annual Security Review (ASR) process for the Mary River Iron Mine Project, Type A Water Licence No. 2AM-MRY1325 - Amendment No. 1 Mine (CCSM).

This revised report provides a summary of updated financial security cost estimates using RECLAIM version 7 that incorporate information gathered during a site visit, from the Baffinland Iron Mines Corporation (BIMC) work plan for 2019 and from responses to intervener submissions 2019 ASR.

1.1 Background

The Mary River Project (Project) is located in Nunavut, on the northern end of Baffin Island, 160 km south of Pond Inlet. This project is an iron ore mine owned and managed by BIMC. It has been in production since fall 2014, hauling ore from the mine site along the Tote Road to Milne Port, where the first ore shipments were made in summer 2015. BIMC is operating under a Nunavut Impact Review Board project certificate and Nunavut Water Board (NWB) Type A water licence 2AM-MRY1325 amendment #1.

Recently, BIMC submitted to the Nunavut Planning Commission (NPC) and the Nunavut Impact Review Board (NIRB), the “Production Increase, Fuel Storage and Milne Port Accommodations Modification Proposal” (Production Increase Proposal). The current scope of the Phase 2 Development Proposal includes the following works and activities:

- Increase in iron ore production and transportation via road through Milne Port from current 4.2 Million tonnes per year (Mtpa) to 6.0 Mtpa
- Construction and operation of a 110 km railway within the Mary River Transportation Corridor between the mine site and Milne Port, generally following the existing Tote Road
- Expansion and improvement of the Milne Port facilities
- Modification of the shipping season
- Expansion of the existing accommodation camp at the Mine site

CIRNAC Mine Site Reclamation Policy for Nunavut (CIRNAC, 2002) requires that financial security be held for the highest reclamation liability for land and water combined for a mine project. The assumptions for determining the security amount are detailed in the 2002 Policy.

For the Mary River Project, the financial security estimations for site development and related activities have been completed by the Baffinland Iron Mines Corporation, the Qikiqtani Inuit Associations (QIA), and a third party contractor hired by CIRNAC. Financial security is held under the above water licence by CIRNAC or the QIA depending on the land ownership where infrastructure and activities are located.

In 2015, CIRNAC retained a third party contractor to complete an independent evaluation of the reclamation liabilities associated with the Mary River Project to ensure that the requirements of the 2002 Policy were met. The reclamation estimations, prepared for CIRNAC, were made using the RECLAIM v. 7 Model. The estimate was consecutively updated annually since 2016.

1.2 Objective and Scope of Work

The objective of the mine reclamation cost estimate update based on the Request for Proposal was to complete a re-evaluation of the reclamation liabilities associated with the Mary River Project using the CIRNAC RECLAIM v. 7 model reflecting the current state of project development and taking into account BIMC's proposed 2019 Work Plan. The intent is to:

- Ensure that the requirements of CIRNAC's Mine Site Reclamation Policy for Nunavut (2002) are met
- Assess whether the existing global security amount as set by the NWB during the 2018 ASR Process is adequate to reflect the updated scope of activities and undertakings proposed by BIMC in the 2019 Work Plan
- Determine whether the 2019 cost estimate is sufficient to ensure appropriate closure and restoration of the site and implementation of any required ongoing measures after site restoration
- Confirm whether the securities BIMC proposes to apply to Crown- and Inuit-owned land in 2018/19 are adequate to meet the highest reclamation liability

The scope of work of this desktop study included the following activities

- Carry out a site visit by a closure and reclamation specialist
- Update the Mine Reclamation Cost Estimate (CIRNAC RECLAIM v. 7 model)
- Prepare a technical reclamation cost estimate review report

2.0 DATA REVIEW

To conduct the Annual Security Review (ASR) process, SNC-Lavalin relied on the following documentation:

- 2018 Work Plan - Revision 1, Baffinland Iron Mines Corporation, January 10, 2018
- 2AM-MRY1325 Mary River Project: CIRNAC contribution to 2018 Annual Security Review – with Arcadis Canada Inc. estimate, February 9, 2018
- 2018 Mary River Reclamation Security Report, Arktis Solutions Inc., February 2, 2018
- 2019 Marginal Closure and Reclamation Financial Security Estimate , Baffinland Iron Mines Corporation, November 1, 2018

- 2019 Work Plan, Baffinland Iron Mines Corporation, November 1, 2018
- Application for Amendment NO.2 of the type A water licence 2AM-MRY1325,Knight Piésold Ltd., August 10, 2018
- 2AM-MRY1325 ASR Process Guidance, Nunavut Water board ,November 2 2018
- 702751-000 BIM 2017 Global RECLAIM_MODEL_VER_1_Oct_24_2017 (version 1).xlsm
- 702751-000 BIM 2018 Marginal RECLAIM_MODEL_VER_1_Jan_25_2018.xlsm
- 31102018_Estimate Breakdown Structure_2019 Work Plan.xlsx, October 31, 2018
- 2018 Geotechnical Site Inspections SNC-Lavalin Inc., October 31, 2018
- Baffinland Iron Mines Corporation Responses to intervener submissions 2019 ASR, December 10, 2018
- Baffinland Iron Mines Corporation 2019 Annual Security Review summary presentation, December 13, 2018
- Appendix C: 2014 Complete Project Financial Security Assessment Report Rev.1, October 31, 2014

2.1 Site Visit

A reconnaissance trip to the site was conducted on August 22 and 23, 2018 by a closure and reclamation specialist with an objective to enhance our understanding of the project, and to obtain information required in support of mine reclamation cost estimate update.

2.2 SNC-Lavalin Update of the Mine Reclamation Cost Estimate (CIRNAC RECLAIM v. 7 model)

SNC-Lavalin's 2019 ASR estimate builds on the previous reviews carried out for the Mary River Project on behalf of CIRNAC.

For the 2019 ASR, we have updated the 2018 RECLAIM mine reclamation cost estimate of the Mary River Project (October 24, 2017 and January 25, 2018). The security estimate is again based on the RECLAIM model (Version 7). Our security estimation integrates information gleaned from our site visit conducted in August 2018 and from a review of BIMC's 2019 Work Plan dated November 1, 2018. The SNC-Lavalin 2018 RECLAIM Global Estimate and 2019 Marginal Estimate is presented respectively in Appendix A and Appendix B.

3.0 BIMC 2019 MARGINAL, CLOSURE AND RECLAMATION FINANCIAL SECURITY ESTIMATE

Relevant sections of work plan 2019 are reported in sections 3.1, 3.2, 3.3 and 3.4.

3.1 BIMC Security Estimate Development

On November 1st, 2018 BIMC submitted to the NWB, the QIA, and CIRNAC their 2019 Work Plan for the Project and the 2019 Marginal Closure and Reclamation Financial Security Estimate (attached as Appendix B to their 2019 Work Plan).

The 2019 Marginal Closure and Reclamation Financial Security Estimate represents BIMC's proposed annual adjustment to reclamation security for 2019. It is BIMC's position that the aggregate of the 2019 Marginal Closure and Reclamation Financial Security Estimate and the previous 2018 Project closure and reclamation security represent the total global closure and reclamation costs required. The estimate assumes a third-party contractor will perform the work in a worst-case scenario to meet reclamation objectives as outlined in the Interim Mine Closure and Reclamation Plan (BAF-PH1-830-P16-0012). The estimate is intended to address all disturbed areas, project components and project activities existing on the Mary River Project site upon conclusion of the 2019 Work Plan.

These security cost estimates were all developed by BIMC employing Hatch's Estimate Breakdown Structure (EBS) approach. The EBS approach and the unit costs developed are described in 2014 Complete Project Financial Security Assessment Report (H349000-1000-07-126-0018, Rev. 1, October 31, 2014). As a result of ongoing discussions with QIA regarding the high uncertainty items for the Mary River Project Financial Security Estimate, an evaluation and update of the unit rates was completed in 2018 and is outlined below.

3.1.1 New Direct Cost Unit Rates

Evaluation of labour and equipment rates were carried out by BIMC to reflect the current market rates. Labour rate derived in the 2014 Complete Project Financial Security Estimate was $100/hour based on an average from three (3) different 3rd Party Contractors for personnel skilled in a number of occupations required to carry out the reclamation activities identified. In 2018 Baffinland completed an assessment of five (5) different 3rd Party Contractors, including both contractors from outside Nunavut and those registered in Nunavut. The revised labour rate based on blended updated 2018 contractor rates used is $75/hour.

The 2014 Complete Project Financial Security Estimate utilized a blended equipment rate of $150/hour, representative of the variety of equipment required to implement the reclamation activities, and includes the cost to operate and maintain the equipment, but exclusive of labour and mobilization/demobilization. The 2014 blended equipment rate was calculated based on actual equipment rates from three (3) different contractors. In 2018, Baffinland completed an assessment of three (3) different 3rd Party Contractors, including both contractors from outside Nunavut and those registered in Nunavut. The revised equipment rate based on blended updated 2018 contractor rates used is $125/hour.

Based on the updated labour and equipment rates for the Project, the direct cost unit rates for all reclamation activities have been updated. As a result of the unit rates update, the overall reclamation

estimate for the Project was adjusted by BIMC to reflect the updated rates and represents a reduction of the estimate (2014 through 2018) of $7,901,310.

Finally, in consultation with QIA, it was determined that the unit rate for culverts utilized for the Project may no longer be representative, as culvert lengths have potentially varied from the assumptions used in the original derivation of unit rates in 2014 by both Baffinland and QIA. The QIA has presented to Baffinland a unit rate of $50/m for culverts and will only apply for the installation of new culverts, and that existing culverts are exempt and will continue to utilize historical unit rates.

3.2 BIMC 2018/2019 Annual Security Review Reconciliation

The 2018 Reconciliation process removed the following items from the 2018 ASR direct cost estimate:

- As a result of the unit rates update, the overall reclamation estimate for the Project was adjusted to reflect the updated rates, and represents a reduction of the estimate (2014 through 2018) of $7,901,310;
- Grade and Re-Contour of Laydown LP1 for a reduction of $19,000 in direct cost (surface reduction);
- 2018 Sea Lift Materials. The position presented by Baffinland during previous security estimates was based on the forecasted equipment expected to be delivered to site in 2018. The actual type and quantity of equipment delivered to site in 2018 varied from the forecasted estimate and therefore during the 2019 reconciliation process Baffinland adjusted the EBS, to ensure the 2018 BIMC estimate reflects the most up-to-date information for a reported increase of $374,000 for 65 pieces of equipment. The total provided in the table is incorrect and should be $535,393 for 71 pieces of equipment.

3.3 BIMC 2019 Work Plan Components

BIMC has provided their proposed operation and work plan for 2019 in a tabular format broken down by geographic area (i.e., Milne Port, Tote Road, Mine Site) and emphasizing changes from the previous year. The major work activities for 2019, without Security in place, are summarized below and are from Marginal and Closure Reclamation 2019 Estimate.

3.3.1 Tote Road

3.3.1.1 New Work for 2019

- Development and expansion of quarries, consisting of four (4) new quarries along the Tote Road with 8 m wide access roads, expansion of previously proposed but not constructed quarry Q5, and expansion of the working limits of existing quarry Q1;
- Development of six (6) laydowns adjacent to the existing Tote Road for material stockpiling and storage. The laydowns will be constructed by filling directly over undisturbed ground and 31 m away from the high water mark of local water bodies. The laydowns will be constructed of 500 mm thickness quarried rock with granular surfacing, free draining to appropriate ditches and water courses. All

laydowns to cover approximately 2 ha, with one laydown at KM7 laydown covering approximately 7.5 ha;

- Grade adjustments at KM8 and KM97 to improve safety and drainage;
- Maintenance on Tote Road bridges, including re-decking and adjustment of bridge abutments. Winter ice road bypasses constructed to allow truck traffic during work.

3.3.2 Milne Port

3.3.2.1 New Work (2019 Work Plan)

- Expansion of the LP2 laydown (included in 2018 Work Plan but not yet constructed)
- Expansion of the Milne Port Ore Stockpile and water management facilities to optimize stockpiling and ship loading operations, resulting in additional 140,000 m^2 of stockpile area and 15,000 m^2 lined sedimentation pond;;
- Construction of berm and linear steel support structure on laydown LP3 for receipt and storage of stacker/reclaimer equipment. Berm dimensions are 200 m x 30 m x 2 m, constructed on existing disturbed area;
- Construction of new polishing waste stabilization pond (PWSP) at 380 Person camp to manage off-spec effluent from the 380p camp waste water treatment plant;
- New contaminated water/snow containment pond adjacent to existing pond at Milne Port;
- Desalination Plant (Seawater reverse Osmosis System) including utilidor located at beach head;
- Construction of new hazardous waste berm at the Mine site and at Milne Port. Decommissioning of selected existing berms to consolidate waste management.

3.3.2.2 Work Carried over from 2018 – Security Not in Place (2019 Work Plan)

- Installation of East Sedimentation Pond Expansion (2a) approved with Modification No. 9, but for which security has not been allocated.

3.3.3 Mine Site

3.3.3.1 New Work (2019 Work Plan)

- Laydown area for parking and equipment storage at KM107.5;
- New KM110.5 Laydown for additional equipment storage and maintenance shop installation;
- Heated maintenance shop for pit equipment at KM110.5 Laydown. Tent structure with lined floor. Footprint is approximately 1,500 m^2;

- Decommissioning and repurposing of Weatherhaven structures for storage and workspace;
- Expansion of the 800 person camp pad to the north by approximately 12,000 m^2 to accommodate additional support offices and buildings;
- Addition of offices/trailers/buildings at the 800p Camp. Total footprint is 925 m^2, including approximately 500 m^2 for a new fire hall and emergency response building;
- Construction of a landfarm at the Mine Site landfill facility, with an estimated footprint of 9,000 m^2. Disturbed area included in 2018 Addendum, new lined area requires security allocation;
- Expansion of the crusher maintenance shop laydown area for seacan and rebuilt equipment storage;
- Installation of second 15 ML tank at Mine Site bulk fuel storage facility;
- Upgrades to the mine site crusher facility, including expansion of the crusher pad (12,000 m^2), new water diversion structures, and increase to sedimentation pond (MS-06) capacity (2,000 m^2). Installation of one (1) culvert in northern perimeter ditching to allow for vehicle access to maintenance shop;
- Waste Rock Facility Water Treatment Plant parking and laydown. Expansion of the pad to allow for light vehicle parking, material laydown and better fuel tank access.

3.3.3.2 Work Carried over from 2018 – Security Not in Place (2019 Work Plan)

- Construction of a Run of Mine (ROM) Stockpile at KM107 (90,000 m^2) including an access road (31,900 m^2) and sedimentation pond (11,500 m^2 disturbed, 7,400 m^2 lined);
- Construction of the Mine Site fuel storage facility and one arctic diesel fuel tank with 15 ML capacity. The fuel storage facility will comprise a fuel containment berm with a welded geomembrane liner, perimeter access road and fuelling module. Lined footprint is approximately 12,000 m^2.

The following table presents the summary of the direct and indirect cost BIMC allocated in the 2019 Marginal Closure and Reclamation Financial Security Estimate.

Table 3-1 Summary of the BIMC Marginal Increase of the 2019 Work Plan Estimate

Activity	Cost ($)
Direct Cost	
Buildings and Foundations	254,000
Mechanical and Mobile Equipment	593,000
Site Works	5,076,000
Storage Tanks	358,000
Culverts	28,500

Activity	Cost ($)
Desalination Plant	7,925
Fill Application	98,000
Indirect Cost	
On-Site Fuel Demobilization and Reclamation Fuel Mobilization	1,736,000
Off-Site Disposal of Hazardous and Non-Hazardous Waste	3,508,000
Mobilization of Workers Required for Reclamation	437,000
Worker Accommodation & Camp Operation	1,198,000
Mobilization and Demobilization of Equipment and Materials	16,282,000
Post Closure Monitoring	1,233,000
Supervision, Project Management and Contract Administration	636,000
Engineering Fees	264,000
Contingency	3,083,000
2018 Reconciliation	355,000
Grand total	**35,146,425**
Amount carried in Table 4-1 under column E of the 2019 Marginal Closure and Reclamation Financial Security	35,128,000

All costs presented in the Table 3-1 were not distributed by liability of land ownership.

3.3.4 BIMC 2018 Global Security Estimate

As presented in Table 4-1 of the 2019 Marginal Closure and Reclamation Financial Security, the total posted Global Security Estimate from the 2018 Addendum Estimate under the Type A (2AM-MRY1325) Licence is $75,128,326.

As comparison, it was estimated at 75,035,673 in Arcadis (2018) and $70,031,000 from Global estimated (Table 2-1 of 2019 Marginal Work Plan).

3.3.5 BIMC Total Global Estimated for 2019/2020

The aggregate of the Global Estimate from 2018 Addendum Estimate, 2018 Unit Rate Adjustment, 2019 Estimate, including 2018 Reconciliation, and Total “Global” estimated Security for 2019 is valued by BIMC at $97,258,000.

The distribution of liabilities by land ownership land use is tabulated below:

Table 3-2 Summary of Total "Global" estimated Security for 2019

Authorization	Liability	Total "Global" estimated Security for 2019 ($)
Type A2AM-MRY1325	IOL	95,480,000
	Crown	1,779,000
	Water	19,689,000
	Land	77,568,878
Sub-total Type A		**97,259,000**

This amount is shown under Column F of Table 9-1 in Appendix C.

3.4 Direct Cost

The Direct Cost for the SNC-Lavalin 2019 RECLAIM Global Estimate and marginal Estimate is presented respectively in Appendix A and Appendix B and used the new unit rates provided by BIMC in the Table 1-2 of the Appendix B of the Baffinland Iron Mines Corporation 2019 Work Plan in Appendix C. The application of the new unit rates in the RECLAIM Global estimate reduce the aggregate of the RECLAIM GLOBAL ASR and the 2018/2019 RECLAIM Marginal ASR by the ARCADIS evaluation dated February 12, 2018 to an estimate of $69,348,915 which represents an overall reduction of $6,003,513. This reduction is divided between IOL ($5,571,821) and Crown land ($431,692) liability

The Land and Water Liability costs with new unit rates are presented in these worksheets.

In summary, the 2019 direct costs for Land Liability (Global + Marginal) have been calculated to be $39,214,926 while the Water Liability has been calculated to be $5,610,489. Given that the site almost entirely contained within the IOL lands the majority of the liability has been assigned to the IOL (98.4%) while the balance or 1.6% has been assigned to the Crown. These percentages translate to $44,096,001 for the IOL and $729,414 for the Crown.

The following sub-sections are divided into the respective work groupings used in the RECLAIM model. The quantities used within the respective worksheets are based on information provided by BIMC, SNC-Lavalin review of the site during the site visit and existing information. The new unit rates used by SNC-Lavalin were provided by BIMC in the Table 1-2 of the Appendix B of the Baffinland Iron Mines Corporation 2019 Work Plan in Appendix C. The new unit rates were analysed and the proposed reduction is reasonable. However those unit rates are not consistent with the rates used by BIMC in their EBS as they used lower unit rates than reported their work plan.

3.4.1 Open Pit

3.4.1.1 Global RECLAIM

Except the unit rates, the assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.4.1.2 Marginal RECLAIM

BIMC's 2019 Marginal Estimate includes the following planned work:

- Development of four (4) new quarries and expansion of the previously proposed quarry Q5, and the expansion of the existing quarry Q1 with a total footprint of 2,328,287 m^2.

3.4.2 Underground Mine

Not applicable.

3.4.3 Tailing Facility

Not applicable.

3.4.4 Waste Rock Pile

3.4.4.1 Global RECLAIM

Except the unit rates, the assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.4.4.2 Marginal RECLAIM

No cost was found in the BIMC's 2019 Marginal Estimate.

3.4.5 Building and Equipment

3.4.5.1 Global RECLAIM

Except the unit rates, the assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.4.5.2 Marginal RECLAIM

BIMC's 2019 Marginal Estimate includes the following planned work:

- Mobilization of various trailers and offices (1,573 m^2);
- Mobilization of washcars and washroom facility (72 m^2);

- Mobilization and assembly of a heated fold away building (contaminated) at the new KM110 laydown area for maintenance of mine operations equipment (1,500 m^2);
- Construction of the Tote Road laydowns totalling a footprint of 285,000 m^2;
- Expansion of the proposed (2018) laydown LP2 at Milne Port by 30,000 m^2;
- Expansion of the Mine Site Crusher Pad (12,000 m^2) and associated sedimentation pond (2,000 m^2)
- Construction of laydowns at the Mine Site (KM110.5, KM107.5, expansion of the 800 person camp pad, WRF Water Treatment Plant pad) with a total footprint of 286,500 m^2;
- Expansion of the landfill footprint from the existing 13,000 m^2 to a total of 76,000 m^2, representing an increase in disturbed area of 63,000 m^2;
- Construction of the KM107 Run of Mine Stockpile and access road (133,400 m^2) and associated sedimentation pond (7,400 m^2);
- Construction of the Mine Site bulk fuel storage facility at a total footprint of 21,620 m^2 with a lined footprint of 12,000 m^2;
- Expansion of the Milne Port Ore Stockpile pad by 140,000 m^2, and the construction of a new associated sedimentation pond (15,000 m^2);
- Construction of the east sedimentation pond (No. 2a) at the Milne Port Ore Stockpile with a lined footprint of 4,400 m^2;
- Construction of a new contaminated snow dump/oily water containment area at Milne Port with a lined footprint of 2,700 m^2;
- Construction of new hazardous waste berms at the Mine Site and Milne Port with a total area of 360 m^2 per berm;
- The mobile and mechanical equipment to be delivered to the Mary River Project in 2019 are summarized by category in Table 3-3;

Table 3-3 Mobile and Mechanical Equipment to be delivered to Project in 2019

Type/ Location	Heavy Mobile	Medium Mobile	Light Mobile	Heavy Mechanical	Medium Mechanical	Light Mechanical	Total
Total	67	62	94	8	1	29	261

- The mobilization of additional water and fuel tanks to the Project Site in 2019 are summarized in Table 3-4;

Table 3-4 Summary of Marginal Increase of Storage Tanks

Description	Unit Rate Type	Quantity (ea)
Water Tanks	Light Tank	6
Fuel Tanks	Light Diesel Tank	5
	Medium Mobile Diesel Tank	7
	Largest Diesel Tanks	2

- Installation of 365 m of new culverts at within the Tote Road area and the Mine Site area;
- Proposed desalination plant to be mobilized to Milne Port in 2019;
- Marginal increase of demolition materials to be disposed of on-site. Based on an additional 2,664 m^2 of compacted material requiring fill application at an assumed disposal depth of six (6) meters.

SNC-Lavalin noted some observations from BIMC's 2019 Marginal Estimate:

- While the expansion of the landfill footprint from the existing 13,000 m^2 to a total of 76,000 m^2, representing an increase in disturbed area of 63,000 m^2 is listed in section 3.3.1.3 of the 2019 Marginal Closure and Reclamation Financial Security Estimate (Rev.0, November 1st, 2018) document, the disturbed area was located in the EBS Excel file submitted by BIMC and was considered and accounted in 2018.

3.4.6 Chemical and Contaminated Soil Management

3.4.6.1 Global RECLAIM

The assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.4.6.2 Marginal RECLAIM

The unit rates used by BIMC for the demobilization of ammonium nitrate are consistent with previous rates used and were used for the SNC-Lavalin RECLAIM.

3.4.7 Surface and Groundwater Management

3.4.7.1 Global RECLAIM

Except the unit rates, the assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.4.7.2 Marginal RECLAIM

No cost was found in the BIMC's 2019 Marginal Estimate.

3.4.8 Interim Care and Maintenance

Refer to section 3.5.2.

3.4.9 Summary of Direct Cost Review

The updated 2019 Marginal Estimated using RECLAIM Version 7 represents a total of direct costs of $10,661,662.The costs are summarized in Table 3-4.

Table 3-4 Summary of Direct Costs

Cost Item	Subtotal (Land and Water Liability)
Direct Costs	
Open pit	$3,477,111
Mary River Mine Pit	*$3,477,111*
Underground Mine	$0
Tailings Facility	$0
Rock Pile	$0
Buildings and Equipment	$3,676,150
Mine Site	*$2,874,355*
Milne Port	*$372,171*
Tote Road	*$429,625*
Chemicals and Contaminated Soil Management	$3,508,400
Surface and Groundwater Management	$0
Interim Care and Maintenance	$0
Subtotal Direct Costs	**$10,661,662**

Refer to Appendix A for the RECLAIM spreadsheets, presenting the detailed breakdown of costs by mine components.

3.5 Indirect Cost

The indirect costs include the cost related to post-closure monitoring and maintenance, mobilization and demobilization, as well as some cost factors such as contingency, engineering, project management, health and safety/QA-QC/engagement costs, bonding/insurance and contingency.

The indirect cost for the SNC-Lavalin 2019 RECLAIM Global Estimate and marginal Estimate is presented respectively in Appendix A and Appendix B.

The Land and Water Liability costs are presented in these worksheets.

In summary, indirect costs for the Land Liability (Global + Marginal) have been calculated to be $56,617,599, while the Water Liability has been calculated to be $5,810,734. Given that the site almost entirely contained within the IOL lands the majority of the liability has been assigned to the IOL (98.8%) while 1.2% has been assigned to the Crown. These percentages translate to $61,708,946 for the IOL and $719,387 for the Crown.

The following sub-sections are divided into the respective work groupings used in the RECLAIM model.

Unless notes, BIMC applied similar indirect unit rates and multipliers as in previous EBS estimates. These are described in the 2014 Complete Project Financial Security Assessment (H349000-1000-07-126-0018, Rev. 1) report.

3.5.1 Mobilization and Demobilization

3.5.1.1 Global RECLAIM

The assumptions and conclusions outlined in the ARCADIS evaluation dated February 12, 2018 remain valid for the purposes of this assessment and as such the costs provided in the 2019 ASR RECLAIM model for the Global security have been used herein.

3.5.1.2 Marginal RECLAIM

BIMC's 2019 Marginal Estimate includes the following mobilization and demobilization:

- Demobilization of fuel stored on Site, and the mobilization of fuel required for the marginal increase in reclamation activities. Fuel mobilization rate is assumed to be $0.40/L;
- Mobilization of Workers Required for Reclamation;
- Cost per person-day on site for worker mobilization from southern communities is $85.45/person-day on-site;
- Cost per person-day on site for worker mobilization from northern communities is $75.00/person-day on-site;
- Worker accommodation and camp operation during marginal reclamation activities associated with the 2019 Estimate. Person-hours required to complete direct cost related on-site marginal

reclamation activities is estimated to be 53,120 hrs or 5,312 person-days (based on 10hr/day productivity);

- Cost for accommodation and camp operation is assumed to be $225.50/person-day and includes camp maintenance, catering, housekeeping, and fuel costs;
- Mobilization and demobilization of equipment and materials. The amount is based the assumption that mobilization and demobilization cost are estimated as 10% of total direct costs;
- Demobilization of the Phase 2 Expansion Project Materials and Equipment;
- Based on discussions with QIA in 2018 regarding the previous estimation of demobilizing the equipment, Baffinland utilized a unit rate of $68/m^3 for an estimated volume of 229,289 m^3 of material that would be required to be backhauled from the Site in the event of unforeseen closure, prior to the approval of the Phase 2 expansion and subsequent construction and installation of this equipment. It is recognized that the costs associated with this equipment are solely related to backhaul, and will need to be re-assessed prior to their installation following approval of the Phase 2 expansion;
- Demobilization of hazardous waste materials associated with the Water Treatment Plant at the Waste Rock Facility.

3.5.2 Post-Closure Monitoring and Maintenance

In 2016 Marginal Closure and Reclamation Financial Security Estimate, a total of $3,430,000 was allocated for Post Closure Monitoring cost. In 2017 Global Reclaim $1,560,000 has been already considered. From Table 4-8 of 2019 BIMC's Marginal Estimate SNC-Lavalin assumed a total of $3,430,000 in 2019 Marginal Reclaim increase so a total of $4,990,000 would be accounted for. It was noted that "Short Term Temporary Care and Maintenance Program" as well as Year 0 and Year 1 of the other items should be considered in ICM cost instead of in Post-Closure Monitoring and Maintenance cost.

3.5.3 Engineering

As used by BIMC in 2019 Marginal Increase, 3.9% of direct costs for engineering, design and execution planning fees was also used in SNC-Lavalin's Marginal Reclaim. Exact indirect cost allowance for that is shown in Table 3-5.

Indirect costs should reflect the stage of completion of the project. If BIMC are not in engineering detailed phases, they should increase the level of indirect costs according to engineering stage.

3.5.4 Project Management

Also used by BIMC for both The Global and Marginal Estimates, SNC-Lavalin used in the 2019 Marginal Reclaim a proportion of 9.4% of direct costs for project supervision, management and contract administration. Exact indirect cost allowance for that is shown in Table 3-5.

3.5.5 Health and Safety Plans/Monitoring and QA/QC

SNC-Lavalin assumed that the costs associated with health and safety plans, monitoring and QA/QC are considered under Engineering and Project Management since no detail was found in the BIMC's 2019 Marginal Estimate document.

3.5.6 Bonding/Insurance

While these items haven't been carried by BIMC, SNC-Lavalin used 2% of direct costs for bonding and insurance fees, which is the same percentage used in the latest BIMC Global and Marginal Estimates.

3.5.7 Contingency

As described in BIMC's Marginal Estimate, the contingency suggested for the Marginal security evaluation is 12.5%. In the latest BIMC Global and Marginal Estimates as well as in Arcadis (2018) the contingency is rather 15%. Given the level of uncertainty the contingency should be increased to 20% to cover all the uncertainties and items mentioned in section 3.6.

3.5.8 Market Factor Adjustment

No market factor adjustment was used by SNC-Lavalin in 2019 Marginal Estimate. This is consistent with BIMC approach since no detail was found in BIMC's 2019 document.

3.5.9 Summary of Indirect Cost Review

The updated 2019 Marginal Estimated using RECLAIM Version 7 represents a total of indirect costs of $27,243,171.The costs are summarized in Table 3-5 presented below.

Table 3-5 Summary of Indirect Costs

Cost Item	Subtotal (Land and Water Liability)
Indirect Costs	
Mobilization/Demobilization	$20,049,605
Post-Closure Monitoring and Maintenance	$3,430,000
Engineering (3.9%)	$415,805
Project Management (9.4%)	$1,002,196
Health and Safety Plans/Monitoring, QA/QC and Engagement Costs (0%)	$0
Bonding/Insurance (2%)	$213,233
Contingency (20%)	$2,132,332
Market Price Factor Adjustment (0%)	$0
Subtotal Indirect Costs	**$27,243,171**

3.6 General Security Cost Review of Mary Project for 2018

3.6.1 Mine closure general criteria

In terms of mine reclamation, land and site will return to the community, and long-term criteria are the main focus where closure should look at in terms of design criteria. From CIRNAC guidelines, closure principals are:

- Physical stability;
- Chemical stability;
- No long-term active care;
- Future use (including aesthetics and value).

3.6.2 Mary River Licence Approach

Closure and reclamation costs for the Mary River Project are determined under the Annual Security Review (ASR) process conducted in accordance with Schedule C of the Type "A" Water Licence Amendment No. 1 2AM-MRY1325 and Commercial Lease No. Q13C301. Under the ASR process, Baffinland, the respective landowners (QIA & the Crown), the NWB, and other interested parties confer to determine the estimated closure and reclamation costs for an upcoming year on an annual basis. This approach allows for Baffinland to post financial security in incremental adjustments prior to the beginning of work.

3.6.3 Security Cost review for Mine Site Reclamation

According to the requirements of CIRNAC's Mine Site Reclamation Policy for Nunavut (2002), the total financial security for final reclamation required at any time during the life of the mine should be equal to the total outstanding reclamation liability for land and water combined (calculated at the beginning of the work year, to be sufficient to cover the highest liability over that time period).

The following sections are usual requirements in regards to the global objective of reclamation to confirm whether the securities BIMC proposed to apply to Crown-owned and Inuit-owned land in 2018/19 are satisfactory to meet the highest reclamation liability and the requirement of Nunavut Policy for Mine Site Reclamation.

If a hypothetical site abandonment occurs, some items are not included in the Security cost, but will have to be complete to reclaim the site. Section 3.6 highlights where there is no cost or security in the 2017 Marginal and Global Reclaim model and the 2019 work plan in regards to reclamation and closure criteria. Section follows Reclaim model tabs (work groupings).

3.6.3.1 Open Pit

Cost for studies needed at the end of mine (open pit) operation should be added to the security estimate to secure the access and for water management (pit flooding). In the Reclaim conciliation estimate, there is no cost for:

- Stabilized slopes:
  - As a minimum over the expected water level (flooding), terrain should be sloped and stabilized.
- Construct diversion ditches and spillway:
  - 2017 Interim closure plan proposed that water will join natural environment and flow to the final spillway. Water infrastructures (ditch/intermediate spillway) should be planned between the open pit and final spillway of the mine site.
- Control access (fence, or others);
- Conduct stability study;
- Contingency for unit of water treatment:
  - Any extension of the open pit should rely on geochemical characterization and prediction of water quality.

Security costs for these items should be validated, and so added to the security estimates.

3.6.3.2 Rock Pile

In the interim closure plan (Baffinland, 2017[1]), conditions in regards to reclamation of rock piles are:

- The waste rock stockpile will be monitored during operations. It is anticipated, based on current investigations, that most of the waste rock will not be prone to metal leaching or acid drainage;
- However, if ongoing ore characterization studies show that the minor portion of waste rock that is potentially acid generating (PAG) could cause unacceptable impact to runoff and seepage, the waste rock stockpile construction strategy will be modified accordingly. Baffinland will implement, on an as needed basis, any measures required to ensure:
  - Generation of poor water quality from waste rock piles has been minimized, including that from:
    - Acid Rock Drainage/Metal Leaching (ARD/ML);
    - Surface runoff and seepage water quality is safe for humans and wildlife.
- The pile is physically and geotechnically stable for human and wildlife safety in the long-term;
- The risks of erosion, thaw settlement, slope failure, collapse, and the release of contaminants or sediments have been minimized;
- Dust levels are safe for people, vegetation, aquatic life, and wildlife in the long-term.

[1] Section 5.1.1.6 of the interim closure plan

From CIRNAC guidelines, the specific objectives of Baffinland closure design criteria are:

- Develop and implement preventive and control strategies to effectively minimize the potential for ARD and ML to occur;
- Where ARD and ML are occurring as a result of mine activities, mitigate and minimize impacts to the environment;
- Re-establish the pre-mining ground cover, which may involve encouraging self-sustainable indigenous vegetation growth.

The main concern identified by Arcadis during the 2017 geotechnical inspection of the site is related to the stability of the earthworks of certain discrete containment structures. The water quality in one of the containment structures was also reported to have a low pH, which is indicative of an acid rock drainage concern within the waste rock stockpile area.

- How this will influence future security estimates is unclear; however, it is understood that BIMC is looking to amend the 2018 Work Plan once a course of action is planned for this coming summer. It is understood that the amendment to the 2018 Work Plan will also include an amendment to the security being held for the project to address the possibility of future and long-term surface water management within the vicinity of the waste rock stockpile (Arcadis, 2018).

Acidic water[2] was still observed in 2018 and no security appears in BIMC 2018 estimates as an amendment to address risks of long-term performance of waste rock pile.

From the closure cost estimation, the interim closure plan, licences to operate, and observations from field visit, some aspects to meet these criteria are missing in the global security estimation as:

- Validation regarding the reclamation strategy of the waste rocks piles. Until studies could conclude that there will not be any Acid Rock Drainage/Metal Leaching in short and long term, an additional contingency regarding a proper cover or design should be added to the closure cost estimate.

Other aspects regarding reclamation criteria should be looked at and included somewhere in the security estimate:

- Mitigation for dust emission during and mostly for final reclamation;
- Strategy and studies to ensure a cover for vegetation growth;
- Validation about Global Warming effect on the reclamation strategy of the waste rock piles design (long term viability) with onsite conditions (revalidate rock management plan and geochemical analysis);

[2] Was reported at the field visit (August 24th) and during meetings between SNC-Lavalin and Indigenous and Northern Affairs Canada

Baffinland is in northern conditions and permafrost prevails in the surrounding natural land. It was therefore conceivable to assume that the potentially acid waste rocks would quickly integrate into the permafrost. This method keeps mine rocks permanently frozen to prevent acid generation or metal leaching. To avoid contaminant dispersion into the environment and for the reclamation concept to be viable as a long-term option, the conception criteria related to this concept has to ensure that potentially acid waste rocks will remain frozen in the long-term, even during extremely warm year conditions and considering the predictions of temperature and precipitation increase related to climate change. Studies about waste rock management and reclamation have considered the depth of the active layer under warming conditions from climatic change model available (50 metres from the 2017 interim closure plan). Studies and scientific advances should highlight the effects of climate change on the viability of the concept of permanently frozen waste rocks after closure. The risk of partial or complete extinction of the permafrost, while taking into consideration the current permafrost environment at the Baffin land Mine site should be taken into consideration regarding closure design and waste rock management as ARD and Metals leaching have already started on the site.

Also, a new geochemical investigation should confirm ARD/Metals leaching potential of waste rocks in regards of the latest results of low pH from the rock pile. Geology (geological lithology) from the open pit should be compared and validated with the initial geochemical database.

All this information may be included in other documentation or studies conducted by the mine, but neither are reflected in the interim closure plan, nor in the global security estimation. Closure cost should be based on other reclamation concept (as a cover) until the Baffinland mine could validate that they could manage ARD and metals leaching with their waste rock management plan.

Based on our experiences and similar project, cost to reclaim similar materials (potentially ARD waste rock) in a permafrost environment could represent $100 000 to $300 000 per hectare.

As a minimum, cost for studies and instrumentation should be included in the Security estimates.

3.6.3.3 Chemicals

The amount in the Reclaim 2017 model regarding contaminated soil treatment is $238 904 and $62 549 as a marginal increase from work plan 2018.

Closure and reclamation cost should include cost for:

- Buildings decontamination & consolidation of hazardous materials;
- Contaminated soil removal.

One of the observations from geotechnical inspection report (2018, SLI):

- Most of the hazardous waste containment facilities are early facilities associated with exploration/early production phase. The hazardous waste containment requirements should be re-established and progressive closure of some of these earlier facilities and upgrading of the rest should be considered.

Mining activities at Baffinland Mine can potentially lead to contamination of underlying and adjacent soils.

In order to foresee the effect of potential soil contamination below the infrastructure in place, roads, the port and because rocks characterization suggested some lithology to be potentially Acid Rock Drainage/Metal Leaching, enough contingency should be put in place for contaminated soil management at the end of the mine-of-life.

Guidance and experiences suggest that a minimum of percentage of impacted surface should be considered to have to be treated as contaminated soil. As an example, the closure plan could consider 10% of the Mine surface infrastructures that will have to be decontaminated. Unit cost of this contingency should include, as a minimum:

- Excavation and transport (onsite and offsite);
- Contaminated soil treatment.

3.6.3.4 Water Management & Water Treatment

The following table for short or long term water treatment is presented in the reclaim model Excel worksheet. Most of these items listed have no cost in neither the global nor the marginal cost estimate.

Table 3-6 Guidance for Short and Long Term Water Treatment

The following table provides guidance as to whether water management and treatment is considered short term or long term. Short term closure activities may be costed within a component (eg 'Open Pit' or 'Rock Pile') or 'Water Management'. Long term or post-closure water treatment is costed in 'Water Treatment'.

		Short Term/ Capital Ex.	Long term/ NPV
Open Pit	flood pit - install/operate pumping system	x	
	construct diversion ditches	x	
	treat 1st filling	x	
	install pump/decant system	x	
	passive/biological treatment	x	
	overflow treatment		x
Rock Pile/Heap Leach Facility	construct diversion ditches	x	
	install groundwater collection system	x	
	install toe seepage collection system	x	
	collect and treat groundwater		x
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
	operate pump and detoxify heap leach pile (cyanide destruction)	x	
Tailings Facility	construct diversion ditches	x	
	pump supernatant (to pit, U/G)	x	
	treat supernatant	x	
	install toe seepage collection system	x	
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
U/G Mine	accelerate flooding	x	
	install seepage collection system	x	
	install dewatering/pumping system	x	
	operate seepage/dewatering system (ARD/ML)		x
Water Management	refill lakes		
	redirect creeks/streams	x	
	stabilize water management ponds	x	
	stabilize/close sediment ponds	x	
	fresh water supply - breach embankment	x	
	fresh water supply - remove piping system	x	
	construct water treatment plant	x	
	construct sludge pond	x	
	water control in reclamation quarry	x	
	operate/maintain water treatment plant		x

From this table, cost to operate and maintain passive system and cost for water treatment system should be added to the Security closure cost.

The rate of oxidation of waste rocks (already in progress) resulting in an increase in metal concentrations could increase or bring cost for water treatment in the short, middle and long term. As they need to treat water during operations, water treatment should be included for a minimum of 5 to 10 years in Security cost estimates.

Cost to stabilize sediment ponds/water management ponds and sludge management has not been found in the Security estimate and should also be considered.

3.6.3.5 Interim Care & Maintenance

From the 2019 work plan, items of care and maintenance have been included in post-closure cost in the 2019 Marginal closure and reclamation financial security estimate. The amount for temporary care and maintenance is $200,000. In the 2018 Global Reclaim the amount is $1,116,000.

Interim care and maintenance on 18 months only should be confirmed from BIMC licences and authorization, as Nunavut policy recommend a scenario around 5 years of interim cares and maintenance for reclamation cost estimates.

3.6.3.6 Post Closure

In 2016 Marginal Closure and Reclamation Financial Security Estimate, a total of $3,766,000 was allocated for Post Closure Monitoring cost. In 2017 Global Reclaim $1,560,000 has been accounted for. From Table 4-8 of 2019 BIMC's Marginal Estimate SNC-Lavalin assumed a total of $3,766,000 in 2019 Marginal Reclaim increase.

SNC understands that a total of $4.99M will be in the financial Security. If not, the total amount for post closure monitoring should be clarified and confirmed.

Nunavut policy recommends 25 of post closure for reclamation cost estimates. Regarding the waste pile design (permafrost) and the nature of waste rock (some ARD and metals leaching), frequency should be increases to 25 years initially and can be reduced after analysis of monitoring data demonstrates site stability.

An additional measure recommended is to monitor and put in place instruments (thermistors) into the waste rock pile to validate the concept. Baffinland's environmental responsibility may increase due to long-term environmental monitoring (follow-up will be longer, changes may be requested during follow-up depending on the outcome).

4.0 CONCLUSION

4.1 Summary of Costs

The updated 2019 estimated Marginal Reclaim using RECLAIM Version 7.0 represents a total of $37,904,833. This total includes $10,661,662 of direct costs and $27,243,171 of indirect costs. The costs are summarized in Table 4-1 presented on the next page. Refer to Appendix B for the RECLAIM spreadsheets, presenting the detailed breakdown of closure costs by mine components.

Table 4-1 Summary of Costs

Cost Item	Subtotal with BIMC 2018 Unit Rates (Land and Water Liability)
Direct Costs	
Open pit	$3,477,111
Mary River Mine Pit	*$3,477,111*
Underground Mine	$0
Tailings Facility	$0
Rock Pile	$0
Buildings and Equipment	$3,676,150
Mine Site	*$2,874,355*
Milne Port	*$372,171*
Tote Road	*$429,625*
Chemicals and Contaminated Soil Management	$3,508,400
Surface and Groundwater Management	$0
Interim Care and Maintenance	$0
Subtotal Direct Costs	**$10,661,662**
Indirect Costs	
Mobilization/Demobilization	$20,049,605
Post-Closure Monitoring and Maintenance	$3,430,000
Engineering (3.9%)	$415,805
Project Management (9.4%)	$1,002,196
Health and Safety Plans/Monitoring, QA/QC and Engagement Costs (0%)	$0
Bonding/Insurance (2%)	$213,233
Contingency (20%)	$2,132,332
Market Price Factor Adjustment (0%)	$0
Subtotal Indirect Costs	**$27,243,171**
GRAND TOTAL	$37,904,833

The 2019 Global RECLAIM Estimate (2018 Global + Marginal) have been calculated to a total of $69,348,915. This total includes $34,163,753 of direct costs and $35,185,162 of indirect costs.

With 2019 Marginal Reclaim Estimate, which is detailed in sections 3.4 and 3.5, it would come down for a new total of $107,253,748 when the Marginal will be merged for a new Global Reclaim Model using the new unit rates provided by BIMC in the Table 1-2 of the Appendix B of the Baffinland Iron Mines Corporation 2019 Work Plan in Appendix C.

As a reminder, new RECLAIM unit rates for the work are not consistent with the rates used in the EBS by BIMC in the 2019 Marginal Closure and Reclamation Financial Security Estimate (BIMC 2018), as described in sections 3.1 and 3.4. The total difference with indirect costs between 2019 Marginal Estimate with new RECLAIM unit rates and BIMC's is $2,776,833.

Application of the new unit rates in the RECLAIM Global estimate reduces the aggregate of the RECLAIM GLOBAL ASR and the 2018/2019 RECLAIM Marginal ASR by the ARCADIS evaluation dated February 12, 2018 to an estimate of $69,348,915 which represents an overall reduction of $6,003,513. This reduction is divided between IOL ($5,571,821) and Crown land ($431,692) liability.

4.2 Recommendations

4.2.1 Cost conciliation (BIMC's model and RECLAIM model)

- It was noted that "Short Term Temporary Care and Maintenance Program" as well as Year 0 and Year 1 of the other items should be considered in ICM cost instead of in Post-Closure Monitoring and Maintenance cost. ICM should be separated from Post-closure cost as it is in the RECLAIM worksheet for better evaluation and understanding;

- BIMC reduction of closure cost from 2019 work plan to 2018 Global Estimate ($7,901,310) were not validated. New unit rates in the RECLAIM Global estimate reduce the closure cost by $6,003,513. The difference is mainly due to the different in the unit rates reported in the Table 1-2 of the Appendix B of the Baffinland Iron Mines Corporation 2019 Work Plan in Appendix C and the unit rates used by BIMC in their EBS.

- SNC-Lavalin increase from 12,5% to 20 % the contingency in the Marginal cost to address the uncertainty associated with acid rock drainage at the waste rock pile; however the best practice would be to add those elements to the direct cost of the Security estimate instead of increasing the contingency.

- Indirect cost of 3,9% for engineering should be validated. Indirect cost should reflect the stage of completion of the project. If BIMC are not in engineering detailed phases, they should increase the level of indirect according to engineering stage.

- The need to adjust closure cost in a different model year over year may introduce many errors in the Security estimate as such it would be recommended that Baffinland present their closure estimate in RECLAIM format as recommended in CIRNAC guidelines.

4.2.2 General

- In terms of mine reclamation, land and site will return to the community. Baffinland Interim Closure and Reclamation Plan and financial Security estimate should reflect design criteria of the waste rock pile design by incorporating the following:
  - The risk of not completing a progressive reclamation of the waste rocks pile during the operation include, but are not limited, to increase the rate of oxidation of waste rocks (already in progress) resulting in increase in metal concentrations and cost for water treatment in the short, middle and long term;
  - Waste rock management plan and operations should promptly be reviewed and validated to minimize the time of waste rock exposure and oxidation;
  - Closure cost should be based on other reclamation concept (as a cover) until the Baffinland mine could validate that they could manage ARD and metals leaching with their waste rock management plan. They should validate geology and geochemistry of waste rocks and rock pile closure design (based on permafrost);
  - Fugitive dust settling on cover must be prevented as a minimum for site reclamation, and a cover layer that will be sustainable for long-term vegetation should be validated too and included in closure cost;
  - Review long-term design criteria of BIMC according to state-of-the art and other mine sites in permafrost conditions, and/or regarding ARD characterization;
  - Cost for studies and instrumentation not in place yet or needed at the end of mine operations at Baffinland site should be added to the security estimate;
  - Security should be adjusted for waste rocks pile as long as they could prove the viability of their concept.
- Interim care and maintenance should be increased to 5 years, and post-closure cost to 25 years according to Nunavut Guidelines;
- The contingency should be increased to cover all the uncertainties and items mentioned in section 3.6. The best practice would be to add those elements in the direct cost of the Security estimate instead of increasing the contingency.

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5.0 Personnel

This report has been prepared by Alain Lebel, Philippe Lemieux, Martine Paradis and Denis Vachon and revised by Denis Vachon and Martine Paradis.

We trust that this report is to your satisfaction and we will be available to discuss if you have any question regarding this report.

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DV/MP

6.0 References

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CIRNAC Mine Site Reclamation Policy for Nunavut (CIRNAC, 2002)

SNC Lavalin Inc, 2018. Geotechnical Site Inspections. October 31, 2018.

2AM-MRY1325 Mary River Project: CIRNAC contribution to 2018 Annual Security Review – with Arcadis Canada Inc. estimate, February 9, 2018.

2AM-MRY1325 ASR Process Guidance, Nunavut Water board, November 2 2018.

Baffinland Iron Mines Corporation Responses to intervener submissions 2019 ASR, December 10, 2018

Baffinland Iron Mines Corporation 2019 Annual Security Review summary presentation, December 13, 2018

Appendix C: 2014 Complete Project Financial Security Assessment Report Rev.1, October 31, 2014

6.1 Guidelines

Aboriginal Affairs and Northern Development Canada (AANDC), 2007. Mine Site Reclamation Guidelines for the Northwest Territories. Formerly Indian and Northern Affairs Canada (INAC). January 2007.

Aboriginal Affairs and Northern Development Canada and Mackenzie Valley Land and Water Board (AANDC/MVLWB), 2013. Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. November 2013.

Aboriginal Affairs and Northern Development Canada and Mackenzie Valley Land and Water Board (AANDC/MVLWB/INAC/GNWT), 2017. Guidelines for the Closure and Reclamation Cost Estimates for Mines. November 2017.

Crown-Indigenous Relations and Northern Affairs Canada. Guidelines for duration of interim care & maintenance and post-closure monitoring in mine site closure & reclamation plan cost estimates for Nunavut.

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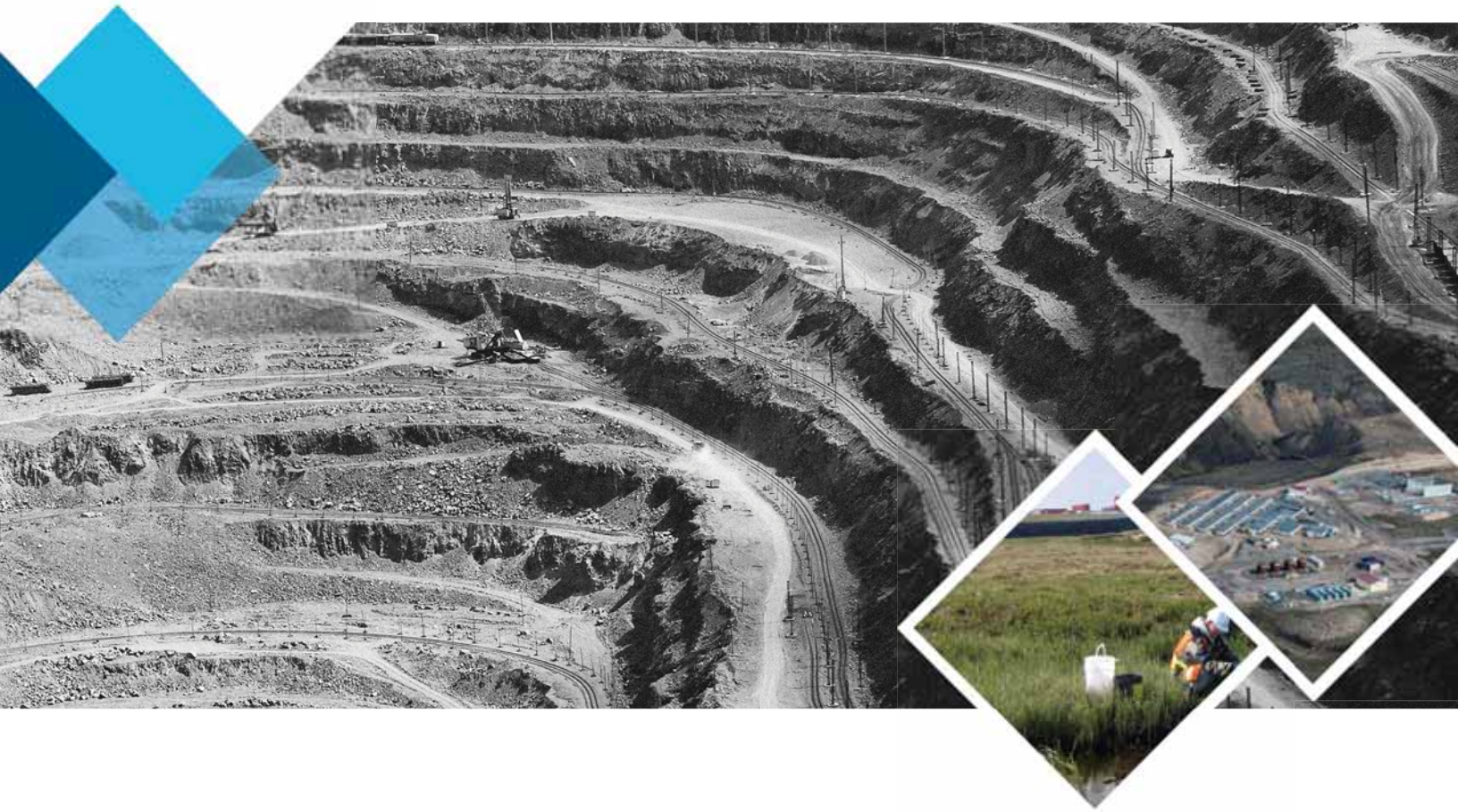
Mary River Project

Report of mine reclamation cost estimate update for the 2019 Annual Security Review process for the type A Water Licence 2AM-MRY1325

APPENDICES

Crown-Indigenous Relations and Northern Affairs Canada



Mining & Metallurgy

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Internal ref. 658342-3000-4GER-0001

Appendix A

SNC-Lavalin 2018 RECLAIM Global Estimate

Project Name: *nd Iron Mine (Bas*

Reclaim Model - Overview of Program

All users are urged to read the Reclaim Model User Manual - Scroll down for overview description of program.

Important! Reclaim 7.0 works better with no other excel files open.
If other excel files are open ignore run time error and proceed

Reclaim Menu	The default Excel menu bar has an additional tab labelled "Add-Ins" that provides options specific to the Reclaim Model.
Clear	This option deletes all input data, deletes any duplicated elements and blanks out the project name. It also allows for segregation into land costs vs water costs if required.
Duplicate	This option Duplicates components of the project. E.g. if there is more than one Open Pit, use duplicate to add a second Open Pit. Quantities for the new Open Pit are erased, but the Activities and Cost Codes are carried over from the original Open Pit. The new Open Pit subtotal is added to the Summary page.
Unit Costs	This option opens a window of unit costs to provide easy reference. NOTE: the unit cost table has a filter in the 'UNITS' column. You can select to only see a particular unit (eg km) or multiple units (km and m3) or all units.
Print All	This option prints the Summary Worksheet, Unit Cost Worksheet, and the individual component worksheets having non-zero balances. Individual worksheets can be printed directly using standard printing methods, such as Ctl - P.
Quit	Select Quit to exit the program
Help	Redirects user to Instructions worksheet.

WorkSheets	
Summary	This worksheet contains a cumulative summary of costs for each component of the project. Associated costs such as engineering and project management are added as a percentage of the component costs.
Components	Costs are derived for individual closure and reclamation activities by multiplying a "quantity" of activity by a "unit cost". An activity can be edited, added, or deleted from worksheet. However, care should be taken not to modify cells that are defined and used elsewhere in the program. ***Do not change the content or column width of the first column of each component worksheet.***
Unit Costs	This worksheet contains a look up table with costs for typical work associated with each closure and reclamation activity

Limitations	***The Reclaim Program will NOT work if the worksheets are changed such that the following requirements are not met. Please review the following prior to modifiying worksheets.***
WorkSheet Names	*The names of the worksheets must not be changed.*
Defined Names	Certain cells have defined names, which must not be changed. Where the cell is named, the name will appear in the "Name Box" to the left of the formula bar.
First line of data	The first line of data for any component worksheet starts on line 4. ***Do not change the first line of a component worksheet, ie the component name.***
Cell A1	Cell A1 on the component sheet MUST always contain the count of that component for the duplicate function to operate. ***DO NOT CHANGE.***
Adding Lines	You can add lines to components and the unit cost table, as long as they are not the last lines. The last line might fall outside the named ranges. You can check the size of the named range by selecting the name from the drop down box at the top left of the sheet. Usually this box has a cell reference, or a name.
Printing	A component will only be printed if its sub-total is greater than zero. In addition, a component and the summary sheet cannot be printed if there is an error. Printing has been set to print 1 page per component.

Conditions of Use	The Reclamation Cost Estimating Model was prepared to serve as a guide for Government Agencies, mining companies, and others to estimate the cost of mine reclamation. This model is not intended to replace reclamation planning or to be used to determine the activities required to reclaim a site or to dictate how much should be spent on reclamation. Reclaim was prepared by Brodie Consulting Ltd. on behalf of AANDC. AANDC and Brodie Consulting Ltd. are not responsible for the completeness or accuracy of any reclamation estimate made using this model. The user agrees to check and take responsibility for all aspects of any cost estimate made using this model.

The following table provides guidance as to whether water management and treatment is considered short term or long term. Short term closure activities may be costed within a component (eg 'Open Pit' or 'Rock Pile') or 'Water Management'. Long term or post-closure water treatment is costed in 'Water Treatment'.

		Short Term/ Capital Ex.	Long term/ NPV
Open Pit	flood pit - install/operate pumping system	x	
	construct diversion ditches	x	
	treat 1st filling	x	
	install pump/decant system	x	
	passive/biological treatment	x	
	overflow treatment		x
Rock Pile/Heap Leach Facility	construct diversion ditches	x	
	install groundwater collection system	x	
	install toe seepage collection system	x	
	collect and treat groundwater		x
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
	operate pump and detoxify heap leach pile (cyanide destruction)	x	
Tailings Facility	construct diversion ditches	x	
	pump supernatant (to pit, U/G)	x	
	treat supernatant	x	
	install toe seepage collection system	x	
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
U/G Mine	accelerate flooding	x	
	install seepage collection system	x	
	install dewatering/pumping system	x	
	operate seepage/dewatering system (ARD/ML)		x
Water Management	refill lakes		
	redirect creeks/streams	x	
	stabilize water management ponds	x	
	stabilize/close sediment ponds	x	
	fresh water supply - breach embankment	x	
	fresh water supply - remove piping system	x	
	construct water treatment plant	x	
	construct sludge pond	x	
	water control in reclamation quarry	x	
	operate/maintain water treatment plant		x

SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY	IOL LIABILITY	CROWN LIABILITY
OPEN PIT	Mary River Mine Pit	$4 808 916	$4 808 916	$0	$4 692 698	$116 218
UNDERGROUND MINE		$0	$0	$0	$0	$0
TAILINGS FACILITY		$0	$0	$0	$0	$0
ROCK PILE	Mine Site Waste Rock Pile	$283 750	$283 750	$0	$283 750	$0
BUILDINGS AND EQUIPMENT	Mine Site	$11 894 285	$11 635 931	$258 354	$11 894 285	$0
	Milne Port	$7 273 581	$7 202 455	$71 126	$7 273 581	$0
	Tote Road	$2 127 100	$1 017 892	$1 109 208	$1 774 085	$353 015
	Project Wide/Other	$724 684	$724 684	$0	$724 684	$0
CHEMICALS AND CONTAMINATED SOIL MANAGEMEN		$2 900 946	$2 900 946	$0	$2 850 739	$50 207
SURFACE AND GROUNDWATER MANAGEMENT		$1 358 346	-	$1 358 346	$1 334 838	$23 509
INTERIM CARE AND MAINTENANCE		$2 792 145	-	$2 792 145	$2 743 821	$48 324
	SUBTOTAL: Capital Costs	**$34 163 753**	**$28 574 574**	**$5 589 179**	**$33 572 481**	**$591 272**
	PERCENT OF SUBTOTAL		**83,6%**	**16,4%**	**98,3%**	**1,7%**

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY	IOL LIABILITY	CROWN LIABILITY
MOBILIZATION/DEMOBILIZATION		$23 273 544	$19 466 000	$3 807 544	$22 870 749	$402 795
POST-CLOSURE MONITORING AND MAINTENANCE		$1 560 000	$1 304 785	$255 215	$1 533 001	$26 999
ENGINEERING	4%	$1 332 386	$1 114 408	$217 978	$1 309 327	$23 060
PROJECT MANAGEMENT	9%	$3 211 393	$2 686 010	$525 383	$3 155 813	$55 580
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	0%	$0	$0	$0	$0	$0
BONDING/INSURANCE	2%	$683 275	$571 491	$111 784	$671 450	$11 825
CONTINGENCY	15%	$5 124 563	$4 286 186	$838 377	$5 035 872	$88 691
MARKET PRICE FACTOR ADJUSTMENT	0%	$0	$0	$0	$0	$0
	SUBTOTAL: Indirect Costs	**$35 185 162**	**$29 428 881**	**$5 756 281**	**$34 576 212**	**$608 950**
TOTAL COSTS		**$69 348 915**	**$58 003 455**	**$11 345 460**	**$68 148 693**	**$1 200 222**

1 **Open Pit Name:** **Mary River Mine Pit** **Pit # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
CONTROL ACCESS										
STABILITY STUDY										
STABILIZE SLOPES										
COVER/CONTOUR SLOPES										
CONSTRUCT DIVERSION DITCHES										
CONSTRUCT SPILLWAY										
RECLAIM QUARRIES (the unit cost is inclusive of backfill, compaction and scarification with a dozer)										
P10 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P13 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P14 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P15 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P5 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P6 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P7 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
P8 Borrow Source	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
Q13 Quarry	2017 Work Plan addendum	m2	31350	18GCS	$1,49	$46 819	100%	$46 819	$0	
Q14 Quarry	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
Q15 Quarry	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
Q16A Quarry	In 2016 Work Plan but deferred to 2017	m2	11240	18GCS	$1,49	$16 786	100%	$16 786	$0	
Q9 Quarry	2016/2017 ASR Reconciliation	m2		15GCS	$1,81	$0		$0	$0	
D1Q2 Quarry	2016 Work Plan	m2	109807	18GCS	$1,49	$163 988	100%	$163 988	$0	
Q1 Quarry	2017 work plan addendum marginal increase Add 50000 m2. 2017 Actual add 824,500 m2	m2	944700	18GCS	$1,49	$1 410 834	100%	$1 410 834	$0	
Q5 Quarry	2018 work plan see table 3-3 off marginal estimate	m2	15000	18GCS	$1,49	$22 401	100%	$22 401	$0	
Q11 Quarry	2017 work plan marginal increase Add 2000 m2	m2	52433	18GCS	$1,49	$78 305	100%	$78 305	$0	
Q18 Quarry (on Crown Land)	**2017 Work Plan new quarry Add 2000 m2 (100% Crown Land)**	**m2**	**2000**	**18GCS**	**$1,49**	**$2 987**	**100%**	**$2 987**	**$0**	
Q19 Quarry		m2	18760	18GCS	$1,49	$28 017	100%	$28 017	$0	
Q7 Quarry	2017 work plan marginal increase Add 2000 m2	m2	55050	18GCS	$1,49	$82 213	100%	$82 213	$0	
QMR2 Quarry	2017 work plan addendum marginal increase Add 50000 m2	m2	314580	18GCS	$1,49	$469 800	100%	$469 800	$0	
Pit 1		m2	55000	18GCS	$1,49	$82 138	100%	$82 138	$0	
Pit 1 marginal increase		m2	214450	18GCS	$1,49	$320 264	100%	$320 264	$0	
P1 Borrow Source (on Crown Land)	**100% on Crown Land**	**m2**	**75820**	**18GCS**	**$1,49**	**$113 231**	**100%**	**$113 231**	**$0**	
Km 2 Borrow Source	2017 work plan marginal increase Add 1000 m2	m2	42795	18GCS	$1,49	$63 911	100%	$63 911	$0	
Borrow Development Areas		m2	42080	18GCS	$1,49	$62 843	100%	$62 843	$0	
Unidentified Borrow Sources		m2	697910	15GCS	$1,49	$1 042 273	100%	$1 042 273	$0	
GRADING AND CONTOURING SIGNIFICANTLY DISTURBED AREAS (the unit cost is inclusive of backfill, compaction and scarification with a dozer)										
Km 97 Borrow Source	2017 work plan marginal increase Add 1000 m2. No 2018 unit rate availabe	m2	158012	15GCDS	$2,72	$429 793	100%	$429 793	$0	No 2018 unit rate availabe
Type A Quarry	No 2018 unit rate availabe	m2	136880	15GCDS	$2,72	$372 314	100%	$372 314	$0	No 2018 unit rate availabe
FLOOD PIT-Captital										
FLOOD PIT-Annual Cost										
Other				#N/A	$0,00	$0		$0	$0	
					Annual pumping costs	$0				
Number of years of pump flooding		years								
					Total pumping costs	$0		$0	$0	
					Total	$4 808 916		$4 808 916	$0	
					% of Total			100%	0%	

1 **Rock Pile Name:** **Mine Site Waste Rock Pile**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
STABILIZE SLOPES									
COVER ROCK PILE									
VERY LOW PERMEABILITY COVER (in addition to above)									
CONSTRUCT DIVERSION DITCHES									
CONSTRUCT SEEPAGE COLLECTION POND									
INSTALL GROUNDWATER COLLECTION SYSTEM									
RELOCATE DUMPS									
SPECIALIZED ITEMS									
Install permanent instrumentation		allow		#N/A	$0,00	$0		$0	$0
Install permanent instrumentation, drilling		each		#N/A	$0,00	$0		$0	$0
Grade and Contour Waste Rock dump		m2	190000	18GCS	$1,49	$283 750	100%	$283 750	$0
TREAT ROCK PILE SEEPAGE - see "Water Management"									
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox									
					Annual treatment costs	$0			
Number of years of treatment		years							
					Total treatment costs	$0			$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**									
Upgrade/modify pumping system - report to WTP		allow		#N/A	$0,00	$0			$0
					Total	$283 750		$283 750	$0
					% of Total			100%	0%

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost

**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

1 **Chemicals/Soil Area Name:**

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
HAZARDOUS MATERIALS AUDIT										
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS										
HAZARDOUS MATERIALS REMOVAL										
HAZARDOUS MATERIALS										
CONTAMINATED SOILS										
CONTAMINATED SOIL REMOVAL										
Contaminated Soil Treatment	No 2018 unit rate availabe	m3	16164	15CSTS	$14,78	$238 904	100%	$238 904	$0	No 2018 unit rate availabe
Contaminated Soil Treatment (2017 Work Plan)	Marginal increase associated with 2017 Work Plan. Spill 16-283 at Milne Port Bulk Fuel Tank Farm. No 2018 unit rate availabe	m3	8464	15CSTS	$14,78	$125 098	100%	$125 098	$0	No 2018 unit rate availabe
Excavate and transport		m3		#N/A	$0,00	$0		$0	$0	
Manage hydrocarbon remediation		m3		#N/A	$0,00	$0		$0	$0	
Reagents/stabilizing agent		m2		#N/A	$0,00	$0		$0	$0	
Excavate and transport to offsite facility		m3		#N/A	$0,00	$0		$0	$0	
Contour decontaminated area		m3		#N/A	$0,00	$0		$0	$0	
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER										
OTHER										
Ammonium nitrate (explosive material)		m3	2343	16AN1S	$358,00	$838 794	100%	$838 794	$0	
Pre-package explosives		kg	716519	16AN2S	$2,37	$1 698 150	100%	$1 698 150	$0	
				#N/A	$0,00	$0		$0	$0	
					Total	$2 900 946		$2 900 946	$0	
					% of Total			100%	0%	

1 **Building / Equip Name:** **Mine Site** **Bldg / Equip #:** 1

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill										
Light Mobile Equipment	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions. Includes forklifts, picks up, vehicles around five (5) tonnes and under, scissor lift, man lifts, and small garbage bins (Ref 1, pg 24-25). 2017 Work Plan add 6 units. Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-5 30 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate. 2018 Work Plan see Table 3-2	each	417	18MOLS	$876,92	$365 676	95%	$347 392	$18 284	
Medium Mobile Equipment	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions.Includes vehicles around 10 tonnes, trailers, buses, tow trucks, large garbage bins and water trucks (Ref 1, pg 24-25). 2017 Work Plan add 10 units. Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-5 40 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate. 2018 Work Plan see Table 3-2	each	435	18MOMS	$1 378,63	$599 704	98%	$587 710	$11 994	
Heavy Mobile Equipment	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions.Includes vehicles over 10 tonnes, boom trucks, large front end loaders, dump trucks, graders and cranes (Ref 1, pg 24-25). 2017 Work Plan add 21 units. Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-5 92 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate. 2018 Work Plan see Table 3-2	each	373	18MOHS	$2 310,67	$861 955	98%	$844 715	$17 239	
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill										
Light mechanical equipment - Decontaminate and dispose on-site	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions.Light equipment includes pumps, fuel dispenser, laboratory equipment, and sample bins (Ref 1, pg 23). 2017 Work Plan add 20 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each	91	18LMES	$1 707,45	$155 378	98%	$152 270	$3 108	
Medium mechanical equipment - Decontaminate and dispose on-site	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions. Medium equipment includes aerodrome equipment, generators, shop / maintenance equipment, screens, and chutes (Ref 1, pg 23). 2017 Work Plan add 2 units. Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-5 12 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each	120	18MMES	$3 714,64	$445 757	100%	$445 757	$0	
Heavy mechanical equipment - Decontaminate and dispose on-site	Equipment quantes updated to reflect BIMC Nov. 24 EBS revisions. Heavy equipment includes crusher, feeder, power plant generators, large screens, conveyors, and stackers (Ref 2, pg 23). 2017 Work Plan add 1 unit (Truck Wash system). Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-5 4 units. 2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate 2018 Work Plan see Table 3-2	each	38	18MEHS	$35 507,45	$1 349 283	100%	$1 349 283	$0	
Light Tanks	Light non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 26).	each	6	18TLS	$1 872,41	$11 234	0%	$0	$11 234	
	Light non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (see Tables 2-4 & 3-4 of 2018 Marginal Estimate).	each	7	18TLS	$1 872,41	$13 107	100%	$13 107	$0	
Medium Tanks	Medium non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 26).	each	12	18MTS	$6 386,31	$76 636	100%	$76 636	$0	
	Medium non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (see Tables 2-4 & 3-4 of 2018 Marginal Estimate).	each	2	18MTS	$6 386,31	$12 773	100%	$12 773	$0	
Light Diesel Tanks	Small fuel tanks (10,000-20,000L) (Ref 1, pg 27)	each	5	18LIDTS	$3 193,16	$15 966	100%	$15 966	$0	
	Small fuel tanks (10,000-20,000L) 2017 actual not previously allocated (see Tables 2-4 & 3-4 of 2018 Marginal Estimate)	each	10	18LIDTS	$3 193,16	$31 932	100%	$31 932	$0	
Medium Diesel Tanks	Medium fuel tanks (500,000-750,000L). The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 27).	each	4	18MDTS	$13 928,01	$55 712	100%	$55 712	$0	
	Medium fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Tables 2-4 & 3-4 of 2018 Marginal Estimate).	each	5	18MDTS	$13 928,01	$69 640	100%	$69 640	$0	
Misc. Items	On-site disposal. Miscellaneous (minor) items were defined as any item less than 200 kg not captured in other unit costs (Ref 1, pg 42).	Lot	0	15MEIS	$529,83	$0	100%	$0	$0	
Fuelk tanks - On-site disposal of medium mobile fuel tanks (3,000 to 500,000 L)	On-site disposal of medium -mobile fuel tanks (3,000 to 500,000L). See table 3-4 of 2018 marginal Estimate	each	18	18MMFTS	$9 031,52	$162 567	100%	$162 567	$0	
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport										
Modular	Trailers and Pre-fabricated buildings 2017 Work Plan Addendum includes 800 person temp hardwall camp , construction offices, lunch rooms and washcars at both Mine Site and Milne Port	m2	23461	18RBMS	$59,38	$1 393 114	89%	$1 239 872	$153 243	
Fold Away Buildings		m2	709	18RBFS	$41,57	$29 473	100%	$29 473	$0	
Soft-Walled	2017 Work Plan Addendum soft Walled Buildings includes 50 person camp and 35 person Norse man style camp at Mine Site only	m2	7917	18RBSS	$40,60	$321 430	100%	$321 430	$0	
ISO Shipping Containers (Shelters, Comm. Facilities)		m2	30	18RBIS	$25,38	$761	100%	$761	$0	
Office/washcars	2017 Actual work not previously allocated. See Table 2-4 of 2018 Marginal Estimate. No 2018 unit rate availabe	m2	576	15RBIS	$102,05	$58 781	89%	$52 315	$6 466	No 2018 unit rate availabe
Water and Wastewater Treatment Facilities	Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18WWTS	$9 649,58	$19 299	0%	$0	$19 299	
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport										
Modular	Trailers and pre-fabricated buildings (Ref 1, pg 29).	m2	3112	18RCBMS	$123,02	$382 838	100%	$382 838	$0	
Fold Away Buildings	**2017 Work Plan add 1500 m2 Truck wash Building 2018 Work Plan see table 3-1 add 4230 m2**	m2	14457	18RCBFS	$122,25	$1 767 368	100%	$1 767 368	$0	
Soft-Walled	2017 Work Plan Addendum Maintenance Garage at Mine Site	m2	2046	18RCBSS	$127,32	$260 497	100%	$260 497	$0	
ISO Shipping Containers (Shelters, Comm. Facilities)	**2017 Work Plan add 500 m2 Tire Shop**	m2	604	18RCBIS	$123,02	$74 304	100%	$74 304	$0	No 2018 unit rate availabe
Temporary Construction Warehouse and Office Allowan	No 2018 unit rate availabe	m2	1	18RCBTS	$25 000,00	$25 000	100%	$25 000	$0	No 2018 unit rate availabe
BREAK FOUNDATIONS										
Precast Foundations	Includes load and transport of precast concrete foundations (Ref 1, pg 34). **Add 2017 Work Plan Truck Wash Building foundation of 1500 m2. Add 2017 Work Plan addendum 800 person temp hard walled camp at mine 4333 m2.**	m2	13357	18FCS	$32,88	$439 178	100%	$439 178	$0	
Slab on Grade	Includes perforating the concrete slabs on grade Includes perforating the concrete slabs on grade 2017 Work Plan Addendum for pre-cast concrete foundation and Maintenance Garages at Mine Site	m2	17750	18FSS	$33,11	$587 703	100%	$587 703	$0	
Timber Cribbing	Includes disassemby load and transport of the timber cribbing	m2	1102	18TCS	$17,76	$19 572	100%	$19 572	$0	
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and scarfication with a dozer										
	In 2017 Work Plan Addendum - Mine Site 60000 m2 Removed in 2018 Work Plan for Mine Site (reconciliation of 2017 work plan addendum) - 15000m2 2018 Work Plan See Table 3-3 in Marginal Estimate 11400 m2			18GCS						
Grade and contour laydown areas	2017 Actual work not previously allocated (laydown	m2	162843		$1,49	$243 193	100%	$243 193	$0	
Grade and contour building footprints		m2	223	18GCS	$1,49	$333	100%	$333	$0	
Grade and contour infrastructure pads	Add 2017 Work Plan Addendum - Camp pad 45000m	m2	202968	18GCS	$1,49	$301 971	100%	$301 971	$0	
Aerodome Facilities		m2	5776	18GCS	$1,49	$8 626	100%	$8 626	$0	
Road		m2	121619	18GCS	$1,49	$181 628	100%	$181 628	$0	
Stockpiles	**Add 2017 Work Plan Increase in Crusher Pad Storage Area - Ph 1: 8,200m2 & Ph 2: 17,500m2**	m2	30800	18GCS	$1,49	$45 997	100%	$45 997	$0	
Truck weigh facility distributed area		m2	13000	18GCS	$1,49	$19 414	100%	$19 414	$0	
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and scarfication with a dozer										
Waste Disposal		m2	900	18GCLS	$4,99	$4 491	100%	$4 491	$0	
Fuel tank farm dyke		m2	1911	18GCLS	$4,99	$9 536	100%	$9 536	$0	
Hazardous waste berm		m2	2106	18GCLS	$4,99	$10 509	100%	$10 509	$0	
Bulk fuel storage facility (Bladder Farm)		m2	5788	18GCLS	$4,99	$28 882	100%	$28 882	$0	
Crusher Pad Sedimentation Pond	2018 Work Plan See Table 3-3 in Marginal Estimate	m2	4500	18GCLS	$4,99	$22 455	100%	$22 455	$0	
Mine Site Soft Wall Maintenance Garages	2017 Work Plan Addendum	m2	2046	18GCLS	$4,99	$10 210	100%	$10 210	$0	
Other		m2	5812	18GCLS	$4,99	$29 002	100%	$29 002	$0	
LANDFILL FOR DEMOLITION WASTE										
Place fill material over demolition waste (Mine Site Landfill)	Includes drill and blasting of material aggregated caulking, excavation of fill, load and haul of fill material, backfill and compact source of material, and fill application. Assumes avg fill depth 1.5m over 6m of demolition waste (Ref 1, pg 17). For 2018 work plan see table 3-9 in the Marginal estimate for quantity and 2017 Work Plan Addendum Table 3-8 Add 8948 m2	m2	20068	18PFS	$44,37	$890 417	100%	$890 417	$0	
SPECIALIZED ITEMS										
Electrical Cable	Includes the removal, loading, hauling and disposal of cable (Ref 1, pg 41). **2017 Work Plan add 3500 m of cable.**	m	19700	18ECS	$22,64	$446 008	100%	$446 008	$0	
Incinerator	Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18FIS	$8 743,93	$17 488	100%	$17 488	$0	
Potable Water	Equipment quantes updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18PWS	$8 743,93	$17 488		$0	$17 488	
					Total	$11 894 285		#########	$258 354	
					% of Total			98%	2%	

Note:

1 **Building / Equip Name:** **Milne Port** **Bldg / Equip #: 2**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill										
Light Mobile Equipment	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Includes forklifts, picks up, vehicles around five (5) tonnes and under, scissor lift, man lifts, and small garbage bins (Ref 1, pg 24-25). **2017 Work Plan add 6 units**	each	104	18MOLS	$876,92	$91 200	98%	$89 376	$1 824	
Medium Mobile Equipment	Includes vehicles around 10 tonnes, trailers, buses, tow trucks, large garbage bins and water trucks (Ref 1, pg 24-25).	each	48	18MOMS	$1 378,63	$66 174	95%	$62 866	$3 309	
Heavy Mobile Equipment	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Includes vehicles over 10 tonnes, boom trucks, large front end loaders, dump trucks, graders and cranes (Ref 1, pg 24-25). **2017 Work Plan add 4 units.**	each	63	18MOHS	$2 310,87	$145 585	100%	$145 585	$0	
Other (reclaim conveyor)	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Conveyors have been classified as large mobile equipment, with the exception of the reclaim conveyor (850m in length). (Ref 1, pg 40). **For 2017 Work Plan add 0.1667 units for for cross conveyor which is 1/6th of Reclaim Conveyor length. 2017 Work Plan Addendum this work was removed**	each	1,1667	18MORS	$1 136 232,91	$1 325 643	100%	$1 325 643	$0	NOTE THIS Additional work never happened
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill										
Light mechanical equipment - Decontaminate and dispose on-site	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Light equipment includes pumps, fuel dispenser, laboratory equipment, and sample bins (Ref 1, pg 23). **2017 Work Plan add 20 units.**	each	58	18LMES	$1 707,45	$99 032	98%	$97 051	$1 981	
Medium mechanical equipment - Decontaminate and dispose on-site	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Medium equipment includes aerodrome equipment, generators, shop / maintenance equipment, screens, and chutes (Ref 1, pg 23). **2017 Work Plan add 16 units.**	each	19	18MMES	$3 714,64	$70 578	100%	$70 578	$0	
Heavy mechanical equipment - Decontaminate and dispose on-site	Equipment quantities updated to reflect BIMC Nov. 24 EBS revisions. Heavy equipment includes crusher, feeder, power plant generators, large screens, conveyors, and stackers (Ref 2, pg 23). **2017 Work Plan add 1 unit (Cone Crusher).**	each	4	18MEHS	$35 507,45	$142 030	100%	$142 030	$0	
Light Tanks	Light non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 26).	each	3	18TLS	$1 872,41	$5 617	0%	$0	$5 617	
Medium Tanks	Medium non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 26).	each	0	15MTS	$6 386,31	$0	0%	$0	$0	
Light Diesel Tanks	Small fuel tanks (10,000-20,000L) (Ref 1, pg 27)	each	1	18LDTS	$3 193,16	$3 193	100%	$3 193	$0	
Medium Diesel Tanks	Medium fuel tanks (500,000-750,000L). The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 27). Add a tank from the 2017 Work Plan Addendum - Milne Port	each	1	18MDTS	$13 928,01	$13 928	100%	$13 928	$0	
Large Diesel Tanks	Large fuel tanks (3ML-5ML). The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 27). Add a tank from the 2017 Work Plan Addendum - Milne Port	each	1	18LDTS	$91 285,24	$91 285	100%	$91 285	$0	
Largest Diesel Tanks	Largest fuel tanks (5ML-10ML). The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 27). Add a tank from the 2017 Work Plan Addendum - Milne Port	each	1	18LDTS	$147 297,85	$147 298	100%	$147 298	$0	
Misc. Items	On-site disposal. Miscellaneous (minor) items were defined as any item less than 200 kg not captured in other unit costs (Ref 1, pg 42).	each	0	15MEIS	$452,83	$0	100%	$0	$0	
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport										
Modular	Trailers and pre-fabricated buildings. (Ref 1, pg 29). **Add 2017 Work Plan 49-person Camp (ATCO, not soft-walled, 950 m2) Add 2017 Work Plan Addendum includes 380 person temp hardwall camp , construction offices, lunch rooms and washcars at both Mine Site and Milne Port10936m2 Add 2018 Work Plan see table 3-1 1218m2**	m2	18625	18RBMS	$50,75	$945 219	100%	$945 219	$0	
Fold Away Buildings		m2	1525	18RBFS	$35,53	$54 183	100%	$54 183	$0	
Soft-Walled		m2	5392,34	18RBSS	$40,60	$218 929	100%	$218 929	$0	
ISO Shipping Containers (Shelters, Comm. Facilities)		m2	15	18RBIS	$25,38	$381	100%	$381	$0	
Water and Wastewater Treatment Facilities	2015 Security Assessment pg 39 Equipment quantities updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18WWTS	$9 649,58	$19 299	0%	$0	$19 299	
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport										
Modular	Trailers and pre-fabricated buildings. (Ref 1, pg 29).	m2	1171	18RCBMS	$123,02	$144 056	85%	$122 448	$21 608	
Fold Away Buildings		m2	3194	18RCBFS	$122,25	$390 467	100%	$390 467	$0	
Soft-Walled	Add 2017 Work Plan Addendum Maintenance Garage at Milne Port 2046m2	m2	4177	18RCBSS	$127,32	$531 816	100%	$531 816	$0	
ISO Shipping Containers (Shelters, Comm. Facilities)		m2	134	18RCBIS	$123,02	$16 485	100%	$16 485	$0	
Temporary Construction Warehouse and Office Allo	No 2018 unit rate availabe	m2	1	15RCBTS	$25 000,00	$25 000	100%	$25 000	$0	No 2018 unit rate availabe
BREAK FOUNDATIONS										
Precast Foundations	Includes load and transport of precast concrete foundations (Ref 1, pg 34).	m2	3513	18FCS	$32,88	$115 507	100%	$115 507	$0	
Slab on Grade	Includes perforating the concrete slabs on grade 2017 Work Plan Addendum for pre-cast concrete foundation and Maintenance Garages at Milne Site Add 10046 m2	m2	11812	18FSS	$33,11	$391 095	100%	$391 095	$0	
Timber Cribbing	Includes disassemby load and transport of the timber cribbing	m2	732	18TCS	$17,76	$13 000	100%	$13 000	$0	
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer										
Grade and contour laydown areas	Port -150000 m2 In 2017 Work Plan Addendum - Milne Port add 150000 m2 2018 Work Plan See Table 3-3 in Marginal Estimate add 308000 m2 2017 actual work not previously allocated (W1,W3,W6, W7, W10B, W11, W14 AND W15) see table 2-2 of 2018 work plan add 81730 m2	m2	702651	18GCS	$1,49	$1 049 353	100%	$1 049 353	$0	
Grade and contour building footprints		m2	14306	18GCS	$1,49	$21 365	100%	$21 365	$0	
Grade and contour infrastructure pads		m2	66536	18GCS	$1,49	$99 366	100%	$99 366	$0	
Road		m2	12149	18GCS	$1,49	$18 144	100%	$18 144	$0	
Stockpiles	**Add 2017 Work Plan Increase in Ore Stockpile Storage Area - Ph 1: 36,900m2 & Ph 2: 45,100m2**	m2	216046	18GCS	$1,49	$322 647	100%	$322 647	$0	
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer										
Hazardous waste berm		m2	4417	18GCLS	$4,99	$22 041	100%	$22 041	$0	
Milne Port Soft Wall Maintenance Garages	2017 Work Plan Addendum	m2	2046	18GCLS	$4,99	$10 210	100%	$10 210	$0	
Weatherhaven genset fuel bladder berm		m2	500	18GCLS	$4,99	$2 495	100%	$2 495	$0	
Storage Area		m2	1971	18GCLS	$4,99	$9 835	100%	$9 835	$0	
Fuel tank farm dyke		m2	25893	18GCLS	$4,99	$129 206	100%	$129 206	$0	
Landfarm		m2	14083	18GCLS	$4,99	$70 274	100%	$70 274	$0	
LANDFILL FOR DEMOLITION WASTE										
Place fill material over demolition waste	2017 Work Plan Addendum	m2	2216	18PFS	$38,83	$86 125	100%	$86 125	$0	
SPECIALIZED ITEMS										
Electrical Cable	Includes the removal, loading, hauling and disposal of cable (Ref 1, pg 41). **2017 Work Plan add 3500 m of cable.**	m	14600	18ECS	$22,64	$330 544	100%	$330 544	$0	
Incinerator	Equipment quantities updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18FIS	$8 743,93	$17 488	100%	$17 488	$0	
Potable Water	Equipment quantities updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each	2	18PWS	$8 743,93	$17 488		$0	$17 488	
					Total	$7 273 581		$7 202 455	$71 126	
					% of Total			99%	1%	

Note:

1 **Building / Equip Name:** **Tote Road** **Bldg / Equip #: 3**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport									
Modular		m2	0	15RBMS	$59,38	$0	89%	$0	$0
Fold Away Buildings		m2	0	15RBFS	$41,57	$0	100%	$0	$0
ISO Shipping Containers (Shelters, Comm. Facilities)	Assume 7% on Crown Land 2017 Actual work not previously allocated (see Table 2-3 of 2018 Marginal cost) Add 1050 m2	m2	1273	18RBIS	$25,38	$32 309	100%	$32 309	$0
Water and Wastewater Treatment Facilities		each	0	15WWTS	$11 035,58	$0	0%	$0	$0
Power Plant		m2		brs1h	$65,00	$0		$0	$0
Communication Tower		m2		brs1h	$65,00	$0		$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
AN Storage Facility		m2		brs1s	$128,00	$0		$0	$0
Warehouse, Shops and Other		m2		brs1l	$45,00	$0		$0	$0
Storage Facility at Laydown/Airstrip		m2		#N/A	$0,00	$0		$0	$0
Fuel tanks		m2		brs1h	$65,00	$0		$0	$0
Fire Protection pumping station		m		brs1h	$65,00	$0		$0	$0
Freshwater intake		m2		brs1l	$45,00	$0		$0	$0
Reclaim pumps		m2		#N/A	$0,00	$0		$0	$0
Outfall & Diffuser		m2		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, electrician		mandays		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	$0,00	$0		$0	$0
Break foundation slabs		m2		brcs	$6,00	$0		$0	$0
Consolidate & dump boneyard debris		allow		brs1l	$45,00	$0		$0	$0
Worker Dry		m2		brs1l	$45,00	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		brs1l	$45,00	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		brs1l	$45,00	$0		$0	$0
Water Intake		m2		brcs	$6,00	$0		$0	$0
Other		m2		bdcs	$12,63	$0		$0	$0
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport									
Modular		m2	0	15RCBMS	$123,02	$0	100%	$0	$0
Fold Away Buildings	**Mobile Maintenance Depot (100% on Crown Land)**	**m2**	**682**	**18RCBFS**	**$122,25**	**$83 375**	**100%**	**$83 375**	**$0**
ISO Shipping Containers (Shelters, Comm. Facilities)		m2	0	15RCBIS	$143,42	$0	100%	$0	$0
Temporary Construction Warehouse and Office Allowance		m2	0	15RCBTS	$25 000,00	$0	100%	$0	$0
BREAK FOUNDATIONS									
Slab on Grade	**Mobile Maintenance Depot (100% on Crown Land)**	m2	682	18FSS	$33,11	$22 581	100%	$22 581	$0
Timber Cribbing	Includes disassemby load and transport of the timber cribbing. Assume 7% on Crown Land	m2	59	18TCS	$17,76	$1 048	100%	$1 048	$0
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer									
Grade and contour laydown areas	In 2017 Actual work not previous allocated - IT tower upgrades KM7, KM26,KM40, KM49, KM69, KM80 & KM88 (see table 2-2 of 2018 Marginal Estimate)	m2	33900	18GCS	$1,49	$50 627	100%	$50 627	$0
Grade and contour building footprints	**Assume 7% on Crown Land**	**m2**	**13040**	**18GCS**	$1,49	**$19 474**	**100%**	**$19 474**	**$0**
Grade and contour infrastructure pads	**Assume 7% on Crown Land**	**m2**	**6760**	**18GCS**	$1,49	**$10 096**	**100%**	**$10 096**	**$0**
Aerodome Facilities		m2	0	15GCS	$1,81	$0	100%	$0	$0
Road	**Assume 7% on Crown Land**	**m2**	**533000**	**18GCS**	$1,49	**$795 993**	**100%**	**$795 993**	**$0**
Stockpiles		m2		15GCS	$1,81	$0	100%	$0	$0
Remove Liner	**Mobile Maintenance Depot (100% on Crown Land)**	**m2**	**683**		**$3,50**	**$2 391**	**100%**	**$2 391**	**$0**
Grade and Contour Significant Disturbed Areas		m2		15GCDS	$2,72	$0	100%	$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
Warehouse, Shops and Other		m2		AE	$8,47	$0		$0	$0
Fuel tanks on site for bulk fuel storage		m2		AE	$8,47	$0		$0	$0
Fire Protection pumping station		m2		AE	$8,47	$0		$0	$0
Worker Dry		m2		AE	$8,47	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		AE	$8,47	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		AE	$8,47	$0		$0	$0
Other		ha		scfyl	$4 300,00	$0		$0	$0
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer									
LANDFILL FOR DEMOLITION WASTE									
RECLAIM ROADS									
Remove bridges (IOL)	The unit cost is inclusive of the demolition and removal of a bridge. Assumed not contaminated (Ref 1, pg 36).	each	3	18BRS	$172 505,43	$517 516	0%	$0	$517 516
Remove bridges (CROWN)	**The unit cost is inclusive of the demolition and removal of a bridge. Assumed not contaminated (Ref 1, pg 36).**	**each**	**1**	**18BRS**	**$172 505,43**	**$172 505**	**0%**	**$0**	**$172 505**
Remove Culverts (IOL)	The unit cost is inclusive of the travel time to and from the culvert location, the earthwork necessary expose a culvert and the removal of the culvert material (Ref 1, pg 21).	each	372	15CRS	$1 094,48	$407 147	0%	$0	$407 147
Remove Culverts (CROWN)	**The unit cost is inclusive of the travel time to and from the culvert location, the earthwork necessary expose a culvert and the removal of the culvert material (Ref 1, pg 21).**	**each**	**11**	**15CRS**	**$1 094,48**	**$12 039**	**0%**	**$0**	**$12 039**
Scarifying and install water breaks		ha		#N/A	$0,00	$0		$0	$0
Scarifying Airstrip		ha		#N/A	$0,00	$0		$0	$0
Scarifying Laydown Areas		ha		#N/A	$0,00	$0		$0	$0
vegeation		ha		#N/A	$0,00	$0		$0	$0
Other		ha		#N/A	$0,00	$0		$0	$0
SPECIALIZED ITEMS									
					Total	$2 127 100		$1 017 892	$1 109 208
					% of Total			48%	52%

Note:

1 **Building / Equip Name:** **Project Wide/Other** **Bldg / Equip #:** ***4***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport									
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport									
BREAK FOUNDATIONS									
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer									
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer									
LANDFILL FOR DEMOLITION WASTE									
Place fill material over demolition waste	Includes drill and blasting of material aggregated crushing, excavation of fill material, load and haul of fill material, backfill and compact source of material, and fill application. Assumes avg fill depth of 1.5m over 6m of demolition waste (Ref 1, pg 17). **2017 Work Plan and BIMC Nov. 24 EBS revision add 1192 m2 for disposal of 2017 mobile and mechanical equipment (107 units in total)**	m2	18663	18PFS	$38,83	$724 684	100%	$724 684	$0
RECLAIM ROADS									
SPECIALIZED ITEMS									
					Total	$724 684		$724 684	$0
					% of Total			100%	0%

Note:

1 **Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT						
STABILIZE SEDIMENT PONDS/WATER MANAGEMENT PONDS						
Place soil cover		m3		#N/A	$0,00	$0
Doze & spread excavated material		m3		#N/A	$0,00	$0
Vegetate spread material		ha		#N/A	$0,00	$0
Rip rap in channel base		each		#N/A	$0,00	$0
Grade and Contour with liner	Includes liner removal and disposal (Ref 1, pg 21) and backfill, compaction and scarifcation with a dozer (Ref 1, pg 19).	m2	49636,2	18GCLS	$4,99	$247 685
REDIRECT RUNOFF/CONSTRUCT DIVERSION DITCHES						
BREACH DITCHES						
DECOMISSION FRESH WATER SUPPLY						
WATER CONTROL IN RECLAMATION QUARRY						
REMOVE PIPELINES						
Remove pipes	The unit cost includes the cleaning, plugging, disassembly, loading, hauling and disposal of piping (Ref 1, pg 41).	m	19623	18RPS	$56,60	$1 110 662
Concrete plug deep pipes		m3		#N/A	$0,00	$0
Other				#N/A	$0,00	$0
GROUNDWATER COLLECTION SYSTEM						
CONSTRUCT CONTAMINATED WATER STORAGE POND						
CONSTRUCT PASSIVE TREATMENT SYSTEM (e.g. Constructed Wetland)						
CONSTRUCT WATER TREATMENT PLANT						
					Total	$1 358 346

For cost of long-term/post-closure water treatment see "WATER TREATMENT" Worksheet"

1 **Interim Care and Maintenance (18 Month duration)**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
on-site caretaker	Three caretakers for 18 months (assume 2 at 3w/1w and 1 at 2w/2w rotation). Assume 36 days of travel for each caretaker over 18-months.10-hr days.	hr	11160	15BLS	100	$1 116 000
extra personnel	Assume crew of 15 people for 56, 10-hr days, to stabalize site and equipment at both the Mine Site, and Milne Port. Blended unit rate is used to allow for different skill levels that would make up the crew.	hr	8400	15BLS	100	$840 000
-electrician		manmonths	0	elech	95	$0
-mechanic		manmonths	0	mechh	72,85	$0
annual fuel		litre	0	fcdh	1,39	$0
Mobilization of Workers Required for Stabilization Period (from northern communities)	Assume two rotations per worker, 30% from northern communities and 70% from southern communities. Mobilization from the south is $85.45/person days on site, and from the north $75/person-days on site (Ref 1).	person-days	252	15NWS	$75,00	$18 900
Mobilization of Workers Required for Stabilization Period (from southern communities)	Assume two rotations per worker, 30% from northern communities and 70% from southern communities. Mobilization from the south is $85.45/person days on site, and from the north $75/person-days on site (Ref 1).	person-days	588	15SWS	$85,45	$50 245
Mobilization of caretakers	Assume mobilize from the north	person-days	1 080	15NWS	$75,00	$81 000
Camp accomodations- stabilization period	15 workers for 56 days	person-days	840	15WACS	$225	$189 000
Camp accomodations for caretakers	18 month duration full time	person-days	1 080	15WACS	$225	$243 000
Equipment - site stabilizaiton	Assume 1 dozer, 56 days, 10 hr/day	hr	560	15BES	$150	$84 000
misc. supplies		allow		accmh	0	$0
pick-up truck		each		#N/A	0	$0
small dozer		allow		#N/A	0	$0
small excavator		allow		#N/A	0	$0
snow machine		allow		#N/A	0	$0
communications		allow	0	#N/A	0	$0
SNP/AEMP water sampling & reporting		each	3	15MCWL	30000	$90 000
geotechnical assessment		each	3	15GTS	20000	$60 000
environmental assessment	Assumes spending 1st year budget for this type of activity for interim care	each	1	RPTH	20000	$20 000
interim water treatment				#N/A		$0
other		each		#N/A	0	$0
			18 Month Interim C&M Cost			$2 792 145
Number of years of ICM		years	1,5		**Total**	$2 792 145

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Annual geotechnical inspection	Assume 2 geotech inspections are specified at year 4 and 8 (Ref 2, pg 81).	each	2	15GTS	$20 000,00	$40 000
Survey inspection		each		#N/A	$0,00	$0
Regulatory costs*	Annual reporting over 8 years. Unit rate from RECLAIM.	each	8	RPTL	$10 000,00	$80 000
Site water monitoring (AEMP and SNP)	Two sampling events per year for 8 years, at 20 sample locations.	each	16	15MCWL	$30 000,00	$480 000
- Active closure and flooding		each		#N/A	$0,00	$0
- Post pit flooding		each		#N/A	$0,00	$0
Air Quality Monitoring Program (AQMP)	Assume 3 sampling events specified at year 2, year 4 and year 7 (Ref 2, pg 81). Unit rate from RECLAIM.	each	3	RPTH	$20 000,00	$60 000
Wildlife Effects Monitoring Program (WEMP	Assume 2 sampling events specified at year 5 and year 7 (Ref 1, pg 81). Unit rate from RECLAIM.	each	2	RPTH	$20 000,00	$40 000
Vegetation Monitoring		each		#N/A	$0,00	$0
Project Environmental Assessment	Assume carried once (1x) during closure/post closure period year 4; at Mine site, Tote Road and Milne Port (Ref 2, pg 81). Unit rate from RECLAIM.		3	RPTH	$20 000,00	$60 000
COVER MAINTENANCE						
Maintenance Allowance	According to the PDW closure plan, maintenance costs are estimated at $100,000 per year (Ref 1, pg 103).This allowance expected to cover all maintenance activities at the sites.	allow	8	15MCAL	$100 000,00	$800 000
Repair erosion - infill gullies		allow		#N/A	$0,00	$0
Repair erosion - upgrade diversion ditches		allow		#N/A	$0,00	$0
Remove problem vegetation		allow		#N/A	$0,00	$0
Repair animal damage		allow		#N/A	$0,00	$0
Repair/upgrade access controls		allow		#N/A	$0,00	$0
Other				#N/A	$0,00	$0
Repair erosion		m3		#N/A	$0,00	$0
Clear spillway		each		#N/A	$0,00	$0
CWTS MAINTENANCE						
POST-CLOSURE WATER TREATMENT						
water treatment - refer to water treatment tab			1	wt tab	$0,00	$0
Subtotal, Annual post-closure costs						$1 560 000
Discount rate for calculation of net present value of post-closure cost, %				0,00%		
Number of years of post-closure activity				8	years	
Present Value of payment stream						$1 560 000

*Regulatory costs - annual reporting, management plans, progress reports etc.

1 **Mobilization/Demobilization:**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
MOBILIZE MISC. EQUIPMENT						
Mobilization and Demobilization of Equipment and Materials by Sealift		LS	1		2180000	$2 180 000
Mobilization and Demobilization of Equipment and Materials for 2017 Work Plan addendum	Assumed 10% of marginal 2017 Work Plan Addendum Direct costs (minus Soil and Water management and ICM components) i.e., $5,554,000 from BIMC 2018 Marginal Summary Worksheet.	LS	1	#N/A	555400	$555 400
Mobilization and Demobilization of Equipment and Materials for 2018 Work Plan	Assumed 10% of marginal 2018 Work Plan Direct costs (minus Soil and Water management and ICM components) i.e., $2,600,700 from BIMC 2018 Marginal Summary Worksheet.	LS	1	#N/A	260070	$260 070
Off-site Disposal of Waste	Ref 1 pg 59	m3	5500	15ODS	358	$1 969 000
Consumables (**2017 Work Plan** marginal increase)	Cost to remove additional 49 bed spaces delivered to site in **2017 Work Plan**. 2017 Work Plan addendum (table 3-7) increases this to a 800 person and 50 person camp structures at the Mine Site and a 380 person camp at Milne Port Add 1230	Ea	1279	15CONS	700,8	$896 323
Consumables	Cost to remove consumables delivered to site in 2015 (lubricants, grease, detergents, boosters, EZ Dets, dry goods, food, household supplies, etc.) (2015 Security Assessment, pg 18).	Ea	550	15CONS	700,8	$385 440
Truck tires		allow		#N/A	0	$0
Other				#N/A	0	$0
MOBILIZE CAMP						
MOBILIZE WORKERS						
Mobilization of Workers Required for Reclamation (from northern communities, **2018 Work Plan**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 13 of Marginal Estimate).	person-days	957	15NWS	75	$71 775
Mobilization of Workers Required for Reclamation (from southern communities, **2018 Work Plan**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 13 of Marginal Estimate).	person-days	2233	15SWS	85,45	$190 810
Mobilization of Workers Required for Reclamation (from northern communities, **2017 Work Plan Addendum**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	644	15NWS	75	$48 300
Mobilization of Workers Required for Reclamation (from southern communities, **2017 Work Plan Addendum**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	1502	15SWS	85,45	$128 346
Mobilization of Workers Required for Reclamation (from northern communities, **2017 Work Plan**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	155	15NWS	75	$11 625
Mobilization of Workers Required for Reclamation (from southern communities, **2017 Work Plan**)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	362	15SWS	85,45	$30 933
Mobilization of Workers Required for Reclamation (from northern communities, 2016 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	937	15NWS	75	$70 275
Mobilization of Workers Required for Reclamation (from southern communities, 2016 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days	2185	15SWS	85,45	$186 708
Mobilization of Workers Required for Reclamation (2014 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	man hours	7921		82,32	$652 057
Mobilization of Workers Required for Reclamation (2015 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	each	559		82,32	$46 017
Mobilization of Workers Required for Reclamation (2015 A Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	each	207		82,32	$17 040
WORKER ACCOMODATIONS						
Worker Accommodation & Camp Operation		person-days	11 186	15WACS	225	$2 516 850
Worker Accommodation & Camp Operation	For the Post-Closure Monitorong and Reporting System (from 2016 Work Plan)	person-days	216	15WACS	225	$48 600
Worker Accommodation & Camp Operation (**2017 Work Plan**)	For marginal reclamation activities (517 person-days) associated with **2017 Work Plan**. Includes maintenance, catering,, housekeeping & fuel costs.	person-days	517	15WACS	225	$116 325
Worker Accommodation & Camp Operation (**2018 Work Plan**)	For marginal reclamation activities (3190 person-days) associated with **2018 Work Plan (Page 13 of Marginal Estimate)**. Includes maintenance, catering,, housekeeping & fuel costs.	person-days	3 190	15WACS	225,5	$719 345
Worker Accommodation & Camp Operation (**2017 Work Plan addendum**)	For marginal reclamation activities (2145 person-days) associated with **2017 Work Plan addendum**. Includes maintenance, catering,, housekeeping & fuel costs.	person-days	2 145	15WACS	225,5	$483 698
Long term reclamation activities (eg pump flooding)		manmonths		#N/A	0	$0
MOBILIZE FUEL						
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents the fuel mobilization cost associated with the 2014 Work Plan as provided in Oct 30, 2015 EBS	$	2 888 000	#N/A	1	$2 888 000
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for 2015 provided in Oct 30, 2015 EBS	$	30 000	#N/A	1	$30 000
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for the 2015 Addendum provided in September 23rd, 2015 EBS	$	9 000	#N/A	1	$9 000
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for 2015 R provided in September 23rd, 2015 EBS	$	203 000	#N/A	1	$203 000
Fuel Required for Reclamation (2016 Work Plan)	Ref 1, pg 61	litre	35 435	15MF1S	0,4	$14 174
Fuel Required for Reclamation (**2017 Work Plan**)	**2017 Work Plan**, Appendix B, pg 9. Mobilize 50% of fuel required. Reclamation activities in Nov. 24, 2016 EBS = 90,987L. Heat & power = 116L per 517 person days x $0.40/L for mobilization. Fuel cost be captured under Worker Accom. & Camp Operation.	litre	74 480	15MF1S	0,4	$29 792
Fuel Required for Reclamation (**2017 Work Plan Addendum**)	**2017 Work Plan Addendum page 8**. Mobilize 50% of fuel required. Reclamation activities for Marginal increase = 1,144,276L. Heat & power = 116L per 2145 person days x $0.40/L for mobilization. Fuel cost be captured under Worker Accom. & Camp Operation. Correction made to $1,213,000 per EBS not $1,216,000 as noted in the addendum. BIMC information does not clarify how the volume of fuel was derived so cost provided used to back out a volume of fuel.	litre	3 032 500	15MF1S	0,4	$1 213 000
Fuel Required for Reclamation (2018 Work Plan)	**2018 Work Plan page 13**. Mobilize 50% of fuel required. Reclamation activities for Marginal increase = 638,170L. Heat & power = 116L per 3190 person days x $0.40/L for mobilization. Fuel cost be captured under Worker Accom. & Camp Operation.	litre	504 105	15MF1S	0,4	$201 642
WINTER ROAD						
DEMOBILIZE HEAVY EQUIPMENT						
Crushing Module	2018 Work Plan (see Table 3-6 in Marginal Estimate)	lot	1	EBS	1500000	$1 500 000
Screening Module		lot	1	EBS	1400000	$1 400 000
Car Dumper Module		lot	1	EBS	2200000	$2 200 000
BMH Conveyors		lot	1	EBS	1500000	$1 500 000
Rail Construction Materials		lot	1	EBS	500000	$500 000
Excavators		km		mherh	10,25	$0
Dump trucks		km		mherl	3,4	$0
Dozers		km		mherh	10,25	$0
Demolition shears		km		mherh	10,25	$0
Crane		km		mherh	10,25	$0
Loader		km		mherh	10,25	$0
Compactor		each		#N/A	0	$0
Light duty vehicles		km		mherl	3,4	$0
Other		km		#N/A	0	$0
DEMOBILIZE CAMP						
DEMOBILIZE WORKERS						
WINTER ROAD						
					Total	**$23 273 544**

1 **Underground Mine Name** **UG Mine # *1***

ACTIVITY/MATERIAL	Notes	Unit	Qty	Code	Unit Cost	Cost Land	Land Cost	Water Cost
CONTROL ACCESS								
REMOVE HAZARDOUS MATERIALS								
INSTALL BULKHEADS								
FLOOD MINE								
INSTALL GROUNDWATER COLLECTION SYSTEM								
SPECIALIZED ITEMS								
					Total	$0	$0	$0
					% of Total		0%	0%

1 **Tailings Impoundment Name:** **Pond # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
STABILIZE EMBANKMENT(S)									
COVER TAILINGS									
BURY PAG ROCK									
STABILIZE DECANT SYSTEM									
REMOVE TAILINGS DISCHARGE									
CONSTRUCT DIVERSION DITCHES									
FLOOD TAILINGS									
UPGRADE SPILLWAY									
CONSTRUCT SEEPAGE COLLECTION POND									
INSTALL GROUNDWATER COLLECTION SYSTEM									
SPECIALIZED ITEMS									
TREAT SEEPAGE - see "Water Management" and "Water Treatment"									
TREAT SUPERNATANT									
					Annual treatment costs	$0			
Number of years of treatment		years							
					Total treatment costs	$0			$0
					Total	$0		$0	$0
					% of Total			0%	0%

* for construction of passive treatment system refer to "Water Management"

1 **Post Closure Water Treatment - Identified as long term/post-closure in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS TO WTP						
LABOUR AND SUPPLIES						
WATER MANAGEMENT						
WTP WATER SAMPLING AND ANALYSES						
SITE ACCESS						
					Annual water treatment costs	$0
Number of years of water treatment		years	25			
					Total	$0

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

ITEM	Detail	COST CODE	UNITS	LOW $	HIGH $	SPECIFIED $	COMMENTS
Accomodation							
		ACCM	manday	100,00	175,00		
Buildings - Decontaminate							
	Asbestos	BDA	m2	25,60	51,20		Low: removal of asbestos siding & flooring; High: removal of insulated pipes,
Buildings - Remove							Unit costs are based on 3m high, single storey building. Scale areas accordi
	Wood	BRW	m2	27,50	41,00		
	Concrete	BRC	m2	40,00	65,00	6,00	Specified: puncture concrete foundation slabs
	Steel - teardown	BRS1	m2	45,00	65,00		
	Steel - for salvage	BRS2	m2	67,00	100,00		
Concrete work							
	Small pour	CSF	m3	426,50	639,75		Low: YK; High=1.5xLow
	Large pour	CLF	m3	353,50	530,25	2 130,00	Specified: concrete crown pillar
Contaminated Soils							
	ESA Phase 1	CS1	each	7500,00			Low: small, "clean" site
	ESA Phase 1	CS2	each	50000,00			Low: small, "clean" site
	Remediate on site	CSR	m3	47,00	146,00		
Dozing							
	doze rock piles	DR	m3	1,05	2,40		Low cost: doze crest off dump
	doze overburden/soil piles	DS	m3	0,95	3,80		High cost: push up to 300 m
Excavate Rock; Low Spec's and QA/QC							
	drill/blast/load/short haul	RB1	m3	11,40	17,05		Low:quarry operations for bulk fill
	drill/blast/load/long haul	RB2	m3	12,05	17,80		
	RB1 + spread and compact	RB3	m3	12,05	17,80		
	RB2 + spread and compact	RB4	m3	12,50	30,75		
	Specified activity	RBS	m3				
Excavate Rock; High Spec's and QA/QC							(e.g. ditch/spillway excavation)
	drill/blast/load/short haul	RC1	m3	12,05	17,80		Low:foundation excavation;High:spillway excavation
	drill/blast/load/long haul	RC2	m3	12,70	18,40		
	RC1 + spread and compact	RC3	m3	12,70	18,40		e,g, cover construction
	RC2 + spread and compact	RC4	m3	13,50	19,20		e,g, cover construction
	Specified activity	RCS	m3			175,00	Specified-drift excavation
Excavate Rip Rap							
	drill/blast/load/short haul/place	RR1	m3	13,50	17,75		High: quarry & place rip rap in channel
	drill/blast/load/long haul/place	RR2	m3	14,20	20,65		
	source is waste dump/short haul	RR3	m3	7,00			cost includes sorting
	source is waste dump/long haul	RR4	m3	7,60			
	Specified activity	RRS	m3				
Excavate Soil; Low Spec's and QA/QC							
	clear & grub	SBC	m2	3,40	5,00		
	excavate/load/short haul	SB1	m3	4,30	5,90		
	excavate/load/long haul	SB2	m3	4,60	7,30		
	SB1 + spread and compact	SB3	m3	5,10	8,90		Low: non-engineered; High:engineered
	SB2 + spread and compact	SB4	m3	5,50	11,00		Low: non-engineered; High:engineered
	Specified activity	SBS	m3	3,20	6,30		Low: rehandle waste rock dump by dozing; High:rehandle waste rock by hauli
	Tailings	SBT	m3	1,35	3,70	15,50	High:contour surface - wet or frozen; Specified:haul/place wet infill
Excavate Soil, High Spec's and QA/QC							
	excavate/load/short haul	SC1	m3	6,80	9,30		
	excavate/load/long haul	SC2	m3	7,10	11,75		
	SC1 + spread and compact	SC3	m3	8,90	14,20		Low: non-engineered; High:engineered
	SC2 + spread and compact	SC4	m3	9,30	23,20		Low: non-engineered; High:engineered (e.g. complex covers, low volume dar
	Specified activity	SCS	m3			18,80	Backfill adit with waste rock
Fence							
		FNC	m	13,55	203,00		
Fuel and Electricity							
	Fuel cost - gas	FCG	litre	1,05	1,40		
	Fuel cost - diesel	FCD	litre	0,99	1,39		
	Fuel mobilization	FCM	litre	0,22	0,42		High: winter road usage
	Electricity	FCE	kW-h	0,17	0,19	0,49	Low and High:Yellowknife; Specified:diesel generator
Geo-Synthetics							
	geotextile	GST	m2	3,44			Supply and install
	geogrid	GSG	m2	5,75			
	liner, HDPE	GSHDPE	m2	7,95			Supply and install; large quantity
	liner, ES3	GSES3	m2	20,20			FOB Yellowknife
	geosynthetic installation	GSI	m2	3,16	14,00		Low:geotextile; High:ES3 or HDPE
	bentonite soil ammendment	GSBA	tonne	308,30	348,50		FOB Edmonton, add shipping & mixing
Grouting (/m3 of rock grouted)							
		grout	m3	236,55	286,75		High: cement, FOB Yellowknife

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

Labour & Equipment Rates						
Site manager	sman	$/hr	125,00	152,00		
Supervisor	super	$/hr	52,00	91,84		
Registered engineer	eng	$/hr	95,00	220,00		
Environmental coordinator	envco	$/hr	74,16	130,00		
Evironmental technologist	envtech	$/hr	36,00			
Electrician	elec	$/hr	74,00	95,00		
Journeyman - various	journey	$/hr	44,00	71,79		
Labour - skilled	lab-s	$/hr	41,00	49,60	120,00	
Labour - unskilled	lab-us	$/hr	31,00	43,98		
Equipment operator	oper	$/hr	41,00	65,00		
Heavy duty mechanic	mech	$/hr	49,00	72,85		
Water treatment plant operator	oper-wt	$/hr	41,00	59,86		
Security / first aid	safety	$/hr	36,00	66,97		
Administative staff	admin	$/hr	38,00	57,89		
Equipment rates include operator and fuel						
Loader - 4 cu.yd (3.06m3)	load-s	$/hr	175,00			
Loader - 7 cu.yd (5.35m3)	load-l	$/hr	315,00			
Excavator - 26.76-30.84 tonnes	exc-s	$/hr	190,00			
Excavator - 68.95+tonnes	exc-l	$/hr	420,00			
Grader	grad	$/hr	190,00			
Dump truck off hwy 30-50 tonnes	truck-s	$/hr	225,00			
Dump truck off hwy 55-75 tonnes	truck-l	$/hr	300,00			
dozer, small	dozers	$/hr	205,00	260,00		
dozer, large	dozerl	$/hr	490,00	565,00		
smooth drum compactor	comp	$/hr	155,00			
scooptram, 6 yd3 bucket	scoop	$/hr	170,00			
flat bed truck with hiab	hiab	$/hr	155,00			
fuel truck	ftruck	$/hr	150,00			
water truck	wtruck	$/hr	58,00	150,00		
Mobilize Heavy Equipment						
Road access	MHER	kmtonne	3,40	10,25		
Air access	MHEA	kmtonne	12,00			cargo rate>500lb
Mobilize Camp						
Road access	MCR	each	50000,00			refurbish existing camp
Mobilize Workers						
flight	MW	each	4500,00	9100,00		Low:e.g. 8 passenger; High: Dash 7
Oil Removal						
oil removal	OR	litre	0,43	1,20		Low:waste oil heater; High: ship offsite
PCB Removal						
Remove from site	PCBR	litre	40,20	46,90		Low: shipping, handling & disposal from Yellowknife
Pipes, small (<6in dia.)						
remove/dispose on site	PSR	m	1,00	24,00		Low: remove/dispose on site; High: remove/re-use
supply	PSS	m	6,10	11,10		Low:supply; High:supply and ship
install	PSI	m	25,00			
Pipes, large (>6in dia.)						
remove/dispose on site	PLR	m	22,00	72,00		Low: remove/dispose on site; High: remove/re-use
supply	PLS	m	129,00	143,00		Low:supply; High:supply and ship
install	PLI	m	50,00			
Power Lines						
remove/dispose on site	POWR	m	25,50			
Process Chemicals						
Remove from site	PCR	kg	0,45	2,50		Low: shipping, handling & disposal from Yellowknife
Pumps						
Pump capital cost	PC	each	#######			
Pump shipping	PS	each	2500,00			
Pump operating cost	POC	m3	0,12			pump operating costs should be calculated based on pump capacity, fuel cos
Pump maintenance	PM	allow	25000,00			
Pump sand BackFill						
	PBF	m3	85,00	300,00		
Scarify - road/mine site						
	SCFY	ha	4300	6030	2150	
Shaft, Raise & Portal Closures						
Shaft & Raises	SR	m2	645,00	2132,00		Low:pre-cast concrete slabs, little site prep. Area=shaft+>1m all around
Portals	POR	m3	18,80	250,00	1200,00	Low:unit cost code SCS;High:excavate & backfill collapsed portal;Spec: insta
Site Inspection Report						
	RPT	each	10000,00	20000,00		
SpillWay - Clear						
	SW	each	3000,00	7000,00		

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

Survey/Instrumentation						
	SI	each	1800,00	3600,00		2 person crew
Treatment Plant - Construct						
Small (< 1000 m3/d)	TPS	lump sum	9000000	15000000		
Large (> 1000 m3/d)	TPL	lump sum	1,5E+07	46000000		
Constructed Wetland	CWTS	ha	200000	300000		
Treatment Plant - Operate						
	TPO	m3	0,35	2,00		
Treatment Chemicals						
ferric sulphate	ferric	kg	1,19			
ferrous sulphate	ferrous	kg	1,32			
lime	lime	kg	0,56			
hydrogen peroxide, 35%	hperox	kg	1,50			
Sodium Metabisulfate	Nametab	kg	1,18			
Caustic soda, 50%	caustic	kg	0,74			
Sulfuric acid, 93%	sulfuric	kg	0,31			
flocculant	flocc	kg	6,00			
copper sulphate	copper	kg				
shipping	shipping	kg	0,20			
Vegetation						
Hydroseed, Flat	VHF	ha	4000,00			
Hydroseed, Sloped	VHS	ha	4500,00			
Veg. blanket/erosion mat	VB	ha	13000,00			
Tree planting	VT	ha	2600,00	6000,00		
Wetland species	VW	ha			47,72	Specified= /m3, Wetland Growth Media Substrate mixed and installed (sand,
Water Sampling/Analysis/Reporting						
	WS	each	7000,00	10000,00		
Winter Road						
Construction	WRC	km	2000,00	11500,00		
Usage	WRU	kmtonne	0,29			
Unit Rates as per 2015 EBS						
Grade and Contour	15GC	m2			$1,81	
Grade and Contour With Liner	15GCL	m2			$5,31	
Grade and Contour Significant Disturbed Areas	15GCD	m2			$2,72	
Fill Application	15PF	m2			$44,37	
Cost for On-Site Disposal of Equipment:						
Light Mobile Equipment	15MOL	Ea			941,1	
Medium Mobile Equipment	15MOM	Ea			1 494,1	
Heavy Mobile Equipment	15MOH	Ea			2 618,9	
Other mobile equipment (reclaim conveyor)	15MOR	Ea			1 329 441,3	
Light mechanical equipment - Decor	15LME	Ea			1 980,8	
Medium mechanical equipment - De	15MME	Ea			4 261,3	
Heavy mechanical equipment - Dec	15MEH	Ea			41 205,4	
Light Tanks	15TL	Ea			2 148,3	
Medium Tanks	15MT	Ea			7 387,3	
Light Diesel Tanks	15LiDT	Ea			3 693,7	
Medium Diesel Tanks	15MDT	Ea			16 166,4	
Large Diesel Tanks	15LDT	Ea			106 338,7	
Largest Diesel Tanks	15XLDT	Ea			171 468,2	
Misc Items (Minor)	15MEI	Ea			529,8	
Fuel tanks - Medium Mobile Diesel T	15MMFT	Ea			$10 481,05	
Removal of Contaminated Buildings						
fold away	15RCBF	m2			$142,41	
ISO Shipping Container	15RCBI	m2			$143,42	
modular	15RCBM	m2			$143,42	
soft walled	15RCBS	m2			$148,35	
Temporary construction warehouses	15RCBT	m2			$25 000,00	
Removal of Buildings						
fold away	15RBF	m2			$41,57	
modular	15RBM	m2			$59,38	
ISO Shipping Container	15RBI	m2			$29,69	
soft walled	15RBS	m2			$47,51	
water and wastewater treatment faci	15WWT	Ea			$11 035,58	
Foundations						
Precast concrete	15FC	m2			$38,47	
Slab on grade	15FS	m2			$33,11	
Timber cribbing	15TC	m2			$20,78	
Reclaim roads						
Remove bridges	15BR	Ea			$201 838,77	
Remove culverts	15CR	Ea			$1 094,48	
Specialized Items						
Power distribution - electrical cable	15EC	m			$26,49	
Electrical Cable	15EC	m			26,5	
Incinerator	15FI	Ea			9 975,9	
Potable Water	15PW	Ea			9 975,9	
Consumables	15CON	Bed space			701	

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

Mobilization					
Mobilization and Demobilization of Equipment and Materials by Sealift	15SL	Ea			$2 572 000,00
Demobilization of Existing Fuel	15MF1	L			$0,10
Fuel Required for Reclamation	15MF2	L			$0,40
Offsite disposal of waste and materi	15OD	m3			$358,00
Worker accomodation and camp op	15WAC	person-day			$225,00
Northern worker mobilization	15NW	person-day			$75,00
Southern worker mobilization	15SW	person-day			$85,45
Blended Labour and Equip Rates (2015)					
Blended labour rate	15BL	hr			$100,00
Blended equipment rate	15BE	hr			$150,00
Water management					
Remove pipes	15RP	m			$66,23
Reclaim roads					
Remove bridges	15BR	Ea			$201 838,77
Remove culverts	15CR	Ea			$1 094,48
Chemicals					
Contaminated soil treatment	15CST	m3			$14,78
Ammonium nitrate (explosive)	15AN	kg			$2,37
Unit Rates as per 2016 EBS/ Other communication from Baffinland					
Chemicals					
Ammonium nitrate (explosive)	16AN1	m3			$358,00
Pre-packaged explosives	16AN2	kg			$2,37
Other Unit Rates					
Monitoring					
SNP/AEMP water sampling & report	15MCW	each	$30 000	$36 000	
Envrionmental site assessment	15EA	each			$18 000
Geotechnical assessment	15GT	each			$20 000
Maintenance allowance	15MCA	each	$100 000	$150 000	
Unit Rates as per table 1-2 in 2019 Marginal closure and Reclamation Finalcial Security Estimate					
Grade and Contour	18GC	m2			$1,49
Grade and Contour With Liner	18GCL	m2			$4,99
Fill Application	18PF	m2			$38,83
Cost for On-Site Disposal of Equipment:					
Light Mobile Equipment	18MOL	Ea			876,9
Medium Mobile Equipment	18MOM	Ea			1 378,6
Heavy Mobile Equipment	18MOH	Ea			2 310,9
Other mobile equipment (reclaim conveyor)	18MOR	Ea			1 136 232,9
Light mechanical equipment - Decor	18LME	Ea			1 707,5
Medium mechanical equipment - De	18MME	Ea			3 714,6
Heavy mechanical equipment - Dec	18MEH	Ea			35 507,5
Light Tanks	18TL	Ea			1 872,4
Medium Tanks	18MT	Ea			6 386,3
Light Diesel Tanks	18LiDT	Ea			3 193,2
Medium Diesel Tanks	18MDT	Ea			13 928,0
Large Diesel Tanks	18LDT	Ea			91 285,2
Largest Diesel Tanks	18XLDT	Ea			147 297,9
Misc Items (Minor)	18MEI	Ea			452,8
Fuel tanks - Medium Mobile Diesel T	18MMFT	Ea			$9 031,52
Removal of Contaminated Buildings					
fold away	18RCBF	m2			$122,25
ISO Shipping Container	18RCBI	m2			$123,02
modular	18RCBM	m2			$123,02
soft walled	18RCBS	m2			$127,32
Removal of Buildings					
fold away	18RBF	m2			$35,53
modular	18RBM	m2			$50,75
ISO Shipping Container	18RBI	m2			$25,38
soft walled	18RBS	m2			$40,60
water and wastewater treatment faci	18WWT	Ea			$9 649,58
Foundations					
Precast concrete	18FC	m2			$32,88
Slab on grade	18FS	m2			$33,11
Timber cribbing	18TC	m2			$17,76
Reclaim roads					
Remove bridges	18BR	Ea			$172 505,43
Specialized Items					
Power distribution - electrical cable	18EC	m			$22,64
Electrical Cable	18EC	m			26,5
Incinerator	18FI	Ea			8 743,9
Potable Water	18PW	Ea			8 743,9
Blended Labour and Equip Rates (2018)					
Blended labour rate	18BL	hr			$75,00
Blended equipment rate	18BE	hr			$125,00
Water management					
Remove pipes	18RP	m			$56,60
Reclaim roads					
Remove bridges	18BR	Ea			$172 505,43

Unit Cost Estimator

1 Equipment Productivity Figures and Graphs have been reproduced from Caterpillar Performance Handbook - Edition 42

EXCAVATION

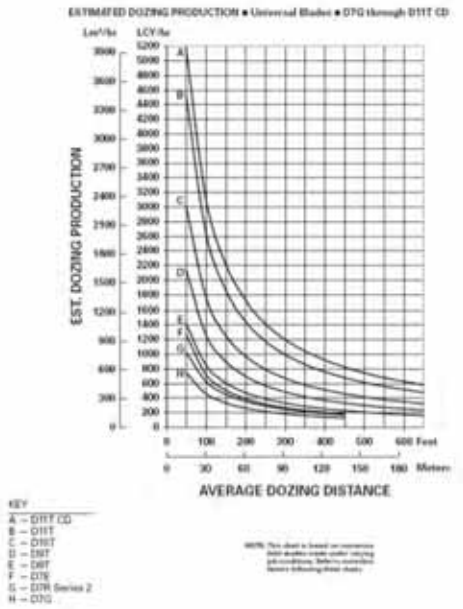
Productivity		
Machine Cat 336EL		
bucket capacity	3,16	m3
fill factor	75%	%
cycle time	45	seconds
operator skill	80%	%
machine availability	83%	%
altitude adjustment	100%	%
Hourly productivity	125,89	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$180,00	$/hr
Excavation cost - contractor rate	1,43	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	$/hr
Excavation cost - owner rate	$0,00	$/m3
Excavation cost - select contractor or owner rate (D22 or D31)		$/m3

HAUL AND DUMPING

Productivity		
Machine Cat 770		
truck capacity	25,1	m3
fill factor	80%	%
load time	6,0	min.
haul distance	1,5	km
average velocity	20,0	km/hr
haul time + return time	9,0	min.
wait time	0,5	min.
dump time	1,0	min.
cycle time	16,5	min.
machine availability	83%	%
altitude adjustment	100%	%
	13,7	ve. min/cycle
Hourly productivity	88,0	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$225,00	$/hr
Haul and Dump - contractor rate	2,56	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	$/hr
Haul/Dumping Cost - owner rate	$0,00	$/m3
Haul/Dumping Cost - select contractor or owner rate (I22 or I31		$/m3

SPREADING/DOZING

Productivity		
Machine Cat D8		
Estimate production using example curves provided or equivalent from other supplier	600	m3/hr
Correction factors (see table provided)		
operator skill	0,75	
material type, see table	0,80	
slot dozing	1,00	
side by side dozing	1,00	
visibility	1,00	
job efficiency	0,83	
altitude adjustment	1,00	
slope adjustment	1,00	
Hourly productivity	298,8	m3/hr
Operating Costs		
- Contractor		
Hourly rate - contractor supplied	$260,00	$/hr
Dozing - contractor rate	0,87	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	
Spreading/Dozing Cost - owner rate	$0,00	$/hr
Spreading/Dozing Cost - select contractor or owner rate (N22 or N31)		$/m3



Excavator

	Cat 320	Cat 325B	Cat 375
heaped bucket capacity, m3	1,5	2,2	5,4
	Typical Cycle Times (seconds)		
easy digging, shallow digging, small swing angle	16	18	20
med. to hard digging, rocky soil, swing angle to 90 deg.	23	23	25
tough digging, sandstone, caliche, at max. machine depth, swing angle > 120 deg.	27	29	35

Material	Fill Factor (% of heaped bucket capacity
Moist loam or sandy clay	100 - 110
sand and gravel (not till)	95 - 110
hard tough clay	80 - 90
rock - will blasted	60 - 75
rock - poorly blasted	40 -60

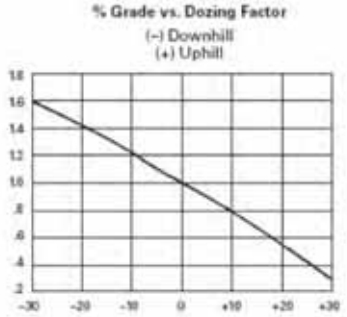
Operator Skill	poor	average	good
Correction factor	0,6	0,75	1

Machine availability	poor	average	good
Correction factor	0,9	0,95	1

Trucking

	Cat 771 D	Cat 777D	Cat 789C
Truck capacity - heaped, m3	27,5	60,5	137

Dozing



Appendix B

SNC-Lavalin 2019 RECLAIM Marginal Estimate

Project Name: *nd Iron Mine (Bas*

Reclaim Model - Overview of Program

All users are urged to read the Reclaim Model User Manual - Scroll down for overview description of program.

Important! Reclaim 7.0 works better with no other excel files open.
If other excel files are open ignore run time error and proceed

Reclaim Menu

The default Excel menu bar has an additional tab labelled "Add-Ins" that provides options specific to the Reclaim Model.

Clear	This option deletes all input data, deletes any duplicated elements and blanks out the project name. It also allows for segregation into land costs vs water costs if required.
Duplicate	This option Duplicates components of the project. E.g. if there is more than one Open Pit, use duplicate to add a second Open Pit. Quantities for the new Open Pit are erased, but the Activities and Cost Codes are carried over from the original Open Pit. The new Open Pit subtotal is added to the Summary page.
Unit Costs	This option opens a window of unit costs to provide easy reference. NOTE: the unit cost table has a filter in the 'UNITS' column. You can select to only see a particular unit (eg km) or multiple units (km and m3) or all units.
Print All	This option prints the Summary Worksheet, Unit Cost Worksheet, and the individual component worksheets having non-zero balances. Individual worksheets can be printed directly using standard printing methods, such as Ctl - P.
Quit	Select Quit to exit the program
Help	Redirects user to Instructions worksheet.

WorkSheets

Summary	This worksheet contains a cumulative summary of costs for each component of the project. Associated costs such as engineering and project management are added as a percentage of the component costs.
Components	Costs are derived for individual closure and reclamation activities by multiplying a "quantity" of activity by a "unit cost". An activity can be edited, added, or deleted from worksheet. However, care should be taken not to modify cells that are defined and used elsewhere in the program. ***Do not change the content or column width of the first column of each component worksheet.***
Unit Costs	This worksheet contains a look up table with costs for typical work associated with each closure and reclamation activity

Limitations

The Reclaim Program will NOT work if the worksheets are changed such that the following requirements are not met. Please review the following prior to modifiying worksheets.

WorkSheet Names	*The names of the worksheets must not be changed.*
Defined Names	Certain cells have defined names, which must not be changed. Where the cell is named, the name will appear in the "Name Box" to the left of the formula bar.
First line of data	The first line of data for any component worksheet starts on line 4. ***Do not change the first line of a component worksheet, ie the component name.***
Cell A1	Cell A1 on the component sheet MUST always contain the count of that component for the duplicate function to operate. ***DO NOT CHANGE.***
Adding Lines	You can add lines to components and the unit cost table, as long as they are not the last lines. The last line might fall outside the named ranges. You can check the size of the named range by selecting the name from the drop down box at the top left of the sheet. Usually this box has a cell reference, or a name.
Printing	A component will only be printed if its sub-total is greater than zero. In addition, a component and the summary sheet cannot be printed if there is an error. Printing has been set to print 1 page per component.

Conditions of Use

The Reclamation Cost Estimating Model was prepared to serve as a guide for Government Agencies, mining companies, and others to estimate the cost of mine reclamation. This model is not intended to replace reclamation planning or to be used to determine the activities required to reclaim a site or to dictate how much should be spent on reclamation.

Reclaim was prepared by Brodie Consulting Ltd. on behalf of AANDC. AANDC and Brodie Consulting Ltd. are not responsible for the completeness or accuracy of any reclamation estimate made using this model. The user agrees to check and take responsibility for all aspects of any cost estimate made using this model.

The following table provides guidance as to whether water management and treatment is considered short term or long term. Short term closure activities may be costed within a component (eg 'Open Pit' or 'Rock Pile') or 'Water Management'. Long term or post-closure water treatment is costed in 'Water Treatment'.

		Short Term/ Capital Ex.	Long term/ NPV
Open Pit	flood pit - install/operate pumping system	x	
	construct diversion ditches	x	
	treat 1st filling	x	
	install pump/decant system	x	
	passive/biological treatment	x	
	overflow treatment		x
Rock Pile/Heap Leach Facility	construct diversion ditches	x	
	install groundwater collection system	x	
	install toe seepage collection system	x	
	collect and treat groundwater		x
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
	operate pump and detoxify heap leach pile (cyanide destruction)	x	
Tailings Facility	construct diversion ditches	x	
	pump supernatant (to pit, U/G)	x	
	treat supernatant	x	
	install toe seepage collection system	x	
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
U/G Mine	accelerate flooding	x	
	install seepage collection system	x	
	install dewatering/pumping system	x	
	operate seepage/dewatering system (ARD/ML)		x
Water Management	refill lakes		
	redirect creeks/streams	x	
	stabilize water management ponds	x	
	stabilize/close sediment ponds	x	
	fresh water supply - breach embankment	x	
	fresh water supply - remove piping system	x	
	construct water treatment plant	x	
	construct sludge pond	x	
	water control in reclamation quarry	x	
	operate/maintain water treatment plant		x

Mary River Mine

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY	IOL LIABILITY	CROWN LIABILITY
OPEN PIT	Mary River Mine Pit	$3 477 111	$3 477 111	$0	$3 477 111	$0
UNDERGROUND MINE		$0	$0	$0	$0	$0
TAILINGS FACILITY		$0	$0	$0	$0	$0
ROCK PILE	Mine Site Waste Rock Pile	$0	$0	$0	$0	$0
BUILDINGS AND EQUIPMENT	Mine Site	$2 874 355	$2 855 863	$18 491	$2 874 355	$0
	Milne Port	$372 171	$369 352	$2 819	$372 171	$0
	Tote Road	$429 625	$429 625	$0	$291 483	$138 141
					$0	$0
CHEMICALS AND CONTAMINATED SOIL MANAGEME		$3 508 400	$3 508 400	$0	$3 508 400	$0
SURFACE AND GROUNDWATER MANAGEMENT		$0	-	$0	$0	$0
INTERIM CARE AND MAINTENANCE		$0	-	$0	$0	$0
	SUBTOTAL: Capital Costs	**$10 661 662**	**$10 640 351**	**$21 310**	**$10 523 520**	**$138 141**
	PERCENT OF SUBTOTAL		**99,8%**	**0,2%**	**98,07%**	**1,93%**

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY	IOL LIABILITY	CROWN LIABILITY
MOBILIZATION/DEMOBILIZATION		$20 049 605	$20 009 530	$40 075	$20 049 605	$0
POST-CLOSURE MONITORING AND MAINTENANCE		$3 430 000	$3 423 144	$6 856	$3 392 244	$37 756
ENGINEERING	3,9%	$415 805	$414 974	$831	$407 775	$8 030
PROJECT MANAGEMENT	9,4%	$1 002 196	$1 000 193	$2 003	$982 842	$19 354
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	0%	$0	$0	$0	$0	$0
BONDING/INSURANCE	2%	$213 233	$212 807	$426	$209 115	$4 118
CONTINGENCY	20,0%	$2 132 332	$2 128 070	$4 262	$2 091 153	$41 179
MARKET PRICE FACTOR ADJUSTMENT	0%	$0	$0	$0	$0	$0
	SUBTOTAL: Indirect Costs	**$27 243 171**	**$27 188 718**	**$54 453**	**$27 132 734**	**$110 437**
TOTAL COSTS		**$37 904 833**	**$37 829 069**	**$75 763**	**$37 656 255**	**$248 578**

1 **Open Pit Name:** **Mary River Mine Pit** **Pit # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
STABILITY STUDY									
STABILIZE SLOPES									
COVER/CONTOUR SLOPES									
CONSTRUCT DIVERSION DITCHES									
CONSTRUCT SPILLWAY									
RECLAIM QUARRIES (the unit cost is inclusive of backfill, compaction and scarification with a dozer)									
P10 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P13 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P14 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P15 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P5 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P6 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P7 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
P8 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
PQ2a Quarry		m2	345500	18GCS	$1,49	$515 977	100%	$515 977	$0
PQ4a Quarry		m2	105000	18GCS	$1,49	$156 809	100%	$156 809	$0
PQ6a Quarry		m2	194000	18GCS	$1,49	$289 724	100%	$289 724	$0
PQ12a Quarry		m2	232200	18GCS	$1,49	$346 772	100%	$346 772	$0
Q9 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
D1Q2 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
Q1 Quarry		m2	226000	18GCS	$1,49	$337 513	100%	$337 513	$0
Q11 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
Q18 Quarry (on Crown Land)		m2		15GCS	$1,81	$0	100%	$0	$0
Q19 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
Q5 Quarry		m2	1225587	18GCS	$1,49	$1 830 317	100%	$1 830 317	$0
Q7 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
QMR2 Quarry		m2		15GCS	$1,81	$0	100%	$0	$0
Pit 1		m2		15GCS	$1,81	$0	100%	$0	$0
P1 Borrow Source (on Crown Land)	**100% on Crown Land**	**m2**		**15GCS**	**$1,81**	**$0**	**100%**	**$0**	**$0**
Km 2 Borrow Source		m2		15GCS	$1,81	$0	100%	$0	$0
Borrow Development Areas		m2		15GCS	$1,81	$0	100%	$0	$0
Unidentified Borrow Sources		m2		15GCS	$1,81	$0	100%	$0	$0
GRADING AND CONTOURING SIGNIFICANTLY DISTURBED AREAS (the unit cost is inclusive of backfill, compaction and scarification with a dozer)									
FLOOD PIT-Captital									
FLOOD PIT-Annual Cost									
					Annual pumping costs	$0			
Number of years of pump flooding		years							
					Total pumping costs	$0		$0	$0
					Total	$3 477 111		$3 477 111	$0
					% of Total			100%	0%

1 **Rock Pile Name:** **Mine Site Waste Rock Pile**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
STABILIZE SLOPES									
COVER ROCK PILE									
VERY LOW PERMEABILITY COVER (in addition to above)									
CONSTRUCT DIVERSION DITCHES									
CONSTRUCT SEEPAGE COLLECTION POND									
INSTALL GROUNDWATER COLLECTION SYSTEM									
RELOCATE DUMPS									
SPECIALIZED ITEMS									
TREAT ROCK PILE SEEPAGE - see "Water Management"									
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox									
					Annual treatment costs	$0			
Number of years of treatment		years							
					Total treatment costs	$0			$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**									
Upgrade/modify pumping system - report to WTP		allow		#N/A	$0,00	$0			$0
					Total	$0		$0	$0
					% of Total			0%	0%

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost

**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

1 **Chemicals/Soil Area Name:**

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
HAZARDOUS MATERIALS AUDIT									
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS									
HAZARDOUS MATERIALS REMOVAL									
HAZARDOUS MATERIALS									
CONTAMINATED SOILS									
CONTAMINATED SOIL REMOVAL									
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER									
OTHER									
Ammonium nitrate (explosive material)	2019 estimate (See section 3.3.2.2 of 2019 Marginal Estimate)	m3	9800	16AN1S	$358,00	$3 508 400	100%	$3 508 400	$0
Pre-package explosives		kg		16AN2S	$2,37	$0	100%	$0	$0
				#N/A	$0,00	$0		$0	$0
					Total	$3 508 400		$3 508 400	$0
					% of Total			100%	0%

Building / Equip Name: **Mine Site** **Bldg / Equip #:** ***1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
Light Mobile Equipment	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-5 30 units.	each		15MOLS	$941,09	$0	95%	$0	$0
	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15MOLS	$941,09	$0	95%	$0	$0
	2018 Work Plan see Table 3-2	each		15MOLS	$941,09	$0	95%	$0	$0
	2019 estimate (add 2 from reconciliation, add 33 from Marginal Increase and add 61 from 3rd Party)	each	137	18MOLS	$876,92	$120 138	95%	$114 131	$6 007
Medium Mobile Equipment	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-5 40 units.	each		15MOMS	$1 494,13	$0	98%	$0	$0
	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15MOMS	$1 494,13	$0	98%	$0	$0
	2018 Work Plan see Table 3-2	each		15MOMS	$1 494,13	$0	98%	$0	$0
	2019 estimate (add 14 from reconciliation, add 13 from Marginal Increase and add 49 from 3rd Party)	each	47	18MOMS	$1 378,63	$64 796	98%	$63 500	$1 296
Heavy Mobile Equipment	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-5 92 units.	each		15MOHS	$2 616,87	$0	98%	$0	$0
	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15MOHS	$2 616,87	$0	98%	$0	$0
	2018 Work Plan see Table 3-2	each		15MOHS	$2 616,87	$0	98%	$0	$0
	2019 estimate (add 13 from reconciliation, add 33 from Marginal Increase and add 34 from 3rd Party)	each	96	18MOHS	$2 310,87	$221 844	98%	$217 407	$4 437
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
Light mechanical equipment - Decontaminate and dispose on-site		each		15LMES	$1 980,80	$0	98%	$0	$0
Light mechanical equipment - Decontaminate and dispose on-site	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15LMES	$1 980,80	$0	98%	$0	$0
	2019 estimate (add 29 from Marginal Increase)	each	29	18LMES	$1 707,45	$49 516	98%	$48 526	$990
Medium mechanical equipment - Decontaminate and dispose on-site	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-5 12 units.	each		15MMES	$4 261,34	$0	100%	$0	$0
	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15MMES	$4 261,34	$0	100%	$0	$0
	2019 estimate (add 1 from Marginal Increase)	each	1	18MMES	$3 714,64	$3 715	100%	$3 715	$0
Heavy mechanical equipment - Decontaminate and dispose on-site	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-5 4 units.	each		15MEHS	$41 205,45	$0	100%	$0	$0
	2017 Actual work as outlined in Table 2-4 of 2018 Marginal Estimate	each		15MEHS	$41 205,45	$0	100%	$0	$0
	2018 Work Plan see Table 3-2	each		15MEHS	$41 205,45	$0	100%	$0	$0
	2019 estimate (add 14 from reconciliation and add 8 from Marginal Increase)	each	22	18MEHS	$35 507,45	$781 164	100%	$781 164	$0
Light Tanks	Light non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (see Tables 3-4 of 2019 Marginal Estimate).	each	6	18TLS	$1 872,41	$11 234	100%	$11 234	$0
Medium Tanks	Medium non- fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (3-4 of 2019 Marginal Estimate).	each		15MTS	$11 371,00	$0	100%	$0	$0
Light Diesel Tanks	Small fuel tanks (10,000-20,000L) 2017 actual not previously allocated (see Table 3-4 of 2019 Marginal Estimate)	each	5	18LiDTS	$3 193,16	$15 966	100%	$15 966	$0
Medium Mobile Diesel Tank	Medium fuel storage tanks. The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Table 3-4 of 2019 Marginal Estimate).	each	7	18MMMTS	$13 928,01	$97 496	100%	$97 496	$0
Medium Diesel Tanks		each		15MDTS	$16 166,40	$0	100%	$0	$0
Large Diesel Tanks	Large fuel tanks (3ML-15ML). The cleaning, plugging, disassembly and removal of all associated pipeline infrastructure is included (Ref 1, pg 27).	each	2	18LDTS	$147 297,85	$294 596	100%	$294 596	$0
Misc. Items	On-site disposal. Miscellaneous (minor) items were defined as any item less than 200 kg not captured in other unit costs (Ref 1, pg 42).	Lot		15MEIS	$529,83	$0	100%	$0	$0
Fuelk tanks - On-site disposal of medium mobile fuel tanks (3,000 to 500,000 L)	On-site disposal of medium-mobile fuel tanks (3,000 to 500,000L). See table 3-4 of 2019 marginal Estimate	each		15MMFTS	$10 481,05	$0	100%	$0	$0
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport									

Building / Equip Name: Mine Site **Bldg / Equip #:** 1

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
Modular	2017 Work Plan Addendum includes 800 person temp hardwall camp , construction offices, lunch rooms and washcars at both Mine Site and Milne Port	m2		15RBMS	$59,38	$0	89%	$0	$0
	2019 estimate (See table 3-1 of 2019 Marginal Estimate)	m2	1032	18RBMS	$50,75	$52 374	89%	$46 613	$5 761
Fold Away Buildings		m2		15RBFS	$41,57	$0	100%	$0	$0
Soft-Walled	2017 Work Plan Addendum soft Walled Buildings includes 50 person camp and 35 person Norse man style camp at Mine Site only	m2		15RBSS	$47,51	$0	89%	$0	$0
ISO Shipping Containers (Shelters, Comm. Facilities)		m2		15RBIS	$29,69	$0	100%	$0	$0
Office/washcars		m2		15RBIS	$102,05	$0	89%	$0	$0
Water and Wastewater Treatment Facilities	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each		15WWTS	$11 035,58	$0	0%	$0	$0
Power Plant		m2		brs1h	$65,00	$0		$0	$0
Communication Tower		m2		brs1h	$65,00	$0		$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
AN Storage Facility		m2		brs1s	$128,00	$0		$0	$0
Warehouse, Shops and Other		m2		brs1l	$45,00	$0		$0	$0
Storage Facility at Laydown/Airstrip		m2		#N/A	$0,00	$0		$0	$0
Fuel tanks		m2		brs1h	$65,00	$0		$0	$0
Fire Protection pumping station		m		brs1h	$65,00	$0		$0	$0
Freshwater intake		m2		brs1l	$45,00	$0		$0	$0
Reclaim pumps		m2		#N/A	$0,00	$0		$0	$0
Outfall & Diffuser		m2		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, electrician		mandays		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	$0,00	$0		$0	$0
Break foundation slabs		m2		brcs	$6,00	$0		$0	$0
Consolidate & dump boneyard debris		allow		brs1l	$45,00	$0		$0	$0
Worker Dry		m2		brs1l	$45,00	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		brs1l	$45,00	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		brs1l	$45,00	$0		$0	$0
Water Intake		m2		brcs	$6,00	$0		$0	$0
Other		m2		bdcs	$12,63	$0		$0	$0
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport									
Modular	Trailers and pre-fabricated buildings. (Ref 1, pg 29).	m2		15RCBMS	$143,42	$0	100%	$0	$0
Fold Away Buildings	2019 estimate (See table 3-1 of 2019 Marginal Estimate)	m2	1572	18RCBFS	$122,25	$192 177	100%	$192 177	$0
Soft-Walled		m2		15RCBSS	$148,35	$0	100%	$0	$0
ISO Shipping Containers (Shelters, Comm. Facilities)	**2017 Work Plan add 500 m2 Tire Shop**	m2		15RCBIS	$143,42	$0	100%	$0	$0
Temporary Construction Warehouse and Office Allowance		m2		15RCBTS	$25 000,00	$0	100%	$0	$0
BREAK FOUNDATIONS									
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer									
	Expansion of 800 camp	m2	12000	18GCS	$1,49	$17 921	100%	$17 921	$0
	Water Treatment Plant 2019	m2	3500	18GCS	$1,49	$5 227	100%	$5 227	$0
	Km 107.5, Km 110, Km 107 stockplile	m2	404400	18GCS	$1,49	$603 939	100%	$603 939	$0
	mine site fuel tank foot print	m2	21620	18GCS	$1,49	$32 288	100%	$32 288	$0
Grade and contour laydown areas		m2		15GCS	$1,49	$0	100%	$0	$0
		m2		15GCS	$1,49	$0	100%	$0	$0
		m2		15GCS	$1,49	$0	100%	$0	$0
		m2		15GCS	$1,49	$0	100%	$0	$0
		m2		15GCS	$1,49	$0	100%	$0	$0
Crusher Pad expansion pad		m2	12000	18GCS	$1,49	$17 921	100%	$17 921	$0
Culvert Removal	on mine site 2019 estimate	m	285		$50,00	$14 250	100%	$14 250	$0
Grade and contour infrastructure pads	In 2017 Work Plan Addendum - Camp pad	m2		15GCS	$1,49	$0	100%	$0	$0
		m2		15GCS	$1,81	$0	100%	$0	$0
Aerodome Facilities		m2		15GCS	$1,81	$0	100%	$0	$0
Road		m2		15GCS	$1,81	$0	100%	$0	$0
Stockpiles	**Add 2017 Work Plan Increase in Crusher Pad Storage Area - Ph 1: 8,200m2 & Ph 2: 17,500m2**	m2		15GCS	$1,81	$0	100%	$0	$0
Truck weigh facility distributed area		m2		15GCS	$1,81	$0	100%	$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
Warehouse, Shops and Other		m2		AE	$8,47	$0		$0	$0
Fuel tanks on site for bulk fuel storage		m2		AE	$8,47	$0		$0	$0
Fire Protection pumping station		m2		AE	$8,47	$0		$0	$0
Worker Dry		m2		AE	$8,47	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		AE	$8,47	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		AE	$8,47	$0		$0	$0
Other		ha		scfyl	$4 300,00	$0		$0	$0
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer									
Waste Disposal		m2		15GCLS	$5,31	$0	100%	$0	$0
Fuel tank farm dyke		m2		15GCLS	$5,31	$0	100%	$0	$0

Building / Equip Name: **Mine Site** **Bldg / Equip #:** ***1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
Hazardous waste berm		m2		15GCLS	$5,31	$0	100%	$0	$0
Bulk fuel storage facility (Bladder Farm)		m2		15GCLS	$5,31	$0	100%	$0	$0
Crusher Pad Sedimentation Pond	Crusher pad sedimentation pond	m2	2000	18GCLS	$4,99	$9 980	100%	$9 980	$0
Mine Site Fuel Tank, Farm containment Area	Mine Site Fuel Tank, Farm Containment Area	m2	12000	18GCLS	$4,99	$59 880	100%	$59 880	$0
Hazardous waste berm	Hazardous Waste Berm	m2	360	18GCLS	$4,99	$1 796	100%	$1 796	$0
Other	New PWSP 2019	m2	4180	18GCLS	$4,99	$20 858	100%	$20 858	
Other	Landfarm	m2	9000	18GCLS	$4,99	$44 910	100%	$44 910	
Other	KM107 Sedimentation Pond	m2	7400	18GCLS	$4,99	$36 926	100%	$36 926	
LANDFILL FOR DEMOLITION WASTE									
Place fill material over demolition waste (Mine Site Landfill)	Includes drill and blasting of material aggregated crushing, excavation of fill, load and haul of fill material, backfill and compact source of material, and fill application. Assumes avg fill depth 1.5m over 6m of demolition waste (Ref 1, pg 17). For 2018 work plan see table 3-9 in the Marginal estimate for quantity and 2017 Work Plan Addendum Table 3-8, 2018 Breakdown. Fill application for 2018 Estimate Addendum see table 3-	m2	2664	18PFS	$38,83	$103 443	100%	$103 443	$0
SPECIALIZED ITEMS									
					Total	$2 874 355		$2 855 863	$18 491
					% of Total			99%	1%

Building / Equip Name: **Milne Port** **Bldg / Equip #: 2**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport									
	2017 Work Plan Addendum includes 380 person temp hardwall camp , construction offices, lunch rooms and washcars at both Mine Site and Milne Port 2019 breakdown	m2		15RBMS	$59,38	$0	89%	$0	$0
Modular	2018 Work Plan see table 3-1	m2		15RBMS	$59,38	$0	89%	$0	$0
	2019 estimate (See table 3-1 of 2019 Marginal Estimate)	m2	505	18RBMS	$50,75	$25 629	89%	$22 810	$2 819
Fold Away Buildings		m2		15RBFS	$41,57	$0	100%	$0	$0
Soft-Walled		m2		15RBSS	$47,51	$0	100%	$0	$0
ISO Shipping Containers (Shelters, Comm. Facilities)		m2		15RBIS	$29,69	$0	100%	$0	$0
Water and Wastewater Treatment Facilities	Equipment quanties updated to reflect 2017 Work Plan addendum Table 3-6 2 units one at Milne Port and one at Mine Site.	each		15WWTS	$11 035,58	$0	0%	$0	$0
Power Plant		m2		brs1h	$65,00	$0		$0	$0
Communication Tower		m2		brs1h	$65,00	$0		$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
AN Storage Facility		m2		brs1s	$128,00	$0		$0	$0
Warehouse, Shops and Other		m2		brs1l	$45,00	$0		$0	$0
Storage Facility at Laydown/Airstrip		m2		#N/A	$0,00	$0		$0	$0
Fuel tanks		m2		brs1h	$65,00	$0		$0	$0
Fire Protection pumping station		m		brs1h	$65,00	$0		$0	$0
Freshwater intake		m2		brs1l	$45,00	$0		$0	$0
Reclaim pumps		m2		#N/A	$0,00	$0		$0	$0
Outfall & Diffuser		m2		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, electrician		mandays		#N/A	$0,00	$0		$0	$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	$0,00	$0		$0	$0
Break foundation slabs		m2		brcs	$6,00	$0		$0	$0
Consolidate & dump boneyard debris		allow		brs1l	$45,00	$0		$0	$0
Worker Dry		m2		brs1l	$45,00	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		brs1l	$45,00	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		brs1l	$45,00	$0		$0	$0
Water Intake		m2		brcs	$6,00	$0		$0	$0
Other		m2		bdcs	$12,63	$0		$0	$0
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport									
BREAK FOUNDATIONS									
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer									
Grade and contour laydown areas	Laydown LP2	m2	30 000	18GCS	$1,49	$44 803	100%	$44 803	$0
	Laydown LP1	m2	-13000	18GCS	$1,49	($19 414)	100%	($19 414)	$0
	2018 Work Plan See Table 3-3 in Marginal Estimate	m2		15GCS	$1,81	$0	100%	$0	$0
	2017 actual work not previously allocated (W1,W3,W6, W7, W10B, W11, W14 AND W15) see table 2-2 of 2018 work plan	m2		15GCS	$1,81	$0	100%	$0	$0
		m2		15GCS	$1,81	$0	100%	$0	$0
Grade and contour building footprints		m2		15GCS	$1,81	$0	100%	$0	$0
Grade and contour infrastructure pads		m2		15GCS	$1,81	$0	100%	$0	$0
Road		m2		15GCS	$1,81	$0	100%	$0	$0
Stockpiles	Ore Stockpile expansion 2019	m2	140000	18GCS		$209 079		$209 079	$0
					$1,49		100%		
U/G Heating Plant		m2		15GCS	$1,81	$0	100%	$0	$0
Emulsion Plant		m2		15GCS	$1,81	$0	100%	$0	$0
Warehouse, Shops and Other		m2		15GCS	$1,81	$0	100%	$0	$0
Fuel tanks on site for bulk fuel storage		m2		15GCS	$1,81	$0	100%	$0	$0
Fire Protection pumping station		m2		15GCS	$1,81	$0	100%	$0	$0
Worker Dry		m2		15GCS	$1,81	$0	100%	$0	$0
WTP & Fresh Water Pumping Station		m2		15GCS	$1,81	$0	100%	$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		15GCS	$1,81	$0	100%	$0	$0
Other		m2		15GCS	$1,81	$0	100%	$0	$0
	2019 ajusted	m2		15GCS	$1,81	$0	100%	$0	$0
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer									
Ore Stockpile Sedimentation		m2	15000	18GCLS	$4,99	$74 850	100%	$74 850	$0
Ore Stockpile Sedimentation Pond 2a		m2	4400	18GCLS	$4,99	$21 956	100%	$21 956	$0
contaminated dump		m2	2700	18GCLS	$4,99	$13 473	100%	$13 473	$0
New hazardous waste berm	2019 breakdown	m2	360	18GCLS	$4,99	$1 796	100%	$1 796	$0
Landfarm		m2		15GCLS	$5,31	$0	100%	$0	$0
LANDFILL FOR DEMOLITION WASTE									
SPECIALIZED ITEMS									
					Total	$372 171		$369 352	$2 819
					% of Total			99%	1%

Building / Equip Name: **Tote Road** **Bldg / Equip #:** ***3***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
DISPOSE MECHANICAL EQUIPMENT - Unit Costs includes disassembly and decontamination required for on-site disposal, load and transport to landfill									
REMOVE BUILDINGS - Unit Costs include disassembling, removing or securing all items and load and transport									
REMOVE CONTAMINATED BUILDINGS - Unit Costs include disassembling, removing or securing all items, decontamination and load and transport									
BREAK FOUNDATIONS									
GRADE AND CONTOUR, GENERAL - Unit costs are inclusive of backfill, compaction and sacrfication with a dozer									
Culvert Removal		m	80		$50,00	$4 000	100%	$4 000	$0
Grade and contour laydown areas	Laydown 2, 4, 7, 10, 13	m2	192500	18GCS	$1,49	$287 483	100%	$287 483	$0
Grade and contour laydown areas	Laydown 9	m2	92500	18GCS	$1,49	$138 141	100%	$138 141	$0
Grade and contour building footprints	**Assume 7% on Crown Land**	**m2**		**15GCS**	**$1,81**	**$0**	**100%**	**$0**	**$0**
Grade and contour infrastructure pads	**Assume 7% on Crown Land**	**m2**		**15GCS**	**$1,81**	**$0**	**100%**	**$0**	**$0**
Aerodome Facilities		m2		15GCS	$1,81	$0	100%	$0	$0
Road	**Assume 7% on Crown Land**	**m2**		**15GCS**	**$1,81**	**$0**	**100%**	**$0**	**$0**
Stockpiles		m2		15GCS	$1,81	$0	100%	$0	$0
Remove Liner	**Mobile Maintenance Depot (100% on Crown Land)**	**m2**			**$3,50**	**$0**	**100%**	**$0**	**$0**
Grade and Contour Significant Disturbed Areas		m2		15GCDS	$2,72	$0	100%	$0	$0
U/G Heating Plant		m2		#N/A	$0,00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0,00	$0		$0	$0
Warehouse, Shops and Other		m2		AE	$8,47	$0		$0	$0
Fuel tanks on site for bulk fuel storage		m2		AE	$8,47	$0		$0	$0
Fire Protection pumping station		m2		AE	$8,47	$0		$0	$0
Worker Dry		m2		AE	$8,47	$0		$0	$0
WTP & Fresh Water Pumping Station		m2		AE	$8,47	$0		$0	$0
WRSF Pond and Attenuation Pond Pumphouses		m2		AE	$8,47	$0		$0	$0
Other		ha		scfyl	$4 300,00	$0		$0	$0
GRADE AND CONTOUR, WITH LINER - Unit costs include liner removal and disposal, backfill, compaction and sacrfication with a dozer									
LANDFILL FOR DEMOLITION WASTE									
RECLAIM ROADS									
SPECIALIZED ITEMS									
					Total	$429 625		$429 625	$0
					% of Total			100%	0%

Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT						
STABILIZE SEDIMENT PONDS/WATER MANAGEMENT PONDS						
REDIRECT RUNOFF/CONSTRUCT DIVERSION DITCHES						
BREACH DITCHES						
DECOMISSION FRESH WATER SUPPLY						
WATER CONTROL IN RECLAMATION QUARRY						
REMOVE PIPELINES						
GROUNDWATER COLLECTION SYSTEM						
CONSTRUCT CONTAMINATED WATER STORAGE POND						
CONSTRUCT PASSIVE TREATMENT SYSTEM (e.g. Constructed Wetland)						
CONSTRUCT WATER TREATMENT PLANT						
					Total	$0

For cost of long-term/post-closure water treatment see "WATER TREATMENT" Worksheet"

Interim Care and Maintenance (18 Month duration)

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
Number of years of ICM		years	1,5		**Total**	$0

Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Short Term Temporary Care and Maintenance Program		LS	1	#N/A	$200 000,00	$200 000
Annual geotechnical inspection		LS	1	#N/A	$200 000,00	$200 000
Permitting		LS	1	#N/A	$220 000,00	$220 000
Socio-economic reporting		LS	1	#N/A	$320 000,00	$320 000
Aquatic monitoring Program	2019 estimate (See section 3.3.2.6 of 2019 Marginal Estimate)	LS	1	#N/A	$450 000,00	$450 000
Environmental Effects Monitoring Program		LS	1	#N/A	$285 000,00	$285 000
Post-Closure fauna and Flora monitoring. Terrestrial Program		LS	1	#N/A	##########	$1 000 000
Marine Monitoring		LS	1	#N/A	$120 000,00	$120 000
Air Quality Monitoring Program (AQMP)		LS	1	#N/A	$210 000,00	$210 000
Wildlife Effects Monitoring Program (WEMP)	Assume sampling events specified year 1 to 5.	each		RPTH	$40 625,00	$0
Safety compliance inspection		LS	1	#N/A	$185 000,00	$185 000
Project Environmental Assessment	2019 estimate (See section 3.3.2.6 of 2019 Marginal Estimate)	LS	1	#N/A	$240 000,00	$240 000
COVER MAINTENANCE						
SPILLWAY MAINTENANCE						
CWTS MAINTENANCE						
POST-CLOSURE WATER TREATMENT						
Subtotal, Annual post-closure costs						$3 430 000
Discount rate for calculation of net present value of post-closure cost, %				0,00%		
Number of years of post-closure activity					years	
Present Value of payment stream						$0

*Regulatory costs - annual reporting, management plans, progress reports etc.

Mobilization/Demobilization:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
MOBILIZE MISC. EQUIPMENT						
Mobilization and Demobilization of Equipment and Materials Required for Reclamation (2019)	2019 estimate (See section 3.3.2.5 of 2019 Marginal Estimate) Assumed 10% of marginal 2019 Estimate Direct costs	LS	1	#N/A	1066166,163	$1 066 166
	2019 estimate (Phase 2 Expansion Project Materials and Equipment see table 3-7 of 2019 Marginal Estimate)	LS	1	#N/A	15592000	$15 592 000
	2019 estimate (Demob. Of hazardous waste materials associated with the Water Treatment Plant at the WRF)	LS	1	#N/A	13300	$13 300
Mobilization and Demobilization of Equipment and Materials by Sealift		LS			2180000	$0
Mobilization and Demobilization of Equipment and Materials for 2018 Work Plan addendum	Assumed 10% of marginal 2017 Work Plan Addendum Direct costs(minus Soil and Water management and ICM components) i.e., $5,554,000 from BIMC 2018 Marginal Summary Worksheet.	LS		#N/A	555400	$0
Mobilization and Demobilization of Equipment and Materials for 2018 Work Plan	Assumed 10% of marginal 2018 Work Plan Direct costs(minus Soil and Water management and ICM components) i.e., $2,600,700 from BIMC 2018 Marginal Summary Worksheet.	LS		#N/A	260070	$0
Off-site Disposal of Waste	Ref 1 pg 59	m3		15ODS	358	$0
Consumables (**2018 Work Plan** marginal increase)	2018 Work Plan addendum (table 3-7) increases this to a 800 person and 50 person camp structures at the Mine Site and a 380 person camp at Milne Port	Ea		15CONS	700,8	$0
Consumables	Cost to remove consumables delivered to site in 2015 (lubricants, grease, detergents, boosters, EZ Dets, dry goods, food, household supplies, etc.) (2015 Security Assessment, pg 18).	Ea		15CONS	700,8	$0
Truck tires		allow		#N/A	0	$0
Other				#N/A	0	$0
MOBILIZE CAMP						
MOBILIZE WORKERS						
Mobilization of Workers Required for Reclamation (from northern communities, **2018 Work Plan**	Person-hours required to complete direct cost reclamation activities (10-h person-days)	person-days		15NWS	75	$0
Mobilization of Workers Required for Reclamation (from southern communities, **2018 Work Plan**	Person-hours required to complete direct cost reclamation activities (10-h person-days)	person-days		15SWS	85,45	$0
Mobilization of Workers Required for Reclamation (from northern communities,	2019 estimate (See section 3.3.2.3 of 2019 Marginal Estimate)	person-days	1594	15NWS	75	$119 550
Mobilization of Workers Required for Reclamation (from southern communities,	2019 estimate (See section 3.3.2.3 of 2019 Marginal Estimate)	person-days	3719	15SWS	85,45	$317 789
Mobilization of Workers Required for Reclamation (from northern communities, 2016 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days		15NWS	75	$0
Mobilization of Workers Required for Reclamation (from southern communities, 2016 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1).	person-days		15SWS	85,45	$0
Mobilization of Workers Required for Reclamation (2014 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	man hours			82,32	$0
Mobilization of Workers Required for Reclamation (2015 Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	each			82,32	$0
Mobilization of Workers Required for Reclamation (2015 A Work Plan)	Person-hours required to complete direct cost reclamation activities (10-h person-days) (pg 63, Ref 1). Based on a blended unit rate of $82.315, which assumes 70% of hires from southern communities at a rate of $85.45/ person-day, and 30% from northern communities at $75/ person-day.	each			82,32	$0
WORKER ACCOMODATIONS						
Worker Accommodation & Camp Operation	2019 estimate (See section 3.3.2.4 of 2019 Marginal Estimate)	person-days	5 312	15WACS	225	$1 195 200
Worker Accommodation & Camp Operation	For the Post-Closure Monitorong and Reporting System (from 2016 Work Plan)	person-days		15WACS	225	$0
Worker Accommodation & Camp Operation (**2018 Work Plan**)	For marginal reclamation activities (3190 person-days) associated with **2018 Work Plan (Page 13 of Marginal Estimate)**. Includes maintenance, catering,, housekeeping & fuel costs.	person-days		15WACS	225,5	$0
Worker Accommodation & Camp Operation (**2017 Work Plan addendum**)	For marginal reclamation activities (2145 person-days) associated with **2017 Work Plan addendum**. Includes maintenance, catering,, housekeeping & fuel costs.	person-days		15WACS	225,5	$0
Long term reclamation activities (eg pump flooding)		person-days		15WACS	225,5	$0
Worker Accommodation & Camp Operation (**2019 Marginal estimate**)	Page 16 in FSE	person-days		15WACS	225,5	$0
MOBILIZE FUEL						
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents the fuel mobilization cost associated with the 2014 Work Plan as provided in Oct 30, 2015 EBS	$		#N/A	1	$0
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for 2015 provided in Oct 30, 2015 EBS	$		#N/A	1	$0
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for the 2015 Addendum provided in September 23rd, 2015 EBS	$		#N/A	1	$0

Mobilization/Demobilization:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
Demobilization of Existing Fuel and/or Fuel Required for Reclamation	Represents marginal increase in fuel for 2015 R provided in September 23rd, 2015 EBS	$		#N/A	1	$0
Fuel Required for Reclamation (2016 Work Plan)	Ref 1, pg 61	litre		15MF1S	0,4	$0
Fuel Required for Reclamation **(2017 Work Plan Addendum)**	**2017 Work Plan Addendum page 8**. Mobilize 50% of fuel required. Reclamation activities for Marginal increase = 1,144,276L. Heat & power = 116L per 2145 person days x $0.40/L for mobilization. Fuel cost be captured under Worker Accom. & Camp Operation. Correction made to $1,213,000 per EBS not $1,216,000 as noted in the addendum. BIMC information does not clarify how the volume of fuel was derived so cost provided used to back out a volume of fuel.	litre		15MF1S	0,4	$0
Fuel Required for Reclamation (2018 Work Plan)	**2018 Work Plan page 13**. Mobilize 50% of fuel required. Reclamation activities for Marginal increase = 638,170L. Heat & power = 116L per 3190 person days x $0.40/L for mobilization. Fuel cost be captured under Worker Accom. & Camp Operation.	litre		15MF1S	0,4	$0
Fuel Required for Reclamation (2019)	2019 estimate (See section 3.3.2.1 of 2019 Marginal Estimate)	litre	614 000	15MF1S	0,4	$245 600
WINTER ROAD						
DEMOBILIZE HEAVY EQUIPMENT (includes disassembly, demob as well as worker accommodations and mob/demob)						
DEMOBILIZE FUEL						
Fuel Required for Reclamation (2019)	2019 estimate (See section 3.3.2.1 of 2019 Marginal Estimate)	litre	15 000 000	15MF1S	0,1	$1 500 000
DEMOBILIZE CAMP						
DEMOBILIZE WORKERS						
WINTER ROAD						
				Total		**$20 049 605**

Underground Mine Name **UG Mine #** *1*

ACTIVITY/MATERIAL	Notes	Unit	Qty	Code	Unit Cost	Cost Land	Land Cost	Water Cost
CONTROL ACCESS								
REMOVE HAZARDOUS MATERIALS								
INSTALL BULKHEADS								
FLOOD MINE								
INSTALL GROUNDWATER COLLECTION SYSTEM								
SPECIALIZED ITEMS								
					Total	$0	$0	$0
					% of Total		0%	0%

Tailings Impoundment Name: **Pond # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost Land	Land Cost	Water Cost
CONTROL ACCESS								
STABILIZE EMBANKMENT(S)								
COVER TAILINGS								
BURY PAG ROCK								
STABILIZE DECANT SYSTEM								
REMOVE TAILINGS DISCHARGE								
CONSTRUCT DIVERSION DITCHES								
FLOOD TAILINGS								
UPGRADE SPILLWAY								
CONSTRUCT SEEPAGE COLLECTION POND								
INSTALL GROUNDWATER COLLECTION SYSTEM								
SPECIALIZED ITEMS								
TREAT SEEPAGE - see "Water Management" and "Water Treatment"								
TREAT SUPERNATANT								
					Annual treatment costs	$0		
Number of years of treatment		years						
					Total treatment costs	$0		$0
					Total	$0	$0	$0
					% of Total		0%	0%

* for construction of passive treatment system refer to "Water Management"

Post Closure Water Treatment - Identified as long term/post-closure in 'Instructions' worksheet

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS TO WTP						
LABOUR AND SUPPLIES						
WATER MANAGEMENT						
WTP WATER SAMPLING AND ANALYSES						
SITE ACCESS						
CONSTRUCT WATER TREATMENT PLANT						
					Annual water treatment costs	$0
Number of years of water treatment		years	25			
					Total	$0

Filter by unit

ITEM	Detail	COST CODE	UNITS	LOW $	HIGH $	SPECIFIED $	COMMENTS
Accomodation							
		ACCM	manday	100,00	175,00		
Buildings - Decontaminate							
	Asbestos	BDA	m2	25,60	51,20		Low: removal of asbestos siding & flooring; High: re
Buildings - Remove							Unit costs are based on 3m high, single storey build
	Wood	BRW	m2	27,50	41,00		
	Concrete	BRC	m2	40,00	65,00	6,00	Specified: puncture concrete foundation slabs
	Steel - teardown	BRS1	m2	45,00	65,00		
	Steel - for salvage	BRS2	m2	67,00	100,00		
Concrete work							
	Small pour	CSF	m3	426,50	639,75		Low: YK; High=1.5xLow
	Large pour	CLF	m3	353,50	530,25	2 130,00	Specified: concrete crown pillar
Contaminated Soils							
	ESA Phase 1	CS1	each	7500,00			Low: small, "clean" site
	ESA Phase 1	CS2	each	50000,00			Low: small, "clean" site
	Remediate on site	CSR	m3	47,00	146,00		
Dozing							
	doze rock piles	DR	m3	1,05	2,40		Low cost: doze crest off dump
	doze overburden/soil piles	DS	m3	0,95	3,80		High cost: push up to 300 m
Excavate Rock; Low Spec's and QA/QC							
	drill/blast/load/short haul	RB1	m3	11,40	17,05		Low:quarry operations for bulk fill
	drill/blast/load/long haul	RB2	m3	12,05	17,80		
	RB1 + spread and compact	RB3	m3	12,05	17,80		
	RB2 + spread and compact	RB4	m3	12,50	30,75		
	Specified activity	RBS	m3				
Excavate Rock; High Spec's and QA/QC							(e.g. ditch/spillway excavation)
	drill/blast/load/short haul	RC1	m3	12,05	17,80		Low:foundation excavation;High:spillway excavatio
	drill/blast/load/long haul	RC2	m3	12,70	18,40		
	RC1 + spread and compact	RC3	m3	12,70	18,40		e,g, cover construction
	RC2 + spread and compact	RC4	m3	13,50	19,20		e,g, cover construction
	Specified activity	RCS	m3			175,00	Specified-drift excavation
Excavate Rip Rap							
	drill/blast/load/short haul/place	RR1	m3	13,50	17,75		High: quarry & place rip rap in channel
	drill/blast/load/long haul/place	RR2	m3	14,20	20,65		
	source is waste dump/short haul	RR3	m3	7,00			cost includes sorting
	source is waste dump/long haul	RR4	m3	7,60			
	Specified activity	RRS	m3				
Excavate Soil; Low Spec's and QA/QC							
	clear & grub	SBC	m2	3,40	5,00		
	excavate/load/short haul	SB1	m3	4,30	5,90		
	excavate/load/long haul	SB2	m3	4,60	7,30		
	SB1 + spread and compact	SB3	m3	5,10	8,90		Low: non-engineered; High:engineered
	SB2 + spread and compact	SB4	m3	5,50	11,00		Low: non-engineered; High:engineered
	Specified activity	SBS	m3	3,20	6,30		Low: rehandle waste rock dump by dozing; High:rel
	Tailings	SBT	m3	1,35	3,70	15,50	High:contour surface - wet or frozen; Specified:hau
Excavate Soil, High Spec's and QA/QC							
	excavate/load/short haul	SC1	m3	6,80	9,30		
	excavate/load/long haul	SC2	m3	7,10	11,75		
	SC1 + spread and compact	SC3	m3	8,90	14,20		Low: non-engineered; High:engineered
	SC2 + spread and compact	SC4	m3	9,30	23,20		Low: non-engineered; High:engineered (e.g. compl
	Specified activity	SCS	m3			18,80	Backfill adit with waste rock
Fence							
		FNC	m	13,55	203,00		
Fuel and Electricity							
	Fuel cost - gas	FCG	litre	1,05	1,40		
	Fuel cost - diesel	FCD	litre	0,99	1,39		
	Fuel mobilization	FCM	litre	0,22	0,42		High: winter road usage
	Electricity	FCE	kW-h	0,17	0,19	0,49	Low and High:Yellowknife; Specified:diesel generat
Geo-Synthetics							
	geotextile	GST	m2	3,44			Supply and install
	geogrid	GSG	m2	5,75			
	liner, HDPE	GSHDPE	m2	7,95			Supply and install; large quantity
	liner, ES3	GSES3	m2	20,20			FOB Yellowknife
	geosynthetic installation	GSI	m2	3,16	14,00		Low:geotextile; High:ES3 or HDPE
	bentonite soil ammendment	GSBA	tonne	308,30	348,50		FOB Edmonton, add shipping & mixing
Grouting (/m3 of rock grouted)							

Filter by unit

	grout	m3	236,55	286,75		High: cement, FOB Yellowknife
Labour & Equipment Rates						
Site manager	sman	$/hr	125,00	152,00		
Supervisor	super	$/hr	52,00	91,84		
Registered engineer	eng	$/hr	95,00	220,00		
Environmental coordinator	envco	$/hr	74,16	130,00		
Evironmental technologist	envtech	$/hr	36,00			
Electrician	elec	$/hr	74,00	95,00		
Journeyman - various	journey	$/hr	44,00	71,79		
Labour - skilled	lab-s	$/hr	41,00	49,60	120,00	
Labour - unskilled	lab-us	$/hr	31,00	43,98		
Equipment operator	oper	$/hr	41,00	65,00		
Heavy duty mechanic	mech	$/hr	49,00	72,85		
Water treatment plant operator	oper-wt	$/hr	41,00	59,86		
Security / first aid	safety	$/hr	36,00	66,97		
Administative staff	admin	$/hr	38,00	57,89		
Equipment rates include operator and fuel						
Loader - 4 cu.yd (3.06m3)	load-s	$/hr	175,00			
Loader - 7 cu.yd (5.35m3)	load-l	$/hr	315,00			
Excavator - 26.76-30.84 tonnes	exc-s	$/hr	190,00			
Excavator - 68.95+tonnes	exc-l	$/hr	420,00			
Grader	grad	$/hr	190,00			
Dump truck off hwy 30-50 tonnes	truck-s	$/hr	225,00			
Dump truck off hwy 55-75 tonnes	truck-l	$/hr	300,00			
dozer, small	dozers	$/hr	205,00	260,00		
dozer, large	dozerl	$/hr	490,00	565,00		
smooth drum compactor	comp	$/hr	155,00			
scooptram, 6 yd3 bucket	scoop	$/hr	170,00			
flat bed truck with hiab	hiab	$/hr	155,00			
fuel truck	ftruck	$/hr	150,00			
water truck	wtruck	$/hr	58,00	150,00		
Mobilize Heavy Equipment						
Road access	MHER	kmtonne	3,40	10,25		
Air access	MHEA	kmtonne	12,00			cargo rate>500lb
Mobilize Camp						
Road access	MCR	each	50000,00			refurbish existing camp
Mobilize Workers						
flight	MW	each	4500,00	9100,00		Low:e.g. 8 passenger; High: Dash 7
Oil Removal						
oil removal	OR	litre	0,43	1,20		Low:waste oil heater; High: ship offsite
PCB Removal						
Remove from site	PCBR	litre	40,20	46,90		Low: shipping, handling & disposal from Yellowknife
Pipes, small (<6in dia.)						
remove/dispose on site	PSR	m	1,00	24,00		Low: remove/dispose on site; High: remove/re-use
supply	PSS	m	6,10	11,10		Low:supply; High:supply and ship
install	PSI	m	25,00			
Pipes, large (>6in dia.)						
remove/dispose on site	PLR	m	22,00	72,00		Low: remove/dispose on site; High: remove/re-use
supply	PLS	m	129,00	143,00		Low:supply; High:supply and ship
install	PLI	m	50,00			
Power Lines						
remove/dispose on site	POWR	m	25,50			
Process Chemicals						
Remove from site	PCR	kg	0,45	2,50		Low: shipping, handling & disposal from Yellowknife
Pumps						
Pump capital cost	PC	each	195000,00			
Pump shipping	PS	each	2500,00			
Pump operating cost	POC	m3	0,12			pump operating costs should be calculated based o
Pump maintenance	PM	allow	25000,00			
Pump sand BackFill						
	PBF	m3	85,00	300,00		
Scarify - road/mine site						
	SCFY	ha	4300	6030	2150	
Shaft, Raise & Portal Closures						
Shaft & Raises	SR	m2	645,00	2132,00		Low:pre-cast concrete slabs, little site prep. Area=s
Portals	POR	m3	18,80	250,00	1200,00	Low:unit cost code SCS;High:excavate & backfill co
Site Inspection Report						

Filter by unit

	RPT	each	10000,00	20000,00		
SpillWay - Clear						
	SW	each	3000,00	7000,00		
Survey/Instrumentation						
	SI	each	1800,00	3600,00		2 person crew
Treatment Plant - Construct						
Small (< 1000 m3/d)	TPS	lump sum	9000000	15000000		
Large (> 1000 m3/d)	TPL	lump sum	15000000	46000000		
Constructed Wetland	CWTS	ha	200000	300000		
Treatment Plant - Operate						
	TPO	m3	0,35	2,00		
Treatment Chemicals						
ferric sulphate	ferric	kg	1,19			
ferrous sulphate	ferrous	kg	1,32			
lime	lime	kg	0,56			
hydrogen peroxide, 35%	hperox	kg	1,50			
Sodium Metabisulfate	Nametab	kg	1,18			
Caustic soda, 50%	caustic	kg	0,74			
Sulfuric acid, 93%	sulfuric	kg	0,31			
flocculant	flocc	kg	6,00			
copper sulphate	copper	kg				
shipping	shipping	kg	0,20			
Vegetation						
Hydroseed, Flat	VHF	ha	4000,00			
Hydroseed, Sloped	VHS	ha	4500,00			
Veg. blanket/erosion mat	VB	ha	13000,00			
Tree planting	VT	ha	2600,00	6000,00		
Wetland species	VW	ha			47,72	Specified= /m3, Wetland Growth Media Substrate r
Water Sampling/Analysis/Reporting						
	WS	each	7000,00	10000,00		
Winter Road						
Construction	WRC	km	2000,00	11500,00		
Usage	WRU	kmtonne	0,29			
Unit Rates as per 2015 EBS						
Grade and Contour	15GC	m2			$1,81	
Grade and Contour With Liner	15GCL	m2			$5,31	
Grade and Contour Significant Disturbed Areas	15GCD	m2			$2,72	
Fill Application	15PF	m2			$44,37	
Cost for On-Site Disposal of Equipment:						
Light Mobile Equipment	15MOL	Ea			941,1	
Medium Mobile Equipment	15MOM	Ea			1 494,1	
Heavy Mobile Equipment	15MOH	Ea			2 618,9	
Other mobile equipment (reclaim conveyor)	15MOR	Ea			1 329 441,3	
Light mechanical equipment - Decor	15LME	Ea			1 980,8	
Medium mechanical equipment - De	15MME	Ea			4 261,3	
Heavy mechanical equipment - Dec	15MEH	Ea			41 205,4	
Light Tanks	15TL	Ea			2 148,3	
Medium Tanks	15MT	Ea			7 387,3	
Light Diesel Tanks	15LiDT	Ea			3 693,7	
Medium Diesel Tanks	15MDT	Ea			16 166,4	
Large Diesel Tanks	15LDT	Ea			106 338,7	
Largest Diesel Tanks	15XLDT	Ea			171 468,2	
Misc Items (Minor)	15MEI	Ea			529,8	
Fuel tanks - Medium Mobile Diesel T	15MMFT	Ea			$10 481,05	
Removal of Contaminated Buildings						
fold away	15RCBF	m2			$142,41	
ISO Shipping Container	15RCBI	m2			$143,42	
modular	15RCBM	m2			$143,42	
soft walled	15RCBS	m2			$148,35	
Temporary construction warehouse	15RCBT	m2			$25 000,00	
Removal of Buildings						
fold away	15RBF	m2			$41,57	
modular	15RBM	m2			$59,38	
ISO Shipping Container	15RBI	m2			$29,69	
soft walled	15RBS	m2			$47,51	
water and wastewater treatment fac	15WWT	Ea			$11 035,58	
Foundations						
Precast concrete	15FC	m2			$38,47	
Slab on grade	15FS	m2			$33,11	
Timber cribbing	15TC	m2			$20,78	
Reclaim roads						
Remove bridges	15BR	Ea			$201 838,77	
Remove culverts	15CR	Ea			$1 094,48	

Filter by unit

Specialized Items					
Power distribution - electrical cable	15EC	m			$26,49
Electrical Cable	15EC	m			26,5
Incinerator	15FI	Ea			9 975,9
Potable Water	15PW	Ea			9 975,9
Consumables	15CON	Bed space			701
Mobilization					
Mobilization and Demobilization of Equipment and Materials by Sealift	15SL	Ea			$2 572 000,00
Demobilization of Existing Fuel	15MF1	L			$0,10
Fuel Required for Reclamation	15MF2	L			$0,40
Offsite disposal of waste and materi	15OD	m3			$358,00
Worker accomodation and camp op	15WAC	person-day			$225,00
Northern worker mobilization	15NW	person-day			$75,00
Southern worker mobilization	15SW	person-day			$85,45
Blended Labour and Equip Rates (2015)					
Blended labour rate	15BL	hr			$100,00
Blended equipment rate	15BE	hr			$150,00
Water management					
Remove pipes	15RP	m			$66,23
Reclaim roads					
Remove bridges	15BR	Ea			$201 838,77
Remove culverts	15CR	Ea			$1 094,48
Chemicals					
Contaminated soil treatment	15CST	m3			$14,78
Ammonium nitrate (explosive)	15AN	kg			$2,37
Unit Rates as per 2016 EBS/ Other communication from Baffinland					
Chemicals					
Ammonium nitrate (explosive)	16AN1	m3			$358,00
Pre-packaged explosives	16AN2	kg			$2,37
Other Unit Rates					
Monitoring					
SNP/AEMP water sampling & report	15MCW	each	$30 000	$36 000	
Envrionmental site assessment	15EA	each			$18 000
Geotechnical assessment	15GT	each			$20 000
Maintenance allowance	15MCA	each	$100 000	$150 000	
Unit Rates as per table 1-2 in 2019 BIMC Marginal Closure and Reclamation FSE					
Grade and Contour	18GC	m2			$1,49
Grade and Contour With Liner	18GCL	m2			$4,99
Fill Application	18PF	m2			$38,83
Cost for On-Site Disposal of Equipment:					
Light Mobile Equipment	18MOL	Ea			876,9
Medium Mobile Equipment	18MOM	Ea			1 378,6
Heavy Mobile Equipment	18MOH	Ea			2 310,9
Other mobile equipment (reclaim conveyor)	18MOR	Ea			1 136 232,9
Light mechanical equipment - Decor	18LME	Ea			1 707,5
Medium mechanical equipment - De	18MME	Ea			3 714,6
Heavy mechanical equipment - Dec	18MEH	Ea			35 507,5
Light Tanks	18TL	Ea			1 872,4
Medium Tanks	18MT	Ea			6 386,3
Light Diesel Tanks	18LiDT	Ea			3 193,2
Medium Diesel Tanks	18MDT	Ea			13 928,0
Large Diesel Tanks	18LDT	Ea			91 285,2
Largest Diesel Tanks	18XLDT	Ea			147 297,9
Misc Items (Minor)	18MEI	Ea			452,8
Fuel tanks - Medium Mobile Diesel T	18MMFT	Ea			$9 031,52
Removal of Contaminated Buildings					
fold away	18RCBF	m2			$122,25
ISO Shipping Container	18RCBI	m2			$123,02
modular	18RCBM	m2			$123,02
soft walled	18RCBS	m2			$127,32
Removal of Buildings					
fold away	18RBF	m2			$35,53
modular	18RBM	m2			$50,75
ISO Shipping Container	18RBI	m2			$25,38
soft walled	18RBS	m2			$40,60
water and wastewater treatment fac	18WWT	Ea			$9 649,58
Foundations					
Precast concrete	18FC	m2			$32,88
Slab on grade	18FS	m2			$33,11
Timber cribbing	18TC	m2			$17,76
Reclaim roads					
Remove bridges	18BR	Ea			$172 505,43
Specialized Items					
Power distribution - electrical cable	18EC	m			$22,64
Electrical Cable	18EC	m			26,5
Incinerator	18FI	Ea			8 743,9
Potable Water	18PW	Ea			8 743,9

Filter by unit

Blended Labour and Equip Rates (2018)			
Blended labour rate	18BL	hr	$75,00
Blended equipment rate	18BE	hr	$125,00
Water management			
Remove pipes	18RP	m	$56,60

1 Equipment Productivity Figures and Graphs have been reproduced from Caterpillar Performance Handbook - Edition 42

EXCAVATION

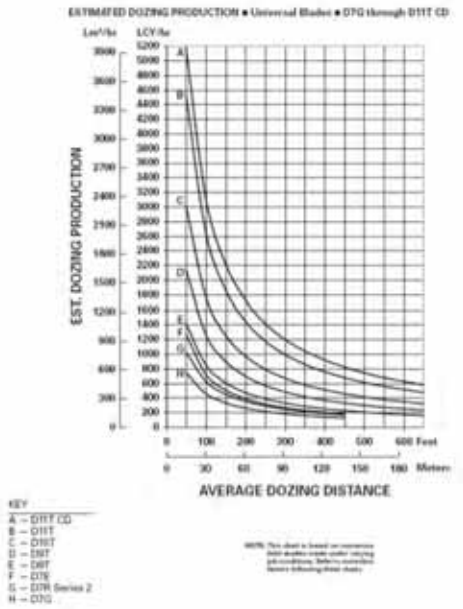
Productivity		
Machine Cat 336EL		
bucket capacity	3,16	m3
fill factor	75%	%
cycle time	45	seconds
operator skill	80%	%
machine availability	83%	%
altitude adjustment	100%	%
Hourly productivity	125,89	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$180,00	$/hr
Excavation cost - contractor rate	1,43	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	$/hr
Excavation cost - owner rate	$0,00	$/m3
Excavation cost - select contractor or owner rate (D22 or D31)		$/m3

HAUL AND DUMPING

Productivity		
Machine Cat 770		
truck capacity	25,1	m3
fill factor	80%	%
load time	6,0	min.
haul distance	1,5	km
average velocity	20,0	km/hr
haul time + return time	9,0	min.
wait time	0,5	min.
dump time	1,0	min.
cycle time	16,5	min.
machine availability	83%	%
altitude adjustment	100%	%
	13,7	ve. min/cycle
Hourly productivity	88,0	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$225,00	$/hr
Haul and Dump - contractor rate	2,56	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	$/hr
Haul/Dumping Cost - owner rate	$0,00	$/m3
Haul/Dumping Cost - select contractor or owner rate (I22 or I31		$/m3

SPREADING/DOZING

Productivity		
Machine Cat D8		
Estimate production using example curves provided or equivalent from other supplier	600	m3/hr
Correction factors (see table provided)		
operator skill	0,75	
material type, see table	0,80	
slot dozing	1,00	
side by side dozing	1,00	
visibility	1,00	
job efficiency	0,83	
altitude adjustment	1,00	
slope adjustment	1,00	
Hourly productivity	298,8	m3/hr
Operating Costs		
- Contractor		
Hourly rate - contractor supplied	$260,00	$/hr
Dozing - contractor rate	0,87	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0,00	
Spreading/Dozing Cost - owner rate	$0,00	$/hr
Spreading/Dozing Cost - select contractor or owner rate (N22 or N31)		$/m3



Excavator

	Cat 320	Cat 325B	Cat 375
heaped bucket capacity, m3	1,5	2,2	5,4
	Typical Cycle Times (seconds)		
easy digging, shallow digging, small swing angle	16	18	20
med. to hard digging, rocky soil, swing angle to 90 deg.	23	23	25
tough digging, sandstone, caliche, at max. machine depth, swing angle > 120 deg.	27	29	35

Material	Fill Factor (% of heaped bucket capacity
Moist loam or sandy clay	100 - 110
sand and gravel (not till)	95 - 110
hard tough clay	80 - 90
rock - will blasted	60 - 75
rock - poorly blasted	40 -60

Operator Skill	poor	average	good
Correction factor	0,6	0,75	1

Machine availability	poor	average	good
Correction factor	0,9	0,95	1

Trucking

	Cat 771 D	Cat 777D	Cat 789C
Truck capacity - heaped, m3	27,5	60,5	137

Dozing

Appendix C

Baffinland Iron Mines Corporation 2019 Work Plan

2019 WORK PLAN

1 November 2018

2018-11-01	0	Issued for Use	Orginal Signed	Orginal Signed	Orginal Signed	Orginal Signed	Orginal Signed
			C. Murray	G. Goddard	S. Proulx	P. Du Toit	B. Penney
Date	**Rev.**	**Status**	**Prepared By**	**Checked By**			**Approved By**

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SECTION 1.0 - INTRODUCTION

The following document presents the 2019 Work Plan for the Mary River Project as required under Section 6.1 of Commercial Lease No. Q13C301 (the Lease) agreed between Baffinland Iron Mines Corporation (Baffinland) and the Qikiqtani Inuit Association (QIA). Additionally, this document is a requirement under Amendment No. 1 of the Type 'A' Water Licence 2AM-MRY1325 for the purposes of an Annual Security Review (ASR). In the event the Project does not advance, the work items as described and constructed in the 2019 Work Plan will be subject to reclamation, as per the Mary River Project Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012, refer to Appendix C) and relevant regulatory and permit obligations.

The 2019 Work Plan has been prepared in accordance with the Lease Operations Guide for the "Annual Work Plan Submission" finalized in 2018. The Operations Guide is a set of procedures developed jointly by QIA and Baffinland to guide the on-going administration of the Lease.

Baffinland continues to expand the operation of the Mary River Project, both through the 6 million tonne per annum (Mtpa) increase sought in 2018 and the submission of the Phase 2 Environmental Impact Statement (EIS) in 2018. Activities outlined in this 2019 Work Plan represent planned works, improvements, infrastructure and equipment required to execute the currently approved phase of the project. Additionally, equipment and materials required for the Phase 2 expansion will be mobilized to the Mary River Project in 2018 in anticipation of the amended permits. For clarity, no earthworks or infrastructure construction associated with the Phase 2 expansion have been included in this 2019 Work Plan. It is anticipated that a 2019 Work Plan Addendum will be required to assess reclamation security and implement the construction of any Phase 2 works following successful receipt of the amended Project Certificate and amended Type 'A' Water Licence.

An overview of the on-going mining operations and works planned for 2019 is provided below, with further details presented in subsequent sections of the document.

1. Development and operation of the mine, ore crushing and land transportation, stockpiling and marine shipment of ore;
2. The continued development and construction of infrastructure required at Milne Port and the Mary River Mine Site (Mine Site) and along the Tote Road for the Mary River Project;
3. Continued operation of Mine Site and Milne Port Camps to support ongoing operations and construction activities which will include the use of water and deposition of waste as authorized under existing permits;
4. On-going operation and expansion of permitted quarry and borrow sources; additionally, four (4) new quarries have been identified along the Tote Road to support ongoing maintenance and construction;
5. At Milne Port, vessels carrying fuel, equipment and supplies for use at the Mine Site and Milne Port will arrive during open water (approximately between mid-July and mid-October 2019). Material, fuel and supplies required for operational and construction activities will be transported to the Mine Site year round via the Tote Road;
6. Ongoing environmental effects studies and baseline data collection will continue to support the construction and operation of the Project as well as for future engineering requirements;

7. Continued environmental monitoring in accordance with the approved Project Certificate, licenses, authorizations, management plans and environmental effects monitoring plans;
8. On-going exploration activities including drilling, mapping, prospecting, sampling, and geophysics. Planning of the details of the summer drilling and/or trenching program is not yet finalized;
9. Tote Road improvements to address safety concerns, freshet runoff issues and poor road conditions during the spring and summer periods;
10. Continued construction of additional fuel storage at the project;
11. Continued construction of the 800-person hardwall camp at the Mine site to address retention issues and safety concerns with continued long-term use of the tent camp at the Mine;
12. Construction of the 380-person hardwall camp at Milne Port following approval of a Water Licence Modification;
13. Site grading and laydown construction for supplies and equipment to support future construction activities and remove ponding and permafrost degradation issues around current infrastructure.
14. Installation of a floating freight dock to improve efficiencies on offloading of sealift as well as provide an opportunity for shore based connection for fuel ships to potentially avoid future use of floating hose for fuel receipt.
15. Erection of additional maintenance facilities to safely service equipment.

SECTION 2.0 - LIST OF CURRENT PERMITS

The Work Plan is presented within the context of the applicable regulatory authorizations. The main regulatory instruments that allow for the 2019 Work Plan activities are presented in Table 2-1 below.

Table 2-1: Existing Environmental Permits

Permit Name	Permit Number	Regulatory Agency	Expiry
Project Certificate and Amended Project Certificate	005	Nunavut Impact Review Board	No Expiry
Inuit Impact Benefit Agreement	N/A	Qikiqtani Inuit Association	No Expiry
Commercial Lease	Q13C301	Qikiqtani Inuit Association	31-Dec-43
Amendment No.1 Type A Water Licence	2AM-MRY1325	Nunavut Water Board	10-Jun-25
Type B Water License – Exploration	2BE-MRY1421	Nunavut Water Board	16-Apr-21
Land Use Permit - Steensby and Milne	N2014C0013	Crown Indigenous Relations and Northern Affairs Canada (formerly INAC)	30-Jun-19
Land Use Permit - Milne Foreshore	N2014X0012	Crown Indigenous Relations and Northern Affairs Canada (formerly INAC)	30-Jun-19
Land Use and Quarrying Permit - Tote Road (Borrow P1 at Km 63)	N2014Q0016	Crown Indigenous Relations and Northern Affairs Canada (formerly INAC)	30-Jun-19
Land Use Permit - Bruce Head	N2014J0011	Crown Indigenous Relations and Northern Affairs Canada (formerly INAC)	30-Jun-19
Land Lease - Milne Foreshore	47H/16-1-2	Crown Indigenous Relations and Northern Affairs Canada (formerly INAC)	30-Jun-35
Permitted Quarries and Borrows on Inuit Owned Land: Quarries Q1, QMR2,Q7, Q11, Q19, Borrows KM104, Km 2, and Km 97	N/A	Qikiqtani Inuit Association	N/A
Fisheries Authorization - Ore Dock	14-HCAA-00525	Department of Fisheries and Oceans	31-Dec-20
Fisheries Authorization - Tote Road	NU-06-0084	Department of Fisheries and Oceans	No Expiry
Fisheries Authorization – Crossings	06-HCAA-CA7-00084	Department of Fisheries and Oceans	N/A
Fisheries Crossings along Tote Road and Quarries, culvert extensions and replacements	Various Letters of Advice	Department of Fisheries and Oceans	No Expiry
Licence to Fish for Scientific Purposes and Animal Use Protocol [1]	S-16/17-1016-NU, S-16/17-1019-NU, AUP 2016-027 FWI-ACC-2016-017	Department of Fisheries and Oceans	-
Navigable Waters - Crossings	8200-07-10273, 10267, 10269, 10268, 10274, 10272, 10266, 10271	Transport Canada	Until work completed
Marine Facility	4306-2-6- P/B	Transport Canada	24-June-20
Scientific Permit [2]	02 008 15R-M	Government of Nunavut	-
Archaeology Permit [3]	2016-29A	Government of Nunavut	-
Factory Licence [4]	F76068	National Resources Canada	-

NOTE:
1 Held by Minnow Environmental Inc. and North/South Consulting for Licence to Fish for Scientific Purposes associated with the Project
2 Held by Knight Piésold for performance of IQ and Traditional Harvest Studies associated with the Project
3 Held by Claude Pinard for performance of archeology work associated with the Project
4 Held by Dyno Nobel, the explosives contractor on behalf of the Project

SECTION 3.0 - ANNUAL SCOPE OF OPERATIONS AND WORK

Table 3-1 below provides a description of Baffinland's proposed operation and work for 2019, with an emphasis on changes from the previous year, and the anticipated effects that this work would have on the Property and the infrastructure of the mine.

While the activities outlined in this 2019 Work Plan represent planned works, improvements, infrastructure and equipment required to execute the currently approved phase of the project, it is anticipated that additional approvals from the NWB, QIA, and DFO will be required for select activities, and may include;

- Modifications to the existing Type 'A' Water Licence 2AM-MRY1325;
- An Options Exercise Notice (OEN) to modify the boundaries of the Commercial Lease, or to reclassify lands in accordance the terms and conditions of the Commercial Lease;
- A Tote Road Adjustment Notice (TRAN) for changes to the alignment, grade or design of the Tote Road as described in the Lease Operations Guide for the Tote Road Adjustment Notice and in accordance with the terms and conditions of the Commercial Lease;
- Quarry Management Plans (QMPs) will be required for the newly proposed quarries in 2019. Additionally, existing plans may need to be revised to reflect changes in the quarry footprint proposed for 2019; and,
- Authorization or Letter of Advice from DFO for fish habitat.

Where required, these additional approvals have been indicated in Table 3-1 for each activity. These additional approvals and authorizations are considered to be within the scope of the approved Project as described in the Final Environmental Impact Statement (FEIS) and FEIS Addendum for the Early Revenue Phase, and are reasonably anticipated to be required during the course of operation of the Project and therefore have been included in the scope of the 2019 Work Plan and the 2019 Marginal Closure and Reclamation Financial Security Estimate prior to approval. It is anticipated that a 2019 Work Plan Addendum will be required to assess reclamation security and implement the construction of any Phase 2 works following successful receipt of the amended Project Certificate and amended Type 'A' Water Licence.

Table 3-1: Scope of Work for 2019

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
Scope of Work for 2019								
1	Tote Road, Milne Port	Impact Area	Q1 N7975563 E504289 (222,000 m2 + 4,000 m2) Q5 N797200 E506000 (1,225,600 m2) PQ2a N7955289 E522130 (345,500 m2) PQ4a N7942972 E523552 (105,000 m2) PQ6a N7929733 E528240 (194,000 m2) PQ12a N7920935 E539158 (232,300 m2)	Development and expansion of quarries, consisting of; four (4) new quarries along the Tote Road with 8m wide access roads, expansion of previously proposed but not constructed quarry Q5, and expansion of the working limits of existing quarry Q1.	Leveling and grading within Potential Development Area and Tote Road	2019	Security Quarry Management Plans DFO Authorization (PQ6a) CIRNAC Lease (PQ6a)	IFCs
2	Tote Road	Impact Area	Laydown 2 N7972166 E505637 (55,800 m2) Laydown 4 N7960605 E518164 (66,300 m2) Laydown 7 N7940427 E524119 (28,900 m2) Laydown 9 N7929681 E527833 (92,500 m2) Laydown 10 N7921358 E540249 (34,500 m2) Laydown 13 N7915170 E557599 (7,000 m2)	Development of six (6) laydowns adjacent to the existing Tote Road for material stockpiling and storage. The laydowns will be constructed by filling directly over undisturbed ground and 31m away from the high water mark of local water bodies. The laydowns will be constructed of 500 mm thickness quarried rock with granular surfacing, free draining to appropriate ditches and water courses. All laydowns to cover approximately 2 ha, with one laydown at km 7 laydown covering approximately 7.5 ha	Leveling and grading within Potential Development Area	2019	Security OEN CIRNAC Lease (Laydown 9)	IFCs
3	Tote Road	Impact Area	KM8 N7971100 E506250 KM97 N7914750 E554750	Grade adjustments at KM8 and KM97 to improve safety and drainage. No new culvert installations required.	Leveling and grading within Potential Development Area.	2019	Security TRAN	IFCs
4	Tote Road	Impact Area	KM97 N7914719 E555762 KM80 N7922178 E542323 KM63 N7926858 E529302 KM17 N7965904 E513568	Maintenance on Tote Road bridges, including re-decking and adjustment of bridge abutments. Winter ice road bypasses constructed to allow truck traffic during work.	Optimization of existing infrastructure	2019	DFO Notification	N/A
5	Milne Port	Impact Area	LP1 N7976200 E504100 (-13,000 m2) LP2 N7975900 E503775 (30,000 m2)	Expansion of the LP2 laydown (included in 2018 Work Plan but not yet constructed). Combined with LP1 from 2018 Work Plan, which is removed here for clarity.	Leveling and grading within Potential Development Area	2019	Security	Layout Drawing(s)
6	Milne Port	Impact Area	N7975763 E502984 (155,000 m2)	Expansion of the Milne Port Ore Stockpile and water management facilities to optimize stockpiling and shiploading operations, resulting in additional 140,000 m2 of stockpile area and 15,000 m2 lined sedimentation pond.	Leveling and grading within Potential Development Area	2019	Security Water Licence Modification DFO Authorization	IFCs
7	Milne Port	Impact Area	N9775000 E503150 (6,000 m2)	Construction of berm and linear steel support structure on laydown LP3 for receipt and storage of stacker/reclaimer equipment. Berm dimensions are 200m x 30m x 2m, constructed on existing disturbed area.	No effect, will occur on developed laydown within Potential Development Area	2019	None - on existing disturbed area	Layout Drawing(s)
8	Milne Port	Impact Area	N7976033 E503590 (4,180 m2)	Construction of new polishing waste stabilization pond (PWSP) at 380 Person camp to manage off-spec effluent from the 380p camp waste water treatment plant	No effect, will occur on developed laydown within Potential Development Area	2019	Security OEN Water Licence Modification	IFCs

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
9	Milne Port	Impact Area	N7975481 E503779 (2700 m2)	New contaminated water/snow containment pond adjacent to existing pond at Milne Port	Leveling and grading within Potential Development Area	2019	Security OEN Water Licence Modification	IFCs
10	Milne Port	Impact Area	N 7976466 E 504128 (200 m2)	Desalination Plant (Seawater reverse Osmosis System) including utilidor located at beach head	No effect, will occur on developed laydown within Potential Development Area	2019	Security Water Licence Modification	IFCs
11	Milne Port Mine Site	Impact Area	N7914691 E558503 (360m2) N7976251 E503874 (360m2)	Construction of new hazardous waste berm at the Mine site and at Milne Port. Decommissioning of select existing berms to consolidate waste management.	Environmental optimization. Leveling and grading within Potential Development Area	2019	Security OEN Water Licence Modification	IFCs
12	Mine Site	Impact Area	N7914015 E564007 (91,000 m2)	Laydown area for parking and equipment storage at KM107.5	Leveling and grading within Potential Development Area	2019	Security	Layout drawing(s)
13	Mine Site	Impact Area	N7915590 E563181 (180,000 m2)	New KM110.5 Laydown for additional equipment storage and maintenance shop installation	Leveling and grading within Potential Development Area	2019	Security	Layout drawing(s)
14	Mine Site	Impact Area	N7915590 E563181 (1,500 m2)	Heated maintenance shop for pit equipment at KM110.5 Laydown. Tent structure with lined floor. Footprint is approximately 1,500 m2.	No effect, will occur on developed laydown within Potential Development Area	2019	Security	Layout drawing(s)
15	Mine Site	Impact Area	N7914500 E558150 (area m2)	Decommissioning and repurposing of Weatherhaven structures for storage and workspace.	No effect, will occur on developed laydown within Potential Development Area	2019	None - Movement of existing structures	Layout drawing(s)
16	Mine Site	Impact Area	N9713450 E560450 (12,000 m2)	Expansion of the 800 person camp pad to the north by approximately 12,000 m2 to accommodate additional support offices and buildings.	Leveling and grading within Potential Development Area	2019	Security	Layout drawing(s)
17	Mine Site	Impact Area	N9713450 E560450 (925 m2)	Addition of offices/trailers/buildings at the 800p Camp. Total footprint is 925 m2, including approximately 500 m2 for a new fire hall and emergency response building.	No effect, will occur on developed laydown within Potential Development Area	2019	Security	Layout drawing(s)
18	Mine Site	Impact Area	N7912328 E561111 (9,000 m2)	Construction of a landfarm at the Mine Site landfill facility, with an estimated footprint of 9,000 m2. Disturbed area included in 2018 Addendum, new lined area requires security allocation.	Leveling and grading within Potential Development Area. Area already allocated as disturbed.	2019	Water Licence Modification No. 10 (Approved) Security in place Notification to NWB	IFCs
19	Mine Site	Impact Area	N7913123 E0561560 (2000 m2)	Expansion of the crusher maintenance shop laydown area for seacan and rebuilt equipment storage.	Leveling and grading within Potential Development Area. Area already allocated as disturbed.	2019	None - existing disturbed area	Layout drawing(s)

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
20	Mine Site	Impact Area	N7913410 E561092	Installation of second 15 ML tank at Mine Site bulk fuel storage facility.	No effect, will occur on developed area within Potential Development Area	2019	Security Notification to NWB	IFCs
21	Mine Site	Impact Area	N7912819 E561635 (12,000 m2)	Upgrades to the mine site crusher facility, including expansion of the crusher pad (12,000 m2), new water diversion structures, and increase to sedimentation pond (MS-06) capacity (2,000 m2). Installation of one (1) culvert in northern perimeter ditching to allow for vehicle access to maintenance shop.	Leveling and grading within Potential Development Area	2019	Security Water Licence Modification	IFCs
22	Mine Site	Impact Area	N7916848 E563153 (3,500 m2)	Waste Rock Facility Water Treatment Plant parking and laydown. Expansion of the pad to allow for light vehicle parking, material laydown and better fuel tank access.	Expansion of existing pad in tundra.	2019	Security	Layout drawing(s)
Works Carried forward from 2018 - Security Not In Place								
23	Mine Site	Impact Area	N7913600 E564236 (133,400 m2)	Construction of a Run of Mine (ROM) Stockpile at KM 107 (90,000 m2) including an access road (31,900 m2) and sedimentation pond (11,500 m2 disturbed, 7,400 m2 lined)	Minor leveling and grading within Potential Development Area	2019	Notification to NWB Security	IFCs
24	Mine Site	Impact Area	N7913410 E561092 (21,620 m2)	Construction of the Mine Site fuel storage facility and one arctic diesel fuel tank with 15 ML capacity. The fuel storage facility will comprise a fuel containment berm with a welded geomembrane liner, perimeter access road and fuelling module. Lined footprint is approximately 12,000 m2.	No effect, will occur on developed laydown within Potential Development Area	2018/2019	Notification to NWB Security	IFCs
25	Milne Port	Impact Area	N7976389 E503422 (4,400 m2)	Installation of East Sedimentation Pond Expansion (2a) approved with Modification No. 9, but for which security has not been allocated.	Minor leveling and grading within Potential Development Area.	2019	Water Licence Modification No. 9 (Approved) Security	IFCs
Works Carried over from Prior Years - Security in Place								
2017-1	Milne Port	Impact Area	N7975200 E503350	Installation of 380-person temporary camp inclusive of potable water treatment, sewage treatment, incinerator, kitchen, dining, locker, recreational and washroom facilities.	No effect, will occur on developed laydown within Potential Development Area	2018/2019	Water Licence Modification No. 3b (Pending Approval)	IFCs
2018-1	Milne Port	Impact Area	LP1 N7976200 E504100 (13,000 m2) LP2 N7975900 E503775 (32,000 m2) LP3 N7975200 E503200 (131,000 m2) LP4 N7975175 E503500 (13,000 m2) LP5 N7974900 E503400 (65,000 m2) LP6 N7974700 E503500 (7,000 m2) LP7 N7974600 E503700 (21,000 m2)	Laydown LP7 completed in 2018, remainder carried over to 2019. Development of seven (7) laydowns in the Port area totaling 282,000 m2 to improve the efficiency of material storage and management. The laydowns will be constructed by filling directly over undisturbed ground including filling in low lying areas that collect water. The lay down will be constructed utilizing blasted rock with granular topping to a total minimum thickness of 1 m, free draining to appropriate ditches and water courses.	Minor leveling and grading within Potential Development Area	2019	None - Security in Place	Layout drawing(s)
2018-2	Milne Port	Impact Area	N976800 E504110	Upgrade existing barge offload area to improve safety and operational efficiencies by installing a floating freight dock, improving vessel turnaround time.	Spudding of barge in marine foreshore	2018	DFO Authorization	IFCs

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
2018-3	Milne Port	Impact Area	N7976100 E503500	Relocate existing facilities located in the general area of the fuel tank farm to improve the traffic management of the overall port area.	No effect, will be placed on developed laydown within Potential Development Area	2018	None - Security in Place	Layout drawing(s)
2018-4	Milne Port	Impact Area	N7975800 E503200	Realignment of existing shipload conveyor to improve stockpile laydown area management, including realignment of the stockpile laydown area resulting in additional 26,000 m^2 disturbed land. Installation of West Sedimentation Pond Expansion (1a)	Minor leveling and grading within Potential Development Area.	2018	Water Licence Modification No. 9 (Approved)	Layout drawing(s)
2018-6	Milne Port	Impact Area	N7972669 E504899	Installation of garages, site offices and equipment storage containers on laydown R3 (laydown identified in 2017 work plan).	No effect, will occur on developed laydown within Potential Development Area	2018	None - Security in Place	Layout drawing(s)
2017-2	Milne Port	Impact Area	R1 N7974015 E504036 R2 N7973631 E504478 R3 N7972669 E504899	Laydowns R1 and R2 completed in 2018. R3 construction pending regulatory approval from DFO. Development of three laydown areas (R1, R2 and R3) for construction material laydown, equipment maintenance and welding workshops, site offices and containerized spares. The additional laydown space will optimize storage of materials and supplies and reduce traffic. The laydowns will be constructed by filling directly over undisturbed ground including filling in low lying areas that collect water. The lay down will be constructed utilizing blasted rock with granular topping to a total minimum thickness of 1 m, free draining to appropriate ditches and water courses.	Minor leveling and grading within Potential Development Area.	2018	DFO Authorization	Layout drawing(s)
2018-25	Milne Port	Impact Area	Various locations	Construction of up to 3 km of Port site access roads to improve port traffic management. Locations to be determined.	Leveling and grading within Potential Development Area	2018	Water License Modification	N/A
2018-26	Milne Port	Impact Area	Various locations	Implementation of the Port Site Water Management plan, including berms, ditches and culverts to manage surface water around Milne Port infrastructure.	Positive environmental effect, focus on improving water management by keeping water away from coming in contact with the port area.	2018	Water Licence Modification No. 7 (Approved)	IFCs
2018-27	Milne Port	Impact Area	N7976518 E504044	Relocation of effluent discharge point to barge offload area	Positive effect. Reduced environmental spill risk.	2018	Water Licence Modification No. 7 (Approved)	IFCs
2018-28	Milne Port	Impact Area	N7976800 E504110	Marine manifold building relocation - moving from current location north of fuel tank farm to upgraded freight dock location	Minor leveling and grading within Potential Development Area	2018	Water Licence Modification No. 7 (Approved)	Layout drawing(s)

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
2018-8	Milne Port Mine Site	Impact Area	N7913206 E561603	Continued construction of Mine Site truck shop and initiation of Milne Port truck shop	Minor leveling and grading within Potential Development Area	2019	Water Licence Modification No. 7 (Approved)	IFCs
2018-5	Mine Site	Impact Area	N917115 E562565	Continued upgrades and environmental improvements at the Waste Rock Facility, including the repair and expansion of the Waste Rock Facility pond and on-going operation of the water treatment system in 2019.	Positive effect. Reduced environmental spill risk.	2018	Water Licence Modification No. 7 (Approved) Water Licence Modification No. 8 (Approved)	IFCs
2018-9	Mine Site	Impact Area	N7913733 E560057	Contractor office, garage and workshop installation on existing laydown pad.	No effect, will be placed on developed laydown within Potential Development Area	2018	None - Security in Place	Layout drawing(s)
2018-10	Mine Site	Impact Area	N7911960 E561780	Additional garage at explosives plant facility	No effect, will be placed on developed laydown within Potential Development Area	2018	None - Security in Place	Layout drawing(s)
2017-3	Mine Site	Impact Area	N7914181 E560035	Continued installation of 800-person permanent camp inclusive of: potable water treatment, sewage treatment, incinerator, kitchen, dining, locker, recreational and washroom facilities.	No effect, will be placed on developed laydown within Potential Development Area	2018	Water Licence Modification No. 4 (Approved)	IFCs
2018A-1	Mine Site	Impact Area	N7913855 E563904	Construction of the Mine Haul Road Cross Cut, and widening of the existing Mine Haul Road for safety purposes and to permit larger truck traffic	Minor leveling and grading within Potential Development Area	2019	Water Licence Modification No. 7 (Approved) Submission of IFC Drawings	IFCs
2018A-3	Mine Site	Impact Area	N7912607 E560898	Expansion of the Mine Site Landfill beyond the initial cell. The expansion involves leveling, grading and placing non-hazardous waste and cover material within the ultimate landfill boundary. Cell 2 planned for construction in 2019.	Minor leveling and grading within Potential Development Area	2019	Water Licence Modification No. 10 (Approved)	IFCs
2018A-4	Mine Site	Impact Area	N7913236 E560891	Installation of an effluent discharge line from the sewage treatment plant servicing the 800-person camp to the existing effluent discharge line, to allow for direct discharge of treated sewage effluent to the approved discharge location near the Mary River. This activity involves laying sections of 3” insulated, HDPE pipe and installing four (4) utilities culverts along its alignment.	No effect, will be placed on developed area within Potential Development Area	2018 / 2019	Water Licence Modification No. 10 (Approved) Security for Culverts	IFCs
2015-1	Mine Site	General Area	N7915564 E557216 N7916885 E555697	Improvements to the aerodrome flight path (2015 Work Plan item); includes the leveling of knolls that are within the airstrip approach and the construction of temporary access roads to those areas for the purpose of completing this work and associated environmental monitoring.	Minor leveling and grading outside of Potential Development Area	2019	OEN (Approved by QIA) Security	Layout drawing(s)

Item No.	Property Section	Land Use Area	Approximate Location	Description	Description of Effect on Feature(s)	Anticipated Completion Year	Required Permit or QIA Applications	Other Information
	e.g. Milne Inlet/Tote Road/Mine Site	*e.g. Impact Area /Exploration Area*	*Approximate UTM (if known) (Zone 17W)*	*Provide a detailed description of the activity.*	*A description of how the feature(s) (topographical and/or manmade) will be affected*	*N/A*	*List any associated permit applications if applicable.*	*e.g. Issued for construction documentation*
Progressive Reclamation								
-	Milne Port	-	N7975568 E503745	Management of hydrocarbon impacted soils within the existing landfarm facility.	N/A	Ongoing	N/A	N/A
-	Milne Port	-	N/A	Demobilization of equipment and supplies not required for near term activities as well as current inventory of hazardous waste and other materials by means of sealift from Milne Port	N/A	2018	N/A	N/A
-	Milne Port and Mine Site	-	N/A	Discharge and treatment of residual treated sewage effluent stored in PWSP at Mary River Exploration Camp and Milne Port Site.	N/A	Ongoing	N/A	N/A
-	Tote Road	-	N/A	Continue the development and implementation of a long term multi-year plan to address localized areas of permafrost degradation associated with the current borrow areas including KM97, and the area	N/A	Ongoing	N/A	N/A
-	Tote Road	-	N/A	Reclamation of sections of the exploration phase Tote Road no longer in use by means of scarifying and culvert removals.	N/A	Ongoing	N/A	N/A
-	Mine Site	-	N7912845 E560922	Continued development of the Mine Site landfill and deposition of non-hazardous waste in accordance with the Landfill Maintenance and Operations Manual	N/A	Ongoing	N/A	N/A
-	Site Wide	-	N/A	Ongoing removal from site, or safe disposal on-site of infrastructure, equipment and supplies no longer required for ongoing construction and operations.	N/A	Ongoing	N/A	N/A
-	Site Wide	-	N/A	Unless otherwise identified within the approved interim Closure and Reclamation Plan, where roads are no longer in use - removal of culvert and open/restore the natural drainage channel. Measures will be taken to minimize erosion and sedimentation	N/A	Ongoing	N/A	N/A
-	Site Wide	-	N/A	Areas that have been contaminated by hydrocarbons from normal fuel transfer, handling and storage activities will be reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation 2010. Use of reclamation soils for purpose of back fill or general site grading may be carried out with approval of applicable inspectors and agencies.	N/A	Ongoing	N/A	N/A

NOTES:

1. Two (2) of the seven (7) laydowns for the Milne Port area will require a Water Licence Modification. Based on direction from NWB, these have been included as Category 1 activities such that securities can be assessed. Work on these two (2) laydowns will not commence until the applicable regulatory approval is granted.
2. Modification of the Waste Rock Sedimentation Pond (MS-08) is required to address uncontrolled discharge of non-compliant water. An action plan and revised mitigation design has not been finalized at this time, however this work item has been included such that a security estimate for reclamation can be prepared, and will be revised and reconciled following implementation of any revised structures or mitigation measures.
3. An Options Exercise Notice is required to revise the boundaries of the lease area. Work on the select locations requiring an OEN will not commence until approval from QIA is granted.

3.1 INFRASTRUCTURE LAYOUT AT END OF 2019

Site layouts for Milne Port, Tote Road, and Mary River Mine Site can be found in Appendix A of this document.

The survey drawings and calculated areas as defined in the 2015 Montieth and Sutherland Survey Plans remain valid for 2019, however may need to be updated following approval of the Tote Road OEN (Appendix F) and any subsequent OENs submitted in 2019 in relation to the current project or the Phase 2 expansion.

SECTION 4.0 - MINING AND EXPLORATION ACTIVITES

4.1 EXPLORATION ACTIVITIES AND DRILLING PLANS

The scope of Baffinland's Type 'B' Licence (2BE-MRY1421) and Commercial Lease with QIA allows for Baffinland to continue/undertake the exploration activities and drilling programs on its mineral leases in the Qikiqtani Region of Nunavut. This includes the exploration land use areas as defined in Section 2.2 of Commercial Lease. The types of exploration activities planned for 2019 are included within the scope of the Type 'B' Water Licence, with the exception of the proposed Eqe Bay exploration program which will be seeking a new and separate Type 'B' Water Licence for the operation of the exploration camp and activities.

At this time when the Work Plan is required to be submitted, the exploration and drilling programs for 2019 have not yet been finalized. However, as a minimum, activities will include:

- Drilling
- Mapping
- Sampling
- Geophysical and geochemical surveys.

Operation of the Steensby Inlet Camp and Mid Rail Camp are not at this time anticipated to be required during 2019. A new exploration camp at the Eqe Bay location is being evaluated, and Baffinland has engaged QIA in a new land lease for this camp.

It is anticipated that exploration activities will continue in 2019 with a drilling program on Deposits 1, 2, and 3. Once proposed drilling locations are finalized, this information will be provided to QIA, NWB, CIRNAC, and others.

4.2 AMOUNT AND TYPE OF ORE AND WASTE TO BE MINED

An estimate of the breakdown of ore vs. waste mined from Deposit No. 1 by month during 2018 is provided in Table 4-1 below:

Table 4-1: Mine Forecast 2019

Month	Ore Mined (wmt)	Waste Mined (wmt)	Total Mined (wmt)
January	771,123	139,490	910,614
February	772,713	150,034	922,747
March	604,491	501,769	1,106,259
April	730,699	451,726	1,182,425
May	610,065	696,718	1,306,783
June	950,675	253,886	1,204,560
July	587,515	870,835	1,458,349
August	523,383	723,345	1,246,728
September	550,226	742,396	1,292,622
October	819,837	348,347	1,168,184
November	889,212	132,430	1,021,641

Month	Ore Mined (wmt)	Waste Mined (wmt)	Total Mined (wmt)
December	599,097	454,952	1,054,049
Total	8,409,034	5,465,927	13,874,961

4.3 AMOUNT AND TYPE OF ORE TO BE SHIPPED EACH MONTH

Ore shipping during 2019 will occur during the open water season from end of July to approximately mid-October. The expected total shipping quantities for 2019 are shown in Table 4-2 below.

Table 4-2: Ore Shipping Forecast 2019

	Lump Ore Shipped (wmt)		Fines Shipped (wmt)		Total Shipped (wmt)	
Month	**Milne Inlet**	**Steensby Inlet**	**Milne Inlet**	**Steensby Inlet**	**Milne Inlet**	**Steensby Inlet**
January	-	-	-	-	-	-
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	572,530	-	294,940	-	867,470	-
August	1,335,903	-	688,193	-	2,024,096	-
September	1,288,193	-	663,614	-	1,951,807	-
October	763,373	-	393,253	-	1,156,626	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
TOTAL	**3,959,999**	**-**	**2,040,000**	**-**	**5,999,999**	**-**

4.4 SPECIFIED SUBSTANCES TO BE QUARRIED AND EXPECTED USES

A summary of the expected quantities of quarried and borrow materials to be extracted during 2019 are provided in Table 4-3, below. The expected quarterly quantities of each specified substance per quarry site and borrow location is provided also in Table 4-3, below.

Table 4-3: 2018 Quarry and Borrow Pit Quantities

Quarry Summary	Km Location	Permitted	Q1	Q2	Q3	Q4	Total	Estimated Surface Area Increase	Estimated Breakdown Of Specified Substances
UNITS			m^3	m^3	m^3	m^3	m^3	m^2	
Q1	1	Permitted	0	45,000	20,000	20,000	**85,000**	226 000	Rock
Q5	4	*Proposed*[2]	0	188,333	188,333	188,333	**564,999**	1,225,600	Rock
Q7	7	Permitted	0	0	0	0	**0**	0	Rock
Q11	21	Permitted	0	0	0	0	**0**	0	Rock
PQ2a	28.9	*Proposed*[2]	0	0	30,000	0	**30,000**	345,500	Rock
PQ4a	41.6	*Proposed*[2]	0	0	30,000	0	**30,000**	105,000	Rock
PQ6a	56.4	*Proposed*[2]	0	0	0	30,000	**30,000**	194,000	Rock
PQ12a	76	*Proposed*[2]	0	0	0	30,000	**30,000**	235,500	Rock
Q19	93.5	Permitted	0	0	0	0	**0**	0	Rock
QMR2	102	Permitted	0	10,000	45,000	15,000	**70,000**	32,670	Rock
Km 2	2	Permitted	0	0	0	0	**0**	0	Granular
Km 97	97	Permitted	750	750	750	750	**3,000**	1,500	Granular
Total			**750**	**244,083**	**314,083**	**284,083**	**842,999**	**1,564,170**	

Notes:

1. The quantities from each source are approximate values and may vary based on minor changes to the schedule and scope, however, the aggregate volume to be extracted is expected to remain constant.
2. The final schedule for the issuance of Quarry and Borrow Source Management Plans for proposed new quarry and borrow areas is not finalized at the time the Work Plan was prepared.
3. It is noted D1Q1 and D1Q2 will also be used as a source of aggregate in 2018 to support Mine Haul Road maintenance but is not considered a formal quarry as it is located in the Mining Lease and is anticipated to be within the LOM pit extent.

SECTION 5.0 - ANNUAL QUANTITIES OF SOLID WASTE

5.1 SOLID WASTE DISPOSAL

The expected annual quantity of solid wastes to be deposited during 2019 is established from survey volumes measured in 2015 through 2018, as well as an analysis of proposed activities. Estimated quantities of solid waste to be deposited in approved waste storage areas are shown in the Table 5-1 below.

Table 5-1: Annual Volume of Solid Waste to be Deposited in Waste Storage Areas in 2019

Property Section	Waste Storage Area	Volume of Solid Waste to be disposed of (m^3)
e.g. Milne Port/Tote Road/Mine Site	-	
Mine Site	Landfill	5,000
TOTAL		5,000

SECTION 6.0 - EXPECTED USES OF WATER

6.1 WATER USE

The Amended No.1 Type 'A' Water Licence 2AM-MRY1325, and the construction Type 'B' Water Licence, 8BC-MRY1416, permits the maximum water use for domestic and industrial purposes during construction phase of the Project as shown in Table 6-1 below. As per Clause 22 of the QIA-Baffinland Water Compensation Agreement, Baffinland will pay a Consumptive Payment for Water Use, in connection with the Project for the maximum water volume permitted to be used or withdrawn annually as defined in the water licences issued to Baffinland by NWB.

Table 6-1: Approved Water Use for Domestic and Industrial Purposes during Construction Phase

Property Section	Water Source Name	Water Source Location	Annual Volume to be used (m^3)
Milne Port (Milne Inlet)	Phillips Creek (Summer)	71° 52' 53.3" N 80° 56' 04.0" W	134,130 m^3/year
	Km 32 (Winter)	71° 30' 39.5" N80° 14' 54.4" W	
Mine Site (Mary River)	Camp Lake	71° 19' 38.6" N 79° 22' 57" W	240,000 m^3/year
Steensby Port (Steensby Inlet)	ST 347 km Lake	N/A	0 m^3/year
	3 km Lake	N/A	
TOTAL			**371,130 m^3/year**

Source: Amendment No.1 Type 'A' Water Licence (2AM-MRY1325)

The Amendment No.1 of the Type 'A' Water Licence authorizes Baffinland to withdraw up to 1,500 m^3/day to a maximum of 547,500 m^3 annually of water specifically for use in dust suppression or control along the Tote Road of the Project. Water for dust suppression or control shall be obtained from the sources in accordance with thresholds established and shown in Table 6-2 below:

Table 6-2: Water Use for Dust Suppression

Property Section	Water Source Name	Water Source Location		Daily Water Take Proposed for Dust Suppression(m^3/day)	Restrictions
		Latitude	Longitude		
Milne Port	Phillip's Creek	71° 52' 53.3" N	80° 56' 04.0" W	212	None
Milne Port	Km 32 Lake	71° 30' 39.5" N	80° 14' 54.4" W	364	
Tote Road	CV128	71° 47' 35.1" N	80° 36' 41.7" W	579.5	None
Tote Road	CV099	71° 38' 21.7" N	80° 22' 46.6" W	110	June-July only during low flow (<mean flow) years
Tote Road	CV087	71° 34' 10.0" N	80° 19' 41.6" W	90	June-July only during low flow

Property Section	Water Source Name	Water Source Location		Daily Water Take Proposed for Dust Suppression(m^3/day)	Restrictions
		Latitude	Longitude		
					(<mean flow) years
Tote Road	CV078	71° 31’ 51.9” N	80° 16’ 07.8” W	75	June-July only during low flow (<mean flow) years
Tote Road	Katiktok Lake	71° 23’ 45.7” N	79° 48’ 22.0” W	318	None
Tote Road	BG50	71° 26’ 29.6” N	80° 10’ 27.1” W	150	None
Tote Road	BG32	71° 23’ 35.1” N	79° 51’ 24.9” W	120	June-July only during low flow (<mean flow) years
Tote Road	CV217	71° 23’ 51.4” N	79° 48’ 50.9” W	130	None
Tote Road	Muriel Lake	71° 22’ 18.5” N	79° 39’ 24.3” W	212	None
Tote Road	David Lake	71° 19’ 38.6” N	79° 22’ 57.0” W	132	June-July only during low flow (<mean flow) years
Tote Road	BG17	71° 21’ 19.8” N	79° 34’ 44.0” W	75	June-July only during low flow (<mean flow) years
Tote Road	CV223 (Tom River)	71° 19’ 40.5” N	79° 26’ 15.8” W	135	None
Mine Site	Camp Lake	71° 19’ 38.6” N	79° 22’ 57” W	86	None

Source: Amendment No.1 Type ‘A’ Water Licence (2AM-MRY1325)

SECTION 7.0 - MATERIALS TO BE SHIPPED OFF THE PROPERTY

7.1 MATERIALS SHIPPED OUT

As required by the Lease, the expected quantities of materials planned to be shipped off site in 2019 are detailed in Table 7-1 below.

Table 7-1: Materials to be shipped out in 2019

Property Section	Equipment/ Material Item	Owner	Estimated Annual Amount of Equipment and Material (tonne)	Estimated Annual Revenue Tonnes
e.g. Milne Port/Mine Site	Description of the equipment or the material*	e.g. BIM/Third Party	Estimated total annual amount of equipment and material (tonne)	Estimated amount of revenue tonnes assigned to the shipping of equipment or material
Milne Port	Batteries	BIMC	89	-
Milne Port	Hydro Carbon Contaminated Material	BIMC	205	-
Milne Port	Waste Oil	BIMC	1,238	-
Milne Port	Waste Fuels	BIMC	91	-
Milne Port	Waste Grease	BIMC	32	-
Milne Port	Waste Hazardous Liquids	BIMC	401	-
Milne Port	Waste Aerosol Canisters	BIMC	2.5	-
Milne Port	Contaminated Containers/Solids	BIMC	319	-
Milne Port	Misc Hazardous Materials	BIMC	250	-

Note: For hazardous waste assumptions used in the calculation of the quantity of generated hazardous waste for the Project, please refer to the Waste Management Plan (BAF-PH1-830-P16-0028).

SECTION 8.0 - MATERIALS TO BE SHIPPED TO THE PROPERTY

8.1 DELIVERY OF FUEL

At least two bulk fuel deliveries will occur during the 2019 sealift. At the onset of the shipping season, arctic diesel and Jet A fuel will be delivered to fill the tanks at the Milne Port tank farm. The anticipated fuel delivery provided in the below Table 8-1.

Table 8-1: Anticipated Fuel Delivery During 2019

	Diesel	Jet A
Total Bulk Fuel Delivery	78 ML	3 ML

8.2 MATERIALS SHIPPED TO THE PROPERTY

Materials, equipment, supplies, buildings and machinery to support construction and operations through 2019 will arrive on the 2019 sea lift include:

Table 8-2: Mobile and Mechanical Equipment to be received during 2019

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	793 Trucks	Baffinland	3	375
Mine Site	854 Wheel Dozer	Baffinland	1	30
Mine Site	D10 Dozer	Baffinland	1	70
Mine Site	374 Excavator	Baffinland	1	80
Mine Site	Ejector Box for 740	Baffinland	1	2
Mine Site	4 x 4 hotseating bus	Baffinland	1	20
Mine Site	F350 truck	Baffinland	11	10
Mine Site	Light Plants	Baffinland	21	5
Mine Site	Pumps	Baffinland	2	2
Mine Site	Washcar	Baffinland	1	36
Mine Site	Lunch Trailer	Baffinland	1	36
Milne Port	pumper fire truck	Baffinland	1	20
Mine Site	off road tracked rescue vehicle	Baffinland	1	10
Mine Site	Light ERT utility vehicle	Baffinland	1	8
Milne Port	office trailers	Baffinland	2	72
Mine Site	washroom facility for tote road	Baffinland	2	72
Milne Port	generator	Baffinland	1	1

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	office trailers	Baffinland	2	72
Milne Port	conveyor feeder	Baffinland	1	8
Milne Port	jump conveyor	Baffinland	2	15
Milne Port	heavy duty shunt truck	Baffinland	1	14
Milne Port	950 loader	Baffinland	1	240
Milne Port	feeder dolly	Baffinland	1	6
Tote Road	740 B water truck body	Baffinland	1	15
Mine Site	2 Spare Jaw Feeder Assemblies	Baffinland	1	4
Mine Site	New or Used 349 excavator	Baffinland	1	80
Mine Site	2 FS353 Screen Decks	Baffinland	2	80
Mine Site	Boom truck	Baffinland	1	20
Mine Site	Pressure washing truck	Baffinland	1	15
Mine Site	Telehandler	Baffinland	1	20
Mine Site	247B or 257D skid steer	Baffinland	1	6
Mine Site	Frost Fighters	Baffinland	7	2
Mine Site	Generators/compressors	Baffinland	2	4
Mine Site	Jet A truck	Baffinland	1	10
Mine Site	Fuel Tanker & Tractor	Baffinland	1	15
Milne Port	Desalination Plant for Fresh Water	Baffinland	1	70
Milne Port	Bucket Wheel Stacker Reclaimer	Baffinland	2	210
Milne Port	Fines Mobile Stacker	Baffinland	1	170
Milne Port	Genset modules	Baffinland	4	180
Milne Port	E-house	Baffinland	1	50
Mine Site	Mobile Primary Crusher Unit	Baffinland	1	231
Mine Site	Passenger bus	Baffinland	2	15
Mine Site	Telehandler	Baffinland	1	20
Mine Site	Front End Loader	Baffinland	1	15
Mine Site	Fuel/Lube Truck	Baffinland	1	15
Mine Site	Mobile Fleet- 745C Rock Truck - TFK00727	Baffinland	2	40
Milne Port	Crusher Services office	Baffinland	1	36
Milne Port	Site Construction Office	Baffinland	1	36
Milne Port	Manlift Z-60	Baffinland	2	16
Milne Port	Manlift S135X	Baffinland	3	16

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Milne Port	Zoom Boom 12,000lb	Baffinland	4	20
Milne Port	150T Crane	Baffinland	2	40
Milne Port	Freight Liner Highway Truck	Baffinland	1	20
Milne Port	Tri- Trombone Flat Trailer - 53' to 90'	Baffinland	1	18
Milne Port	Diesel F250 or F350 Pick-up Truck	Baffinland	4	10
Milne Port	Diesel F250 15 passenger Van	Baffinland	1	12
Milne Port	12’ x 60’ c/w 2 offices, open area in middle, and office furniture,	Baffinland	2	36
Milne Port	12’ x 60’ lunch room complete 8’ tables, chairs and equipment	Baffinland	3	36
Milne Port	12’ x 34’ Self-contained washcar on skids	Baffinland	4	36
Milne Port	30,000 L Fuel Tanker Trucks	Baffinland	12	180
Mine Site	Winch Tractor	Nuna	1	13.2
Mine Site	Scissor Deck Trailer	Nuna	1	6.37
Mine Site	Skid steer	Nuna	1	7.633
Mine Site	Manlift	Nuna	1	7.5
Mine Site	Light Plants	Nuna	2	1.92
Mine Site	Frost Fighters	Nuna	4	0.8
Mine Site	Hot Box	Nuna	1	1.55
Mine Site	Cat 988 Loader	Nuna	1	51.4
Mine Site	Mech Truck	Nuna	1	16.4
Mine Site	RO/RO Truck	Nuna	1	16.4
Mine Site	Bins for RO/RO	Nuna	3	21
Mine Site	Vac Trailer or Vac Truck	Nuna	1	16.4
Mine Site	Skid steer	Nuna	1	7.633
Mine Site	Light Plants	Nuna	2	1.92
Mine Site	Frost Fighters	Nuna	4	0.8
Mine Site	Hot Box	Nuna	1	1.55
Mine Site	Cat 930 Loader	Nuna	1	17
Mine Site	Bus	Nuna	2	16.4
Mine Site	Crewcab	Nuna	1	3.8
Mine Site	Flat Deck	Nuna	2	9.98
Mine Site	Fuel Truck	Nuna	1	16.4
Mine Site	Raw Water Truck	Nuna	1	16.4

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	Effluent Water Truck	Nuna	1	16.4
Mine Site	RO/RO Truck	Nuna	1	16.4
Mine Site	Bins for RO/RO	Nuna	3	21
Mine Site	Grocery Truck	Nuna	1	16.4
Mine Site	Skid steer	Nuna	2	15.266
Mine Site	Light Plants	Nuna	2	1.92
Mine Site	Frost Fighters	Nuna	2	0.4
Mine Site	Bear Proof Garbage Bins	Nuna	2	2
Mine Site	RO/RO Truck + VAC for RO/RO - UNIT 1374	Nuna	1	15.876
Mine Site	Bins for RO/RO (2 x GARBAGE BINS)	Nuna	2	4.5
Mine Site	Bins for RO/RO (2 x GARBAGE BINS)	Nuna	2	4.5
Mine Site	Busses 42 passenger	Nuna	3	24.6
Mine Site	Lighting plants	Nuna	10	11.3
Mine Site	D6 Dozer - Caterpillar D6 R II	Besix Vanpile JV	1	24.3
Mine Site	966G Wheel loader - Caterpillar 966G - 4m"	Besix Vanpile JV	1	22.75
Mine Site	Trucks - Articulated dumper 38T/23 m3 - Type Terex TA40	Besix Vanpile JV	5	153.8
Mine Site	Compactor - 9.2T Articulated tandem roller w/ 2 vibratory drums - Type Hamm HD 90	Besix Vanpile JV	1	8.3
Mine Site	85T Track excavator w/ long stick	Besix Vanpile JV	2	172.6
Mine Site	20T 6x4 Tipper Truck	Besix Vanpile JV	1	26
Mine Site	Conveyor belt	Besix Vanpile JV	1	25
Mine Site	Ripper	Besix Vanpile JV	2	5
Mine Site	Diesel Hammer D180	Besix Vanpile JV	3	112.41
Mine Site	Vibrohammer - Type 5.9T, 50KNm, Hydraulic hammer IHC S50/90	Besix Vanpile JV	3	28.95
Mine Site	71KW Power pack for EMV300 vibro hammer	Besix Vanpile JV	2	4
Mine Site	Crawler crane 350 ton - Type Liebherr LR1400-2	Besix Vanpile JV	2	622
Mine Site	Clamshell	Besix Vanpile JV	1	15
Mine Site	250T Lifting crawler crane	Besix Vanpile JV	1	210

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	Mobile crane 32T	Besix Vanpile JV	1	24
Mine Site	Mixer Truck 6/9 m3	Besix Vanpile JV	1	12.2
Mine Site	Bucket 0.5/1 m3	Besix Vanpile JV	1	0.4
Mine Site	80T extensible semi-trailer	Besix Vanpile JV	2	45.4
Mine Site	125 KW/170 HP tractor for 80T semi-trailer	Besix Vanpile JV	2	19
Mine Site	20T Flatbed truck w/ truck mounted crane	Besix Vanpile JV	1	11.6
Mine Site	20' x CONTAINER - Oxy fuel cutting systems, induction heating system, 400A welding generators, welding sets, 7m3/min / 250cft/min mobile compressors	Besix Vanpile JV	1	22
Mine Site	20' x CONTAINER - Mobile Compressor + 50mm PVC Perforated tubes	Besix Vanpile JV	5	110
Mine Site	40' x CONTAINER - Generator 150 kVA, Generator 250 kVA, Generator 30 kVA, Generator 100 Kva	Besix Vanpile JV	3	66
Mine Site	Maintenance truck (water/fuel/maintenance)	Besix Vanpile JV	1	4.8
Mine Site	Piling Frame	Besix Vanpile JV	2	12
Mine Site	Sheetpiles AZ26 - 700	Besix Vanpile JV	72	459.36
Mine Site	Sheetpiles AZ26 - 700	Besix Vanpile JV	14	47.6
Mine Site	Tie-rod dia 800 mm	Besix Vanpile JV	55	386.1
Mine Site	Tie-rod dia 800 mm	Besix Vanpile JV	14	91.84
Mine Site	40' x OPEN TOP - Temporary structural steel access platform	Besix Vanpile JV	1	22
Mine Site	40' x OPEN TOP - Temporary structural steel quay	Besix Vanpile JV	1	22
Mine Site	40' x OPEN TOP - Steel trolley	Besix Vanpile JV	1	22
Mine Site	40' x OPEN TOP - Engine system for mobile trolley movement	Besix Vanpile JV	1	22
Mine Site	40' x OPEN TOP - Walkway	Besix Vanpile JV	1	22
Mine Site	Concrete mattresses scour protection	Besix Vanpile JV	337	674
Mine Site	40' x CONTAINER - workshop materials and spare parts	Besix Vanpile JV	10	220

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	40' x CONTAINER - material for offices, site small facility tools	Besix Vanpile JV	10	220
Mine Site	Container office	Besix Vanpile JV	4	12
Mine Site	Container with lunch room	Besix Vanpile JV	2	6
Mine Site	Precast pile caps	Besix Vanpile JV	1	25
Mine Site	40' x CONTAINER - Fenders SCN 2000, bollards, handrail, guardrail	Besix Vanpile JV	4	88
Mine Site	10'x44' wheeled lunchtrailer	Contractor	1	14
Mine Site	Herman Nelson 6700	Contractor	6	7.2
Mine Site	Bear Proof Garbage Bin	Contractor	4	2.4
Mine Site	20` Container	Contractor	6	130.02
Mine Site	55KW Generator	Contractor	4	4.4
Mine Site	Generator enclosure	Contractor	3	0.66
Mine Site	40` Container	Contractor	6	158.88
Mine Site	Mark IV Tamper	Contractor	2	63.525
Mine Site	Knox Kershaw KBR 940 Regulator	Contractor	2	29.4
Mine Site	Pettibone 445F w/ high rail	Contractor	2	32.77785
Mine Site	Rail car mover	Contractor	2	48.52
Mine Site	Ballast Car	Contractor	15	379.5
Mine Site	CAT 950 loader	Contractor	2	31
Mine Site	CAT 988 loader	Contractor	1	60
Mine Site	Telehandler	Contractor	3	42
Mine Site	Skidsteer	Contractor	1	7
Mine Site	Clipping Machine	Contractor	4	1
Mine Site	Diesel Rail Heater Drapeau 2	Contractor	1	16
Mine Site	Herman Nelson 6700 all in one	Contractor	2	2.4
Mine Site	Herman Nelson extreme cold BT400NEX-D4A	Contractor	6	2.0475
Mine Site	Herman Nelson Flagro-1000 trailer mount	Contractor	1	2.1
Mine Site	light plants	Contractor	15	16.95
Mine Site	light system for office (in C-Can)	Contractor	1	4
Mine Site	F-350 crew cab 4x4 Diesel	Contractor	6	28.68
Mine Site	F-350 crew cab w/ fuel tank	Contractor	6	25.5
Mine Site	Crew Van 4x4 15 passenger	Contractor	5	21

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	F-550 Mechanic Truck	Contractor	2	18
Mine Site	F-450 CSV trucks	Contractor	3	25
Mine Site	power pack 5/10 gallon per minute	Contractor	6	1
Mine Site	Kennworth 880 w/ winch	Contractor	1	24
Mine Site	Kennworth 880 w/ grapple	Contractor	1	17
Mine Site	highway trailer 48 foot	Contractor	1	11
Mine Site	highway trailer 40 foot lowbed	Contractor	1	10.5
Mine Site	trailer w/ rail	Contractor	1	14
Mine Site	Kennworth 880 w/hirail & crane	Contractor	1	32
Mine Site	Kennwoth 370 fuel & lube truck (filled)	Contractor	1	54
Mine Site	Kennworth 880 Dump Truck w/ hirail	Contractor	1	23
Mine Site	Geismar Power Jack Model RV100	Contractor	2	3
Mine Site	Air Compressor	Contractor	1	3
Mine Site	Excavator	Contractor	2	74
Mine Site	20`Container w/ 3 Rail Puller, Threader,misc. small tools	Contractor	1	22
Mine Site	Track Welding Truck	Contractor	2	81.9
Mine Site	12'x60' Office Trailer w/ furniture	Contractor	1	12
Mine Site	trailers for 24'x60'office w/ furniture	Contractor	1	12
Mine Site	trailers for 60'x60'office w/ furniture	Contractor	3	36
Mine Site	Rail Operations Concrete	Contractor	158	316
Mine Site	Crane Mats	Contractor	74	111
Mine Site	Quonset Hut	Contractor	1	5
Mine Site	Portable Washroom	Contractor	2	3
Mine Site	10,000 gallon fuel tank (diesel empty)	Contractor	1	5
Mine Site	10,000 gallon fuel tank (gasoline full)	Contractor	1	45
Mine Site	Outdoor vehicle plug station	Contractor	1	1
Mine Site	20` Container Hose Crimping	Contractor	1	21.67
Mine Site	Rolling Stock Workshop	Nahanni	1	340
Mine Site	Rolling Stock Workshop Crane	Nahanni	1	12
Mine Site	Rail Operations Offices	Nahanni	1	35
Mine Site	Rail Operations Concrete	Nahanni	1	50
Mine Site	Pick up trucks	Allnorth	2	6.488
Mine Site	Screener power screen	Contractor	1	40

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	Inclined screen	Contractor	1	46
Mine Site	Screener	Contractor	1	40
Mine Site	Conveyors	Contractor	4	47
Mine Site	Gen-set trailers	Contractor	1	28
Mine Site	Electrical sub-station	Contractor	3	8
Mine Site	Fuel truck 10,000 liters	Contractor	1	14
Mine Site	Crane 80T	Contractor	1	43
Mine Site	Crane 200T crawler	Contractor	2	100
Mine Site	Mobile concrete plant	Contractor	1	15
Mine Site	Concrete truck	Contractor	2	52
Mine Site	Drill Rig T40R driller	Contractor	1	35
Mine Site	Loader C-988	Contractor	1	50
Mine Site	Dynamite truck	Contractor	2	20
Mine Site	Dynamite truck	Contractor	1	10
Mine Site	Drilling Rig LB 36-410 (rented)	Contractor	1	82
Mine Site	Piling and drilling Rig LRB 355 (rented)	Contractor	1	76
Mine Site	Oscillator VRM KL (rented)	Contractor	1	17
Mine Site	Loader C-980	Contractor	1	50
Mine Site	Loader C-980	Contractor	1	50
Mine Site	Dynamite truck	Contractor	1	10
Mine Site	Semi-trailer	Contractor	1	15
Mine Site	Crane 130T	Contractor	1	50
Mine Site	Basket crane	Contractor	1	2
Mine Site	Generator 35 kW	Contractor	2	6
Mine Site	Air compressor	Contractor	1	22
Mine Site	Air compressor	Contractor	1	22
Mine Site	Tower light 4 000 W	Contractor	6	4
Mine Site	Pick-up 4x4 diesel	Contractor	12	38
Mine Site	Dynamite pick up	Contractor	2	9
Mine Site	Skid Steer CAT 236B	Contractor	1	3
Mine Site	Bucket Lift	Contractor	1	15
Mine Site	Pick-up 4x4 diesel	Contractor	2	6
Mine Site	Dynamite pick up	Contractor	2	9

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	Tower light 4 000 W	Contractor	4	3
Mine Site	Scissors lift	Contractor	2	6
Mine Site	Bucket Lift	Contractor	1	15
Mine Site	Tower light	Contractor	3	3
Mine Site	Tower light	Contractor	1	1
Mine Site	Pick-up 4x4 diesel	Contractor	2	6
Mine Site	Light tower	Contractor	6	5
Mine Site	Pick-up 4x4 diesel	Contractor	6	19
Mine Site	Scissor lift	Contractor	1	4
Mine Site	Generator 35 kW	Contractor	3	5
Mine Site	Welding machine	Contractor	3	3
Mine Site	Generator 114 kW	Contractor	1	3
Mine Site	Diesel tank 22 500 li	Contractor	1	3
Mine Site	Diesel tank 10 000 li	Contractor	2	2
Mine Site	Gaz tank 50 000 li	Contractor	2	2
Mine Site	Diesel tank 10 000 li	Contractor	2	2
Mine Site	Gaz tank 50 000 li	Contractor	1	1
Mine Site	Gaz tank 50 000 li	Contractor	1	1
Mine Site	Gaz tank 10 000 li	Contractor	1	1
Mine Site	Low boy 100T	Contractor	1	13
Mine Site	Tool truck	Contractor	1	14
Mine Site	Bus ford transit	Contractor	1	3
Mine Site	Bucket Lift 100'	Contractor	1	15
Mine Site	Platform truck	Contractor	1	15
Mine Site	Boom truck	Contractor	1	14
Mine Site	Bus 48 passengers	Contractor	1	8
Mine Site	Water tank 50 000 li	Contractor	1	3
Mine Site	Water tank 15 000 li	Contractor	1	3
Mine Site	Water tank 1 000 li	Contractor	2	2
Mine Site	Water tank 50 000 li	Contractor	1	3
Mine Site	Water tank 10 000 li	Contractor	1	3
Mine Site	Office room	Contractor	1	5
Mine Site	Lunch room	Contractor	1	5

Property Section	Material Item	Owner	Quantity	Revenue Tonne
e.g. Milne Port or Mine Site	*Description of the material**		*Quantity of the material to be shipped to and stored on the Property (including unit of measurement)*	*Estimated amount of revenue tonnes (mt) assigned to the shipping of material*
Mine Site	Spare parts trailers	Contractor	1	28
Mine Site	Explosive matts	Contractor	50	175
Mine Site	Methanol	Contractor	110	110
Mine Site	Calcium	Contractor	877	877
Mine Site	Concrete bags	Contractor	67	101
Mine Site	20' Various Containers	Contractor	20	440
Mine Site	Non-woven Geotextile (bundle of 3 rolls)	Contractor	15	20
Mine Site	Safety barrier (New Jersey)	Contractor	100	204
Mine Site	Non-woven Geotextile (bundle of 3 rolls)	Contractor	5	7
Mine Site	Non-woven Geotextile (bundle of 3 rolls)	Contractor	5	7
Mine Site	Board insulation 50mm (Styrofoam)	Contractor	600	192
Mine Site	Non-woven Geotextile (bundle of 3 rolls)	Contractor	3	4
Mine Site	Geomembrane Liner (5 500 m^2)	Contractor	1	2
Mine Site	Retaining wall concrete bloc 600 x 600 x 1200	Contractor	50	54
Mine Site	Non-woven Geotextile (bundle of 3 rolls)	Contractor	137	178
Mine Site	Unloader board insulation	Contractor	2000	11
Mine Site	Unloader non-woven geotextile	Contractor	68	15
Mine Site	Parts (for generators)	Contractor	3	2
Mine Site	20' Container Miscellaneous accesories for workers	Contractor	1	20
Mine Site	20' Container -Office equipment	Contractor	1	5

In addition to the above noted equipment to be brought to the Project in 2019, there are materials and equipment that will arrive on the 2019 sealift in support of the Phase 2 expansion, currently in the permitting process. These materials consist of large modules, and were previously referred to in the 2018 Work Plan and 2018 Work Plan Addendum as the Expansion Project Equipment and Materials (the 'Modules). In addition to the Crushing, Screening, Car Dumper, Bulk Material Handling (BMH) Conveyors, and Rail Materials, a Shiploader Module has been added to the 2019 sealift. While these materials will be constructed following approval of the Phase 2 expansion, they are being mobilized to Site with the understanding that they would need to be backhauled in the event Phase 2 is not approved. To assist with the calculation of reclamation securities, the detailed breakdown of the Modules is provided in Table 8-3.

Table 8-3: Expansion Project Equipment and Materials

Module Package	Description	Total Volume (m3)
Shiploader	Shiploader	77,938
	Jetty Travel Gear for Shiploader	2,268
	Landside Travelgear for shiploader (Pivot Point)	1,174
	Lower Part Pivot point for shiploader (to be casted in grouting)	20
Subtotal Shiploader		**81,400**
Car Dumper	Steel Tub, Car Dumper, Car Dumper Hall including E-Houses	12,579
	Positioner Hall (Indexer Building) One piece with shipping braces	8,401
	Hopper Support Structure	2,099
	Positioner	487
	Apron Feeder	496
	Hopper	296
	Positioner Track Dwg# 4933706	97
	Hydraulic Power Unit Car Dumper	45
	40' DC or OT (Drive units, small geared motor for the spillage scraper)	77
	Transformer house	179
Subtotal Car Dumper		**24,756**
Crushing	Crusher building Inculding 4.2 to 4.5	21,111
	Main Shaft Kubria M210	63
	Spider Complete Kubria M210	70
	Crusher feeding chute S6	31
	Various disassembled small parts stowed in 20' Containers	154
	Various disassembled small parts stowed in 20' Containers	387
Subtotal Crushing		**21,815**
Screening building	Screening building	33,278
Subtotal Screening		**33,278**
BMH Conveyors (Transfer Conveyor)	Detail 1 Tower (Lower section)	1,476
	Detail 1 Tower (top section)	996
	Detail 1 Tower (diagonal brace)	167
	Detail 1 Tower (horizontal brace)	0
	Detail 2 Tubular Gallery type 2	691
	Detail 3 Tubular Gallery type 1	3,488
	Detail 4 Transfer Truss PT. 1 Head End (Platform)	1,332
	Detail 4 Transfer Truss PT. 2 - Head End (Truss)	349
	Detail 5 Bent TC-B3	184
	Detail 6 Bent TC-B4	129
	Detail 7 Bent TC-B5	97
	Detail 8 Bent TC-B6	73
	Detail 9 Bent TC-B7	38
	Detail 10 Bent TC-B8	21
	Detail 11 Bent TC-B9	0
	Detail 1 - Gravity Takeup Counterweight (4122)	10
	Transfer Conveyor tables, tail and take up pulley supports	232
	Transition walkway	8

Module Package	Description	Total Volume (m3)
	Corrugated wall panels for tower base	0
BMH Conveyors (Screen Feed Conveyor)	Detail 4 - Tubular gallery (Type 2)	578
	Detail 24 - Tubular gallery (Type 4)	1,744
	Detail 24 - Tubular gallery (Type 5)	581
	Detail 5 - Tubular gallery (Type 3)	527
	Detail 6 - Truss section	596
	Detail 8 - Bent SF-B3	76
	Detail 9 - Bent SF-B4	38
	Detail 10 - Bent SF-B5	17
	Detail 11 - Bent SF-B6	8
	Detail 12 - Bent SF-B8	2
	Detail 12 - Bent SF-B9	0
	Detail 15 - Gravity Take up Tower Bent SF-B2	329
	Detail 15 - Gravity Take up Tower Platform	110
	Detail 16 - Gravity Take up Tower Bent SF-B1	121
	Detail 13 - Caged Ladders	77
	Detail 14 - Caged Ladders	77
	Detail 2 - Counter Weight (CV-001)	8
	Bracing, Guarding, Bolts, Monorail and Monorail Supports in Containers	155
	Detail 4 - Transition walkway	10
BMH Conveyors (Stockpile #1 Conveyor)	Apron Feeder Modular Structure Dribble and head chute	1,011
	Apron Feeder Modular Structure and Dribble and head chute	1,045
	Detail 25 - Apron Feeder Modular Structure stairs	0
	Detail 21 - Feeding Hopper (Top Half)	201
	Detail 18 Arches	573
	Detail 18 Arch cross beam connectors	0
	Reclaim tunnel concrete foundations	1,152
	Reclaim tunnel corrugated steel segments and Exit tunnel segments	189
BMH Conveyors (Oversize Conveyor)	Detail 13 - Gravity Takeup Counterweight (CV-002)	8
	Detail 2 - Truss	726
	Detail 3 - Tubular Gallery (Type 1)	493
	Detail 3 - Tubular Gallery (Type 2)	493
	Detail 3 - Tubular Gallery (Type 3)	1,480
	Detail 4 - Tubular gallery (Type 4)	406
	Detail 5 - Bent OSC-B1	113
	Detail 6 - Bent OSC-B2	61
	Detail 7 - Bent OSC-B3	30
	Detail 8 - Bent OSC-B4	14
	Detail 9 - Bent OSC-B5	6
	Detail 10 - Caged Ladder	77
	Detail 11 - Caged Ladder	77
	Detail 12 - Bent OSC-B6	363
	Detail 13 - Gravity Take up Tower Bent OSC-B7	131
	Detail 13 - Gravity Take up Tower Platform	110
	Containers	155
BMH Conveyors	Detail 1 Head Platform for Fines Collection Conveyor	182

Module Package	Description	Total Volume (m3)
(Fines Conveyor)	Detail 2 Head Platform Stairs and legs for Fines Collection Conveyor	77
	Fines collection conveyor stick built section and Head Chute	0
BMH Conveyors (Lump Conveyor)	Detail 1 - Tubular Gallery Section (Type 1)	405
	Detail 1 - Tubular Gallery Section (Type 2)	405
	Detail 2 - Tubular Gallery Section (Type 3)	366
	Detail 3 - Bent LC-B3	3
	Detail 4 - Bent LC-B2	10
	Detail 5 - Bent LC-B1	17
	Detail 6 - Platform	237
	Detail 6 - Platform Columns	36
	Detail 8 - Platform Stairs	33
	40' Container	155
	Detail 7 - Chute - 2336-CV-001 Head Lump conveyor	19
	Detail 7 - Chute - 2336-CV-001 Head Lump conveyor	7
	Detail 7 - Chute - 2336-CV-001 Head Lump conveyor	6
	Detail 7 - Chute - 2336-CV-001 Head Lump conveyor	1
BMH Conveyors (Stockpile #2 Conveyor)	Detail 1 - Truss Sections T1	508
	Detail 1 - Truss Sections T2	1,016
	Detail 1 - Truss Sections T3	508
	Drive Station	9,023
	Chute - 4211-CV-001 Head Yard Stockpile #2 conveyor	67
	Chute - 4211-CV-001 Head Yard Stockpile #2 conveyor	183
	Chute - 4211-CV-001 Head Yard Stockpile #2 conveyor	23
	Chute - 4211-CV-001 Head Yard Stockpile #2 conveyor bypass chute	23
	Stockpile Conveyor Chute Platform - shipped in container	0
	Detail 11 - Tail Section	0
	Conveyor table parts in 40 ft containers or pallets	1,084
	Detail 2 Bent STYC-B1	6
	Detail 2 Bent STYC-B2	3
	Detail 2 Bent STYC-B3	1
	Detail 2 Bent STYC-B4	0
	Detail 10 Loading Area Holding assembly	0
BMH Conveyors (Shiploader Feed Conveyor)	Containers	387
	Tail End Assembly and Conveyor Loading module	0
	Conveyr Stick Built parts for conveyor tables / modules	0
	Conveyor table modules	0
	Drive Station	3,844
	Detail X Bent SFC-B1	7
	Detail X Bent SFC-B2	24
	Detail X Bent SFC-B3	22
	Detail X Bent SFC-B4	39
	Detail X Bent SFC-B5	78
	Detail X Bent SFC-B6	139
	Detail X Bent SFC-B7	250
	Detail X Bent SFC-B8	612
	Detail X Truss T1-1	529

Module Package	Description	Total Volume (m3)
	Detail X Truss T1-2	529
	Detail X Truss T1-3	529
	Detail X Truss T1-4	529
	Detail X Truss T1-5	529
	Detail X Truss T1-6	529
	Detail X Truss T2	534
	Detail X Truss T3	487
	Head Bridge support	163
	Head Bridge support column	125
	Head Bridge support column	125
	Head Truss 1st section	1,201
	Head Truss Final section	845
	Head Platform	96
	Head Chute Removable Portion Section 1	14
	Head Chute Removable Portion Section 2	22
	Head Chute Stationary portion	15
Subtotal BMH Conveyors		**49,868**
Rail Materials	Pandrol Victor Tie Plates (preplated on ties)	764
	Screw Spikes Bags (30/bag)	1,447
	E-Clip Fastener Bags (25kg - 40 bags/pallet)	126
	11" Tie Plates Pallet (300/pallet)	2
	Rail Ties Bundle of 30 ties	11,213
	weld kits (25/ pallet)	171
	Keg track spikes (48/pallet)	3
	joint bar (100/pallet) 136#	3
	Keg bolts & washers (48/pallet)	3
	turnout rail 136# AHH RE	17
	joint bar 115#	10
	HW turnout package ties	150
	TO frog	8
	Sliding Derail	1
	Bumping Post	12
	136# RE RAIL guardrail	3
	Crossing Panel	19
	Timber Screws (1 Pallet)	142
	Rails 25 per bundle	4,059
	115# RE Rail	17
Subtotal Rail		**18,172**

Additional supplies to support construction and operations through 2019 and 2020 will arrive on the 2019 sea lift include:

- Delivery of ammonium nitrate (AN), up to 12,142 m^3 (9,714 tonnes) to be stored on-site in 2019
- Delivery of pre-packaged explosives, up to 176,000 kg to be stored on-site in 2019
- Delivery of maintenance parts.
- Delivery of consumables (lubricants, grease, detergents, boosters, EZ Dets, dry goods, food, household supplies, etc.).

SECTION 9.0 - UPDATES TO ITEMS CONTAINED IN THE SCHEDULES OF THE LEASE

9.1 UPDATES TO THE EMERGENCY RESPONSE PLAN

In accordance with Clause 5.1 item H of the existing Commercial Lease Q13C031, the applicable Emergency Response Plan BAF-PH1-830-P16-0007 and Spill Contingency Plan BAF-PH1-830-P16-0036 have been provided in Appendices of this Work Plan. Note that these documents were updated in September 2018 in support of the approved production increase to 6 Mtpa. Please refer to Section 11 for location and details.

9.2 UPDATES TO ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

All updated Environmental Management and Monitoring Plans were submitted in March 2018 with the Annual Reports, with the exception of the Milne Port Oil Pollution Emergency Plan (OPEP), Spill Contingency Plan, and Emergency Response Plan which were updated in September 2018 in support of the approved 6Mtpa production increase. It is noted that Baffinland and QIA have been working to update the Roads Management Plan for 2018, as well as implement a Tote Road Quarry and Borrow Source Management Plan, however these revised and new documents remain in draft at the time of this Work Plan submission. An extensive list of the current plans for the project is presented in Table 9-1 below.

Table 9-1: Environmental Monitoring and Management Plans

Document Number	Plan Name	Version
BAF-PH1-830-P16-0002	Air Quality and Noise Abatement Management Plan	March 2016
BAF-PH1-830-P16-0006	Cultural Heritage Resource Protection Plan	March 2016
SD-STD-002	Hazard Identification and Risk Assessment Procedure	December 2010
N/A	EHS Framework Standard	December 2010
H337697-0000-01-126-0002	Health and Safety Management Plan	January 2012
SD-SEMP-003	Human Resources Management Plan	December 2010
BAF-PH1-830-P16-0027	Terrestrial Environmental Management and Monitoring Plan	March 2016
BAF-PH1-830-P16-0025	Stakeholder Engagement Plan	March 2016
BAF-PH1-830-P16-0023	Roads Management Plan	March 2016
BAF-PH1-830-P16-0024	Shipping and Marine Wildlife Management Plan	March 2016
N/A	Blasting Management Plan	April 2013
BAF-PH1-830-P16-0004	Borrow Pits and Quarry Management Plan	March 2014
N/A	Borrow Source Management Plan (See Note 1)	October 2013
BAF-PH1-830-P16-0030	Borrow Source Management Plan - Kilometer 2	October 2014
BAF-PH1-830-P16-0032	Borrow Source Management Plan - Kilometer 97	October 2014
BAF-PH1-830-P16-0035	Borrow Source Management Plan - Kilometer 104	March 2014
H349000-4200-07-245-0001	Quarry Management Plan D1Q1	October 2013
H349000-4200-07-245-0002	Quarry Management Plan D1Q2	October 2013

Document Number	Plan Name	Version
BAF-PH1-830-P16-0017	Quarry Management Plan Q1	July 2017
H349000-3000-07-245-0002	Quarry Management Plan Q11	October 2013
H349000-3000-07-245-0003	Quarry Management Plan Q19	October 2013
H349000-3000-07-245-0001	Quarry Management Plan Q7	October 2013
BAF-PH1-830-P16-0040	Quarry Management Plan QMR2	July 2017
BAF-PH1-840-P16-0002	Emergency Response Plan	September 2018
BAF-PH1-830-P16-0036	Spill Contingency Plan	September 2018
BAF-PH1-830-P16-0008	Environmental Protection Plan	August 2016
BAF-PH1-830-P16-0010	Fresh Water Supply, Sewage and Wastewater Management Plan	March 2018
BAF-PH1-830-P16-0011	Hazardous Materials and Hazardous Waste Management Plan	March 2017
BAF-PH1-830-P16-0012	Interim Closure and Reclamation Plan	October 2018
BAF-PH1-830-P16-0026	Surface Water and Aquatic Ecosystems Management Plan	March 2016
BAF-PHI-830-P16-0001	Surface Water Sampling Program - Quality Assurance and Quality Control Plan	March 2017
BAF-PH1-830-P16-0039	Aquatic Effects Monitoring Plan	October 2015
BAF-PH1-830-P16-0028	Waste Management Plan	September 2018
BAF-PH1-830-P16-0029	Phase 1 Waste Rock Management Plan	November 2017
N/A	Interim Waste Rock Management Plan	March 2018
BAF-PH1-830-P16-0031	Life of Mine Waste Rock Management Plan	April 2014
N/A	Explosives Management Plan (see Note 2)	August 2013
BAF-PH1-830-P16-0013	Milne Port Oil Pollution Emergency Plan (OPEP)	September 2018
BAF-PH1-830-P16-0041	Polar Bear Safety Plan	March 2016
BAF-PH1-830-P16-0037	Exploration Spill Contingency Plan	June 2014
BAF-PH1-830-P16-0038	Exploration Closure and Reclamation Plan	July 2014
BAF-PH1-830-P16-0042	Spill at Sea Response Plan	August 2015

NOTES:

[1] Discontinued and incorporated into the March 2014 Borrow Pits and Quarry Management Plan.
[2] The Explosives Management Plan is a contractor document.

9.3 PROPOSED UPDATES TO THE INTERIM CLOSURE AND RECLAMATION PLAN

The Interim Closure and Reclamation Plan (ICRP) was updated in 2018 (Revision 5, 30 October 2018) and approved by QIA, and has been provided as an appendix to this Work Plan. Significant updates to the ICRP have been completed relative to Revision 4 (2016), notably the updates to the Closure Objectives and Criteria, and Closure and Post Closure Monitoring. This update to the ICRP reflects engagement with QIA since 2016 on these and other key topics, however it is recognized that uncertainty remains with respect to topics such as closure criteria and final closure conditions (aesthetics). Future iterations of the ICRP will aim to reduce this uncertainty, both as a result of reclamation research and community engagement. The

ICRP is intended to be an iterative document that will evolve over the life of the mine, and it is recognized that QIA as the land owner will provide valuable input and approval of future versions of the ICRP.

The provision of additional securities for the 2019 Work Plan is allocated as summarized in Table 9-2 below. Further detail can be found in Appendix B.

Table 9-2: Mary River Project Total Closure and Reclamation Security Summary[1] – 2019 Work Plan

	A	B	C	D	E	F	G	H
	Authorization	Liability	Global Estimate from 2018 Addendum Estimate ($)	2018 Unit Rate Adjustment ($)	2019 Estimate, Including 2018 Reconciliation ($)	Total 'Global' Estimated Security for 2018 ($)	Total Posted as of July 2018 ($)	Marginal Adjustment to be Posted ($)
						C + D + E		F - G
1	Type A 2AM-MRY1325	IOL[2]	68,835,000	-7,754,000	34,399,000	95,480,000	73,829,771	21,650,229
2		Crown	1,196,000	-147,000	730,000	1,779,000	1,298,555	480,445
3		Water	1,714,000	-338,000	18,313,000	19,689,000	-	-
4		Land	68,316,878	-7,563,000	16,815,000	77,568,878	-	-
5	*Subtotal Type A*		*70,031,000*	*-7,901,000*	*35,128,000*	*97,258,000*	75,128,326	22,130,674
6	Type B Exploration2BE-MRY1421 [3]	IOL	165,000	-	-	165,000	-	165,000
7		Crown	1,082,000	-	-	1,082,000	1,250,000	-168,000
8		Water	18,000	-	-	18,000	-	-
9		Land	1,229,000	-	-	1,229,000	-	-
10	*Subtotal Type B Exploration*		*1,247,000*	-		*1,247,000*	*1,250,000*	*-3,000*
11	DFO Security Associated with Ore Dock	IOL[2]	-	-	-	-	-	-
12		Crown	563,000	-	-	563,000	563,000	-
13		Water	563,000	-	-	563,000	563,000	-
14		Land	-	-	-	-	-	-
15	*Subtotal DFO*		*563,000*	-		*563,000*	*563,000*	-
16	AANDC Land Lease 47H/16-1-2 [4]	IOL[2]	-	-	-	-	-	-
17		Crown	4,975,000	-	-	4,975,000	4,975,000	-
18		Water	-	-	-	-	-	-
19		Land	4,975,000	-	-	4,975,000	4,975,000	-
20	*Subtotal AANDC Land Lease*		*4,975,000*	-	-	*4,975,000*	*4,975,000*	-
21	**GRAND TOTAL**		**76,816,000**			**104,043,000**	**81,916,326**	

NOTES:

1) Totals rounded to nearest '000 in CAD
2) Security relating to IOL held by Qikiqtani Inuit Association (QIA) under Commercial Lease No. Q13C301
3) As per Mary River Exploration Project Closure and Reclamation Plan (BAF-PH1-830-P16-0038, Rev 1)
4) Posting process for security relating to AANDC Land Lease 47H/16-1-2 phased into a 2-step approach. Phase 1 to be posted November 2016.
5) As per Closure and Reclamation Strategy and Financial Security Estimate for Nunavut Lease #47H/16-1-2 (H349001-2000-07-126-0001, Rev.0)

SECTION 10.0 - REQUESTED AMENDMENTS TO THE PROVISIONS OF THE LEASE

Tote Road Adjustment Notices (TRANs) and Options Exercise Notices (OENs) will be submitted as per Table 3-1, throughout 2019. It is noted that per the Commercial Lease, review of OENs and TRANs outside of the Work Plan will require an associated fee for review.

Included as an appendix of this Work Plan is an OEN for the Tote Road. The intent of this OEN is to reconcile historic adjustments to the Tote Road completed between 2013 and 2016 with the Commercial Lease boundaries, and to incorporate the proposed quarries and laydowns included in the 2019 Work Plan (Item No. 1 and 2).

SECTION 11.0 - ADDITIONAL REPORTS, INFORMATION OR DATA

Additional reports, information or data required to support the 2019 Work Plan are summarized in Table 11-1 below.

Table 11-1: Additional Reports, Information or Data

Title	Organization	Date	Annex
Identify the title of the additional report, information or data to be included with the Annual Work Plan.	*Disclose the name of the organization that produced the addition report, information or data.*	*Include the publish date or reference year to the additional report, information or data.*	*Identify the Annex letter/number corresponding to the additional report, information or data.*
Work Plan Figures - Milne Port - Mine Site - Tote Road	Knight Piésold on behalf of Baffinland	1 November 2018	Appendix A
2019 Marginal Closure and Reclamation Financial Security Estimate	Baffinland	-	Appendix B
Interim Closure and Reclamation Plan	Baffinland	BAF-PH1-830-P16-0012	Appendix C
Emergency Response Plan	Baffinland	BAF-PH1-830-P16-0007	Appendix D
Spill Contingency Plan	Baffinland	BAF-PH1-830-P16-0036	Appendix E
OEN – Tote Road	Baffinland	1 November 2018	Appendix F

Appendix A:

2019 Work Plan Site Layouts

2019 Work Plan – Milne Port Site Layout

2019 Work Plan – Mine Site Layout

2019 Work Plan – Tote Road

Appendix B:

2019 Marginal Closure and Reclamation Financial Security Estimate

Appendix C

Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012)

Appendix D

Emergency Response Plan (BAF-PH1-840-P16-0002)

Appendix E

Spill Contingency Plan (BAF-PH1-830-P16-0036)

Appendix F

Options Exercise Notices