Hope Bay Project
Boston Camp Interim Closure Plan

Prepared for

TMAC Resources Inc.

Prepared by

SRK Consulting (Canada) Inc.
1CT022.006
January 2017

Hope Bay Project
Boston Camp Interim Closure Plan

January 2017

Prepared for

TMAC Resources Inc.
372 Bay Street, Suite 901
Toronto, ON M5H 2W9
Canada

Tel: +1 416 628 0216
Web: www.tmacresources.com

Prepared by

SRK Consulting (Canada) Inc.
2200–1066 West Hastings Street
Vancouver, BC V6E 3X2
Canada

Tel: +1 604 681 4196
Web: www.srk.com

Project No: 1CT022.006

File Name: HopeBay_BostonClosurePlan_1CT022.006_IM_EMR_CH_20170113_FNL

srk consulting

Table of Contents

List of Figures

List of Tables

Appendicies

1 Introduction

The Boston Advanced Exploration Camp (hereafter Boston Camp) was part of the Hope Bay Regional Exploration Project. Boston Camp is located on Inuit Owned Land in the west Kitikmeot region of Nunavut (Figure 1), the camp is authorized under Nunavut Water Board (NWB) Type B Water Licence 2BB-BOS1217. In January 2013, the Hope Bay Regional Exploration Project was acquired by TMAC Resources Inc. from the previous owner Hope Bay Mining Limited (HBML) a wholly owned subsidiary of Newmont Mining Corporation (NMC).

This document presents the closure obligations, the plan for closing the camp and demonstrates how the closure obligations will be met. This closure plan serves as an update to the 2014 Interim Closure Plan (SRK 2014a) according to the provisions set forth in the NWB Water Licence. The water and ore/waste rock management plan developed for the Boston Site (SRK 2017) is incorporated into this plan.

1.1 Background

Boston Camp is located approximately 170 km southwest of Cambridge Bay, above the high water mark on a peninsula in Aimaokatalok Lake. The camp provides support services for exploration activities in and around the Boston mineral resource located at the south end of the Hope Bay Greenstone Belt (Figure 1). The Boston Camp is currently under care and maintenance. It is considered critical infrastructure for restarting exploration in the Hope Bay Greenstone Belt in the future.

Boston Camp was not modified from its original form until June 2010 when a new sewage treatment plant and a new core processing facility were installed. In 2010 the exploration office structures were rearranged and attached to a central corridor leading to the main camp building. This Interim Closure Plan is consistent with the objectives set forth in the 2014 Interim Closure Plan (SRK 2014a) because site modifications have been limited. The Boston site has been in interim care and maintenance since 2012 and no activities were undertaken since, other than regular inspections.

1.2 Closure and Reclamation Plan History

This document presents the closure obligations and the plan for closing all facilities, and demonstrates how the closure obligations will be met.

Table 1 below provides a summary of the historic closure planning documents issued for the Boston project.

Table 1: Closure and Remediation Plan Revision History

Document Title	Primary Author	Release Date	Document Rationale
Abandonment and Restoration Plan for the Boston Gold Project	Rescan Environmental Services Ltd.	1997	
Abandonment and Restoration Plan for the Boston Gold Project	Rescan Environmental Services Ltd.	September 1998	Initial closure cost estimate submitted in support of the original Type B Water License NWB1BOS9801
Abandonment and Restoration Plan Boston Gold Project Water License NWB1BOS9801	Hope Bay Joint Venture	May 2001	Submitted in support of the Type B Water License NWB1BOS9801 Renewal Application
Abandonment and Restoration Plan Boston Only Scenario Boston Gold Project	Miramar Hope Bay Limited	October 2002	Update to reflect the transfer of ownership under Type B Water License NWB1BOS0106
Boston Exploration Camp Closure and Reclamation Plan	Miramar Hope Bay Limited	December 2006	Required update in accordance with Type B Water Licence NWB1BOS0106 conditions
Closure and Reclamation Plan for the Boston Advanced Exploration Project Nunavut	Miramar Hope Bay Limited	September 2007	Required update in accordance with Type B Water Licence 2BB-BOS0712 conditions
Hope Bay Project Boston Camp Revised Interim Closure Plan. Hope Bay, Nunavut	SRK Consulting (Canada) Inc.	June 2012	Required update in accordance with Type B Water Licence 2BB-BOS0712 conditions, as the project formally entered Care and Maintenance
Hope Bay Project Boston Camp Revised Interim Closure Plan	SRK Consulting (Canada) Inc.	May 2014	Update to reflect the transfer of ownership under Type B Water License 2BB-BOS1217
Hope Bay Project Boston Camp Interim Closure Plan	SRK Consulting (Canada) Inc.	January 2017	Submitted in support of the Type B Water License 2BB-BOS1217 Renewal Application

1.3 Closure Objective

The overall closure objective for the Boston Camp is to establish chemical and physical stability to protect human health and the environment. Post-closure care and maintenance, including environmental monitoring will be undertaken to ensure that these conditions are met.

1.4 Permits and Leases

Activities at the Boston Camp were completed in accordance with current NWB Water licences at the time, including the most current NWB Water Licence No. 2BB-BOS1217, and a Land Use Licence with the Kitikmeot Inuit Association (KIA). Table 1 provides a Table of Concordance

indicating how the conditions specified in the current Water Licence are satisfied by this closure plan.

Table 2: Table of Concordance

Licence Reference	Licence Condition (2BB-BOS1217)	Closure Plan Reference	Closure Plan Response/Specification
Part I. 1	Submit revised Abandonment and Reclamation Plan consistent with Mine Site Reclamation Guidelines for the Northwest Territories (INAC 2007), and consistent with the INAC Mine Site Reclamation Policy for Nunavut, 2002.	N/A	Requirements satisfied by submission of this Interim Closure Plan.
Part I. 2	Licencee shall complete all restoration work prior to the expiry of this Licence (July 31, 2017).	5.2	The works will not be completed by this date. TMAC will be applying for a licence extension. Infrastructure at Boston is critical to future exploration when the Hope Bay Greenstone Belt is brought out of Care and Maintenance.
Part I. 3	Complete progressive reclamation of components no longer in use.	3	Entire site will be reclaimed.
Part I. 4	Backfill and restore all sumps to the pre-existing natural contours to the satisfaction of an Inspector.	3.4 -3.7, 3.10 – 3.12	Areas of site disturbance will as far as practical be filled and recontoured to be consistent with natural contours, provide geotechnical stability, and minimize erosion, permafrost degradation and sedimentation.
Part I. 5	Remove site infrastructure and materials prior to expiry of Licence.	3.4, 3.5, 3.8	All facilities and materials will be removed. The rock fill pad and airstrip will be left in place to ensure geotechnical stability.
Part I. 6	Regrade all roads and airstrip to match natural contours and reduce erosion	3.2, 3.4, 3.7, 3.9 - 3.11	Airstrip, roads, and rock pads will be left in place and regraded to prevent ponding. This is done to ensure geotechnical stability.
Part I. 7	Remove culverts and re-establish drainage path of natural channel. Measures to minimize erosion and sedimentation shall be implemented	3.7	Culvert from the Core Storage Road will be removed and the natural flow path restored.
Part I. 8	All disturbed areas will be ripped, graded or scarified to conform to natural topography and promote growth of vegetation	3.7, 3.9 - 3.11	Areas of disturbance will be ripped where necessary and practical and regraded to ensure positive drainage, conform to natural topography and to encourage revegetation.
Part I. 9	Remediation of hydrocarbon contaminated soils to the satisfaction of an Inspector	3.10	Hydrocarbon contaminated soils will either be remediated by landfarming to achieve specified remediation criteria or removed from the site to a licensed disposal facility.
Part I. 10	Restore drill holes and disturbed areas to natural conditions upon completion of drilling, must include removal of drill casing materials and the permanent capping of holes	3.12	All drill steel will be cut at grade, holes will be capped, thermokarst areas backfilled, and soils around the drill sites scarified and revegetated.
Part I. 11	Store drill cores at least thirty (30) metres above ordinary high water mark of any adjacent water body, where any direct flow into a water body is not possible, and no additional impacts are created.	3.3	All drill core boxes will be consolidated in one area on the existing Boston Camp pad.
Part I. 12	Contour and stabilize all disturbed areas upon completion of work and restore to a pre-disturbed state	3.11	Where practical areas of disturbance will be regraded to ensure positive drainage, and to be consistent with natural topography.

2 Closure Scope of Work

The layout of the Boston Camp is shown on Figures 2 and 3. Closure and reclamation activities for Boston Camp include:

- Demolishing and removing remaining site structures;
- Decommissioning and demolition of containment structures;
- Decommissioning the existing portal to underground workings;
- Consolidating and covering ore stockpiles;
- Reclaiming drill sites;
- Collecting and disposing of hazardous wastes;
- Collecting and disposing of non-hazardous wastes;
- Stabilizing permafrost degradation areas;
- Remediating hydrocarbon contaminated soils; and
- Drainage control and revegetation, where appropriate.

Post-closure environmental monitoring will be implemented to confirm conformance with the closure objectives.

3 Closure Activities

3.1 Decommissioning of Camp Structures and Ancillary Facilities

All utilities to structures and facilities will be dismantled and the structures emptied prior to demolition. Non-hazardous and hazardous waste will be segregated as discussed in Section 3.8. Tanks used for heating fuel storage will be drained, removed, and temporarily placed within the lined area of the primary tank farm. If possible and/or if a need is demonstrated, furniture, utilities or structures, will be salvaged. Where possible salvageable structures will be moved intact, or alternatively they will be carefully dismantled and catalogued to facilitate efficient reassembly. Unusable or unwanted buildings will be demolished and the waste material segregated into burnable and non-burnable waste and disposed of as described in Section 3.8.1. Salvage value is not included in the closure cost estimate. The following structures and facilities will be demolished:

- Accommodation and Office Complex;
- Core Processing Facility;
- Maintenance Shop;
- Power Generator Complex;
- Crusher Enclosure;
- Water Supply Structure;
- Sewage Treatment Plant;
- Helipad and Docks;
- Incinerator;
- Vent Raise;
- Communications Tower; and
- Small Sheds.

3.2 Airstrip Decommissioning

Following removal of all buildings and structures the airstrip will be decommissioned. Crushed ore used for surfacing material and for repairing the airstrip will be removed and consolidated into the ore stockpile. The main airstrip rock fill will be left in place, and the airstrip will be regraded to ensure positive drainage. Large white X’s will be painted on the ends of the airstrip.

Adjacent to the airstrip are two areas where drill cuttings have been stored. A geotextile underlies the drill cuttings. Drill cuttings will be removed and stockpiled for backfilling depressions during reclamation. The geotextile will be removed, cut into manageable pieces, and disposed of as described in Section 3.8.1. The area will be regraded to ensure positive drainage and prevent

ponding. Areas of permafrost degradation will be covered with a 1 m thick thermal blanket of waste rock and graded to promote positive drainage.

3.3 Drill Core Storage

Drill core will be consolidated on the Boston Camp pad. Drill core boxes will be placed on pallets and strapped, inventoried, and labelled. This area is outside of the 31 m wide fish habitat buffer zone from the shoreline of Aimaokatalok Lake.

3.4 Decommissioning and Demolition of Containment Structures

3.4.1 Tank Farms

Tank farms at Boston Camp include the primary bulk fuel storage to the north of the airstrip, the power plant fuel containment system and the jet fuel containment system all contained within secondary containment structures. There are also Tidy Tanks for heating fuel located within small secondary containment berms. The bedding, containment berm, and protective granular cover for the liners, of all containment structures on this site were constructed using crushed ore.

All tanks will be decommissioned, drained, and transported to the Doris North waste management yard. Any remaining fuel will be consolidated and hauled to a designated fuel storage area at Doris Camp. At Doris Camp empty drums will be cleaned, crushed and disposed of as non-hazardous waste (see Section 3.8.1). Rinse water from the washing process will be routed through an oil/water separator and not discharged to the environment until treated water meets water quality standards specified in the Water Licence. Tidy Tanks and other self-contained tanks will shipped off-site for resale or disposal. Bulk fuel tanks will be cut into manageable pieces and the steel sheets will be placed in the Doris landfill.

The granular cover layer above the liner will be tested for petroleum hydrocarbons and other contaminants. Depending on the test results, the material will either be consolidated within the ore pile or handled as contaminated soil and treated as described in Section 3.10. Once exposed, the tank farm liner will be cleaned to remove any hydrocarbon contamination, and then cut into manageable pieces for disposal as non-hazardous waste. The underlying bedding soil and containment berm will be tested for the presence of petroleum hydrocarbons. If contaminated, the ore will be remediated as described in Section 3.10, while the uncontaminated ore will be consolidated within the ore stockpile.

The portable pollution control berms situated in the jet fuel containment system will be cleaned, dismantled, and loaded into containers for disposal as non-hazardous waste.

All areas will be regraded for positive drainage after the containment structures are removed. The area will not be revegetated because it was built on a rock pad or bedrock.

3.4.2 Sedimentation Ponds

Two sedimentation ponds were constructed at the Boston Camp (Figures 2 and 3). A high density polyethylene (HDPE) lined pond (Sedimentation Pond 1) and an unlined pond (Sedimentation Pond 2) are located on the east edge of the camp.

Sedimentation Pond 1 was used to settle drilling mud from regional exploration drilling. Any water contained in the pond will be tested and discharged to the tundra or treated to meet the site-specific discharge criteria. Settled sediments will be allowed to dry, then removed from the pond and temporarily stockpiled to allow for the removal of the liner. Liner will be cleaned, cut into manageable pieces, and disposed of as non-hazardous waste. The pond sediments will be tested for contaminants, and depending on the results will be shipped to a licensed off-site disposal facility or covered in place by pushing the containment berm inwards. The area will be subsequently regraded to ensure positive drainage.

Sedimentation Pond 2 was initially used to settle drilling fluids during underground development but was converted to a Burn Pit to burn all wood waste after the bulk sample was completed. Sediment in the pond will be tested for contaminants, and depending on the test results will be either shipped off-site for disposal in a licensed facility or covered in place with by pushing the containment berm inward. The area will be regraded to ensure positive drainage. All solid waste other than fine sediments will be collected and disposed of as described in Section 3.8.1.

For cost estimating purposes, it was assumed the sediments within the sedimentation ponds can be disposed of on site without special treatment.

3.4.3 Landfarm

The soils within the land farm will be tested for petroleum hydrocarbons. Soil hydrocarbon concentrations will be compared to the Nunavut Tier 1 Environmental Guidelines for Contaminated Site Remediation for industrial land use and coarse grained soils (EBA 2012a, EBA 2012b). Soils that meet these remediation criteria may be used for reclamation. Soils not meeting these criteria will be hauled to Doris Camp for underground disposal in the Doris North Mine.

When remediation is complete, the liner will be cut into manageable pieces for disposal. The containment area will be regraded to ensure positive drainage. These materials will be processed as non-hazardous waste.

3.5 Decommission Mine Workings

3.5.1 Underground Portal

The underground portal will be closed in accordance with regulations. A 15 m thick rockfill plug will be installed in the underground portal. The portal opening will be backfilled with waste rock. The backfilled area will be contoured to prevent surface water ponding. The entire area will be regraded to promote positive drainage and to conform to the site topography.

3.5.2 Vent Raise

The wooden collar and cribbing and the ventilation fan will be removed and disposed of as non-hazardous waste. The raise will be capped with reinforced concrete with gas vent in accordance with the appropriate mining regulations.

3.6 Ore Stockpile Closure

The ore stockpile will be consolidated and managed to reduce metal loading to the receiving environment. Ore which has been used as surface dressing, repairs, or for construction of the various containment facilities around site will be collected and consolidated within the existing ore stockpile

The ore piles will be consolidated in an area approximately two-thirds of the original footprint, regraded to prevent ponding, and covered with an HDPE liner. A protective cover of 0.3 m of waste rock would be placed over the geomembrane, with a geotextile separation layer on either side of the liner.

3.7 Decommission Camp Rock Fill Pad

All rock pads on site were built using rock from underground development. The waste rock is non-acid generating and has a significant acid neutralisation potential (SRK 2009). Some of the waste rock from the camp pad may be excavated and used as backfill material where required, but the pad will always have a minimum thickness of 1 m. The rock fill pad will be left in place, regraded to promote positive drainage and prevent the ponding of surface water. The culvert from the Core Storage Road will be removed and a swale created to restore the natural flow path.

3.8 Collection and Disposal of Waste

3.8.1 Non-Hazardous Waste

Following dismantling, demolition, and removal of all structures, a general site wide cleanup will be conducted to gather all waste on site.

The demolition debris from camp structures and other facilities will be collected and segregated for proper disposal. Wood debris will be separated into burnable and non-burnable based on the appropriate guidelines for burning and incineration and/or landfilling (GN 2012, GNWT 2004, particularly Schedules III and IV). Wood waste will either be chipped or burned. Wood waste suitable for burning will be transported to an approved burn pan. Prior to on-site burning, appropriate approvals and permissions will be attained.

Ashes from the incinerator will be managed according to existing management plans.

Non-burnable non-hazardous waste will be loaded into containers and hauled to Doris, and placed into the Doris non-hazardous landfill at Quarry #3.

Prior to demolition, all water supply and sewage pipelines are to be flushed and the sludge and waste water will be collected and loaded into 55 gallon drums. The drums will be transported to the Doris North camp treatment facility for processing.

3.8.2 Hazardous Waste

Hazardous wastes and chemicals will be collected and stored in appropriately sealed and labelled containers and/or empty drums, in accordance with the appropriate guidelines for hazardous

waste management (GN 2010). This includes any remaining fuel, hydraulic oil, antifreeze, lubricants, paint, paint thinners, cleaning supplies, degreasing agents and any other chemicals that cannot be used for their intended purpose. The containers will be hauled to Doris North and consolidated with other hazardous waste for transport and disposal off-site. Materials shipped off site will be disposed of in a licensed facility in accordance with appropriate Federal, Territorial, Provincial or Municipal hazardous waste regulations.

3.9 Stabilization of Permafrost Degradation

A few areas were previously identified as permafrost degradation areas which require stabilization. These areas of permafrost degradation are as follows:

- Airstrip (permafrost degradation ponds can be found at different locations along the east and west shoulders of the airstrip due to historic drilling activities) (SRK 2013);
- Drill Road;
- Drill sites;
- Core Storage Road;
- Diamond Drill Cuttings and Sedimentation Pond;
- Road to Dock (possible small pockets of permafrost degradation) (SRK 2013);
- Road to airstrip (SRK 2013); and
- Sewage Treatment Plant discharge.

Areas of depression should be filled in with and/or covered with a 1 m thick thermal blanket consisting of rock, overburden, drill cuttings, wood chips or a mixture of these during the winter season. The surface of the areas will be regraded to ensure positive drainage.

3.10 Remediation of Hydrocarbon Impacted Soils

A Phase 3 Environmental Site Assessment (SRK 2014a - Appendix A) was conducted in 2012. Soil hydrocarbon concentrations were compared to the Nunavut Tier 1 Environmental Guidelines for Contaminated Site Remediation for industrial land use and Coarse grained soils (EBA 2012a, EBA 2012b). Soils that meet these remediation criteria may be used for reclamation. Soils not meeting these criteria will be remediated or disposed of in an approved underground repository.

A field investigation will be completed after demolition and debris removal to define the nature and extent of hydrocarbon contamination. Remediation options will be assessed after the field investigation. Selection of the type of remediation used to address each of these areas is dependent on the following site-specific factors:

- Size of the impacted area and volume of impacted soils;
- Type of hydrocarbons present; and

- Ground conditions of the impacted area (i.e., solifluction and/or potential for permafrost degradation).

Remediation alternatives will be the same as proposed for Windy Camp and the Patch Lake facility (SRK 2014b). Off-site disposal and in situ bioremediation/landfarming are the preferred alternatives.

Impacted soils will be excavated and disposed of in the Doris North mine. Smaller isolated areas of hydrocarbon impact may be remediated in situ using bioremediation.

The bioremediation method consists of aerobic treatment of the soil. The material will be tilled to oxygenate the active zone of the soil (done in the summer season). At least one season after tilling the soil will be tested to determine if microbial activity has resulted in a reduced hydrocarbon contamination. If the soils still exceed compliance criteria, tilling may be repeated or the soils will be excavated and removed as described below.

Excavated soils or soils previously land farmed which meet the remediation criteria will be used for reclamation or stockpiled.

The open excavations will then be backfilled with suitable backfill to prevent surface water ponding and permafrost degradation. Backfilled excavations will be covered with a minimum 1 m thick layer of waste rock to prevent permafrost degradation and erosion.

The option to encapsulate impacted soils in place is also preserved should it be demonstrated that hydrocarbon risk is minimal and/or other remediation methods are ineffective or inappropriate for a given area. Written approval by the NWB will be sought prior to implementation of encapsulation method.

3.11 Drainage Control and Revegetation

Once all surface infrastructure has been removed and the area has been cleared of debris, the areas will be regraded to ensure no ponding of water. In the summer prior to regrading, the areas should be staked in the field to be easily identified during the winter reclamation work.

Additional areas will not be disturbed during regrading. Any remaining depressions which cannot be regraded will be backfilled with suitable backfill to prevent surface water ponding and permafrost degradation. All roads and trails associated with the existing Boston Camp will be ripped and scarified to promote natural revegetation, reduce erosion potential, and ensure the restoration of natural drainage pathways in a low maintenance fashion.

Vegetation has been damaged in the following areas:

- Sewage Treatment Plant DischargeDrill sites, where appropriate,
- Area South of the Core Storage Road; and

- Area between the Drill Road and the Airstrip.

Areas of complete vegetation dieback and ponding will be backfilled with suitable backfill to prevent surface water ponding and permafrost degradation. The areas will be regraded to ensure positive drainage to support natural revegetation.

3.12 Drill Site Reclamation

A total of 545 drill holes are within an area of 0.81 km^2 in the vicinity of Boston Camp. Drill holes will be inventoried and the extent of remediation work required for each location will be assessed. For drill hole reclamation, above ground casing will be cut at grade, and a cap will be hammered in place to seal the hole. Areas of permafrost degradation around boreholes, if present, will be covered with a 1 m thick thermal blanket and graded to ensure positive ponding. Erosion control measures will be installed where required and vegetation growth will be encouraged where possible by scarifying the soils and seeding. Cost estimates assume that an average area of 10 m^2 will be covered, and that backfilling will be done in the winter using low ground pressure vehicles.

The drill holes will not be grouted and the steel casing will not be backfilled. The holes drilled into the lake bottom (over the ice) as well as any holes encountering artesian conditions were grouted and sealed as part of the drilling procedure. The drill holes located on dry land intersect cold permafrost to a depth of approximately 500 m and as such water flow through these holes is unlikely.

An adaptive management approach will be used to reclaim areas where saline drilling fluid spills have affected vegetation. This first phase of this adaptive management approach will be to revegetate these areas with salt tolerant species. The success of these efforts will be monitored by an Arctic vegetation specialist. Based on the results, management alternatives will be developed and implemented.

4 Post–Closure Monitoring

Monitoring to confirm that the closure plan and associated remediation techniques have achieved the stated closure objectives will be carried out as follows:

- Once closure activities have been completed, the site should be visually inspected by a qualified Professional Geotechnical Engineer annually for three consecutive years to ensure that erosion and/or permafrost degradation areas have stabilized and that remediation objectives for hydrocarbon contaminated soils have been achieved.
- The annual seep sampling program should be continued to detect any changes in the waste rock or ore stockpile leachate chemistry during post-closure monitoring.
- Soil quality in the land farm and/or the hydrocarbon impacted areas where in situ bioremediation has been implemented will be monitored every two years until site soil remediation objectives have been met.

5 Cost Estimate and Scheduling

5.1 Closure Cost Estimate

Appendix A provides details of the estimated closure costs for the Boston Camp site.
The estimated closure cost for Boston Camp site is $6,381,000 in undiscounted 2017 Canadian dollars. These costs assume, in addition to remediation of hydrocarbon contaminated soils, all salvageable equipment and infrastructure will be relocated to the Doris Camp site.

A contingency of 20% of the direct costs is also included. The purpose of the contingency is to account for costs that are uncertain given the current level of information. These items include hydrocarbon impacted soil remediation, drill hole reclamation, and material quantity estimates.

These costs were developed based on equipment and labor rates provided by a third party contractor, using an NWB approved spreadsheet based cost estimating process that is consistent with the principles of RECLAIM. A detailed comparison between the SRK model and RECLAIM is provided in Appendix A.

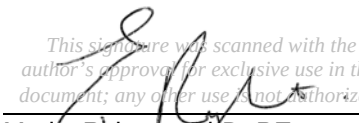
5.2 Scheduling

Closure of the Boston Camp will occur upon closure of the entire Hope Bay Project. Removal of waste from site, and equipment demobilization will be completed after decommissioning. In situ bioremediation and/or landfarming of hydrocarbon impacted soil may take several years.

This report, **"Hope Bay Project, Boston Camp Interim Closure Plan"**, was prepared by SRK Consulting (Canada) Inc.

Iozsef Miskolczi, MASc, PEng
Senior Consultant

and reviewed by



Maritz Rykaart, PhD, PEng
Principal Consultant

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

6 References

BHP Diamonds Inc. 1998. Estimate of Security Deposit for the Boston Gold Project. Letter report issued to Nunavut Water Board, October 22, 1998.

EBA Engineering Consultants Ltd. 2012a. Phase 3 ESA & Biotreatability Study, Former Windy Camp, Hope Bay Gold Project, Nunavut. Prepared for Newmont Mining Corporation. IFR version issued in February.

EBA Engineering Consultants Ltd. 2012b. Phase 3 Environmental Site Assessment and Soil Biotreatability Study Former Patch Workshop, Hope Bay Project, NU. Issued for review. Technical Report prepared for Hope Bay Mining Limited, EBA File: Y22101187.001, February 2012.

GN 2010. Environmental Guideline for the General Management of Hazardous Waste. Department of Environment Government of Nunavut. Revised October 2010.

GN 2012. Environmental Guidelines for the Burning and Incineration of Solid Waste. Department of Environment Government of Nunavut. Revised January 2012.

GNWT 2004. Guideline for Industrial Waste Discharges in the Northwest Territories. Government of Northwest Territories Department of Resources, Wildlife and Economic Development Environmental Protection Service. April 2004.

Hope Bay Joint Venture 2001. Abandonment and Restoration Plan Boston Gold Project Water License NWB1BOS9801. Report prepared for and submitted to The Nunavut Water Board by the Hope Bay Joint Venture, May 2001.

INAC 2007. Indian and Northern Affairs Canada. Mine Site Reclamation Guidelines for the Northwest Territories, NWT

Miramar Hope Bay Ltd. 2002. Abandonment and Restoration Plan Boston Only Scenario Boston Gold Project. Report prepared for and submitted to Kitikmeot Inuit Association by Miramar Hope Bay Ltd., October 2002.

Miramar Hope Bay Ltd. 2006. Boston Exploration Camp Closure and Reclamation Plan. Miramar Hope Bay Limited, December 2006.

Miramar Hope Bay Ltd. 2007. Closure and Reclamation Plan for the Boston Advanced Exploration Project Nunavut. Report prepared by Miramar Hope Bay Ltd., September 2007.

SRK 2009. Water and Ore/Waste Rock Management Plan for the Boston Site. Hope Bay Project, Nunavut. Technical report prepared for Hope Bay Mining Ltd., SRK Consulting (Canada) Inc. Project#1CH008.022 July 2009.

SRK 2012. Hope Bay Project Boston Camp Revised Interim Closure Plan. Hope Bay, Nunavut. Report prepared for Hope Bay Mining Ltd., SRK Consulting (Canada) Inc. Project #1CH008.065 June 2012.

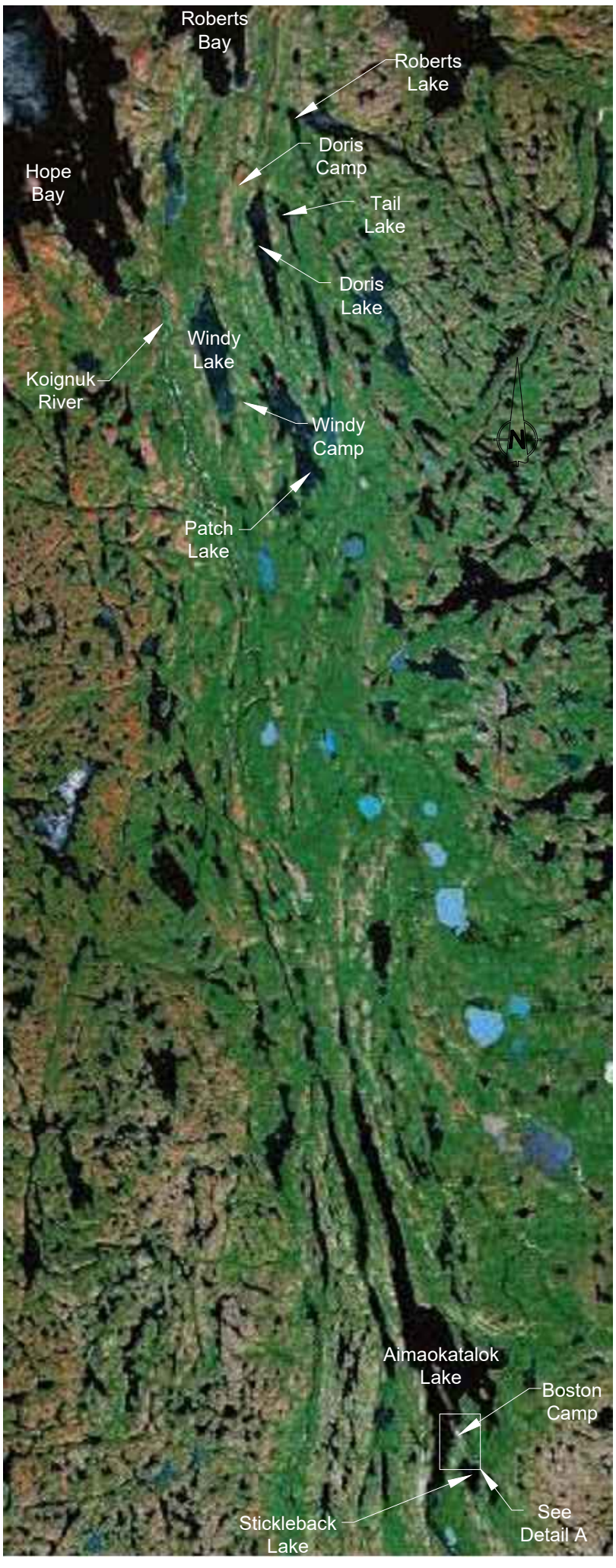
SRK 2013. 2013 Annual Geotechnical Inspection, Boston Advanced Exploration Project. Technical Report prepared for TMAC Resources Inc. SRK Consulting (Canada) Inc. Project #1CT022.000 February 2011.

SRK 2014a. Hope Bay Project Boston Camp Revised Interim Closure Plan. Report prepared for TMAC resources Inc. SRK Consulting (Canada) Inc. Project # 1CT022.001.710. May 2014.

SRK 2014b. Hope Bay Project Windy Camp and Patch Lake Facility Updated Closure Plan. Report prepared for TMAC resources Inc. SRK Consulting (Canada) Inc. Project # 1CT022.001.720. May 2014.

SRK 2017. Water and Ore/Waste Rock Management Plan for the Boston Site. Hope Bay Project, Nunavut. Technical report prepared for TMAC Resources Inc., SRK Consulting (Canada) Inc. January 2017.

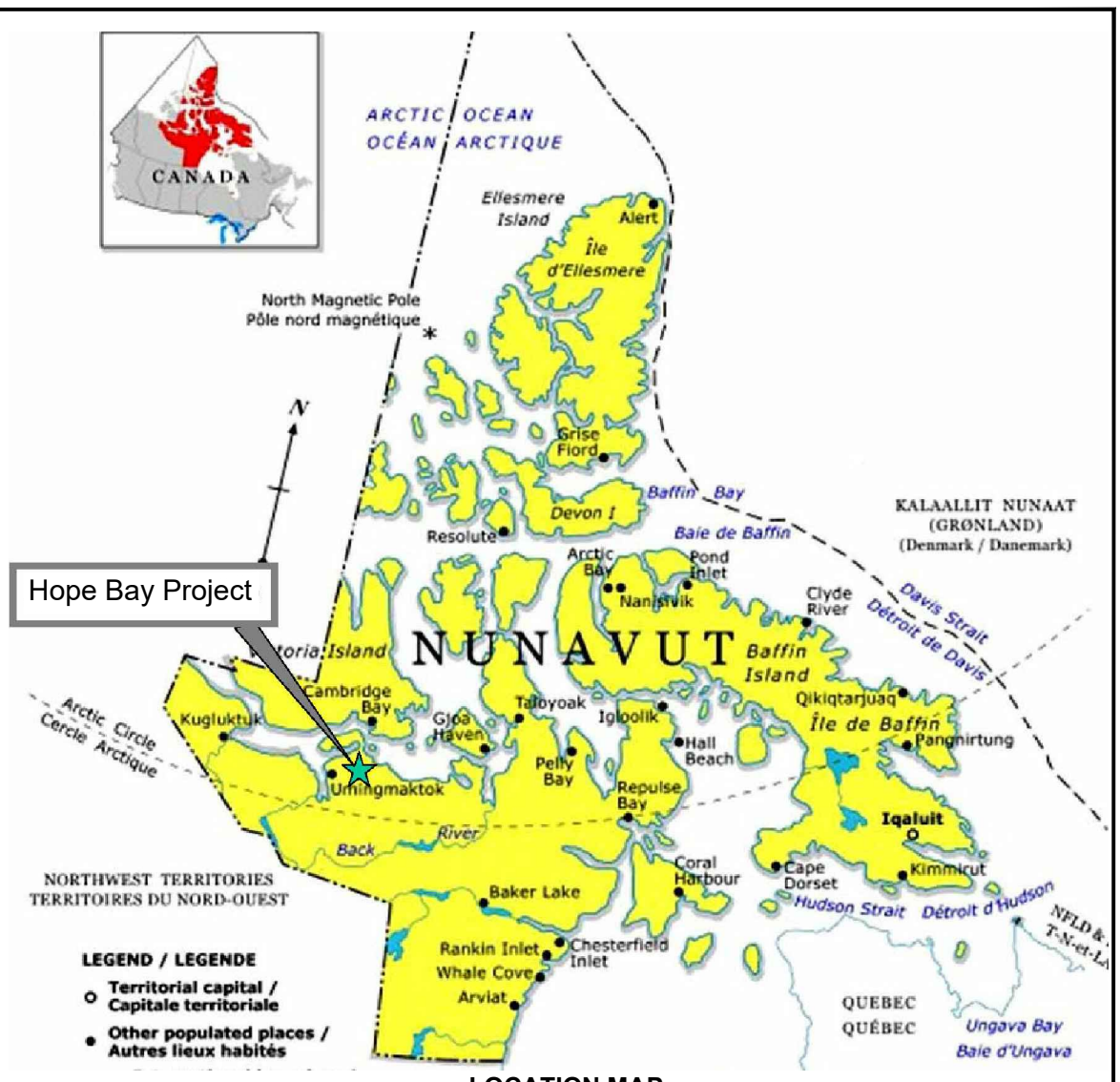
Figures



REGIONAL SATELLITE PHOTOGRAPH

0 5 10 15 20 25

Scale in Kilometers



LOCATION MAP

Not To Scale

DETAIL A

Not To Scale

J:\01_SITES\Hope Bay\IACAD\Updated Topo and Imagery April 20080_boston-camp\Boston Area Cropped.tif

J:\01_SITES\Hope Bay\IACAD\2012 Drawings\Closure Planning\Dwgs\Reference-Boston\Hope bay1.jpg

Y:\1CT022.006_2016_Type_A_Amendment\Task600_BostonClosureCostUpdate\1CT022.006-600_Figure 1.dwg

srk consulting

SRK JOB NO.: 1CT022.006.Task 600

FILE NAME: 1CT022.006-600_Figure 1.dwg

TMAC RESOURCES

TMAC Resources Inc.

Boston Camp Updated Interim Closure Plan

Location Map

DATE:	APPROVED:	FIGURE:
Jan 2017	IM	1

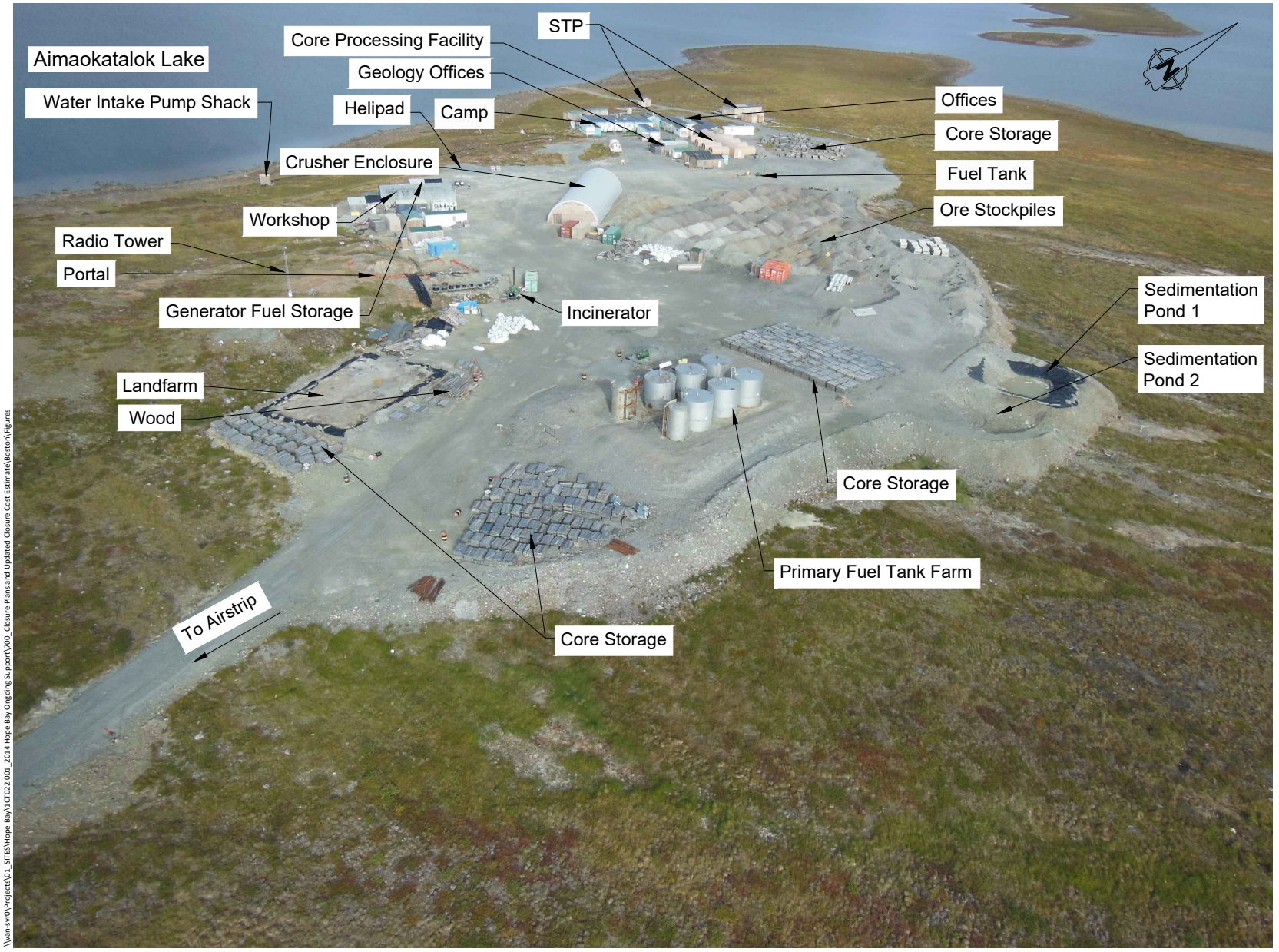
Y:\1CT022.006_2016_Type_A_Amendment\Task600_BostonClosureCostUpdate\BOSTON_SitePlan_1CT022.006_Rev01_IM.dwg

\\van-svr0\Projects\01_SITES\Hope Bay\1CH008.033 Infras. Design Support Services 2011\300_2011 Engineering Site Supervision\Site Back-ups\Doris Drive_20110921\1\2011 Infrastructure Construction QA\Photos\2011.07.28\IMGP3582.JPG

Photo Taken July 2011

srk consulting	TMAC RESOURCES	Boston Camp Updated Interim Closure Plan
SRK JOB NO.: 1CT022.006.Task 600	TMAC Resources Inc.	Boston Site Layout Looking South-West
FILE NAME: BOSTON_SitePlan_1CT022.006_Rev01_IM.dwg		DATE: Jan 2017 / APPROVED: IM / FIGURE: 2

Y:\1CT022.006_2016_Type_A_Amendment\Task600_BostonClosureCostUpdate\BOSTON_SitePlan_1CT022.006_Rev01_IM.dwg



\\van-svr01\Projects\01_SITES\Hope Bay\1CT022.001_2014 Hope Bay Ongoing Support\700_Closure Plans and Updated Closure Cost Estimate\Boston\Figures

Photo Taken August 2013

srk consulting

SRK JOB NO.: 1CT022.006.Task 600

FILE NAME: BOSTON_SitePlan_1CT022.006_Rev01_IM.dwg

TMAC RESOURCES

TMAC Resources Inc.

Boston Camp Updated Interim Closure Plan

Boston Site Layout Looking West

DATE:	APPROVED:	FIGURE:
Jan 2017	IM	3

Appendix A: Boston Interim Closure Plan Cost Estimate – 2017 Update

SRK Consulting (Canada) Inc.
2200–1066 West Hastings Street
Vancouver, BC V6E 3X2

T: +1.604.681.4196
F: +1.604.687.5532
vancouver@srk.com
www.srk.com

Memo

To:	Shelley Potter, Manager, Environment	**Client:**	TMAC Resources Inc.
From:	Iozsef Miskolczi, MASc, PEng	**Project No:**	1CT022.006.600
Reviewed By:	Maritz Rykaart, PhD, PEng	**Date:**	January 13, 2017
Subject:	Boston Interim Closure Plan Cost Estimate – 2017 Update		

1 Introduction

Boston Camp is an advanced exploration camp located approximately 170 km southwest of Cambridge Bay, above the high water mark on a peninsula in Aimaokatalok Lake. Until 2012 the camp provided support services for exploration activities in and around the Boston mineral resource located at the south end of the Hope Bay Greenstone Belt. Currently the camp is inactive; however, it is considered critical infrastructure for restarting exploration in the Hope Bay Greenstone Belt in the future.

This memo provides a detailed description of the costing assumptions and associated closure and reclamation cost. The memo should be read in conjunction with the Interim Closure Plan (SRK 2017).

The cost estimate was developed using an internal SRK spreadsheet model that is consistent with the principles of RECLAIM version 7.0 (Brodie 2014). A summary of the estimated costs (rounded to the nearest thousand) is provided in Table 1, while the detailed backup information is included as Attachment A.

Table 1: Summary of Closure and Reclamation Cost Estimate

Facility Type	Cost (rounded to nearest thousand)
Direct Cost Items	
1. Underground Mine	$23,000
2. Rock Pile	$475,000
3. Buildings and Equipment	$1,050,000
TOTAL DIRECT COSTS	**$1,548,000**
Indirect Cost Items	
4. Mobilization & Demobilization	$3,405,000
5. Post-closure Monitoring	$200,000
6. Engineering and Consultants Services	$150,000
7. Project Management	$740,000
8. Health & Safety Plans/Monitoring and QA/QC	$15,000
9. Bonding / Insurance	$15,000
9. Contingency	$308,000
TOTAL INDIRECT COSTS	**$4,833,000**
CLOSURE COSTS - TOTAL	**$6,381,000**

2 Cost Estimate Basis

2.1 Third Party Contractor

The cost estimate assumes that all work is carried out by an independent qualified third party contractor.

2.2 Quantities

Quantity estimates needed as input into the cost estimates were derived using standard engineering calculations, or direct material take-offs from topographic maps, as-built drawings and aerial photographs. Itemized quantity estimates are provided in Attachment A.

2.3 Unit Costs

2.3.1 Equipment Rates

Equipment rates were provided in 2012 by the independent on-site construction contractor (Nuna Logistics). These rates were updated to represent 2017 CAD dollars by applying an annual inflation rate of 3%. The rates includes ownership, overhead and profit, but excludes maintenance labor and fuel, which is included separately.

2.3.2 Labour Rates

Labor rates were provided in 2015 by Nuna Logistics and include overhead and profit. The 2015 unit rates were updated to 2017 CAD by applying a 3% annual inflation rate. The labour rates do not include the costs of camp accommodation or travel to and from site, which are included separately.

2.3.3 Material Costs

Estimates of material costs were obtained from the following sources:

- Vendor quotes;
- Costs from third party consultants;
- Cost Mine 2011, 2014 (InfoMine 2011, 2014);
- "Environmental Remediation Cost Data – Unit price" 11th Annual Edition, (Martin et al. 2004); and
- SRK experience on other projects.

Older material quotes were adjusted to 2017 dollars based on a 3% annual inflation rate. Material costs were factored up by 15% to include freight and shipping to site.

2.3.4 Task Unit Costs

The Task Unit Rate worksheet, listed in Attachment A, calculates the cost per unit quantity based on the labour, equipment and materials required to complete the task. The productivity for each task was obtained from the following sources:

- Equipment specifications obtained from manufacturer's data, in this case the Caterpillar Handbook (CAT 2012);
- "Environmental Remediation Cost Data – Unit Price" 11th Annual Edition, (Martin et al. 2004); and
- SRK experience on other projects.

2.3.5 Relocation Unit Costs

The relocation unit costs consist of the transport of materials from Boston to Roberts Bay and Doris Landfill over winter roads. Regular 30 and 40 T haul trucks or 20-foot cargo containers (Seacans) on a skids pulled by a tractor (Challenger) were assumed to be used for hauling waste or equipment to Doris Camp.

Detailed relocation costs are provided in Attachment A as line items for each facility. Costs for loading and unloading the Seacans were calculated as separate line items.

2.4 Indirect Costs

Indirect costs were defined as any costs that cannot be directly associated with individual tasks.

Many of the indirect costs depend on the Project duration. The Project duration was estimated as the summation of the individual task quantities (units) divided by the task productivity (units/hr). The work was assumed to occur over a 10-hour work day, 7 days per week.

2.4.1 Interim Care and Maintenance

The camp and the exploration support facilities were deactivated and placed under interim Care and Maintenance in 2012. Since then, regular inspections were completed by TMAC and SRK, as well as by the regulatory inspectors, confirming that facilities and camp surroundings are retaining their adequate physical and chemical integrity. Most importantly, Boston Camp has no ongoing water management requirements or structures requiring continuous maintenance. In light of these observations, it was therefore considered that an Interim Care and Maintenance cost category as recommended by the RECLAIM model is not warranted.

2.4.2 Mobilization and Demobilization

The mob-demob costs were included as a lump sum in the cost estimate and are based on the equipment needs and schedule to complete the works as detailed in the plan.

Mobilized equipment was assumed to originate from Edmonton, AB. Equipment is hauled by truck to Hay River, NWT, and shipped by barge to Roberts Bay. Haul costs per kilometer, per trailer load is included for the trucking, while the barging costs were calculated based on the revenue ton. The cost basis for the equipment barging rates was updated to represent revenue-ton per equipment type. The unit rates for revenue-ton were updated to 2016 rates published by NEAS (NEAS 2016). Revenue tons for barging are calculated as the cubic meter volume or the net weight of the equipment, whichever is larger.

2.4.3 Post-Closure Monitoring

Lump sums were included for each of the various post-closure monitoring items, according to the schedule showing the required frequency and duration. The costs are in undiscounted 2017 CAD.

2.4.4 Engineering and Consulting Services

An allowance was made for hydrocarbon decontamination including planning and engineering as well as sampling and testing costs. The costs are in undiscounted 2017 CAD.

2.4.5 Project Management

General and Administration Costs

Labour benefits were included in the labour unit costs and travel allowance is included in the camp operation cost.

Camp costs were included as a flat day rate of $2,000, irrespective of the number of persons in camp. This includes travel allowance for one shift change. The camp rental of $425,000 per year was also included, based on supplier quotes for a 20-man self-sufficient camp. Camp management was included as a day rate.

Field Support

It was assumed that a supervisor would be on site throughout the Project duration. An allowance for equipment maintenance support was included, with a mechanic assumed to be on-site for 10% of the project duration.

Helicopter support was assumed to be required for 21 days, on a schedule of six hours per day at a rate of $9,190/day.

2.4.6 Health & Safety Plans and Monitoring

An allowance for H&S planning and compliance monitoring was made, equivalent to 1% of the direct costs.

2.4.7 Bonding and Insurance

An allowance for contractor Bonding and Insurance was made, equivalent to 1% of the direct costs.

2.4.8 Contingency

A contingency of 20% of direct costs was added to the estimate.

2.5 Compatibility with RECLAIM 7.0

The Canadian Government liability estimate is required by Indigenous and Northern Affairs Canada (INAC). INAC requires that a spreadsheet model (RECLAIM 7.0) be used to estimate closure costs.

The RECLAIM model is a spreadsheet model originally developed by SRK in 1992, and subsequently modified and updated by Brodie Consulting (Brodie 2014). The model has pre-set sheets that can be expanded to describe a specific project. The model template includes a default list of unit costs for common tasks and materials used in closure work. Typical low and high equipment and labor unit rates are suggested, but the user is encouraged to apply known unit rates instead of the default rates wherever possible. Some indirect costs are estimated as user-specified percentage of direct costs (Engineering and Project Management). Mobilization/ Demobilization costs are calculated based on unit rates.

The cost estimate was structured in a similar fashion to the RECLAIM structure, with the facilities being grouped into functional categories, as follows:

- Underground Mine;
- Rock Piles; and
- Buildings and Equipment.

Indirect cost categories are consistent with the categories existing in the RECLAIM model.

The methods used by SRK and RECLAIM to estimate costs are similar, with the SRK model providing vastly increased details in support of the calculated task unit costs. The methods differ by how this information is organized within the spreadsheets, but the cost information is summarized similarly. Because of this, the SRK cost estimate is, at minimum, an adequate alternative to RECLAIM.

3 References

Brodie Consulting Ltd. (2014). RECLAIM Version 7.0 User Manual. MS Excel Workbook and User Manual prepared for Aboriginal Affairs and Northern Development Canada – Water Resources Division. March 2014.

Caterpillar Inc. (2012). Caterpillar Performance Handbook. Edition 42. January 2012.

InfoMine 2011. Cost Mine Mining Cost Services Section SU Supplies and Miscellaneous Items. Accessed May 11, 2011.

InfoMine 2014. Cost Mine Mining Cost Services Section SU Supplies and Miscellaneous Items. Accessed August 1, 2014.

Martin, S., Rast, J., Rast, R., Eds. 2004. Environmental Remediation Unit Cost Book; 11th Annual Edition; R.S. Means Company Inc.

SRK Consulting (Canada) Inc. (2017). Hope Bay Project Boston Camp Updated Interim Closure Plan. Report prepared for TMAC Resources Inc., SRK Project #1CT022.006, January 2017.

NEAS 2016. Sealift Rates for 2016 Season Nunavut as of May 2016. http://neas.ca/pdf/freight_ nunavut.pdf, accessed January 13, 2017.

Attachment A – Detailed Cost Estimate

Boston Closure Cost Estimate

Work task	Cost (rounded to the nearest By task	By Facility
Direct Cost Items		
1. Underground Mine		**$23,000**
Portal/Decline	$8,000	
Vent Raise	$15,000	
2.Rock Pile		**$475,000**
Ore Stockpiles	$434,000	
Contaminated Soil Implementation Plan	$41,000	
3. Buildings and Equipment		**$1,050,000**
Facilities Demolition		
Accommodation Complex/Buildings	$106,000	
Maintenance Shop Complex	$29,000	
Crusher Enclosure	$7,000	
Water Treatment Facilities	$69,000	
Incinerator	$3,000	
Mobile Equipment	$8,000	
Other Structures	$39,000	
Primary Tank Farm	$430,000	
Power Plant Fuel Containment	$3,000	
Jet Fuel Containment System	$4,000	
Soil Treatment Facility	$27,000	
Camp Complex Foundation Pad	$15,000	
Transporation Infrastructure		
Helipads	$6,000	
Road to Aimaokatalok Lake	$3,000	
Road to Airstrip	$5,000	
Airstrip	$15,000	
Core Storage Road	$3,000	
Drill Road	$3,000	
Permafrost Remediation and Revegetation	$41,000	
Drill Sites/Drill Hole Abandonment		
Drill Sites/Drill Hole Abandonment	$214,000	
Non-Process Ponds & Reservoirs		
Settling Pond #1	$4,000	
Settling Pond #2	$3,000	
Diamond Drill Cuttings Settling Pond	$4,000	
Off-Site Shipping for Disposal	$3,000	
Off-Site Disposal Fees	$6,000	
Total Direct Costs		**$1,548,000**
4. Mobilization & Demobilization	$3,405,000	**$3,405,000**
5. Post-closure Monitoring	$200,000	**$200,000**
6. Engineering and Consultants Services	$150,000	**$150,000**
7. Project Management	$740,000	**$740,000**
8. Health & Safety Plans/Monitoring and QA/QC	$15,000	**$15,000**
9. Bonding / Insurance	$15,000	**$15,000**
9. Contingency	$308,000	**$308,000**
Total Indirect Costs		**$4,833,000**
Total Closure Cost		**$6,381,000**

Table 2. Cost Itemized by Task

Work Area Code	Item	Task	Sub-task	Activity	Task	Quantity	Unit	Cost Code	Unit Cost	Activity Total	Subtotals	Source / Comments
DIRECT COSTS												
Camp Structures												
Accommodation Complex/Buildings											$ 105,721	
B01	1	1	1	Portable Trailers	Decommission (electrical, mechanical)	1	ls	C.1.05	$ 660.82	$ 661		
B01	1	1	2		Prep Trailers for movement (remove boards/piping, etc.).	12	ea	C.1.08	$ 863.16	$ 10,358		
B01	1	1	3		Haul trailers to Doris North for re-use.	12	ea	C.4.06	$ 3,882.93	$ 46,595		
B01	1	2	1	Recreation Tent	Remove heating stove	1	ea	C.1.01	$ 55.39	$ 55		
B01	1	2	2		Demolish	9	m^3	C.3.05	$ 12.32	$ 110		
B01	1	2	3		Collect Debris	23	m^2	C.3.10	$ 0.15	$ 3		
B01	1	2	4		Load debris into containers for transport	12	m^3	C.4.01	$ 9.47	$ 110		
B01	1	2	5		Haul debris to Doris Landfill	12	m^3	C.4.08	$ 94.37	$ 1,091		
B01	1	3	1	Site Office	Demolish	50	m^3	C.3.05	$ 12.32	$ 620		
B01	1	3	2		Collect Debris	62	m^2	C.3.10	$ 0.15	$ 9		
B01	1	3	3		Load debris into containers for transport	101	m^3	C.4.01	$ 9.47	$ 953		
B01	1	3	4		Haul debris to Doris Landfill	101	m^3	C.4.04	$ 88.03	$ 8,857		
B01	1	4	1	Geotech Tent	Remove heating stove	1	ls	C.1.01	$ 55.39	$ 55		
B01	1	4	2		Demolish	13	m^3	C.3.05	$ 12.32	$ 157		
B01	1	4	3		Collect Debris	33	m^2	C.3.10	$ 0.15	$ 5		
B01	1	4	4		Load debris into containers for transport	17	m^3	C.4.01	$ 9.47	$ 157		
B01	1	4	5		Haul debris to Doris Landfill	17	m^3	C.4.08	$ 94.37	$ 1,564		
B01	1	5	1	Core Shack and Core Splitter	Remove heating stoves	2	ls	C.1.01	$ 55.39	$ 111		
B01	1	5	2		Demolish	102	m^3	C.3.05	$ 12.32	$ 1,252		
B01	1	5	3		Collect Debris	115	m^2	C.3.10	$ 0.15	$ 17		
B01	1	5	4		Load debris into containers for transport	198	m^3	C.4.01	$ 9.47	$ 1,873		
B01	1	5	5		Haul debris to Doris Landfill	198	m^3	C.4.08	$ 94.37	$ 18,658		
B01	1	6	1	Muster Station	Remove heating stoves	1	ls	C.1.01	$ 55.39	$ 55		
B01	1	6	3		Demolish	44	m^3	C.3.05	$ 12.32	$ 546		
B01	1	6	4		Collect Debris	49	m^2	C.3.10	$ 0.15	$ 7		
B01	1	6	5		Load debris into containers for transport	66	m^3	C.4.01	$ 9.47	$ 629		
B01	1	6	6		Haul debris to Doris Landfill	66	m^3	C.4.08	$ 94.37	$ 6,268		
B01	1	7	1	Communication Equipment	Dismantle and package Satellite Dish and communication equipment	1	ls	C.1.07	$ 363.70	$ 364		
B01	1	8	1	Generators	Decommission generator	1	ls	C.1.06	$ 696.94	$ 697		
B01	1	8	2		Transport Trailer to Doris Camp for re-use/salvage	1	ls	C.4.06	$ 3,882.93	$ 3,883		
B01	1	9	1	Hazardous Waste	Collect and place in suitable containers	0.48	m^3	C.2.01	$ 2,261.67	$ 1,074		
B01	1	9	2		Haul to Doris North	0	m^3	C.4.03	$ 83.54	$ 40		
Maintenance Shop Complex											$ 29,318	
B01	2	1	1	Heating System	Relocate tanks to tank farm for draining/cleaning	2	ea	C.1.01	$ 55.39	$ 111		
B01	2	2	1	Maintenance Shop	Decommission electrical, mechanical (including connections to generator house & transformer)	1	ls	C.1.05	$ 660.82	$ 661		
B01	2	2	3		Demolish (steel modular structure)	17	m^3	C.3.05	$ 12.32	$ 213		
B01	2	2	4		Demolish wood structures (survival, electrical and compressor sheds)	48	m^3	C.3.05	$ 12.32	$ 590		
B01	2	2	5		Collect Debris	306	m^3	C.3.10	$ 0.15	$ 46		
B01	2	2	6		Load debris into containers for transport	98	m^3	C.4.01	$ 9.47	$ 925		
B01	2	2	7		Haul debris to Doris Landfill	98	m^3	C.4.08	$ 94.37	$ 9,218		
B01	2	3	1	Powerhouse	Decommission (electrical)	1	ls	C.1.05	$ 660.82	$ 661		
B01	2	3	2		Demolish	49	m^3	C.3.05	$ 12.32	$ 602		
B01	2	3	3		Collect Debris	61	m^2	C.3.10	$ 0.15	$ 9		
B01	2	3	4		Load debris into containers for transport	98	m^3	C.4.01	$ 9.47	$ 926		
B01	2	3	5		Haul debris to Doris Landfill	98	m^3	C.4.08	$ 94.37	$ 9,222		
B01	2	4	1	Transformer building	Decommission (electrical)	1	ls	C.1.05	$ 660.82	$ 661		
B01	2	4	2		Demolish (hazardous material removed above)	33	m^3	C.3.05	$ 12.32	$ 401		
B01	2	4	3		Collect Debris	41	m^2	C.3.10	$ 0.15	$ 6		
B01	2	4	4		Load debris into containers for transport	49	m^3	C.4.01	$ 9.47	$ 462		
B01	2	4	5		Haul debris to Doris Landfill	49	m^3	C.4.08	$ 94.37	$ 4,605		
Crusher Enclosure											$ 6,835	
B01	3	1	1	Equipment	Dismantle hopper/crusher parts for transport	1	ls	C.3.08	$ 410.36	$ 410		
B01	3	1	2		Load equipment into containers for transport	20	m^3	C.4.01	$ 9.47	$ 188		
B01	3	2	1	Crusher building	Demolish (tent/steel enclosure)	37	m^3	C.3.05	$ 12.32	$ 452		
B01	3	2	2		Collect Debris	467	m^2	C.3.10	$ 0.15	$ 70		
B01	3	2	3		Load debris into containers for transport	55	m^3	C.4.01	$ 9.47	$ 521		
B01	3	2	4		Haul debris to Doris Landfill	55	m^3	C.4.08	$ 94.37	$ 5,194		
Water Treatment Facilities											$ 69,458	
B01	4	1	1	Water Supply Pipelines	Cut pipelines into manageable pieces	607	m	C.3.03	$ 2.28	$ 1,386		
B01	4	1	2		Load debris into containers for transport	182	m^3	C.4.01	$ 9.47	$ 1,726		
B01	4	1	3		Haul debris to Doris Landfill	182	m^3	C.4.08	$ 94.37	$ 17,195		
B01	4	2	1	Sewage water pipelines	Flush sewage water pipelines	1	ls	C.2.06	$ 585.83	$ 586		
B01	4	2	2		Cut pipelines into manageable pieces	489	m	C.3.03	$ 2.28	$ 1,116		
B01	4	2	3		Load debris into containers for transport	147	m^3	C.4.01	$ 9.47	$ 1,390		
B01	4	2	4		Haul debris to Doris Landfill	147	m^3	C.4.08	$ 94.37	$ 13,846		
B01	4	3	1	Camp Water Intake	Collect and dismantle intake system	1	ls	C.1.03	$ 1,235.43	$ 1,235		
B01	4	4	1	Old Sewage Treatment (RBC)	Flush and remove sewage plumbing	1	ls	C.2.06	$ 585.83	$ 586		
B01	4	4	2		Load sewage sludge/waste water in 55 gallon drums	1	m^3	C.2.06	$ 585.83	$ 586		
B01	4	4	3		Demolish buildings	37	m^3	C.3.05	$ 12.32	$ 455		
B01	4	4	4		Collect Debris	35	m^2	C.3.10	$ 0.15	$ 5		
B01	4	4	5		Load debris into containers for transport	55	m^3	C.4.01	$ 9.47	$ 525		
B01	4	4	6		Haul debris to Doris Landfill	55	m^3	C.4.08	$ 94.37	$ 5,228		
B01	4	4	7		Regrade treatment foundation pad to ensure positive drainage	460	m^2	C.5.05	$ 2.76	$ 1,271		
B01	4	5	1	New Sewage Treatment System	Flush and remove sewage plumbing	1	ls	C.2.06	$ 585.83	$ 586		
B01	4	5	2		Load sewage sludge/waste water in 55 gallon drums	1	m^3	C.2.06	$ 585.83	$ 586		
B01	4	5	3		Decommission (electrical)	1	ls	C.1.05	$ 660.82	$ 661		
B01	4	5	4		Demolish buildings/tanks	122	m^3	C.3.05	$ 12.32	$ 1,502		
B01	4	5	5		Collect Debris	30	m^2	C.3.10	$ 0.15	$ 4		
B01	4	5	6		Load debris into containers for transport	183	m^3	C.4.01	$ 9.47	$ 1,732		
B01	4	5	7		Haul debris to Doris Landfill	183	m^3	C.4.08	$ 94.37	$ 17,252		
Helipads											$ 5,753	
B01	5	1	1	Demolish	Demolish pads	32	m^3	C.3.05	$ 12.32	$ 391		
B01	5	1	2		Collect debris	21	m^2	C.3.10	$ 0.15	$ 3		
B01	5	1	3		Load debris into containers for transport	48	m^3	C.4.01	$ 9.47	$ 451		
B01	5	1	4		Haul debris to Doris Landfill	48	m^3	C.4.08	$ 94.37	$ 4,493		
B01	5	2	1	Regrade	Regrade area to ensure positive drainage	150	m^2	C.5.05	$ 2.76	$ 414		
Incinerator											$ 1,769	
B01	8	1	1	Disassemble	Collect ashes and place in containers	0.01	m^3	C.2.07	$ 621.56	$ 6		
B01	8	1	2		Dismantle (welding crew)	1	ls	C.1.04	$ 1,061.66	$ 1,062		
B01	8	1	3		Load into containers for transport (to Roberts Bay)	7	m^3	C.4.01	$ 9.47	$ 64		
B01	8	1	4		Haul debris to Doris Landfill	7	m^3	C.4.08	$ 94.37	$ 637		
Mobile Equipment											$ 7,872	
B01	9	1	1	Decontaminate	Wash/decontaminate misc. equipment in lined facility	5	ea	C.3.08	$ 410.36	$ 2,052		
B01	9	1	2		Operate oil/water separator (qnty = # of tanks/equip. treated)	5	ea	C.2.08	$ 52.82	$ 264		
B01	9	2	1	Disassemble	Dismantle (welding crew)	5	ea	C.3.08	$ 410.36	$ 2,052		
B01	9	2	2		Load into containers for transport	34	m^3	C.4.01	$ 9.47	$ 320		
B01	9	2	3		Haul debris to Doris Landfill	34	m^3	C.4.08	$ 94.37	$ 3,185		
Other Structures											$ 39,045	
B01	10	1	1	Demolish	Demolish buildings and other structures	44	m^3	C.3.05	$ 12.32	$ 542		
B01	10	1	2		Dismantle radio towers	2	each	C.3.11	$ 15,818.79	$ 31,638		
B01	10	1	3		Collect debris	80	m^2	C.3.10	$ 0.15	$ 12		
B01	10	1	4		Load debris into containers for transport	66	m^3	C.4.01	$ 9.47	$ 625		
B01	10	1	5		Haul debris to Doris Landfill	66	m^3	C.4.08	$ 94.37	$ 6,228		
Subtotal Direct Costs - Camp Structures											**$ 265,770**	
Containment Structures												
Primary Tank Farm											$ 429,885	
B02	1	1	1	Above ground storage tanks	Drain fuel and consolidate in one tank	8	ea	C.2.03	$ 264.66	$ 2,117		
B02	1	1	2		Decommission fuel tanks	8	ea	C.1.02	$ 462.74	$ 3,702		
B02	1	1	3		Pressure wash tanks	8	ea	C.2.04	$ 290.22	$ 2,322		
B02	1	1	4		Operate oil/water separator	8	ea	C.2.08	$ 52.82	$ 423		
B02	1	1	5		Demolish and cut tanks into manageable pieces	8	ea	LS	$ 50,000.00	$ 400,000		
B02	1	1	6		Haul residual fuel on skid to Doris Camp	1	ls	C.4.06	$ 3,882.93	$ 3,883		
B02	1	1	7		Load into containers for transport	25	m^3	C.4.01	$ 9.47	$ 234		
B02	1	1	8		Haul debris to Doris Landfill	25	m^3	C.4.08	$ 94.37	$ 2,336		
B02	1	2	1	Heating Systems Tanks	Drain of fuel (consolidate in one tank) and pressure wash tank	7	ea	C.2.02	$ 22.06	$ 154		
B02	1	2	2		Operate oil/water separator (qnty = # of tanks/equip. treated)	7	ea	C.2.08	$ 52.82	$ 370		
B02	1	2	3		Load into containers for transport (to Roberts Bay)	5	m^3	C.4.01	$ 9.47	$ 50		
B02	1	2	4		Haul debris to Doris Landfill	5	m^3	C.4.08	$ 94.37	$ 495		
B02	1	3	1	Secondary containment system	Excavate liner cover material and consolidate on ore pile	406	m^3	C.5.02	$ 20.29	$ 8,229		
B02	1	3	2		Load HC contaminated bedding in containers for transport	-	m^3	C.4.01	$ 9.47	$ -		
B02	1	3	3		Cut liner into manageable pieces and clean	825	m^2	C.3.02	$ 2.48	$ 2,047		
B02	1	3	4		Load liner into container for transport	12	m^3	C.4.01	$ 9.47	$ 117		
B02	1	3	5		Haul debris to Doris Landfill	12	m^3	C.4.08	$ 94.37	$ 1,168		
B02	1	3	6		Regrade area to ensure positive drainage	810	m^2	C.5.05	$ 2.76	$ 2,238		
Power Plant Fuel Containment											$ 3,302	
B02	2	1	1	Green Storage tanks (2)	Drain of fuel and consolidate in one tank	2	ea	C.2.03	$ 264.66	$ 529		
B02	2	1	2		Pressure wash tanks	2	ea	C.2.04	$ 290.22	$ 580		
B02	2	1	3		Operate oil/water separator	2	ea	C.2.08	$ 52.82	$ 106		
B02	2	1	4		Load into containers for transport (to Roberts Bay)	2	ea	C.4.07	$ 143.36	$ 287		
B02	2	1	5		Haul debris to Doris Landfill	2	ea	C.4.08	$ 94.37	$ 189		
B02	2	2	1	Secondary containment system	Excavate liner cover material and consolidate on ore pile	60	m^3	C.5.02	$ 20.29	$ 1,217		
B02	2	2	2		Load HC contaminated bedding in containers for transport	-	m^3	C.4.01	$ 9.47	$ -		
B02	2	2	3		Cut liner into manageable pieces and clean	12	m^2	C.3.02	$ 2.48	$ 30		
B02	2	2	4		Load liner into container for transport (to Roberts Bay)	0.2	m^3	C.4.01	$ 9.47	$ 2		
B02	2	2	5		Haul debris to Doris Landfill	0	m^3	C.4.08	$ 94.37	$ 17		
B02	2	2	6		Regrade area to ensure positive drainage	125	m^2	C.5.05	$ 2.76	$ 345		
Jet Fuel Containment System											$ 4,148	
B02	3	1	1	Tidy Tanks/Jet fuel Drums	Remove to Doris Camp for reuse	1	ls	C.4.06	$ 3,882.93	$ 3,883		
B02	3	2	1	Portable Pollution Control Berm	Dismantle and prep for shipping	1	ls	C.3.04	$ 264.66	$ 265		
B02	3	2	2		Haul to Doris Camp for reuse (include in jet fuel trip)	1	ls	-	$ -	$ -		
B02	3	2	3		Haul debris to Doris Landfill	1	ls	C.4.08	$ 94.37	$ 94		

Work Area Code	Item	Task	Sub-task	Activity	Task	Quantity	Unit	Cost Code	Unit Cost	Activity Total	Subtotals	Source / Comments
Settling Pond #1											$ 4,159	
B02	4	1	1	Remove liner	Excavate settled material, temp. stockpile	79	m^3	C.5.04	$ 2.98	$ 236		
B02	4	1	2		Remove liner and cut into manageable pieces	400	m^2	C.3.02	$ 2.48	$ 992		
B02	4	1	3		Load liner into container for transport (to Roberts Bay)	6	m^3	C.4.01	$ 9.47	$ 57		
B02	4	1	4		Haul debris to Doris Landfill	6	m^3	C.4.08	$ 94.37	$ 566		
B02	4	2	1	Backfill pond	Backfill pond with settled solids and drill cuttings	79	m^3	C.5.04	$ 2.98	$ 236		Cutting placement included elsewhere
B02	4	2	2		Regrade over pond with pad/berm materials	750	m^2	C.5.05	$ 2.76	$ 2,072		
Settling Pond #2 (incl. Burn Pit)											$ 2,083	
B02	5	1	1	Remove Solid Waste	Load into containers for transport (to Roberts Bay)	-	m^3	C.4.01	$ 9.47	$ -		
B02	5	2	1	Backfill pond	Backfill pond with settled solids and drill cuttings	59	m^3	C.5.04	$ 2.98	$ 177		
B02	5	2	2		Regrade over pond with pad/berm materials	690	m^2	C.5.05	$ 2.76	$ 1,906		
Soil Treatment Facility											$ 26,872	
B02	7	1	1	Current landfarmed soils	Test existing soils in landfarm	10	ea	C.6.01	$ 98.08	$ 981		
B02	7	1	2		Use passing soils for reclamation	90	m^3	-	$ -	$ -		Costed where used
B02	7	1	3		Load failing soils into containers for transport	90	m^3	C.4.01	$ 9.47	$ 853		
B03	7	1	4		Haul soils to Doris for underground disposal	90	m^3	C.4.03	$ 83.54	$ 7,519		
B02	7	2	1	Soil in drums	Empty Drums	100	ea	C.2.09	$ 107.52	$ 10,752		
B02	7	2	2		Wash drums (in tank farm)	100	ea	C.2.05	$ 19.00	$ 1,900		
B02	7	2	3		Crush drums	100	ea	C.3.01	$ 15.75	$ 1,575		
B02	7	2	4		Load into containers for transport (to Roberts Bay)	6	m^3	C.4.01	$ 9.47	$ 60		
B02	7	2	5		Haul debris to Doris Camp	6	m^3	C.4.03	$ 83.54	$ 531		
B02	7	3	1	Remove liner	Remove liner and cut into manageable pieces	368	m^2	C.3.02	$ 2.48	$ 913		
B02	7	3	2		Load liner into container for transport (to Roberts Bay)	6	m^3	C.4.01	$ 9.47	$ 52		
B02	7	3	3		Haul debris to Roberts Bay	6	m^3	C.4.08	$ 94.37	$ 521		
B02	7	4	1	Regrade	Regrade area to ensure positive drainage	440	m^2	C.5.05	$ 2.76	$ 1,216		
Diamond Drill Cuttings Settling Pond											$ 3,612	
B02	8	1	1	Excavate cuttings	Stockpile cuttings on-site	336	m^3	C.5.04	$ 2.98	$ 1,000		
B02	8	2	1	Remove pond	Excavate textile and place in container for transport	5	m^3	C.4.01	$ 9.47	$ 43		
B02	8	2	2		Regrade area to ensure positive drainage	930	m^2	C.5.05	$ 2.76	$ 2,569		
Subtotal Direct Costs - Containment Structures											**$ 474,060**	
Site Regrading												
Camp Complex Foundation Pad											$ 15,463	
B03	1	1	1	Regrade	Stake-out low-lying areas in summer to place fill	1	days	C.5.14	$ 7,188.77	$ 7,189		
B03	1	1	2		Regrade to fill in any low lying areas	2,995	m^2	C.5.05	$ 2.76	$ 8,275		
Road to Aimaokatalok Lake											$ 2,135	
B03	2	1	1	Regrade	Regrade (crown)	773	m^2	C.5.05	$ 2.76	$ 2,135		
Road to Airstrip											$ 4,870	
B03	3	1	1	Regrade	Regrade to fill in any low lying areas and crown road	1,763	m^2	C.5.05	$ 2.76	$ 4,870		
Airstrip											$ 14,741	
B03	4	1	1	Regrade	Regrade to fill in any low lying areas	5,222	m^2	C.5.05	$ 2.76	$ 14,426		
B03	4	2	1	Decommission	Place large white X's at each end of strip	1	ls	C.1.09	$ 314.66	$ 315		
Core Storage Road											$ 1,517	
B03	5	1	1	Remove Wind Sock & Culvert	Excavate culvert	7	m^3	C.5.15	$ 99.02	$ 686		
B03	5	1	2		Dismantle windsock	1	ls	C.3.08	$ 410.36	$ 410		
B03	5	1	3		Load culvert/sock/pole/drum into container for transport (to Roberts Bay	0.3	m^3	C.4.01	$ 9.47	$ 3		
B03	5	1	4		Haul debris to Doris Landfill	0	m^3	C.4.08	$ 94.37	$ 25		
B03	5	2	1	Regrade	Regrade to fill in any low lying areas and crown road	142	m^2	C.5.05	$ 2.76	$ 392		
Drill Road											$ 845	
B03	1	1	1	Regrade	Regrade to fill in any low lying areas and crown road	306	m^2	C.5.05	$ 2.76	$ 845		
Subtotal Direct Costs - Camp Surface Infrastructure											**$ 39,572**	
Underground Mine												
Portal/Decline											$ 8,443	
B04	1	1	1	Remove fencing	Collect Debris (ski fence and supports)	2.2	m^3	C.3.05	$ 12.32	$ 27		
B04	1	1	2		Load debris into container for transport (to Roberts Bay)	2.2	m^3	C.4.01	$ 9.47	$ 21		
B04	1	1	3		Haul debris to Doris Landfill	2	m^3	C.4.08	$ 94.37	$ 209		
B04	1	2	1	Scaling	Use excavator to knock down debris	1	hrs	C.5.11	$ 297.75	$ 298		Est. 1 hr. Excavator time
B04	1	3	1	Backfill decline	Load, haul, dump waste ore to plug incline	389	m3	C.5.02	$ 20.29	$ 7,888		
Vent Raise											$ 15,126	
B04	2	1	1	Demolish	Demolish garden shed and wood support structures	13	m^3	C.3.05	$ 12.32	$ 154		
B04	2	1	2		Load debris into container for transport (to Roberts Bay)	19	m^3	C.4.01	$ 9.47	$ 178		
B04	2	1	3		Haul debris to Doris Landfill	19	m^3	C.4.08	$ 94.37	$ 1,769		
B04	2	2	1	Construct Cap	1.5mx2.1m concrete cap with gas vent	1	LS	C.6.03	$ 13,025.30	$ 13,025		
Subtotal Direct Costs - Mine Openings											**$ 23,570**	
Rock Pile												
Consolidate, Reslope, Encapsulate, and Cover (0.3 m)											$ 433,652	
B05	6	1	1	Consolidate stockpiles and dispersed ore	Scrape up and dump ore within consolidated pile	3,803	m^3	C.5.03	$ 27.05	$ 102,877		
B05	6	1	2		Consolidate ore into large pile	8,265	m^3	C.5.03	$ 27.05	$ 223,578		
B05	6	2	1	Reslope stockpile	Dozer - D7	2,026	m^2	C.5.06	$ 3.68	$ 7,461		
B05	6	3	1	Place Synthetic cover	Supply and place HDPE liner	2,330	m^3	C.5.01	$ 35.83	$ 83,460		
B05	6	3	2	Cover stockpile	Load, haul, place cover material (assumed sourced within 0.5km)	802	m^3	C.5.02	$ 20.29	$ 16,275		
Subtotal Direct Costs - Ore Stockpiles											**$ 433,652**	
Contaminated Soils												
Contaminated Soil Implementation Plan											$ 41,333	
B06	1	1	1	Develop Implementation Plan	Includes field investigation, laboratory costs, and reporting	1	ls	-	$ 41,333.33	$ 41,333		
Subtotal Direct Costs - Contaminated Soils											**$ 41,333**	
Other Areas												
Drill Sites											$ 213,816	
B07	1	1	1	Drill piping	Cut of top of drill pipes and cap.	545	ea	C.3.09	$ 36.42	$ 19,851		
B07	1	1	2		Load top debris into containers for transport to Roberts Bay	9	m^3	C.4.01	$ 9.47	$ 87		
B07	1	1	3		Haul debris to Doris Landfill	9	m^3	C.4.08	$ 94.37	$ 862		
B07	1	2	1	Core	Remove any core to the core storage area	-	each	C.5.07	$ 40.77	$ -		done in 2012
B07	1	3	1	Regrade	Fill in low-lying areas (assumed sourced within 0.5km)	9,000	m^3	C.5.02	$ 20.29	$ 182,602		
B07	1	4	1	Revegetate	Revegetate: Supply and place cocoa matting	450	m^2	C.5.08	$ 4.76	$ 2,143		
B07	1	4	2		Revegetate: Seed/Fertilize, by hand, high application rate	9,000	m^2	C.5.13	$ 0.92	$ 8,272		
Vegetation Die-Back and Permafrost remediation Areas											$ 41,460	
B07	2	1	1	Areas by the Airstrip (excluding drill sites)	Fill in low-lying areas (assumed sourced within 0.5km)	168	m^3	C.5.02	$ 20.29	$ 3,404		
B07	2	1	1	Area by Drill Road	Fill in low-lying areas (assumed sourced within 0.5km)	267	m^3	C.5.02	$ 20.29	$ 5,416		
B07	2	1	2		Revegetate: Supply and place cocoa matting	890	m2	C.5.08	$ 4.76	$ 4,237		
B07	2	1	3		Revegetate: Seed/Fertilize, by hand, high application rate	17,795	m2	C.5.13	$ 0.92	$ 16,356		
B07	2	2	1	Area by Core Storage Road	Fill in low-lying areas (assumed sourced within 0.5km)	149	m^3	C.5.02	$ 20.29	$ 3,013		
B07	2	2	2		Revegetate: Supply and place cocoa matting	50	m^2	C.5.08	$ 4.76	$ 236		
B07	2	2	3		Revegetate: Seed/Fertilize, by hand, high application rate	990	m^2	C.5.13	$ 0.92	$ 910		
B07	2	3	1	Area by Grey Water Discharge	Fill in low-lying areas (assumed sourced within 0.5km)	81	m^3	C.5.02	$ 20.29	$ 1,643		
B07	2	3	2		Revegetate: Supply and place cocoa matting	270	m^2	C.5.08	$ 4.76	$ 1,285		
B07	2	3	3		Revegetate: Seed/Fertilize, by hand, high application rate	5,398	m^2	C.5.13	$ 0.92	$ 4,961		
Subtotal Direct Costs - Other Areas											**$ 255,276**	
Waste Shipping Off-site												
B08	1	1	1	Non-Hazardous Waste	Ship by barge to Hay River	-	m^3	S.03	$ 208.85	$ -		
B08	1	3	1	Hazardous Waste	Ship by barge to Hay River	0.48	m^3	S.02	$ 339.30	$ 161		
Subtotal Direct Costs - Waste Shipping											**$ 161**	
Waste Disposal												
B09	1	1	1	Non-hazardous waste	Disposal fee at Hay River	-	m^3	M.10	$ 6.21	$ -		
B09	1	2	1	Sewage sludge	RBC + New Treatment system sludge/solid waste	2	m^3	C.4.04	$ 88.03	$ 176		
B09	1	4	1	Hazardous Waste	Dump fee at Hay River	0.48	m^3	M.09	$ 11,273.28	$ 5,355		
Subtotal Direct Costs - Waste Disposal											**$ 5,531**	
TOTAL DIRECT COSTS												
					TOTAL DIRECT COSTS						**$ 1,538,926**	
INDIRECT CLOSURE COSTS												
Mobilization & Demobilization											$ 3,405,090	
-	1	1	-	Winter Closure activities	Equipment Mobilization/Demobilization	1	ls	x	$ 452,648.78	$ 452,649		
				Equipment stand-by		1	LS	x	$ 734,254.48	$ 734,254		
-	2	1	1	Construct and maintain Winter Road	Required during closure	59	km	M.08	$ 37,596.39	$ 2,218,187		Assumed open for 4 months
Post-Closure Monitoring and Maintenance											$ 200,000	
-	3	1	-	Compliance Monitoring	Yearly monitoring cost	5	LS	x	$ 40,000.00	$ 200,000		
Engineering and Consultants Services											$ 150,000	
	4	1		Engineering Design		1	LS	x	$ 50,000.00	$ 50,000		
-	4	2	-	Cofirmatory sampling and analysis		1	LS	x	$ 100,000.00	$ 100,000		
Project Management											$ 739,676	
General Administration												
-	5	1	-	Travel allowance		1	LS	x	$0.00	$0		
-	5	2	-	Camp Management		21	day	OC.01	$ 763.20	$16,164		
-	5	3	-	Camp Operations		21	days	OC.02	$ 2,000.00	$42,359		
-	5	4	-	Camp Rental		1	year	OC.03	$ 450,931.21	$450,931		
Field support												
-	5	5	-	Supervision		21	days		$ 1,361.88	$ 28,844		
-	5	6	-	Equipment maintenance support - Mechanic	10% of project duration	2	days	x	$ 1,188.47	$ 2,517		
-	5	7	1	Helicopter Support	transport to camp	21	days	x	$ 9,469.56	$ 198,861		4 trips, 6 hrs/day;
Health & Safety Plans/Monitoring and QA/QC											$ 15,389	
-	6	1	-	H&S Plans and As-built Report		1	%	x	$ 1,538,926.17	$ 15,389		
Bonding / Insurance											$ 15,389	
-	7	1	-			1	%	x	$ 1,538,926.17	$ 15,389		
Contingency											$ 307,785	
-	8	1	-	Contingency	20% of direct costs	20	%	x	$ 1,538,926.17	$ 307,785		
Subtotal Indirect Costs												
				Subtotal Indirect Costs							**$ 4,833,330**	
CLOSURE COSTS - TOTAL												
				Subtotal Indirect Costs							**$ 6,372,256**	

Table 3. Mobilization/ Demobilization costs

Mob/Demob Costs

Crew mobilization costs included in loaded labour rates
The barging fee for equipment is calculated on a square foot basis

No. of units	Description	Units	Quantity	Unit cost	2012 Task cost	Notes
	Crew					
	Note: Labour costs included in loaded Labour Unit Rates found on the Unit Rates and Task Unit Rates worksheets					
	Construction equipment	Footprint				
1	Bobcat	m^3	14.5	$ 435.00	$ 6,329	From Hay River to Roberts Bay
1	Loader	m^2	116.0	$ 435.00	$ 50,474	From Hay River to Roberts Bay
1	Dozer	m^2	49.1	$ 435.00	$ 21,370	From Hay River to Roberts Bay
1	Excavator	m^2	91.7	$ 435.00	$ 39,884	From Hay River to Roberts Bay
1	Small equipment	m^3	24.1	$ 435.00	$ 10,485	From Hay River to Roberts Bay
1	Trucks (CAT 735)	m^2	173.3	$ 435.00	$ 75,364	From Hay River to Roberts Bay
0	Tractor trailer	m^3	86.8	$ 435.00	$ -	From Hay River to Roberts Bay
1	Crew cab pickup (Ford F350)	each	1.0	$ 3,700.00	$ 3,700	From Hay River to Roberts Bay
8	Truck equipment to Hay River (6 trucks)	per km	1100	$12.00	$ 13,200	= hauling 8 trailers from Edmonton / source: Doris cost estimate
				Subtotal Mobilisation	**$ 220,804**	
				Subtotal Demobilisation	**$ 231,844**	Assumes same cost as mobilisation, updated by 5%
				Total	***$ 452,649***	

Equipment stand-by							
	Stand-by time	days	123	2984.77432	$367,127.24	fall	October 1st to January 31st; assume 10 hr days
		days	123	2984.77432	$367,127.24	spring	May 1st to August 31; assume 10 hr days
				Total	***$734,254***		

Camp costs

Description	Units	Cost Code	Quantity	Unit Cost	Task Cost	
Camp Management	day	OC.01	21	$677.00	$14,338	
Camp Operations	per day per person	OC.02	21	$2,000.00	$42,359	5 person crew for 21 days
Camp Rental	year	OC.03	1	$400,000.00	$400,000	
Travel allowance	charter flights	OC.05	0	$10,000.00	$0	Included in camp operation cost
	commercial flights	OC.04	0	$750.00	$0	Included in camp operation cost
					$456,697	

Table 4. Unit Rates

Cost Code	Item	Unit rate	Unit	Comment	Updated Source (2016)
Equipment					
E.01	Dozer (CAT D7)	$ 193.41	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.02	Dozer (CAT D4)	$ 100.60	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.03	Dozer (CAT D4) w/ Tiller	$ 115.69	hr.	15% added for tiller attachment	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.04	Truck (CAT 730)	$ 161.12	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.05	Excavator (CAT 330 CL)	$ 214.90	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.06	Loader (CAT IT38/930)	$ 95.60	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.07	Skidder (CAT Bobcat)	$ 93.05	hr.	hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
E.08	Helicopter	$ 2,367.39	hr.	fuel surcharge applies	IMiskolczi (from Angela Holtzapfel@HBML ESR)
E.09	Welding Equipment	$ 66.82	day	300 Amps, gas/diesel driven	2009 BC Blue Book + 10% Northern Allowance, 10% fuel factor; Inflated to 2017 cost (3% inflation)
E.10	Power washer	$ 127.78	day	Hot water pressure washer - 3000 PSI	www.abtoolrentals.com/equipment.asp?action=category&category=190&key=190%2D0079
E.11	Drum crusher	$ 41.35	hr.	30 tones, mobile	2012 cost plus 3% rate increase to 2017
E.12	Oil-water separator	$ 31.94	hr.	10 GPM, underground	2012 cost plus 3% rate increase to 2017
E.13	Air Track Drill	$ 325.49	hr.		2015-2016 BC Blue Book + 10% Northern Allowance+10% fuel factor; Inflated to 2017 cost (3% inflation)
Materials					
M.01	Liner - HDPE	$ 32.61	m^2	supply and install	from JDS (Surface Water Management Options Analysis)
M.02	Liner - geotextile	$ 30.01	m^2	supply and install	from JDS (Surface Water Management Options Analysis)
M.03	Fuel (Diesel)	$ 1.53	L	2008 Landed fuel cost at Hope Bay	Maritz (from Jeff Reinson @ Newmont)
M.04	Explosives	$ 0.060	lbs	15% freight cost added	costmine 2014 inflated to 2017
M.05	Silt Fencing	$ 1.58	m	15% freight cost added	Cost Mine 2011; original price quoted in linear ft; inflated to 2017
M.06	Coco-matting	$ 2.14	m^2	15% freight cost added	Cost Mine 2011; original price quoted in sq. yards; inflated to 2017
M.07	Seed/Fertilizer	$ 19.92	kg	15% freight cost added	Arctic Alpine seed mix+ fertilizer (2009 increase by 3% per year to 2017)
M.08	Winter road	$ 18,798.19	km	open and maintain for 2 months	NUNA Logistics 2012 (from Court Smith) + 3% per year cost increase to 2017
M.09	Hazardous Waste Disposal fee	$ 11,273.28	m^3	Disposal + handling and cleaning fee	SRK estimate
M.10	Demolition Debris Disposal Fee (@Hay River)	$ 6.21	m^3	Disposal + handling fee	Personal communication with Rob Jamieson@Hay River Disposals Ltd.
M.12	Bentonite chips	$ 643.66	m^3	In 50 pound bags, 15% freight cost added	Holly North Production Supplies Limited
Labour					
L.01	Labour general	$ 66.17	hr.		Nuna Blended 2012 rate, POH included; increased by 3% (yoy) to 2017 cost
L.02	Labour - Trades	$ 99.04	hr.	Electrician, Welder, plumber etc.	Nuna 2015 Electrician and Mechanic Rate (Average); Inflated to 2017 cost (3% inflation)
L.05	Supervision	$ 113.49	hr.		Nuna 2015 Rate; Inflated to 2017 cost (3% inflation)
L.06	Truck Drivers	$ 76.45	hr.	Heavy Equipment	Nuna 2015 Rate; Inflated to 2017 cost (3% inflation)
L.07	Heavy Equipment Operator	$ 82.85	hr.	Light equipment	Nuna 2015 Rate; Inflated to 2017 cost (3% inflation)
L.08	Technician (Consultant)	$ 130.00	hr.	Staff Consultant	SRK-Estimate (all inclusive)
Shipping					
S.01	Outbound Shipping - Soils	$ 1,037.42	m^3	1.7 t/m^3 bulk density	(7.75 m^3/seacan based on 29,000 lbs. limit per seacan, seacan is 38.5 m ^{3}) - NEAS rates for 2016
S.02	Outbound Shipping - Haz Waste	$ 339.30	m^3	1.0 t/m^3 bulk density	(7.75 m^3/seacan based on 29,000 lbs. limit per seacan, seacan is 38.5 m ^{3}) - NEAS rates for 2016
S.03	Outbound Shipping - Demolition	$ 208.85	m^3	0.733 t/m^3 bulk density	$6,700.74/seacan (seacan is 38.5 m3) - from NTCL 17APR 12
Hydrocarbon Soils and Haz Waste					
H.01	Excavate impacted soil	$ 21.62	m^3		WESA estimate
H.02	Low temperature thermal desorption	$ 112.73	m^3		WESA estimate
H.03	Rehydrate and backfill	$ 12.05	m^3		WESA estimate
H.04	Regrade and reshape	$ 2.68	m^2		WESA estimate
Owner's cost					
OC.01	Camp management	$ 763.20	day		Newmont (2013) inflated to 2017 at 3% per year
OC.02	Camp operations	$ 2,000.00	day	includes food and camp maintenance	TMAC estimate (2015)
OC.03	Camp rental	$ 450,931.21	year	25 man mobile camp	Newmont (2013) inflated to 2017 @ 3% per year
OC.04	Commercial flight	$ 796.32	each	flight from Yellowknife to Cambridge Bay and return	
OC.05	Charter flight	$ 11,273.28	flight	Return from Yellowknife	
Stand by equipment rates					
SB. 01	Dozer (CAT D7)	$ 96.70	hr	50 % hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
SB. 02	Excavator (CAT 330 CL)	$ 107.45	hr	50 % hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
SB. 03	Loader (CAT 966 F)	$ 47.80	hr	50 % hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)
SB. 04	Skidder (CAT 242B)	$ 46.52	hr	50 % hourly equipment rate (less operator)	Nuna 2012 equipment rates; Inflated to 2017 cost (3% inflation)

Table 5. Task Unit Rates

Cost Code	Item	Unit	Productivity (Unit/hr.)	Unit Rates				Labour						Equipment										Note / Source
				Total Unit Cost	Material Unit Rate	Labour Unit Rate	Equipment Unit Rate	$ 66.17 General Labour	$ 99.04 Tradesman - Electrical	$ 99.04 Tradesman - Plumber	$ 130.00 Engineer/ Technician	$ 76.45 Truck Drivers	$ 82.85 Heavy Equipment Operator	$ 193.41 Dozer - CAT D7	$ 214.90 Excavator - Cat 330	$ 95.60 Loader - CAT 966	$ 93 Skidder CAT 242	$161.12 Truck - CAT 735	$2,367.39 Helicopter	$ 325.49 Drill	$ 4.14 Drum crusher	$ 12.78 Power washer	$ 6.68 Welding Equipment	
Decommissioning																								
C.1.01	Decommission and remove all heating fuel tanks and place into lined facility	each	4	$ 55.39	$ -	$ 43.44	$ 11.95	2					0.5			0.5								Disconnect and remove all fuel drums and disconnect all Tidy Tanks from all structures
C.1.02	Decommission above ground storage tanks	each	0.5	$ 462.74	$ -	$ 462.74	$ -	2	1															Disconnect all fuel lines and electrical parts
C.1.03	Decommission potable water supply	each	0.25	$ 1,235.43	$ -	$ 1,139.82	$ 95.60	1	1	1			0.25			0.25								Disconnect all electrical and plumbing (intake and distribution)
C.1.04	Decommission waste incinerator	each	0.167	$ 1,061.66	$ -	$ 918.26	$ 143.40	2					0.25			0.25								Disconnect and remove fuel storage
C.1.05	Decommission Main Camp Facility electricity	each	0.25	$ 660.82	$ -	$ 660.82	$ -	1	1															De-energise main electrical board, disconnect auxiliary power (if exists)
C.1.06	Decommission electrical generators	each	0.46	$ 696.94	$ -	$ 593.03	$ 103.91	2	1				0.5			0.5								De-energise main breaker board, disconnect external fuel tanks (if needed) / loader used for lifting; source - RSMeans (260505252100)
C.1.07	Dismantle Satellite/Communication Equipment	each	0.5	$ 363.70	$ -	$ 363.70	$ -	2	0.5															source - SRK estimate
C.1.08	Prep portable trailers for moving (remove cladding, etc.)	each	0.3	$ 863.16	$ -	$ 719.76	$ 143.40	3					0.5			0.5								
C.1.09	Decommission Airstrip - Place large X's at each end of strip	each	0.5	$ 314.66	$ 50.00	$ 264.66	$ -	2																Assumed material cost for a high density plastic, nails and sandbags.
Decontamination																								
C.2.01	Collect hazardous chemical waste and place in suitable containers	m^3	0.17	$ 2,261.67	$ -	$ 1,688.06	$ 573.61	3					1			1								Includes all chemicals on site / jm_Estimate
C.2.02	Drain and power-wash heating fuel tanks (Tidy Tanks)	each	6	$ 22.06	$ -	$ 22.06	$ -	2																Drain fuel from tanks and wash exterior with hot water (collect water for treatment)
C.2.03	Drain above ground fuel storage tank	each	0.5	$ 264.66	$ -	$ 264.66	$ -	2																Drain fuel /source - SRK estimate
C.2.04	Pressure wash above ground fuel tank	each	0.5	$ 290.22	$ -	$ 264.66	$ 25.56	2														1		
C.2.05	Drain and power-wash empty fuel drums	each	12	$ 19.00	$ -	$ 17.93	$ 1.06	2					1									1		Drain fuel and triple-rinse drum (collect water for treatment)
C.2.06	Flush sewage treatment unit and collect sewage sludge	each	0.4	$ 585.83	$ -	$ 434.39	$ 151.45	2					0.5			0.5						1		Flush treatment unit with water (collect water for treatment)/source - SRK estimate
C.2.07	Empty incinerator and collect ashes	m^3	0.25	$ 621.56	$ -	$ 430.36	$ 191.20	1					0.5			0.5								Place ashes and unburned contents into containers / see C.6.04
C.2.08	Operate oil/water separator	each	4	$ 52.82	$ -	$ 49.62	$ 3.19	3														1		Siphon the water than drain the oil - 15 minutes per 55 gal. drum
C.2.09	Empty soil from 45 gallon drums	each	4	$ 107.52	$ -	$ 53.79	$ 53.72	2					1		1									
Demolition																								
C.3.01	Crush empty fuel drums	each	20	$ 15.75	$ -	$ 10.76	$ 4.99	2					1			1					1			Same as C.4.01
C.3.02	Cut Tank Farm geomembrane to manageable size	sq. m	80	$ 2.48	$ -	$ 2.48	$ -	3																source - SRK estimate
C.3.03	Remove intake hoses and cut to manageable size	Lm	100	$ 2.28	$ -	$ 1.74	$ 0.54	2					0.5			0.5							1	source - SRK estimate
C.3.04	Dismantle pollution control berm	each	0.50	$ 264.66	$ -	$ 264.66	$ -	2																
C.3.05	Demolish office buildings/ shop structures/ living quarters	m^3	53	$ 12.32	$ -	$ 6.87	$ 5.45	3					2	1		1								Demolish empty wood structures (offices, shacks, etc.)/ source - RSMeans
C.3.06	Demolish helipads/ float plane dock	m^3	75	$ 3.26	$ -	$ 1.99	$ 1.27	1					1			1								Demolish wood structure / source - SRK estimate
C.3.07	Demolish Above ground storage tanks	m^3	5	$ 100.58	$ -	$ 56.27	$ 44.32	3					1		1								1	
C.3.08	Dismantle Old Equipment (torch)	each	0.5	$ 410.36	$ -	$ 396.99	$ 13.36	3															1	
C.3.09	Cut of tops of drill casings	each	2	$ 36.42	$ -	$ 33.08	$ 3.34	1															1	
C.3.10	Clean up debris from site	m^2	2529	$ 0.15	$ -	$ 0.11	$ 0.04	3					1			1								source - SRK estimate
C.3.11	Dismantle radio tower	each	0.04	$ 15,818.79	$ -	$ 10,661.22	$ 5,157.58	2	1		1		1		1									source - SRK estimate
Material Relocations																								
C.4.01	Load demolition debris/solid waste in containers	m^3	48	$ 9.47	$ -	$ 3.45	$ 6.02						2	1		1								source - SRK calculated from first principles
C.4.02	Empty Seacan of debris at the landfill	each	5.7	$ 100.54	$ -	$ 29.02	$ 71.52						2	1	1									
C.4.03	Haul materials to Doris Camp in 20 ft. container (33.2 m^3/container)	m^3	3.31	$ 83.54	$ -	$ 25.05	$ 58.49						1	1										source - calculated from first principles
C.4.04	Haul waste to Roberts Bay jetty in 20 ft. container (33.2 m^3/container)	m^3	3.14	$ 88.03	$ -	$ 26.40	$ 61.63						1	1										source - calculated from first principles
C.4.05	Ship demolition waste from Roberts Bay to Hay River	m^3	1	$ -									0											
C.4.06	Haul one skid to Doris Camp	each	0.07	$ 3,882.93	$ -	$ 1,164.45	$ 2,718.47						1	1										
C.4.07	Load reusable items on skids	each	3	$ 143.36	$ -	$ 71.73	$ 71.63	2					1		1									
C.4.08	Haul Waste to Quarry#3 landfill (33.2 m^3/container)	m^3	2.93	$ 94.37	$ -	$ 28.30	$ 66.07						1	1										
Earth works																								
C.5.01	Install HDPE Liner	m^2	175	$ 35.83	$ 32.61	$ 1.99	$ 1.23	4					1		1									
C.5.02	Load, haul, dump, place: 1 truck with <0.5 km haul distance	m^3	40	$ 20.29	$ -	$ 6.05	$ 14.24					1	2	1	1			1						
C.5.03	Load, haul, dump, place: 1 truck with <1.0 km haul distance	m^3	30	$ 27.05	$ -	$ 8.07	$ 18.98					1	2	1	1			1						
C.5.04	Excavate: Spoil locally, no trucks	m^3	100	$ 2.98	$ -	$ 0.83	$ 2.15						1		1									
C.5.05	Regrade surface - rough grading, D7	m^2	100	$ 2.76	$ -	$ 0.83	$ 1.93						1	1										source - RSMeans
C.5.06	Reslope Stockpiles - D7	m^3	75	$ 3.68	$ -	$ 1.10	$ 2.58						1	1										
C.5.07	Relocate core box pallet (<0.5 km)	ea.	6	$ 40.77	$ -	$ 24.84	$ 15.93	1					1			1								
C.5.08	Install soil stabilization measures (straw/coconut matting)	m^2	269	$ 4.76	$ 2.14	$ 1.48	$ 1.14	3.5					2		1		1							source - RSMeans
C.5.09	Drill, blast Quarry	m^3	100	$ 6.61	$ 0.06	$ 3.30	$ 3.25	1.5			0.5		2							1				
C.5.10	Track pack using loaded rock truck	m^2	100	$ 2.38		$ 0.76	$ 1.61					1						1						source - SRKjm estimate
C.5.11	Scaling (loose rock)	hr.	1	$ 297.75	$ -	$ 82.85	$ 214.90						1		1									
C.5.12	Load, haul, dump place: 2 trucks with <1.0km haul distance	m^3	75	$ 13.99	$ -	$ 4.25	$ 9.74					2	2	1	1			2						
C.5.13	Seeding/Fertilizing: By hand, high application rate	m^2	320	$ 0.92	$ 0.30	$ 0.62	$ -	3					0											
C.5.14	Summer identification of low-lying areas	day	0.08	$ 7,188.77	$ 100.00	$ 2,353.99	$ 4,734.78	1			1								0.17					
C.5.15	Remove culvert and create swale	lm	5	$ 99.02	$ -	$ 56.04	$ 42.98	2			0.5		1		1									
Other																								
C.6.01	Sample HC contaminated soils / confirmatory samples	each	2	$ 98.08	$ -	$ 98.08	$ -	1			1													Surface grab sample/ hand auger / Source - SRK estimate
C.6.02	Band together core pallets	each	12	$ 11.03	$ -	$ 11.03	$ -	2			0		0			0								
C.6.03	Construction of Vent Raise Seal	LS	0.042	$ 13,025.30	$ 3,000.00	$ 8,878.09	$ 1,147.21	3			1		0.5			0.5								$14,000 LS based on project experience; material cost estimated to bring total to $14k; estimated 2 day task duration

Table 6. Relocation Unit Rates

Hauling Distances			
Boston to Doris	61	km	One Way
Boston to Doris Landfill	69.2	km	One Way
Boston to Roberts Bay	64.4	km	One-Way

C.4.03 - Productivity of hauling bulk materials from Boston on winter road to Doris			
By Skid - SnowCAT (equivalent to D7)			Note: Cost of winter road not included
Equipment Cost	$ 193.41	per hr.	Includes fuel
Labour Cost	$ 82.85	per hr.	
Average speed	9	km/hr.	Sleds assumed as being available on site
Hauling capacity	2	skids	One container per skid
Cargo capacity	33.2	m^3	Standard 20 ft. container
Space utilization ratio	0.7		
Load	46.48	m^3	Cargo Capacity x # of Containers x Space Utilization Ratio
Distance:	61	km	
Time Required 1 round trip:	**14.06**	**hrs.**	**Includes 0.5hr unloading time**
Productivity:	**3.31**	**m^3/ hr.**	

C.4.04 - Productivity of hauling bulk materials from Boston on winter road to Roberts Bay			
By Skid - SnowCAT (equivalent to D7)			Note: Cost of winter road not included
Equipment Cost	$ 193.41	per hr.	Includes fuel
Labour Cost	$ 82.85	per hr.	
Average speed	9	km/hr.	Sleds assumed as being available on site
Hauling capacity	2	skids	One container per skid
Cargo capacity	33.2	m^3	Standard 20 ft. container
Space utilization ratio	0.7		
Load	46.48	m^3	Cargo capacity x # of Containers x Space Utilization Ratio
Distance:	64.4	km	
Time Required 1 round trip:	**14.81**	**hrs.**	**Includes 0.5hr unloading time**
Productivity:	**3.14**	**m^3/ hr.**	

C.4.08 - Productivity of hauling bulk materials from Boston on winter road to Doris Landfill			
By Skid - SnowCAT (equivalent to D7)			Note: Cost of winter road not included
Equipment Cost	$ 193.41	per hr.	Includes fuel
Labour Cost	$ 82.85	per hr.	
Average speed	9	km/hr.	Sleds assumed as being available on site
Hauling capacity	2	skids	One container per skid
Cargo capacity	33.2	m^3	Standard 20 ft. container
Space utilization ratio	0.7		
Load	46.48	m^3	Cargo capacity x # of Containers x Space Utilization Ratio
Distance:	69.2	km	
Time Required 1 round trip:	**15.88**	**hrs.**	**Includes 0.5hr unloading time**
Productivity:	**2.93**	**m^3/ hr.**	

Table 7. Structures

Demolition Bulking Factors	
Tents - Empty	1.3
Wood Structures - Empty	1.5
Wood Structures - w/ Interior Wall Allowance	2
Steel Structures - Empty	1.5
Steel Structures - w/ Interior Wall Allowance	2
Mechanical Equipment	1.1
Liners	3
Pipelines	3

Structure Volumes

Area	Structure	Quantity	Length (m)	Width/Dia. (m)	Footprint Area (m)	Avg Height (m)	Wall thickness (m)	Floor Thickness (m)	Roof Length (m)	Roof Thickness (m)	Wall Volume (m^3)	Floor Volume (m^3)	Roof Volume (m^3)	Total Volume (m^3)	Loose Volume (m^3)	Source
Accommodation Complex	Recreation Tent	1	5.1	4.5	23.0	2.5	0.01	0.3	6	0.05	0.48	6.9	1.5	9	**11.56**	Foot Print AutoCAD, height thickness est. from photo
	Site Office	1	12.2	5.1	62.2	2.5	0.15	0.3	5.1	0.3	13.0	18.7	18.7	50	**100.61**	Foot Print AutoCAD, height thickness est. from photo
	Geotech Tent	1	7.5	4.4	33.0	2.5	0.01	0.3	6	0.05	0.6	9.9	2.3	13	**16.57**	Foot Print AutoCAD, height thickness est. from photo
	Core Processing Facility	1	30	7.85	235.5	2.75	0.15	0.3	7.5	0.3	31.2	70.7	67.5	169	**220.19**	Foot Print AutoCAD, height thickness est. from photo
	Core Shack	1	21	5	105.0	2.75	0.15	0.3	6	0.3	21.5	31.5	37.8	91	**181.50**	Foot Print AutoCAD, height thickness est. from photo
	Core Splitter	1	2.6	3.75	9.8	2.5	0.15	0.3	4	0.3	4.8	2.9	3.1	11	**16.21**	Foot Print AutoCAD, height thickness est. from photo
	Muster Station	1	10.4	4.7	48.9	2.75	0.15	0.3	5.5	0.3	12.5	14.7	17.2	44	**66.42**	Foot Print AutoCAD, height thickness est. from photo
	Heating systems liner	2	4	4	16.0			0.05			0.0	0.8	0.0	2	**4.80**	
Maintenance Shop Complex	Maintenance Shop	1	18	12.2	219.6	0	0.05	0	19.2	0.05	0.0	0.0	17.2	17	**25.87**	Foot Print AutoCAD, height thickness est. from photo
	Shop Sheds (survival, elec. Etc.)	1	23	3.75	86.3	2.5	0.1	0.3	3.75	0.1	13.4	25.9	8.6	48	**71.81**	Foot Print AutoCAD, height thickness est. from photo
	Powerhouse	1	12.2	5	61.0	2.5	0.1	0.3	6	0.3	8.6	18.3	22.0	49	**97.72**	Foot Print AutoCAD, height thickness est. from photo
	Transformer Building	1	9	4.54	40.9	2.5	0.1	0.3	5	0.3	6.8	12.3	13.5	33	**48.79**	Foot Print AutoCAD, height thickness est. from photo
Crusher	Crusher Enclosure	1	36.5	12.8	467.2	0	0.01	0	20.1	0.05	0.0	0.0	36.7	37	**55.04**	Foot Print AutoCAD, height thickness est. from photo
	Hopper/Crusher Parts	1	4	2	8.0	1.5	1				18.0	0.0	0.0	18	**19.80**	Estimated
Water Treatment	Water Intake to Portal & Camp	1	607	0.05	30.4	0.05	1				60.7	0.0	0.0	61	**182.21**	Lengths from ACAD
	Sewage Supply Pipelines	1	489	0.05	24.5	0.05	1				48.9	0.0	0.0	49	**146.72**	Lengths from ACAD
	Old Sewage Treatment Bldg.	1	5.5	6.3	34.7	4	0.15	0.3	7.5	0.3	14.2	10.4	12.4	37	**55.40**	Foot Print AutoCAD, height thickness est. from photo
	New Treatment System (5)	5	12	2.5	30.0	2.5	0.15	0.3	2.5	0.15	10.9	9.0	4.5	122	**182.81**	Footprint: ACAD
Helipads	Helipads (3)	3	4.6	4.6	21.2	0	0	0.5	0	0	0.0	10.6	0.0	32	**47.61**	Foot Print AutoCAD, height thickness est. from photo
Docks	Spyder Lake	1	4	3	12.0			0.5			0.0	6.0	0.0	6	**12.00**	Footprint: ACAD
	Stickleback Lake Dock	1	4	3	12.0			0.5			0.0	6.0	0.0	6	**12.00**	Footprint: ACAD
	Stickleback boardwalk	1	133	2.5	332.5	0	0	0.2	0	0	0.0	66.5	0.0	67	**133.00**	Foot Print AutoCAD, height thickness est. from photo
	Bridge E of Stickleback	1	10	5	50.0	0	0	0.5	0	0	0.0	25.0	0.0	25	**37.50**	Made up; have no info
Incinerator	Incinerator	1	1.5	2	3.0	0	0	1.5	0.0	0	0.0	4.5	0.0	5	**6.75**	Foot Print AutoCAD, height thickness est. from photo
Mobile Equipment	Miscellaneous Eq.	5	1.5	2	3.0	0	0	1.5	0.0	0	0.0	4.5	0.0	23	**33.75**	
Primary Tank Farm	Large Above Ground Tanks	6		4.5	0.0	5	0.05	0.05		0.05	2.3	0.0	0.0	14	**20.25**	Foot Print AutoCAD, height thickness est. from photo
	Medium Above Ground Tanks	2		3	0.0	5	0.05	0.05		0.05	1.5	0.0	0.0	3	**4.50**	Foot Print AutoCAD, height thickness est. from photo
	Heating System Tanks	7		1	0.0	5	0.05	0.05		0.05	0.5	0.0	0.0	4	**5.25**	Quantity breakdown shown below, size estimated
	Containment Liner	1	33	25	825.0			0.005			0.0	4.1	0.0	4	**12.38**	ACAD
Power Plant Containment	Green Storage Tank	2	2.5	1.5	3.8	1.5					0.0	0.0	0.0	0	**0.00**	
	Containment Liner	1	4	3	12.0			0.005			0.0	0.1	0.0	0	**0.18**	Estimated
Settling Pond #1	Containment Liner	1	20	20	400.0			0.005			0.0	2.0	0.0	2	**6.00**	Footprint: ACAD
Settling Pond #2	Solid Waste				0.0						0.0	0.0	0.0	0	**0.00**	Estimated from photo
Soil Treatment Facility	45 gallon drums	100		0.6		0.15					0.042	0.0	0.0	4	**6.36**	Estimated from photo
	Containment Liner	1	16	23	368.0			0.005			0.0	1.8	0.0	2	**5.52**	
Drill Cutting Settling Pond	Geotextile or liner	1	30	20	600.0			0.005			0.0	3.0	0.0	3	**4.50**	
Drill Sites	Top of Casing	545	0.9	0.09	0.1						0.01	0.0	0.0	3	**9.13**	
Core Storage Road	Culvert	1	6	0.3	1.8			0.15			0.0	0.3	0.0	0	**0.27**	Assumed crushed to 1/2 its volume
Mine Openings	Portal Fence	1	61.5	0	0.0	1.2	0.01				1.5	0.0	0.0	1	**2.21**	Estimated from photo
	Vent Raise enclosure	1	5	5	25.0	2.5	0.1	0.15	5	0.15	5.0	3.8	3.8	13	**18.75**	Estimated from photo
Other structures	Other (V-notch weir, sampling points, thermistor housing boxes, other sheds)	1	20	4	80.0	2.5	0.1	0.3	4	0.1	12.0	24.0	8.0	44	**66.00**	Based on site photos, assumed areas
TOTAL:															**1,947.9**	

Demolition Preparation

Area	Structure	# of Units	Decommission			Heating Tanks	Hazardous Material Vol Estimate (L)	Special Item	Special Item Description	Source
			Electrical	Heating System	Plumbing System					
Accommodation Complex	Recreation Tent	1				1	0			Estimated from aerial photo
	Site Office	1				0	1			Estimated from aerial photo
	Geotech Tent	1				1	10			Estimated from aerial photo
	Core Shack/Splitter	1				2	10			Estimated from aerial photo
	Muster Station	1				1	4			Estimated from aerial photo
	Portable Trailers	12	1	1	1	0	25			Estimated from aerial photo
Maintenance Shop Compl.	Maintenance Shop	1	0	0	0	0	60			Estimated from aerial photo
	Shop sheds	4	1			1	25			Estimated from aerial photo
	Powerhouse	1	1			0	50			
	Transformer Building	1	1			0	100			
Crusher	Crusher Enclosure	1	0	0	0	1	20			
Water Treatment	New Facility	5	1	0	0	0	25	1	Sludge/Solid Waste	Estimated
	RBC	1					25	1	Sludge/Solid Waste	Estimated
Incinerator	Incinerator	1	0	0	0	0	0	10	Ashes	Ashes in Liters, estimates
Mobile Equipment	Misc. Equipment on site	5	0	0	0	0	60	10	Residual Fuel (in each)	Estimated from aerial photo
Primary Tank Farm	Above Ground Tanks	8					25	40	Residual Fuel (in each)	Fuel in Liters, estimated
	Heating System Tanks	7					25	10	Residual Fuel (in each)	Fuel in Liters, estimated
Power Plant Containment	Green Storage Tanks	2					10	5	Residual Fuel (in each)	Fuel in Liters, estimated
Soil Treatment Facility	Empty 45 gal drums	100						0.5	Residual Fuel (in each)	Fuel in Liters, estimated
Core Boxes	Total box pallets	520								AutoCAD
	Box pallets located on tundra	400								Estimated based on photos + contingency
TOTAL:						**7**	**475**			

Table 8. Reclamation Areas

Reclamation Areas

Work Area	Location	Total Area (m^2)	Area Sacrificed (m^2)	Area Regraded (m^2)	Area Requiring Fill (m^2)	Cocoa-matting Area (m^2)	Total Area (m^2)	Source/Comment
Camp Structures	Old Water Treatment Foundation Pad	460		460				ACAD/aerial site photo
	Helipads	150		150				ACAD/aerial site photo
Camp Surface Infrastructure	Camp Complex Foundation Pad	29,953	29,953	2,995			29,953	Excludes landfarm/core storage areas; assumed 10% requires regrading
	Road to Spyder Lake	773	773	773		0	0	ACAD
	Road to Airstrip	1,763	1,763	1,763				ACAD
	Airstrip	10,444	10,444	5,222				ACAD; assumed 50% required regrading
	Core Storage Road	142	142	142				ACAD
	Drill Road	306	306	306				ACAD; assumed 50% required regrading
Other Areas	Permafrost Remediation Areas	11,184			559	559	11,184	ACAD, assumed 5% required 0.3m fill in low areas, 5% required matting
	Vegetation Die-Back - Drill Road	17,795			890	890	17,795	ACAD, assumed 5% required 0.3m fill in low areas, 5% required matting
	Vegetation Die-Back - Core Storage Road	990			495	50	990	ACAD, assumed 50% required 0.3m fill in low areas, 5% required matting
	Vegetation Die-Back - Grey Water Dis.	5,398			270	270	5,398	ACAD, assumed 5% required 0.3m fill in low areas, 5% required matting
	Drill Sites	9,000			9,000	450	9,000	9 site included each 1000 sq.m.
	Boston Ore Stockpiles	6,077	6,077	3,039			6,077	ACAD; assumed 50% required regrading

Earthwork Volumes/Quantities

Bulking Factors	
Soil/Rock Pad	1.2
Cover shrinkage factor	1.1

Work Area	Item	Qnty	Length (m)	Width (m)	Height (m)	Side Slope (x:1)	Area (m^2)	In-situ Volume (m^3)	Loose Volume (m^3)	Source / Comments
Core Storage Road	Excavate Culvert	1	5.5	0.5	0.9	1	1.26	7		
Mine Openings	Backfill Decline	1	18	12	3			324	**389**	ACAD estimated
Primary Tank Farm	Excavate Bedding Material				0.5		676	338	**406**	
	Regrade area						810			ACAD estimated
Power Plant Fuel Containment	Excavate Bedding Material				0.5		100	50	**60**	Estimated
	Regrade area						125			Estimated
Settlement Pond #1	Excavate Settled Material		16	9	0.5		144	72	**79**	ACAD estimated
	Regrade area						750			ACAD estimated
Settlement Pond #2	Excavate Settled Material		12	9	0.5		108	54	**59**	ACAD estimated
	Regrade area						690			ACAD estimated
Soil Treatment Facility	Soils				0.5		300	150	**180**	ACAD estimated; assumed 1/2 passing
	Regrade area						440			ACAD estimated
Drill Cutting Settling Pond	Cutting volume				0.5		560	280	**336**	ACAD/aerial site photo
	Regrade area						930			ACAD estimated
Ore Stockpiles	Original stockpile footprint				1.7		6077	10331	**12397**	ACAD estimated. Volume of ore material from SRK 2008 Boston annual inspection (27,000 tonnes) and assuming a bulk density of 2 tonnes/m^3
	Consolidated Stockpile foot print				6.7		2026	13500	**16200**	Entire volume (13500 m^3) consolidated to 1/3 of existing footprint.
	Relocated Volume (used for construction)							3169	**3803**	scraped up from pads and airstrip (estimate by SRK)
	Relocated volume (consolidation of piles)							6887	**8265**	pushed into the large pile
	Cover Volume				0.3		2228	668	**802**	
	Liner Area						2330			Liner area increased by 15% to account for wastage and conversion between 3D and 2D projection.
Landfill Closure	Bedding (crushed rock) (0.3m on each side of liner)				0.6		700	420	**504**	
	Liner						805			
	Run-of-quarry cover				0.5		700	350	**420**	