Lupin Mines Closure Estimate Update December 2014

LUPIN MINES INCORPORATED

Prepared by:

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1 INTRODUCTION

1.1 Background

The Lupin Mine (also referred to as Lupin) is owned and operated by Lupin Mines Incorporated. (LMI).

The Lupin Mine is located in Kitikmeot Region, Nunavut, 360 km north-northeast of Yellowknife, Northwest Territories and 285 km southeast of Kugluktuk. The geographic center of that property is 65° 45'29" N / 113° 13'20W (Figure 1). It is on the western shore of Contwoyto Lake, approximately 60 km south of the Arctic Circle (Figure 1).The site was an operational underground gold mine from 1982 to 2005 with temporary suspensions of activities between Jan 1998 and April 2000, and again between Aug 2003 and March 2004. The mine resumed production in March 2004 until 2005. Since 2005, the site has remained in care and maintenance. During the period 2011 -2013 LMI completed a substantial amount of work in preparation for a re-start of operations planned for 2015. In 2011 the company commenced a drilling program to determine whether a zone referred to as the West Zone South of Shaft continued from depth toward surface indicating that there would be ore available for mining closer to surface. The drilling provided strong evidence for this. Further drilling was completed on other targets as possible mill feed post any re-start of operations. Based on the success of this drilling, LMI purchased a substantial amount of mining equipment in order to complete further drilling from underground locations and prepare the underground areas for access including ventilation and hoisting. Work was also completed on the mill facilities, camp and shops offices and warehouse facilities. Preparations were also made in November 2012 to re-establish the ice-road from the diamond mines in the south up Contwoyto Lake to the Lupin site so that additional bulk materials could be shipped in early 2013. Significant mine site technical, environmental and administrative staff were also hired. However, in late 2012 the price of gold commenced a steep decline which continued into 2013. This drop in the gold price forced LMI to postpone the re-start and await a resurgence in the price of gold.

1.2 Summary

This document provides brief descriptions of the site faculties and the work to be completed as part of the IARP in support of the attached cost estimate prepared by LMI. The complete closure obligations and the plan for closing all facilities are fully described in Interim Abandonment and Restoration Plan (IARP) dated March 2013 (submitted with the 2012 Annual Report).

1.3 Closure Objectives

The site was designed and operated with closure in mind and throughout operations. The Lupin operation has conducted progressive reclamation within the TCA since 1988. Kinross initiated a major tailings reclamation program in the summers of 2004 and 2005, in which the majority of the exposed tailings in the TCA were covered by a 1-m thickness of esker material. During the latest term of care and maintenance continuous progressive reclamation has been evaluated and implemented where practical to do so, bearing in mind the plan to re-start operations.

With the above in mind the overall objectives of the interim closure and reclamation plan are to establish stable chemical and physical conditions and ensure the future use and aesthetics of the site following the Mine Site Reclamation Guidelines for the Northwest Territories, 2007 as specified in Water Licence 2AM-LUP0914. Furthermore, all regulations will be complied with to ensure that once abandonment and restoration has been completed:

- There is no danger to public health or safety;
- The requirement for long term maintenance and monitoring associated with the tailings area is minimal or nil;
- Contaminant loadings to the environment are minimized or prevented;
- The cumulative degradation of abandoned areas affected by the mining activities is prevented, and natural recovery of disturbed lands is enhanced; and
- The affected areas will be returned to a condition that is compatible with the surrounding, original undisturbed area with respect to its future potential/productivity uses.

In terms of future land use, for the purposes of this estimate it has been assumed there will be no on-going use of the camp or fuel storage facility and that these structures and facilities will all be removed and the area reclaimed to acceptable standards for arctic wilderness land use. It is assumed that the airstrip will remain in place for commercial land use.

2 ABANDONMENT AND RECLAMATION REQUIREMENTS

Figure 2 shows the general layout of the Lupin Mine facilities as of October 2014. The Lupin Mine facilities have been grouped into areas for the purposes of completing the LMI closure cost estimate as follows:

- Airstrip Area;
- Bulk Fuel Storage Area;
- Hazardous Waste Management Area;
- Main Mill , Workshops Mine Shaft and ramp, Camp, including sewage lagoons;
- Tailings Containment Area (TCA);
- Fresh Water Intake Area and;
- Secondary Roads Area.

These work areas and a summary of their closure requirements are described below. A detailed description of these facilities and plans for closure and reclamation are provided in the IARP.

2.1 Airstrip Area

2.1.1 Existing Facility

The center of the Airstrip area is approximately 1.0 km south of the main camp and mill facility. The area contains a 1,950 m long airstrip, with aprons at both the north and south ends. A fuel line formerly ran to the west of the tank farm to a fuelling area located on the west side of the airstrip. The pipeline and tanks at the airstrip fueling station were removed in 1998. Runoff from the strip reports to Contwoyto Lake. *Final Site Condition*

Removal of the airstrip will not be carried out; however, access roads will be cut and backsloped to allow uninhibited drainage along its parallel.

All ancillary equipment including signs, marker lights, strobes (associated wiring) and weather station/traffic control building will be dismantled and removed. It is assumed that the radio beacon VOR (VHF Omni Range) and tower (Non-direction Beacon) will be removed.

2.2 Bulk Fuel Storage Areas

2.2.1 Existing Facilities

The bulk fuel storage facilities include a main tank farm (including a system of 14 diesel tanks, 1 jet A tank and 9 individual tanks), a satellite tank farm (including a system of 10 diesel tanks and 2 gasoline tanks) and a waste oil tank farm (including 2 waste oil tanks). In addition there are five (5) glycol tanks on site and various individual tanks. Geosynthetic liners were used for containment purposes. Results obtained to date indicate that the storage areas were constructed with non-acid generating rock bases and rock berms.

2.2.2 Final Site Condition

Any fuel remaining on site at the time of closure will be removed from site. The empty tanks would then be withdrawn from service and disposed of. The tank farm areas would be stripped of any fuel laden substrate. Esker sands that contain residual hydrocarbons will generally be subjected to treatment by landfarm techniques on site. Foundation material will either be screened to remove rocks and the finer material will report to the landfarm for treatment or if the foundation material is found to be PAG it will be excavated and managed with other PAG development rock (see section 2.4).

The underlying plastic liner material would be disposed of within the mine workings or landfill. Foundation material would be surveyed for PHC contamination and PAG rock and managed as necessary. An estimated 14,000 m^3 of contaminated soil and rock will require treatment when the facilities are decommissioned. The site would be graded to provide positive drainage.

2.3 Hazardous Waste Management Area

2.3.1 Existing Facilities

The hazardous waste management area is located by the main bulk fuel storage area and stores all hazardous waste collected during and subsequent to operations that was not yet shipped offsite. The storage areas were constructed with PAG bases and rock berms. Geosynthetic liners were used for containment purposes.

2.3.2 Final Site Condition

Containers stored in the hazardous waste area will be removed and disposed of in

an approved facility. PAG rock and PHC contaminated laden rock and sand will be treated on-site if it is amenable to being treated by land farm techniques or it will be disposed at an approved facility.

The underlying plastic liner material would cleaned and then be disposed of within the mine workings or landfill. Foundation material would be surveyed for contamination and treated or managed on site as necessary. The site would be graded to provide positive drainage.

2.4 Main Mill and Camp

2.4.1 Existing Facilities

The Lupin Mill, shop, office and warehouse facilities, mine headgear and shaft, mine adit and camp are shown on Figure 3. All buildings and structures are located on non-acid generating rock pads to protect permafrost. The rock pads were constructed to ensure positive drainage and prevent permanent ponding.

The underground decline, an open cut and portal are located in this Main Mill and Camp area.

Areas of hydrocarbon soil contamination and arsenic concentrations greater than the background concentration trigger limit of 179 mg/kg proposed in the Environmental Site Assessment (Morrow 2006) are present. Based on a site assessment completed by a previous owner (Kinross) approximately 40% of the waste rock sampling was considered to be PAG.

2.4.2 Final Site Condition

All facilities will be cleaned of any remaining chemicals and reagents and any hazardous waste recovered will be disposed of as per previously described. It is estimated that there will be less than 800 m^3 hazardous materials and soil impacted by contaminates other than PHC or metals to be disposed of during demolition and reclamation of the entire site.

Milling and process equipment will be de-commissioned and cleaned. Equipment and internal components will be sent off-site for salvage where possible, otherwise disposed of in the underground workings or landfill.

Buildings will be disassembled and buried on site in a landfill and within accessible areas of the underground workings. For purposes of the closure cost estimate it is assumed

that modular buildings such as the cold storage buildings and the camp will not be repurposed. Concrete bases remain in place and covered with aggregate. Additional details are provided in section 6.1 of the IARP.

The mine shaft, open cut and adit will be sealed and capped as will the main ventilation shaft. Further detail is provided in section 6.3 of the IARP.

PAG waste rock will be: 1) consolidated within the footprint of the mill complex and covered, 2) placed within the footprint of the TCA, and covered, or 3) placed within the underground workings, or a combination thereof. Soil exceeding the site remediation objectives will be treated or managed with the PAG rock on-site.

2.5 Tailing Containment Area

2.5.1 Existing Facilities

The TCA is located approximately 6 km south of the Lupin Mine, and covers an area of about 361 ha. The containment is divided into three main components: solids retention cells (cells 1, 2, 3, 5), polishing ponds (Pond 1, Pond 2, Cell 4) and the End Lake area (not used) as shown in Figure 4.

The TCA is impounded through natural terrain relief and a series of engineered retaining structures. The main water retaining perimeter dams are Dam 1a and Dam 2, which contain Pond 2, and Dam 4 in Cell 4. Dams 5 and 6 within Cell 3 are low level dams. All perimeter dams have been designed with a synthetic liner for initial control of seepage and temperature monitoring of the dams shows that the cores remain frozen year-round. K-Dam, which is an internal structure, was also designed with a synthetic liner for initial seepage control and temperature monitoring has indicated that the core remains frozen year-round.

Ponds 1 and 2 are separated by J-Dam, which was constructed with esker material and mine development waste rock. Two 18-inch diameter syphons have been placed over this dam to permit the transfer of water from Pond 1 to Pond 2.

As part of progressive restoration activities Lupin has covered the exposed tailings in completed cells with between 1.0 m to 2.0 m of esker material. The uncovered portions of Cell 5 and Cell 3 represent future areas for tailings deposition during the restart of operations. These areas are either saturated for most of the year or under water. It should be noted that site previously covered significant areas of the cells and internal dams with this suitable esker material and the unit costs used in this estimate are based

on the calculated unit costs which produced a final estimated 1.0 m of coverage in these covered areas with a cost escalation factor from the time of the last construction activity. This is noted within the closure cost estimate within the Notes section. Additional instrumentation for the newly covered areas installed for monitoring purposes is also included.

2.5.2 Final Site Condition

All exposed tailings will be covered by the same esker material as part of final closure. As summarized in section 6.5.2 of the IARP the potentially acid generating tailings are encapsulated within a water saturated cover to isolate them from the environment and limit oxygen transfer through the sulphide contained in the tailings and so prevent acid generation. PAG rock will be used to backfill openings in the tailings cells prior to the placement of the esker cover.

The planned restoration activities are described in section 6.5.3 of the IARP and are summarized below.

Closure and Post-Closure Water Management

The sequence of waste rock handling and water management during the closure of the tailings ponds at the Lupin Mine is as follows:

1. The water in Cell 4, Cell 5 and Tailings Pond 1 will be treated and discharged. Treatment will consist of added dilute (<0.5% w/v) lime slurry to the ponds until the pH of the water increases above pH 8.
2. Acid generating or metal leaching waste rock may be disposed of Cell 4, Cell 5, and/or Tailings Pond 1. Lime may be added to the waste rock as it is placed in the cells to consume acidity and reduce the potential for “hot spots” of ARD/ML. Alternately, acid generating or metal leaching waste rock may be submerged in Tailing Pond 2.
3. The water in Tailings Pond 2 will be treated and discharged to lower the pond water level to 480.0 masl. Water will be treated in situ by lime addition until the pH of the water increases above pH 8.
4. Water level in Tailings Pond 2 will be lowered to create enough capacity for at least three years of water storage.
5. Waste rock and sub-aerial tailings will be covered with sand from the esker borrow source.

6. Tailings Pond 5, Cell 4 and Cell 5 will be graded to drain to Tailings Pond 2 or spillways will be constructed to convey flow to Tailings Pond 2.
7. Over the following winter, covered waste will begin to freeze and permafrost migrates into the waste. Based on historic data, it is anticipated that the waste rock and tailings would be completely frozen in a couple years. When the waste is frozen it will no longer be a source of metals or acidity to the tailings ponds.
8. Water quality in Tailings Pond 2 will be monitored annually over the three year period that the pond fills. If water quality deteriorates over this period, Tailings Pond 2 will be treated as described above to increase the pH to above 8.
9. A spillway to convey flow from Tailings Pond 2 to the receiving stream will be constructed in year 2 or 3 after closure before Tailings Pond 2 reaches capacity.
10. After the Tailings Pond spillway is constructed active water management will no longer be required.

Following the final transfer of water to Pond 2, J Dam will be breached and a spillway established to permit a controlled flow of water into Pond 2.

Additional work includes the quarrying of rip-rap from a local quarry source and placing same as erosion protection and also the construction of a suitably designed spillway to permit a controlled flow of water from Pond 2 to the receiving environment.

The closure will include the removal of all associated piping and the closure of the tailings dump ponds. For areas restored with the use of esker material final surface preparation will include the addition of large grain sized quarry material, surface scarification and contouring as necessary to provide proper drainage patterns in order to avoid erosion and ponding of water.

2.6 Fresh Water Intake Area

2.6.1 Existing Facilities

This area is located at the north end of the camp and consists of the fresh water pump station, main water supply line, float plane landing dock and is shown on Figure 5.

2.6.2 Final Site Condition

Buildings, equipment and concrete foundations will be dealt with in a similar manner as described in 2.4.2. Piping will be sectioned and disposed of as non-hazardous waste. The heat tracing lines and controllers will be removed and disposed of in an appropriate manner.

2.7 Secondary Roads Area

2.7.1 Existing Facilities

The Secondary Roads consist of all roads to the TCA, esker, water intake and other minor roads around site. Pockets of potentially acid generating (PAG) rock are present on the secondary roads.

2.7.2 Final Site Condition

The roads will be crowned and graded to promote run-off and scarified to promote natural growth of vegetation. A total of 22 culverts will be removed and disposed of. Further details are provided in section 6.2 of the IARP.

A survey for PAG rock will be carried out to delineate this material for excavation. The excavations will be contour to prevent the ponding of water.

2.8 Tailings and Reclaim Water Pipelines

2.8.1 Existing Facilities

The tailings and reclaim water pipelines run approximately 5.0 km from the mill to TCP.

2.8.2 Final Site Condition

The pipelines will be flushed with clean water and then cut into manageable sections and disposed of as appropriate. The heat tracing lines and controllers will be removed and disposed of in an appropriate manner.

2.9 Post Closure Monitoring

Post-closure monitoring for cost estimating purposes has been separated into two phases; Phase 1 – Annual Monitoring (years 1 through 10) and Phase 2 – Decreasing Frequency with monitoring in(years 15 and 25 for a total of 12 years of monitoring over a 25 year period. The basis for this post-closure monitoring frequency is derived from the AANDC Contaminated Sites Program guidance document entitled "Abandoned Military Site Remediation Protocol" (INAC, 2009) that describes a rationale and outlines a recommended schedule for long-term monitoring of Distant Early Warning (DEW) Line sites in northern Canada. This guidance document has recently been applied to the closed Polaris mine in Nunavut. This same approach is considered reasonable to cost a post-closure frequency at the Lupin mine site. It is important to note that the allowance for 10-initial years of annual post closure

monitoring in the reclamation security estimates accounts for double the annual monitoring suggested by the AANDC protocol. It is acknowledged that the post closure monitoring program would be reviewed following each year of monitoring and the Phase 2 monitoring frequency would be initiated once the site has been determined to be physically and chemically stable. However for the purpose of estimating the post closure monitoring costs for the Interim Abandonment and Reclamation Plan, this frequency applied is reasonable.

3 Cost Estimate

Appendix A provides a basis of estimate for the closure costs

The estimated closure cost is $24 million in undiscounted 2014 Canadian dollars. These costs were developed using an NWB approved spreadsheet based cost estimating process that is consistent with the principles of RECLAIM. Furthermore the closure estimate work was completed with the detailed input of an independent contractor experienced in such work in Northern Canada who recently visited the mine to specifically review the current site for closure based on the closure plan, assess quantities and provided unit costs, timelines and assist in applying indirect costs.. Further, input was also provided by independent environmental consultants with experience at the mine who reviewed the IARP and updated issues such as rip rap for TCA protection and spillways and closure activities.

4 Schedule

Closure of the Lupin site will occur upon completion of mining and milling of remaining economic ore. It is anticipated that all decommissioning and closure activities can be completed in one construction season. These activities will be initiated in the first construction season following the completion of milling.

Water management activities will start in the first year following closure and continue until water quality criteria are met.

Year 2 will be the initial year of the post closure monitoring and maintenance period and as discussed above, will require approximately 10 years.

Figures

Figure 1


140°0'0"W
130°0'0"W
120°0'0"W
110°0'0"W
100°0'0"W
90°0'0"W
80°0'0"W
70°0'0"N
60°0'0"N
50°0'0"N
Cambridge Bay
Kugluktuk
Lupin Mine
YUKON
NUNAVUT
NORTHWEST TERRITORIES
Mackenzie
Yukon
Whitehorse
Yellowknife
Slave
Churchill
Peace
Nelson
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
Edmonton
Saskatchewan
Calgary
Winnipeg
Vancouver
Seattle
Columbia
Missouri
Snake
N
W
E
S
Legend
Project Location
Coordinate System: NAD_1983_UTM_Zone_12N
Map Sources/Notes:
Various Canadian Government Websites - Feb 2012
0 60 120 240 360 480 600 Km
1:15,000,000
Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 26 Mar 2012
File Name: Lup-12-04-01-LocationMap-A.mxd
Project: Lupin Project
Location: Kitikmeot Region, Nunavut, Canada
Location Map - Lupin Mine
Lupin Mines Incorporated
ELGIN MINING INC.
Figure: 1
Rev: 120326

Figure 2

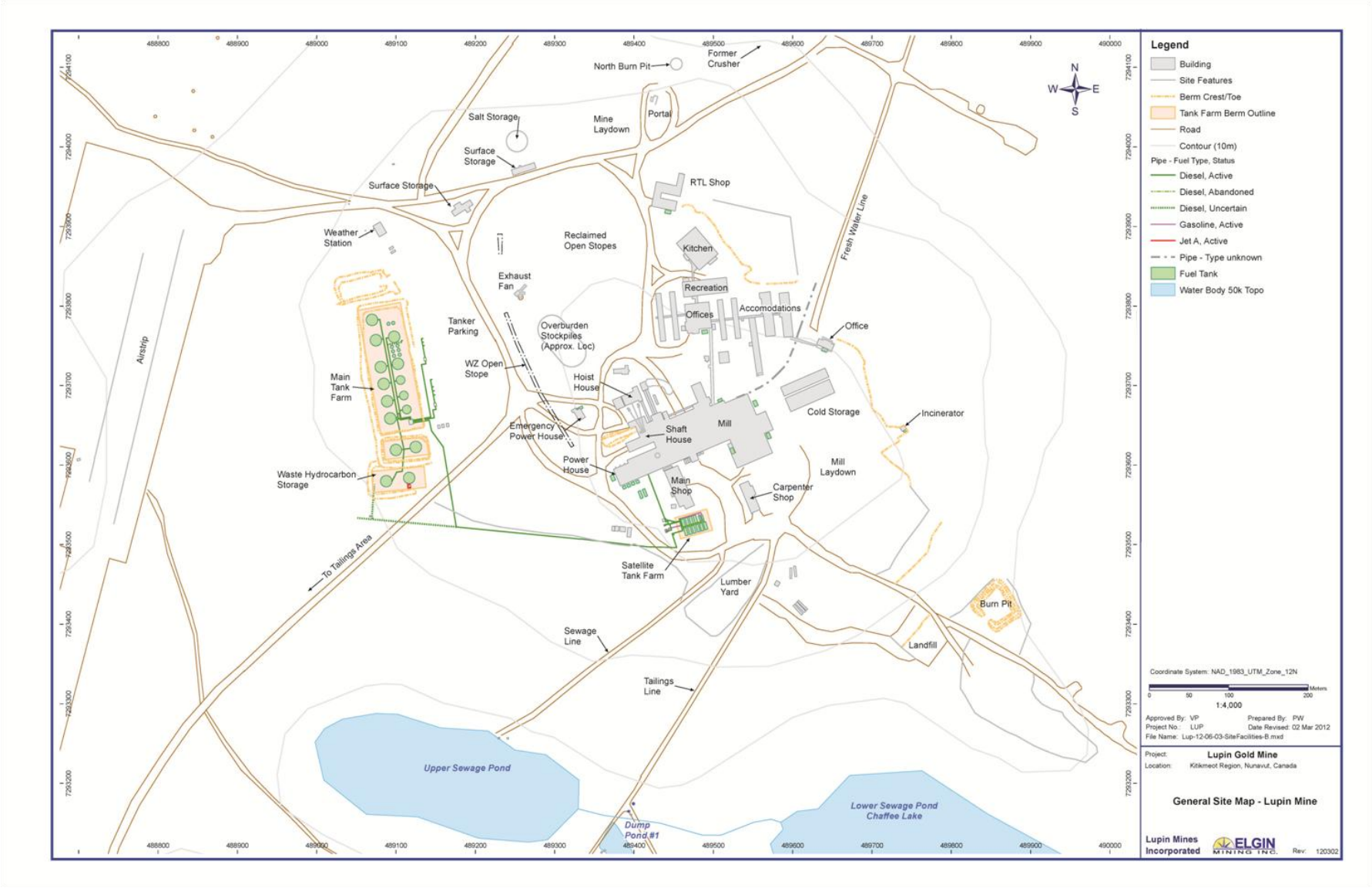
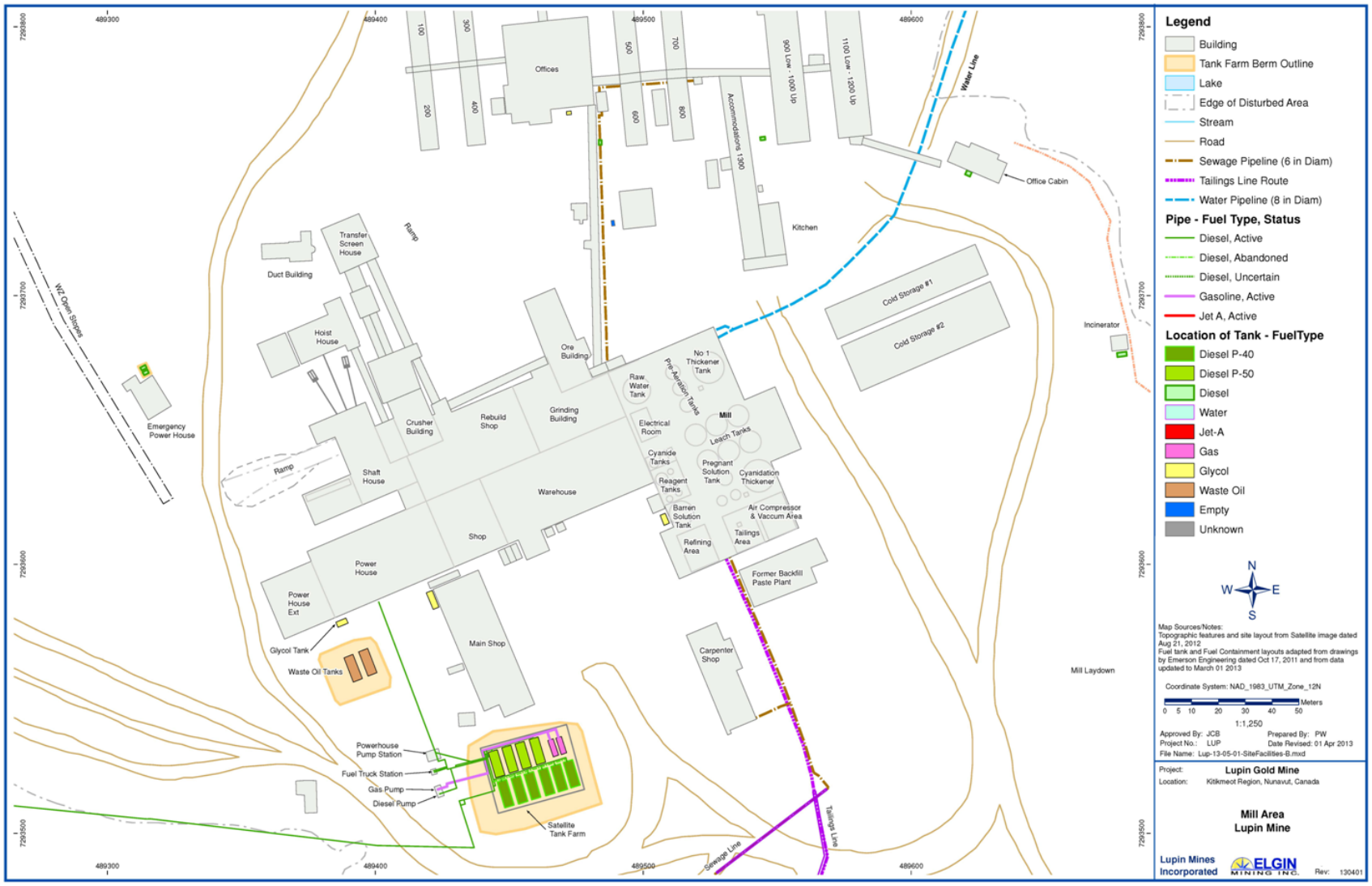

North Burn Pit
Former Crusher
Salt Storage
Mine Laydown
Portal
Surface Storage
Surface Storage
RTL Shop
Weather Station
Reclaimed Open Stopes
Kitchen
Fresh Water Line
Exhaust Fan
Recreation
Offices
Accomodations
Office
Tanker Parking
Overburden Stockpiles (Approx. Loc)
Airstrip
WZ Open Stope
Hoist House
Main Tank Farm
Cold Storage
Incinerator
Emergency Power House
Shaft House
Mill
Power House
Mill Laydown
Waste Hydrocarbon Storage
Main Shop
Carpenter Shop
To Tailings Area
Satellite Tank Farm
Lumber Yard
Burn Pit
Sewage Line
Landfill
Tailings Line
Upper Sewage Pond
Dump Pond #1
Lower Sewage Pond Chaffee Lake
N
W
E
S
Legend
Building
Site Features
Berm Crest/Toe
Tank Farm Berm Outline
Road
Contour (10m)
Pipe - Fuel Type, Status
Diesel, Active
Diesel, Abandoned
Diesel, Uncertain
Gasoline, Active
Jet A, Active
Pipe - Type unknown
Fuel Tank
Water Body 50k Topo
Coordinate System: NAD_1983_UTM_Zone_12N
0 50 100 200 Meters
1:4,000
Approved By: VP
Prepared By: PW
Project No.: LUP
Date Revised: 02 Mar 2012
File Name: Lup-12-06-03-SiteFacilities-B.mxd
Project: Lupin Gold Mine
Location: Kitikmeot Region, Nunavut, Canada
General Site Map - Lupin Mine
Lupin Mines Incorporated
ELGIN MINING INC.
Rev: 120302

Figure 3


Offices
Accommodations 1300
Kitchen
Office Cabin
Water Line
Transfer Screen House
Duct Building
Ramp
Hoist House
Ore Building
Raw Water Tank
No 1 Thickener Tank
Pre-Aeration Tanks
Mill
Leach Tanks
Electrical Room
Crusher Building
Rebuild Shop
Grinding Building
Cyanide Tanks
Pregnant Solution Tank
Cyanidation Thickener
Reagent Tanks
Shaft House
Warehouse
Barren Solution Tank
Air Compressor & Vaccum Area
Tailings Area
Refining Area
Shop
Power House
Power House Ext
Former Backfill Paste Plant
Glycol Tank
Waste Oil Tanks
Main Shop
Carpenter Shop
Mill Laydown
Cold Storage #1
Cold Storage #2
Incinerator
Emergency Power House
W2 Open Stopes
Powerhouse Pump Station
Fuel Truck Station
Gas Pump
Diesel Pump
Satellite Tank Farm
Sewage Line
Tailings Line
Legend
Building
Tank Farm Berm Outline
Lake
Edge of Disturbed Area
Stream
Road
Sewage Pipeline (6 in Diam)
Tailings Line Route
Water Pipeline (8 in Diam)
Pipe - Fuel Type, Status
Diesel, Active
Diesel, Abandoned
Diesel, Uncertain
Gasoline, Active
Jet A, Active
Location of Tank - FuelType
Diesel P-40
Diesel P-50
Diesel
Water
Jet-A
Gas
Glycol
Waste Oil
Empty
Unknown
N
W
E
S
Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012
Fuel tank and Fuel Containment layouts adapted from drawings by Emerson Engineering dated Oct 17, 2011 and from data updated to March 01 2013
Coordinate System: NAD_1983_UTM_Zone_12N
Meters
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1:1,250
Approved By: JCB
Prepared By: PW
Project No.: LUP
Date Revised: 01 Apr 2013
File Name: Lup-13-05-01-SiteFacilities-B.mxd
Project: Lupin Gold Mine
Location: Kitikmeot Region, Nunavut, Canada
Mill Area
Lupin Mine
Lupin Mines Incorporated
ELGIN MINING INC.
Rev: 130401

Figure 4

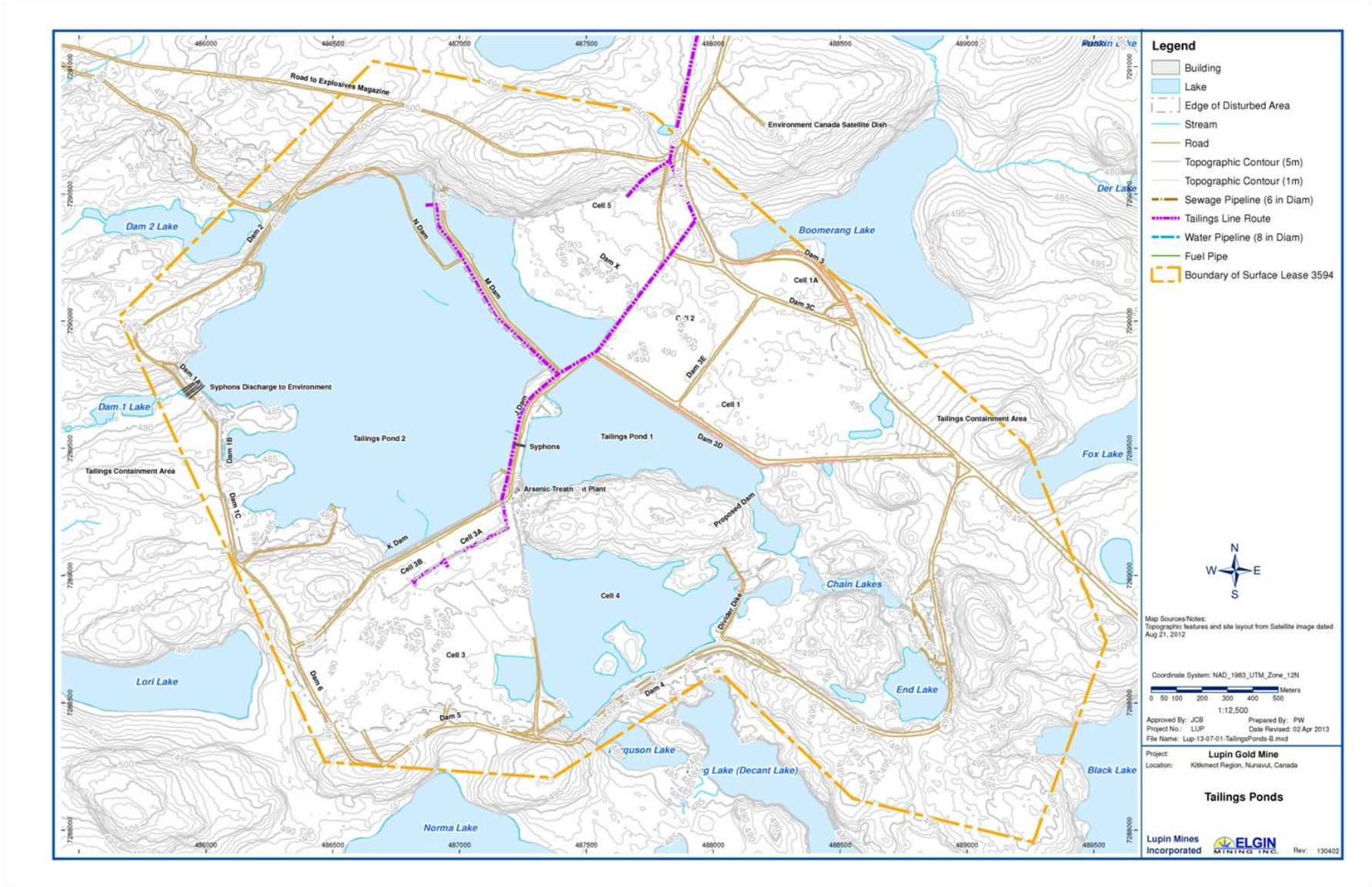
Legend
Building
Lake
Edge of Disturbed Area
Stream
Road
Topographic Contour (5m)
Topographic Contour (1m)
Sewage Pipeline (6 in Diam)
Tailings Line Route
Water Pipeline (8 in Diam)
Fuel Pipe
Boundary of Surface Lease 3594
Road to Explosives Magazine
Environment Canada Satellite Dish
Dam 2 Lake
Dam 2
N Dam
M Dam
Cell 5
Dam X
Boomerang Lake
Dam 3
Cell 1A
Dam 3C
Cell 2
Dam 3E
Der Lake
Dam 1A
Syphons Discharge to Environment
Dam 1 Lake
Tailings Pond 2
J Dam
Syphons
Tailings Pond 1
Dam 3D
Cell 1
Tailings Containment Area
Fox Lake
Dam 1B
Dam 1C
Tailings Containment Area
Arsenic Treatment Plant
Proposed Dam
K Dam
Cell 3A
Cell 3B
Cell 4
Chain Lakes
Divider Dike
Cell 3
Dam 6
Lori Lake
Dam 4
Dam 5
End Lake
Ferguson Lake
Lang Lake (Decant Lake)
Black Lake
Norma Lake
N
W
E
S
Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012
Coordinate System: NAD_1983_UTM_Zone_12N
0 50 100 200 300 400 500 Meters
1:12,500
Approved By: JCB
Prepared By: PW
Project No.: LUP
Date Revised: 02 Apr 2013
File Name: Lup-13-07-01-TailingsPonds-B.mxd
Project: Lupin Gold Mine
Location: Kitikmeot Region, Nunavut, Canada
Tailings Ponds
Lupin Mines Incorporated
ELGIN MINING INC.
Rev: 130402

Figure 5

Appendix A:

Costing Assumptions Summary

1 Introduction

The cost estimate was prepared using an Excel workbook and the estimating inputs are all included in supporting worksheets. This memorandum documents the assumptions and inputs that form the basis of the estimated costs.

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. All labour, equipment and materials required to execute the works were reviewed by a contractor with appropriate experience in the North with similar projects.

2.2 Quantities

Quantity estimates needed as input to the cost estimates were derived using standard engineering calculations based on review of actual facilities, topographic maps, drawings and aerial photographs. All buildings and facilities reclaimed at closure were included, as detailed in the IARP.

Most of the calculations are straight forward as all facilities have associated detailed drawings and quantities.

2.3 Unit Costs

2.3.1 Equipment Rates

Equipment rates were provided by an independent construction contractor (Delta/Carter Construction) who visited site in 2014 and reviewed in detail all the work required. These rates represent 2014 CAD dollars.

2.3.2 Labour Rates

Labor rates were also provided by the contractor. The labour rates do not include the costs of camp accommodation or travel to and from site, which are included separately within the estimate.

2.3.3 Material Costs

Estimates of material costs were derived from the following sources:

- Specific vendor quotes;
- Specific costs from third party consultants;

- Cost Mine 2013
- Environmental Remediation Cost Data – Unit price 11th Annual Edition, (Martin et al 2004); and
- Contractor experience on other projects.

It should be noted that there is significant working equipment located at site such as dozers, excavators, graders, trucks, small vehicles that could be utilized as part of the reclamation work. However, it has been assumed that these will not be available.. Furthermore, there is approximately 2.3mm litres of fuel at site available to complete the work which is more than sufficient however it has again been assumed that fuel will be transported to site for the work.

2.4 Indirect Costs

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

2.4.1 Mobilization and Demobilization

The mob-demob costs were included as a lump sum in the cost estimate. The details of the costs are provided in the closure cost estimate.

Mobilized equipment was assumed to originate from Yellowknife, NWT. Equipment is then hauled by ice road to site.

2.4.2 General and Administration Costs

Labour benefits were included in the labour unit costs.

Travel allowance and flight charter flight (for crews larger than 12) was included in the estimate.

Camp costs were included in addition to a camp management rate for the duration of the project. It has been assumed that the existing camp will be used as it has recently been upgraded.

2.4.3 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.

2.4.4 Engineering and Consultants Services

The costs associated with site visits, sample analysis, and reporting are included in this category.

2.4.5 Contingency

A contingency of 10% of direct costs (excluding the cost of shipping and disposing of the demolition waste off site) was added to the estimate. Based on the fact that the site has operated for many years, the ice road costs are well documented and quantities are well defined and this is considered a proper contingency amount

2.4.6 Post-closure Monitoring

Appropriate sums were included for each of the various post-closure monitoring items, according to the schedule showing the required frequency and duration. Post closure monitoring will be carried out on a decreasing frequency over time.

3 Compatibility with Reclaim

The Canadian Government liability estimate is required by Aboriginal Affairs and Northern Development Canada (AANDC), formerly Indian and Northern Affairs Canada. AANDC requires that a spreadsheet model (RECLAIM) 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. 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 most 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. This was done by having a contractor visit to the site in 2014 and review rates and change where applicable. However based on the rate schedule from a previous estimate in 2012, in general an inflation rate was applied to reflect 2014 rates to the work schedules. 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.

Appendix B:

Lupin Mines Closure and Reclamation Cost Estimate

SUMMARY OF COSTS

CAPITAL COSTS

COMPONENT TYPE	COMPONENT NAME	TOTAL COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT	0	$0	$0	$0
UNDERGROUND MINE	0	$439,639	$0	$439,639
TAILINGS	0	$3,935,562	$0	$3,935,562
ROCK PILE	0	$1,887,702	$0	$1,887,702
BUILDINGS AND EQUIPMENT	0	$6,664,708	$0	$6,664,708
CHEMICALS AND SOIL MANAGEMENT		$2,498,718	$0	$2,498,718
WATER MANAGEMENT		$0	$0	$0
POST-CLOSUREMONITORING AND MAINTENANCE		$830,013	$0	$830,013
	SUBTOTAL	**$16,256,343**	**$0**	**$16,256,343**
		PERCENTAGES	**0%**	**100%**
MOBILIZATION/DEMOBILIZATION		$4,917,904	0	4,917,904
PROJECT MANAGEMENT	4%	$650,254	$0	$650,254
Bonding	0%	$0	$0	$0
Taxes (GST on supplies) - est.	allowance	$0	$0	$0
Insurance	0%	$0	$0	$0
ENGINEERING	4%	$650,254	$0	$650,254
CONTINGENCY	10%	$1,625,634	$0	$1,625,634
Market Price Factor Adjustment	0%	$0	$0	$0
GRAND TOTAL - CAPITAL COSTS		**$24,100,388**	**$0**	**$24,100,388**

Underground Mine Name 1 UG Mine # *1*

ACTIVITY/MATERIAL	Unit	Qty	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
OBJECTIVE: CONTROL ACCESS								
Fence	m		#N/A	0	$0		$0	$0
Signs	each		#N/A	0	$0		$0	$0
Ditch, mat'l A	m3		#N/A	0	$0		$0	$0
, mat'l B	m3		#N/A	0	$0		$0	$0
Berm	m3		#N/A	0	$0		$0	$0
concrete wall in 2 portals	m3		#N/A		$0		$0	$0
backfill portal #1	m3		#N/A	0	$0		$0	$0
backfill portal #2	m3		#N/A	0	$0		$0	$0
cap 5 raises	m3		#N/A	0	$0		$0	$0
cap raise #2	m3		#N/A	0	$0		$0	$0
Cap shaft - 5	each	5	SRS	85656	$428,282		$0	$428,282
cap shaft #1	m3		#N/A	0	$0		$0	$0
cap shaft #2	m3		#N/A	0	$0		$0	$0
backfill audits	m3	1000	DSH	3.4945	$3,494		$0	$3,494
backfill open stope	m3	2,250	DSH	3.4945	$7,863		$0	$7,863
concrete cap over open stope	m3		#N/A	0	$0		$0	$0
other			#N/A	0	$0		$0	$0
	m3		#N/A	0	$0		$0	$0
OBJECTIVE: FLOOD MINE			#N/A					
Bulkheads to control water flow	each		#N/A	0	$0		$0	$0
supply/install pump & piping system	each		#N/A	0	$0		$0	$0
operate pumps to flood workings	m3		#N/A	0	$0		$0	$0
	m3		#N/A	0	$0		$0	$0
other			#N/A	0	$0		$0	$0
OBJECTIVE: HAZARDOUS MATERIALS			#N/A					
remove hazardous materials, U/G labor	mandays		#N/A		$0		$0	$0
off-site disposal costs on Chemicals sheet			#N/A					
remove/decontam. stationary & elect. equ	mandays		#N/A		$0		$0	$0
remove/decontam. mobile equipment	each		#N/A	0	$0		$0	$0
Remove misc. haz. mat & explosives	kg		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
SPECIALIZED ITEMS			#N/A					
install water quality monitoring pipes	each		#N/A	0	$0		$0	$0
intall permanent pumping system	each		#N/A	0	$0		$0	$0
other			#N/A	0	$0		$0	$0
				Subtotal	$439,639	0%	$0	$439,639

Pct Land	Total Land	Total Water

COMMENTS:

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

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
OBJECTIVE: CONTROL ACCESS									
Fence	m		#N/A	0	$0		$0	$0	
Signs	each		#N/A	0	$0		$0	$0	
Ditch, mat'l A	m3		#N/A	0	$0		$0	$0	
, mat'l B	m3		#N/A	0	$0		$0	$0	
Berm	m3		#N/A	0	$0		$0	$0	
Block roads	m3		#N/A	0	$0		$0	$0	
Other			#N/A	0	$0		$0	$0	
OBJECTIVE: STABILIZE EMBANKMENT			#N/A						
toe buttress, drainage layer	m3		#N/A	0	$0		$0	$0	
toe buttress, bulk fill	m3		#N/A	0	$0		$0	$0	
Rip rap	m3	80000	RB4s	15.2	$1,216,000		$0	$1,216,000	
Vegetate	ha		#N/A	0	$0		$0	$0	
Raise crest	m3		#N/A	0	$0		$0	$0	
Flatten slopes	m3		#N/A	0	$0		$0	$0	
Other			#N/A	0	$0		$0	$0	
OBJECTIVE: COVER TAILINGS			#N/A						
Soil cover	m3	241328	SB2S	7.24	$1,748,138		$0	$1,748,138	
Soil cover - starter cell	m3		#N/A	0.00	$0		$0	$0	
geofabric cost and install 30% area - starter cell	m2		#N/A	0.00	$0		$0	$0	
Soil cover - east cell	m2		#N/A	0.00	$0		$0	$0	
geofabric cost and install 60% area - east cell	m2		#N/A	0.00	0		$0	$0	
Soil cover - west cell	m3		#N/A	0.00	$0		$0	$0	
geofabric cost and install - west cell	m2		#N/A	0.00	0		$0	$0	
Vegetate	m2		#N/A	0.00	$0		$0	$0	
cover shortfall - processing cost only	m3		#N/A	0.00	$0		$0	$0	
OBJECTIVE: BURY PAG ROCK			#N/A						
Relocate PAG rock	m2		#N/A	0.00	$0		$0	$0	
place cover over PAG rock	m3		#N/A	0.00	$0		$0	$0	
Raise crest	m2		#N/A	0	$0		$0	$0	
Other	m3		#N/A	0	$0		$0	$0	
OBJECTIVE: FLOOD TAILINGS			#N/A						
Ditch, mat'l A	m3		#N/A	0	$0		$0	$0	
, mat'l B	m3		#N/A	0	$0		$0	$0	
Doze Tailings to final contour	m3		#N/A	0	$0		$0	$0	Included in unit rate in Line 21
Raise crest of dam	m3		#N/A	0	$0		$0	$0	
Other			#N/A	0	$0		$0	$0	
OBJECTIVE: TREAT SUPERNATANT			#N/A						
Pump water	m3		#N/A	0	$0		$0	$0	
Supply reagents	tonne		#N/A	0	$0		$0	$0	
Operate treatment plant	m3		#N/A	0	$0		$0	$0	
Other			#N/A	0	$0		$0	$0	

Tailings Impoundment Name: **Pond # 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
OBJECTIVE: UPGRADE SPILLWAY			#N/A					
Excavate channel, rock	m3		#N/A	0	$0		$0	$0
excavate channel, soil	m3		#N/A	0	$0		$0	$0
Concrete	m3		#N/A	0	$0		$0	$0
Rip rap	m3	20000	RB4H	28.371708	$567,434		$0	$567,434
Other			#N/A	0	$0		$0	$0
OBJECTIVE: STABILIZE DECANT SYSTEM			#N/A					
excavate and replace	m3		#N/A	0	$0		$0	$0
Plug/backfill with concrete or clay	m3		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
OBJECTIVE: REMOVE TAILINGS DISCHARGE			#N/A					
Cyclones	m3		#N/A	0	$0		$0	$0
Pipe	m	6000	ppls	57.33	$343,990		$0	$343,990
Remove reclaim barge	each		#N/A	0	$0		$0	$0
SPECIALIZED ITEMS			#N/A					
install permanent instrumentation, supply & technican	each	1	#N/A	60000	$60,000		$0	$60,000
install permanent instrumentation, drilling	each	8	#N/A	0	$0			$0
				Subtotal	$3,935,562	0%	$0	$3,935,562
						Pct Land	Total Land	Total Water

Rock Pile Name: **Rock Pile #: *1***

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
OBJECTIVE: STABILIZE SLOPES								
Flatten slopes with dozer	m3		#N/A	0	$0		$0	$0
Flatten "bubble dump" areas	m3		#N/A		$0		$0	$0
Divert runon, ditch mat'l A	m3		#N/A	0	$0		$0	$0
, ditch mat'l B	m3		#N/A	0	$0		$0	$0
Toe buttress, drain mat'l	m3		#N/A	0	$0		$0	$0
, fill mat'l A	m3		#N/A	0	$0		$0	$0
, fill mat'l B	m3		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
OBJECTIVE: COVER DUMP			#N/A					
Mat'l A	m3		#N/A	0	$0		$0	$0
Mat'l B	m3		#N/A	0	$0		$0	$0
Rip rap	m3		#N/A	0	$0		$0	$0
Vegetate	ha		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
VERY LOW PERMEABILITY COVER			#N/A					
supply geomembrame, HDPE, ES3, GCl	m2		#N/A	0	$0		$0	$0
upper and lower bedding layers	m3		#N/A	0	$0		$0	$0
install geomembrane, HDPE, ES3, GCL	m2		#N/A	0	$0		$0	$0
erosion protection layer	m3		#N/A	0	$0		$0	$0
vegetate	ha		#N/A	0	$0		$0	$0
install infiltration/seepage instrumentatio	allow		#N/A	0	$0		$0	$0
OBJECTIVE: RELOCATE DUMPS			#N/A					
Load, haul, dump or doze	m3	400000	rr3l	4.7193	$1,887,702		$0	$1,887,702
Add lime	tonne		#N/A	0	$0		$0	$0
Contour reclaimed area	ha		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
SPECIALIZED ITEMS			#N/A					
install permanent instrumentation			#N/A	0	$0		$0	$0
install permanent instrumentation, drilling			#N/A		$0		$0	$0
other			#N/A	0	$0		$0	$0
				Subtotal	$1,887,702	0%	$0	$1,887,702
						% Land	Total Land	Total Water

100,000 hauled and dumped in tails for final cover with Esker-300,000m3 hauled and placed ug

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

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
OBJECTIVE: DISPOSE MOBILE EQUIPMENT									
Decontaminate and ship off-site	each		#N/A	0	$0		$0	$0	
Decontaminate, dispose on-site	each		#N/A	0	$0		$0	$0	
Other	each		#N/A	0	$0		$0	$0	
OBJECTIVE: BUILDING DECONTAMINATION & HAZ. MATERIAL REMOVAL			#N/A						
Decontaminate, oil, fuel and glycol systems	m2	8490	#N/A	22.8	$193,572		$0	$193,572	Based on 2014 contractor rate.
Decontaminate, general	mandays		#N/A	0	$0		$0	$0	
mechanical	mandays		#N/A	0	$0		$0	$0	
Electrical	mandays		#N/A	0	$0		$0	$0	
Decontaminate maintenance shop	each		#N/A	0	$0		$0	$0	
Decontaminate power plant	each		#N/A	0	$0		$0	$0	
Decontaminate bulk fuel storage	each		#N/A	0	$0		$0	$0	
Decontaminate ANFO plant	each		#N/A	0	$0		$0	$0	
Deontaminate offices/warehouse/accom	each		#N/A	0	$0		$0	$0	
Removal of asbestos siding on buildings	each		#N/A	0	$0		$0	$0	
Removal of friable asbestos on equipment	each		#N/A	0	$0		$0	$0	
Other			#N/A	0	$0		$0	$0	
OBJECTIVE: REMOVE BUILDINGS - MOTHBALL BUILDINGS			#N/A						
Sleepers and Offices	m2	7329	BRS1S	128.00	$938,112		$0	$938,112	
Hoist Room and Travel Ways	m2	463	BRS1S	128.00	$59,264		$0	$59,264	
Shaft House	m2	1253	BRS1S	128.00	$160,384		$0	$160,384	
Warehouse	m2	4671	BRS1S	128.00	$597,888		$0	$597,888	
Mill	m2	2864	BRS1S	128.00	$366,592		$0	$366,592	
Powerhouse	m2	1645	BRS1S	128.00	$210,560		$0	$210,560	
Headframe	m2	413	BRS1S	128.00	$52,864		$0	$52,864	
Airlock Building and Freshair Intake	m2	366	BRS1S	128.00	$46,848		$0	$46,848	
Pastefill Plant	m2	316	BRS1S	128.00	$40,448		$0	$40,448	
Cold Storage 2 buildings	m2	1855	BRS1S	128.00	$237,440		$0	$237,440	
Surface Mobile Shop	m2	1008	BRS1S	128.00	$129,024		$0	$129,024	
Carpenter Shop	m2	482	BRS1S	128.00	$61,696		$0	$61,696	
As Treatment Plant Building	m2	177	BRS1S	128.00	$22,656		$0	$22,656	
Pumphouse	m2	74	BRS1S	128.00	$9,472		$0	$9,472	
Explosives Storage	m2	412	BRS1S	128.00	$52,736		$0	$52,736	
Fire house	m2	31	BRS1S	128.00	$3,968		$0	$3,968	
Emergency Power House	m2	117	BRS1S	128.00	$14,976		$0	$14,976	
Weather Station and Storage Buildings	m2	566	BRS1S	128.00	$72,448		$0	$72,448	
Shop	m2	379	BRS1S	128.00	$48,512		$0	$48,512	
Batch Plant	m2	118	BRS1S	128.00	$15,104		$0	$15,104	
ATV Building	m2	172	BRS1S	128.00	$22,016		$0	$22,016	

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

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
OBJECTIVE: BREAK BASEMENT SLABS			#N/A					
Building 1- Accom. Complex	m2		#N/A	0	$0		$0	$0
Building 2 -Process Facilities	m2		#N/A	0	$0		$0	$0
Building 3 -Offices, Repair, Lab, Warehouse	m2		#N/A	0	$0		$0	$0
Building 4 -Storage Facilites	m2		#N/A	0	$0		$0	$0
Building 5 -Water and Wastewater Treatment Facilities	m2		#N/A	0	$0		$0	$0
Building 6 -U/G Heating Plant	m2		#N/A	0	$0		$0	$0
Building 7 - Emulsion Plant	m2		#N/A	0	$0		$0	$0
Building 8 -Warehouse, Shops and Other	m2		#N/A	0	$0		$0	$0
	m2		#N/A	0	$0		$0	
	m2		#N/A	0	$0		$0	$0
Other			#N/A	0	$0		$0	$0
OBJECTIVE:REMOVE TANKS /PIPES								
3 - 360,000 gallon tanks	m2	1638	BRS2S	91.57	$149,992		$0	$149,992
7 - 350,000 gallon tanks	m2	3822	BRS2S	91.57	$349,981		$0	$349,981
3 - 187,000 gallon tanks	m2	1020	BRS2S	91.57	$93,401		$0	$93,401
6- 14,000 gallon tanks	m2	390	BRS2S	91.57	$35,712		$0	$35,712
11 - 20,000 gallon tank	m2	1540	BRS2S	91.57	$141,018		$0	$141,018
2- 5,000 gallon tanks	m2	80	BRS2S	91.57	$7,326		$0	$7,326
Piping	m	2000	PPLS	57.3317	$114,663		$0	$114,663
OBJECTIVE: LANDFILL FOR DEMOLITION WASTE			#N/A					
Isolate Buildings (waste,water,glycol,sewer)	m2	24562	BDCS	12.63	$310,239		$0	$310,239
Bone Yard Clean Up		1	#N/A	350000	$350,000		$0	$350,000
Operation of Landfill		1	#N/A	450000	$450,000		$0	$450,000
OBJECTIVE: GRADE AND CONTOUR			#N/A					
Grade/Contour Entire Mine Site Area	m2	230000	SB2L	4.47206	$1,028,573		$0	$1,028,573
Concrete Slab Removal	m2	25000	BRCS	7.27821	$181,955		$0	$181,955
Building 1- Accom. Complex	ha		#N/A	0	$0		$0	$0
Building 2 -Process Facilities	ha		#N/A	0	$0		$0	$0
Building 3 -Offices, Repair, Lab, Warehouse	ha		#N/A	0	$0		$0	$0
Building 4 -Storage Facilites	ha		#N/A	0	$0		$0	$0
Building 5 -Water and Wastewater Treatment Facilities	ha		#N/A	0	$0		$0	$0
Building 6 -U/G Heating Plant	ha		#N/A	0	$0		$0	$0
Building 7 - Emulsion Plant	ha		#N/A	0	$0		$0	$0
Building 8 -Warehouse, Shops and Other	ha		#N/A	0	$0		$0	$0
place rock cover	m3		#N/A	0	$0		$0	$0
Vegetate	ha		#N/A	0	$0		$0	$0
other	m3		#N/A	0	$0		$0	$0

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

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
OBJECTIVE: LINED SUMPS			#N/A					
puncture liner and place soil cover	m3		#N/A	0.00	$0		$0	$0
OBJECTIVE: RECLAIM ROADS			#N/A					
Scarify and install water breaks	km	12	SCFYS	6272.39	$75,269		$0	$75,269
Remove culverts	each		#N/A	0	$0		$0	$0
Remove bridges	each		#N/A	0	$0		$0	$0
Scarify and install water breaks	ha		#N/A	0	$0		$0	$0
Grade airstriip	1	1	#N/A	20000	$20,000		$0	$20,000
scarify laydown areas	ha		#N/A	0	$0		$0	$0
Vegetate	ha		#N/A	0	$0		$0	$0
other			#N/A	0	$0		$0	$0
SPECIALIZED ITEMS			#N/A					
Dispose of misc. debris and laydown area refuse	m3		#N/A	0	$0		$0	$0
				Subtotal	$6,664,708	0%	$0	$6,664,708
						Pct Land	Total Land	Total Water

All work includes removal of Culverts(22 total)

1 Chemicals and Soil Contamination:

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.								
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HAZARDOUS MATERIALS AUDIT								
Phase 1 audit	each		#N/A	50000	$0	100%	$0	$0
Phase 2 audit	each		#N/A	25000	$0	100%	$0	$0
HAZARDOUS MATERIALS TO BE CONSOLIDATED FOR REMOVAL								
Waste oils	litre		#N/A	0.00	$0		$0	$0
Fuel - Type 1, eg diesel dregs	litre		#N/A	0	$0		$0	$0
Fuel - Type 1, eg gasoline dregs	litre		#N/A	0	$0		$0	$0
waste batteries	kg		#N/A	0	$0		$0	$0
assay & environmental lab reagents	pallet		#N/A	0	$0		$0	$0
machine shop, paints, solvents etc	litre		#N/A	0.9	$0		$0	$0
contaminated soils - hydrocarbon	m3		#N/A	0	$0		$0	$0
metal contam. soil at conc. load-out	m3		#N/A	0	$0		$0	$0
glycol	litre		#N/A	1.15	$0		$0	$0
HAZARDOUS MATERIALS			#N/A					
Transportation to disposal facility	allow		#N/A	0	$0		$0	$0
Disposal fees	allow		#N/A	0	$0		$0	$0
other			#N/A	0	$0		$0	$0
CONTAMINATED SOILS			#N/A					
Type 1, light fuel	m3		#N/A	0	$0		$0	$0
Type 2, heavy fuel and oil	m3	40000	CSRS	60.174	$2,406,967		$0	$2,406,967
Type 3, metals	m3	2000	CSOSS	5.7309	$11,462		$0	$11,462
Other contaminants	m3	800	CSOSS	5.7309	$4,585		$0	$4,585
Contam. soil investigation - technical	each		#N/A	0	$0		$0	$0
Contam. soil investigation - drilling & samplin	each		#N/A	0	$0		$0	$0
Haz. Mat. testing & assessment								
Technician and analyses	each	1	#N/A	0	$37,853		$0	$37,853
Drilling	each	1	#N/A	0	$21,630		$0	$21,630
Report	each	1	#N/A	0	$16,223		$0	$16,223
CONTAMINATED SOIL REMOVAL	m3		#N/A		$0		$0	$0
contaminated soils - hydrocarbon	m2		#N/A	0	$0		$0	$0
. metal contam. soil at conc. load-out	m3		#N/A	0	$0		$0	$0
. Load, haul, dump or doze	m3		#N/A	0	$0		$0	$0
. Reagents/stabilizing agent	m2		#N/A	0	$0		$0	$0
Contour reclaimed area	m3		#N/A	0	$0		$0	$0
. Type 2, heavy fuel and oil	drums		#N/A	155	$0		$0	$0
. CONTAMINATED SOIL VERY LOW PERMEABILITY COVER			#N/A					
. supply geomembrame, HDPE, ES3, GCL	m2		#N/A	0	$0		$0	$0
. upper and lower bedding layers	m3		#N/A	0	$0		$0	$0
. install geomembrane, HDPE, ES3, GCL	m2		#N/A	0	$0		$0	$0
. erosion protection layer	m3		#N/A	0	$0		$0	$0
vegetate	m2		#N/A	0	$0		$0	$0
. install infiltration/seepage instrumentation	allow		#N/A	0	$0		$0	$0
. other			#N/A	0	$0		$0	$0
. OTHER			#N/A					
.			#N/A	0	$0		$0	$0
Subtotal					$2,498,718	0%	$0	$2,498,718
						Pct Land	Total Land	Total Water

1 Mobilization:

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
A	MOBILIZE HEAVY EQUIPMENT								
	Equipment to regional centre								
	Mobilization - ICE ROAD	ea	1	MHER1S	2076450	$2,076,450		$0	$2,076,450
	Demobilization - ICE ROAD	ea	1	MHEA1S	1342000	$1,342,000		$0	$1,342,000
.	Excavators	each	1	#N/A	150000	$150,000		$0	$150,000
.	Dump trucks	each	1	#N/A	50000	$50,000		$0	$50,000
	Dozers	each	1	#N/A	150000	$150,000		$0	$150,000
	Demolition shears	each	2	#N/A	150000	$300,000		$0	$300,000
	Crane	each	1	#N/A	150000	$150,000		$0	$150,000
	Light duty vehicles	each	3	#N/A	20000	$60,000		$0	$60,000
.	loader	each	1	#N/A	150000	$150,000		$0	$150,000
.	Other	each		#N/A	0	$0		$0	$0
	Equipment, regional centre to site			#N/A					
.	Excavators	km		#N/A	0.00	$0		$0	$0
.	Dump trucks	km		#N/A	0	$0		$0	$0
	Dozers	km		#N/A	0	$0		$0	$0
	Demolition shears	km		#N/A	0	$0		$0	$0
	Crane	km		#N/A	0	$0		$0	$0
	Light duty vehicles	km		#N/A	0	$0		$0	$0
.	loader	km		#N/A	0	$0		$0	$0
.	Other	km		#N/A	0	$0		$0	$0
B	MOBILIZE CAMP			#N/A					
.		allow		#N/A	100000	$0		$0	$0
C	MOBILIZE WORKERS			#N/A					
	crew travel time	andays		#N/A	600	$0		$0	$0
.	crew transportation	each		#N/A	0	$0		$0	$0
D	MOBILIZE MISC. SUPPLIES			#N/A					
.	Fuel	litre	0	#N/A	1.3	$0		$0	$0
.	Minor tools and equipment	allow		#N/A	100000	$0		$0	$0
.	Truck tires	allow		#N/A	50000	$0		$0	$0
	Delivery	k loads		#N/A	6033	$0		$0	$0
E	WORKER ACCOMODATIONS			#N/A					
.		manmths	220	accmh	2224.79136	$489,454		$0	$489,454
F	WINTER ROAD			#N/A				$0	$0

tested usable fuel at site for use in work.

1 Mobilization:

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
.	3 year, const & operate section into Sna	km		#N/A	0	$0		$0	$0
.	Limited winter use	km		#N/A	0	$0		$0	$0
.	Winter road tariff, 20,000T x 222 km	km		#N/A	0.11	$0		$0	$0
G	INTERIM CARE & MAINTENANCE			#N/A					
	on-site caretaker	annual		#N/A	95000	$0			
	spring extra personnel	months	3	#N/A	23750	$71,250			
	fuel and misc. supplies	litre		#N/A	0.6	$0			
	electrician	each		#N/A	3300	$0			
	mechnaic	each	2	#N/A	3300	$6,600			
	pick-up truck	each		#N/A	15000	$0			
	small dozer	allow		#N/A	25000	$0			
	small excavator	allow		#N/A	0	$0			
	snow machine	allow		#N/A	3000	$0			
	communications	allow	1	#N/A	25000	$25,000			
	Water licence sampling & reporting	each		#N/A	450000	$0			
	Geotechnical assessment	each	2	#N/A	10000	$20,000			
	Other	each		#N/A	0	$0			
				#N/A	annual C&M cost	$122,850			
	Total C&M cost	years		#N/A	5	$0		$0	$0
					Subtotal	$4,917,904	0%	$0	$4,917,904
							Pct Land	Total Land	Total Water

1 Post-Closure Monitoring & Maintenance:

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost	
A	OBJECTIVE: MONITORING & INSPECTIONS									
	Annual geotechnical insp.	each	10	VIS	$22,923	$229,235		$0	$229,235	
	Monitoring years 1-10	year	3	SIS	$100,000	$300,000		$0	$300,000	includes maintenance
	EEM	each	1	RPTS	$126,079	$126,079		$0	$126,079	
.	Survey inspection	each		#N/A	$0	$0		$0	$0	
.	Surface water sampling	each	10	wsl	$6,180	$61,800		$0	$61,800	
	Groundwater Sampling	each		#N/A	$0	$0		$0	$0	
	Receiving/downstream water sampling	each	10	wsl	$6,180	$61,800		$0	$61,800	
	Monitoring program as per plan	each		#N/A		$0		$0	$0	
.	on-site transportation	each		#N/A	$0	$0		$0	$0	
	transporation to site	each		#N/A	$0	$0		$0	$0	
.	Other			#N/A	$0	$0		$0	$0	
B	OBJECTIVE: COVER MAINTENANCE			#N/A						
.	Repair erosion - infill gullies	allow		#N/A	$0	$0		$0	$0	
.	Repair erosion - upgrade diversion ditches	allow		#N/A	$0	$0		$0	$0	
.	Remove problem vegetation	allow		#N/A	$0	$0		$0	$0	
.	Repair animal damage	allow		#N/A	$0	$0		$0	$0	
.	Repair/upgrade access controls	allow		#N/A	$0	$0		$0	$0	
	Other			#N/A	$0	$0		$0	$0	
C	SPILLWAY MAINTENANCE			#N/A						
	Repair erosion	m3		#N/A	$0	$0		$0	$0	
	Clear spillway	each		#N/A	$0	$0		$0	$0	
	Other			#N/A	$0	$0		$0	$0	
D	POST-CLOSURE WATER TREATMENT			#N/A						
	Annual water treatment cost, from Ongoing water			#N/A		$0		$0	$0	
	Subtotal, Annual post-closure costs					$778,914		$0	$778,914	
	Discount rate for calculation of net present value of post-closure cost, %		0.00%							
	Number of years of post-closure activity		1	years						
	Present Value of payment stream years 0-10					$778,914	$0	$0	$778,914	
	Present Value of payment stream years 10-25 with NPV 3%					$51,100			$51,100	
	SUBTOTAL OF POST-CLOSURE MONTIORING AND MAINTENANCE					**$830,013**			**$830,013**	
							Pct Land	Total Land	Total Water	

SUPP LONGTERM MONITORING

Year			
1	$35,283		
2	$35,283		
3	$261,362		
4	$35,283		
5	$35,283		
6	$135,283		
7	$35,283		
8	$35,283		
9	$135,283		
10	$35,283	NPV 0-10yrs	$778,964.00
11			
12			
13			
14			
15	$35,283		
16			
17			
18			
19			
20			
21			
22			
23			
24			
25	$35,283	NPV 10-25yrs	$51,100
Total	$814,192	NPV 0-25yrs	$830,063.73

Unit Cost Table

this version updated Sep-14

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Alberta Road Builders & Heavy Construction Association
BC Road Builders Blue Book at : www.roadbuilders.bc.ca

Specified unit rates where applicable used for this cost estimate were updated to reflect 2014 costs by Contractor, otherwise inflation rate used.

Year of update	**2014**
Yearly average inflation rate	**1.7%**

ITEM	Detail	COST CODE	UNITS	LOW $	HIGH $	SPECIFIED $	COMMENTS
excavate Rock, Bulk							
	drill, blast, load short haul (<500m) Dump	RB1	m3	$10.51	$15.73	#N/A	quarry operations for bulk fill
	RB1 + long haul, up to 1500 m	RB2	m3	$11.12	$16.41	#N/A	
	RB1 + spread and compact	RB3	m3	$11.12	$16.41	#N/A	
	RB1 + long haul + spread and compact	RB4	m3	$11.74	$28.37	$15.20	
	RB1 + Specified activity	RBS	m3	$12.09	#N/A	#N/A	use low and add 15% premium for work done in winter
excavate Rock, Controlled							
	drill, blast, load short haul (<500m) Dump	RC1	m3	$26.01	$37.08	#N/A	low - foundation excavation, high - spillway excavation
	RC1 + long haul, up to 1500 m	RC2	m3	$11.74	$16.97	#N/A	
	RC1 + spread and compact	RC3	m3	$11.12	$16.41	#N/A	
	RC1 + long haul + spread and compact	RC4	m3	$12.47	$17.67	#N/A	
	RC1 + Specified activity	RCS	m3	#N/A	$200.00	$159.73	$145/M3-drift excavation
excavate Soil, Bulk							
	clear & grub	SBC	m2	$3.12	$0.00		
	excavate, load short haul (<500m) dump	SB1	m3	$3.96	$5.45	#N/A	LOW cost: excavation of loose soil, high volume
	SB1 + long haul, up to 1500 m	SB2	m3	$4.47	$6.71	$7.24	LOW cost: excavation of loose soil, 1.5 km haul, high volume. Pro-rated from Actual Cost Incured in 2005 with RTL
	SB1 + spread and compact	SB3	m3	$4.16	$5.97	#N/A	
	SB1 + long haul + spread and compact	SB4	m3	$5.06	$10.06	#N/A	LOW cost: excavation of loose soil, 1.5 km haul, high volume, const. of simple soil cover
	SB1 + Specified activity	SBS	m3	$2.60	$7.17	$12.06	LOW cost: rehandle waste rock dump into pit, pond up to 3, 0 km haul SPECIFIED cost: rehandle waste rock, haul 3 km, place & compact on dam
	other			$0.00	$0.00	$5.45	LOW cost: doze frost heaves HIGH cost: contour - wet or frozen, Specialized - haul/place wet infill
	Soil, tailings	SBT	m3	$1.25	$3.40	$14.28	

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Alberta Road Builders & Heavy Construction Association

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excavate Soil, Controlled						
excavate, load						
short haul (<500 m), dump	SC1	m3	$6.30	$8.60	#N/A	
SC1 + long haul, up to 1500 m	SC2	m3	$7.81	$10.83	#N/A	
SC1 + spread and compact	SC3	m3	$6.30	$13.10	#N/A	HIGH cost: for simple soil covers
SC1 + long haul + spread and compact	SC4	m3	$7.08	$21.41	#N/A	HIGH cost: for complex covers & dam construction, spillway repair, LOW volume
SC1 + Specified activity	SCS	m3	#N/A	$22.89	$17.35	SPECIFIED cost: backfill adit with waste rock, High - sand bedding layer for liners
Geo-synthetics						
geotextile, filter cloth	GST	M2	$1.11	$3.12	#N/A	high - FOB Yellowknife
geogrid	GSG	M2	$5.31	$0.00	#N/A	
liner, HDPE	GSHDPE	M2	$6.62	$0.00	#N/A	
liner, ES3	GSES3	m2	$18.62	$0.00		low, FOB Yellowknife
liner, PVC	GSPVC	M2	$0.00	$0.00	#N/A	
geosynthetic installation	GSI	m2	$0.93	$13.01	#N/A	low, geotextile, high - ES3 or HDPE
bentonite soil ammendment	GSBA	tonne	$284.28	$321.36	#N/A	FOB Edmonton, add shipping & mixing
Shaft, Raise & Portal Closures						
Shaft & Raises	SR	m2	$595.52	$1,966.36	$85,656.45	LOW cost: pre-cast concrete slabs, little site prep. HIGH cost: for hand construction, remote site. Pro-rated from HAZCO Quote 2005
Portals	POR	m3	$0.00	$230.34	$1,101.60	HIGH cost: for excavate & backfill collapsed portal SPECIFIED cost: installed pressure plug
Concrete work						
Small pour, no forms	CS	m3	$333.72	$668.56	#N/A	
Large pour, no forms	CL	m3	$264.05	$393.27	#N/A	
Small pour, Formed	CSF	m3	$393.27	$1,966.36	#N/A	
Large pour, Formed	CLF	m3	$325.85	$460.69	#N/A	
Vegetation						
Hydroseed, Flat	VHF	ha	$1,792.19	$5,561.98	#N/A	
Hydroseed, Sloped	VHS	ha	$2,076.47	$6,241.78	#N/A	
veg. Blanket/erosion mat	VB	ha	$12,359.95	$14,831.94	#N/A	
Tree planting	VT	ha	$12,359.95	$14,831.94	#N/A	
Wetland species	VW	ha	$61,799.76	$92,699.64	#N/A	
Pumps						
Small, <	PS	each	$3,370.90	$6,741.79	#N/A	
Large, >	PL	each	$5,618.16	$112,363.20	#N/A	large - 250 hp Gould w/diesel motor
PiPes						
Small, < 6 inch diameter	PPS	m	$0.56	$5.62	#N/A	LOW cost: pipe removal, HIGH cost: supply new pipe SPECIFIED: small, heat traced & insulated pipe
Large, > 6 inch diameter	PPL	m	$1.12	$202.25	$57.33	LOW cost: pipe removal, HIGH cost: supply 24" 100 psi HDPE pipe, FOB Edm.
Fuel Contaminated	PPF	m	$1.08	$194.67	$50.02	LOW, HIGH, SPECIFIED: 2005 Quote not located add shipping & installation

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pump sand BackFill	BF	m3	$6.18	$18.54	#N/A	
Fence	F	m	$12.48	$187.27	#N/A	
Signs	S	each	$12.36	$37.08	#N/A	
rock, Drill and Blast only	DB	m3	$12.36	$24.72	#N/A	
excavate Rip Rap						
drill, blast, load short haul (<500 m) dump and spread	RR1	m3	$12.30	$18.37	#N/A	
RR1 + long haul	RR2	m3	$12.47	$19.05	#N/A	HIGH cost: quarry & place rip rap in channel
excavate rock from waste dump, short haul, spread	RR3	m3	$4.72	$6.49	#N/A	LOW cost: removal of 18 in minus from dump, long haul and spread
RR3 + long haul	RR4	m3	$5.26	$7.02	#N/A	
specified rip rap source	RR5	m3	#N/A	#N/A	#N/A	
Import LimeStone	ILS	tonne	$9.89	$14.83	#N/A	
Import LiMe	ILM	tonne	$187.27	$556.61	#N/A	Not applicable- on site
Grouting	G	m3	$350.00	$500.00	#N/A	HIGH cost: cement, FOB Yellowknife
Dozing						
doze Rock piles	DR	m3	$0.96	$2.19	#N/A	LOW cost: doze crest off dump
doze overburden/Soil piles	DS	m3	$0.88	$3.49	#N/A	HIGH cost: push up to 300 m
		each	$0.00	$0.00	#N/A	
		each	$0.00	$0.00	#N/A	
Buildings - Decontaminate						
Isolate (glycol, water,sewer,power)	BDC	m3	#N/A	#N/A	$12.63	SPECIFIED: from revision 5.1. Source of quote not located
Asbestos	BDA	m2	$23.60	$47.19	#N/A	LOW cost: removal of asbestos siding & flooring HIGH cost: removal of insulated pipes, friable asbestos
			$0.00	$0.00	$0.00	
Buildings - Remove						
areas are per floor on 3 m average height			$0.00	$0.00	$0.00	LOW cost: removal and on-site disposal - small wooden structures
Wood - teardown	BRW1	m2	$24.16	$37.08	#N/A	
Wood - burn	BRW2	m2	$6.18	$11.24	#N/A	**high cost: wooden tent structures**
Masonry	BRM	m2	$26.57	$37.08	#N/A	
Concrete	BRC	m	$37.08	$55.62	$7.28	
Steel - teardown	BRS1	m2	$43.20	$63.30	$128.00	Costs of $128/m2 reflects clean up , decontaminate, teardwon and cutting(Where appropiate) and also concrete break-up and dozing.
Steel - salvage	BRS2	m2	$12.30	$28.80	$91.57	2014 contractor rate.
Power & Pipe Lines						
Power lines, remove	POWR	each	$23.48	$5,191.18	#N/A	
		kg	$0.00	$1.77	#N/A	

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Laboratory Chemicals						
Remove from site	LCR	pallet	$2,800.00	$3,700.00	#N/A	
Dispose on site	LCD	each	#N/A	#N/A	#N/A	
PCB - Remove from site	PCBR	litre	$37.08	$43.26	#N/A	LOW cost: shipping, handling & disposal from Yellowknife
			$0.00	$0.00	$0.00	
Fuel						
Remove from site	FR	kg	$1.23	$1.77	#N/A	
Burn on site	FB	kg	#N/A	#N/A	#N/A	
Oil						
Remove from site	OR	litre	$0.39	$1.15	#N/A	
Burn on site	OB	litre	$0.39	$0.62	#N/A	
Process Chemicals						
Remove from site	PCR	kg	$0.39	$2.30	#N/A	
Dispose on site	PCD	kg	#N/A	#N/A	#N/A	
Explosives						
Remove from site	ER	kg	$0.00	$2.47	#N/A	
Dispose on site	ED	kg	#N/A	#N/A	#N/A	
Contaminated Soils						LOW cost: bio-remediate on-site. HIGH cost: ship off-site to landfil as haz. Waste. SPECIFIED: from revision 5.1
Remediate on site	CSR	m3	$43.26	$134.84	$60.17	
Dispose off-site	CSOS	m3			$5.73	
environmental investigation	CSEI	each	$2,080.80	$0.00		
consolidate & cover	Use cost code items		$0.00	$0.00	$0.00	
cover in place	Use cost code items		$0.00	$0.00	$0.00	
Landfill						
Mobilize Heavy Equipment						
Mobilize	MHER1	each	$3.04	$9.11	$2,076,450.00	SPECIFIED:2014 Quote- includes 48 twin otter flights, 20 dash 7 flights and 5 Herc flights, for crews and supplies over decomissioning period.
Demobilize	MHEA1	each	#N/A	#N/A	$1,342,000.00	SPECIFIED:2014 Quote includes all loads backhauled from site.
Road access	MHER	$/km	$3.16	$9.46	$2.26	SPECIFIED cost: $/tonne/km in cargo plane
Air access	MHEA	each	#N/A	#N/A	$1,514.70	SPECIFIED cost: helicopter cost, $/hr of operation
Mobilize Camp						
<20 persons Road access	MC<R	each	#N/A	#N/A	#N/A	
<20 persons Air access	MC<A	each	$1,530.00	#N/A	#N/A	**cost of tents and equipment**
Mobilize Workers						
mobilize	MM<	person	$3,121.20	$6,138.36	$0.00	**crew flight from yellowknife low:turbo beaver, high helicopter/twin otter**
>20 persons	MM>	person	$3,121.20	$6,138.36	#N/A	

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crew travel time	MTT	hr	$39.33	$42.66	$0.00	
ACCoModation	ACCM	month	$1,483.19	$2,224.79	#N/A	LOW cost, accom in existing camp, per man, HIGH cost: - supply new camp
Mobilize Misc. Supplies	MMS	each	#N/A	#N/A	$1,473.90	**removal of 20 kw generator 404 kg; 10 100lb propane**
Winter Road	WR	km	$1,483.19	$2,943.92	$1,890.06	Speicalized winter road to 40,000 kg capactiy
Geotechnical Inspection	VI	each	$6,500.00	$9,500.00	$22,923.49	based on 2014 quotes
Site Monitoring	SI	each	#N/A	#N/A	$401,161.14	Pro-rated From Quote for 2010 reclaim estimate
Water Sampling	WS	each	$6,179.98	$10,112.69	#N/A	
Environmental Effects Monitoring	RPT	each	#N/A	$12,359.95	$126,079.22	Pro-rated From MMG Quote 2010 reclaim estimate
Security Guard	SG	pers/mon	$6,179.98	$8,651.97	#N/A	
Maintain Pumping	MP	month	$3,707.99	#N/A	#N/A	
Clear SpillWay	CSW	each	$2,101.19	$5,932.78	#N/A	
Build Treatment Plant						
Small (< 1000 m3/d)	BTPS	lump sum	$1,123,632.00	$2,247,264.00	#N/A	
Large (> 1000 m3/d)	BTPL	lump sum	$2,247,264.00	$3,932,712.00	#N/A	
Operate Treatment Plant	OTP	m3	$0.33	$1.85	#N/A	
SCariFY road and install water breaks	SCFY	km	$3,960.80	$5,561.98	$6,272.39	
					$0.00	
Water Treatment Chemicals						
ferric sulphate	ferric	kg	$1.15	$0.00	$0.00	
ferrous sulphate	ferrous	kg	$0.49	$0.00	$0.00	
lime	lime	kg	$0.60	$0.00	$0.00	
hydrogen peroxide, 50%	hperox	kg	$1.61	$0.00	$0.00	
Sodium Metabisulfate	Nametab	kg	$1.11	$0.00	$0.00	
Caustic soda, 50%	caustic	kg	$0.70	$0.00	$0.00	
Sulfuric acid, 93%	sulfuric	kg	$0.29	$0.00	$0.00	
flocculant	flocc	kg	$6.06	$0.00	$0.00	
copper sulphate	copper	kg	$0.00	$0.00	$0.00	
typical shipping, to Whitehorse or Yellowknife		kg	$0.08	$0.00	$0.00	
			$0.00	$0.00	$0.00	
Typical Labour & Equipment Rates			$0.00	$0.00	$0.00	Labour rates &equipment rates were updated where deemed applicable and are built into overall unit costs.
Site manager	Sman	$/hr	$77.11	$98.13	$0.00	
Mine superintendent	super	$/hr	$57.12	$87.88	$0.00	
Environmental coordinator	env-co	$/hr	$57.12	$73.20	$0.00	
Journeyman (mech, elec, weld)	trade	$/hr	$60.00	$66.10	$0.00	
surveyor/mech		$hr	$63.75	$0.00	$0.00	
Equipment operator	oper	$/hr	$58.65	$77.93	$0.00	
labour - skilled	lab-s	$/hr	$65.00	$87.88	$87.88	specified - water treatment plant operator
labour - unskilled	lab-us	$/hr	$30.00	$48.00	$0.00	
Security / first aid	safety	$/hr	$38.66	$52.88	$0.00	
Admin.	admin	$/hr	$46.27	$58.33	$0.00	

Unit Cost Table this version updated Sep-14

for additional construciton cost data check the associations below, or use the Estimator Worksheet

Alberta Road Builders & Heavy Construction Association

Specified unit rates where applicable used for this cost estimate were updated to reflect 2014

			$0.00	$0.00	$0.00	
Front end loader, ?, Cat992	loader	$/hr	$282.54	$363.53	$0.00	low - 988 loader, high - 992 loader
excavator, Cat325	excav	$/hr	$293.80	$342.78	$0.00	fuel & oper. Incl.
dump truck - tandem	dumpt	$/hr	$0.00	$0.00	$0.00	fuel & oper. Incl.
dump truck off road, Cat 777	dumpo	$/hr	$291.92	$0.00	$0.00	fuel & oper. Incl.
dozer, D8, D10	dozer	$/hr	$229.50	$330.48	$0.00	
smooth drum compactor, Cat CS563	comp	$/hr	$96.90	$0.00	$0.00	fuel & oper. Incl.
scooptram, 6 yd3 bucket	scoop	$/hr	$150.96	$0.00	$0.00	fuel & oper. Incl.
flat bed truck with hiab	hiab		$133.62	$0.00	$0.00	fuel & oper. Incl.
certified mech with truck		$hr	$204.00	$0.00	$0.00	

Appendix C:

Addendum - Lupin Mines Closure Estimate Update December 2014

Addendum - Lupin Mines Closure Estimate Update – December 2014

LUPIN MINES INCORPORATED (“LMI”)

Prepared by:

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The following are notes provided as an addendum to the final cost estimate for the Lupin Mine. The notes are based on discussions and to provide clarification to the most recent conference call between LMI, its consultants and AANDC and its consultants.

The notes also reflect the most recent review of the cost estimate by LMI and the contractors/ consultants who assisted in the completion of the LMI cost estimate.

For clarity purposes, this addendum follows the format of the closure cost estimate (Appendix B of the Lupin Mines Closure Estimate).

Area/Tab: Underground Mine

The costs were updated to reflect the final cover and closure of the open areas of the mine on surface which will be partially filled with steel and pipe then covered with suitable waste rock. The area is already fenced off and this fence will be reused, when necessary.

The costs also include additional work to backfill and seal the adit.

Area/Tab: Tailings

The costs were updated to include purchase and installation of new monitoring equipment.

No updates were required on the tailings cover as the rate used was one that was based on the historic rate to provide the average 1 m of cover on the tails. This rate was based on an actual cost to load esker, truck and dump and then grade and compact in place.

The new rate is based on inflation from the time of the last work.

It should be noted that this was annotated in all previous estimates submitted for review.

Area/Tab: Rock Pile

A detailed review was completed by LMI and its consultants, SRK, on the work completed in the past by third-party consultants and the previous owners, Kinross. The review was completed to help quantify the amount of potential ARD rock that may have to be removed and relocated. In addition, options were reviewed to dispose of the rock in an acceptable manner in terms of closure. Furthermore, the review was completed to determine what further work could or should be done in the future to help better quantify the ARD issues at site.

Based on this review, LMI believes that the quantity sited by SENES (40% of the development rock) would be at the extreme end of the amount of PAG waste rock site. An estimate was completed by Kinross which quantified the amount at 50,000m^3. However, the review showed that the Kinross estimate did not have sufficient back up documentation to justify the quantity. A review was completed based on the comparison of the original terrain and current terrain contours there is strong evidence that the majority of the non-PAG rock would constitute up to 75% of the waste rock. Further work will be required, including additional field pH contact testing, XRF and test pits to quantify this percentage

number. Therefore, LMI, without additional work or data, will concur with the SENSES estimate of quantities.

The review did show that there are several suitable methods to properly deal with PAG rock for long-term closure. Those options include:

- Disposal underground in open stopes and within the ramp. Review of the underground maps and reports show that there is more than sufficient space for this option.
- Disposal of a significant amount of the rock with the current space with the existing tailings ponds prior to the final cover with the 1 m of esker material.

Based on review of the tailings reports and designs there is space for 290,000 tonnes of tailings. At a settled density of 1.6t/m^3 this equates to 180,000m^3 of space. PAG material from both the ball park area and around the mill could be suitably disposed of in these areas and then covered with esker. For the purposes of this estimate the remaining 120,000m^3 would be disposed of underground.

Another option for disposal would be to complete a sorting exercise on site to better define PAG. Concurrent with this, test pits to define depths and therefore quantities would be completed.

Depending on the results of the above, a decision could be made to sort and then rip and doze PAG rock into a pile by the mill area. This would then be properly covered with a suitable geotextile liner and the liner then covered. This method has been successfully used at other remote northern mining sites.

Area/Tab: Buildings and Equipment

No updated required.

A total of 22 culverts were included in the calculation rate to scarify roads etc.

Area/Tab: Chemicals

No update

Area/Tab: Water

No updates

Area/Tab: Mobilization

Fuel quantities removed as sufficient tested and suitable fuel is stored at site. Fuel will be tested every year and the cost estimate changed as required.

Area/Tab: Post Closure

Geotechnical inspections costs updated based on actual 2014 costs.

Three visits are allowed for to repair spillways etc. at a cost of $100,000 per visit. This will cover equipment, flights, manpower and machinery. An allowance for supplemental long-term monitoring has been added.

Area/Tab: Unit Costs

No updates

Area/Tab: Summary

All changes carried forward from above are now reflected in the Summary table.

The contingency remains at 10%. For greater clarity the contingency calculation is based on the "Individual Risk-Expected Value" method which is very suited to this type of work where several items are readily quantified such as existing building, structures, roads etc. Therefore, the amount of contingency reserve can be based on the "expected value" for individual risk events. Expected value is the mean of a probability distribution of a risk. Firstly, a risk-free estimate of known scope is produced then risk events are identified and costed in terms of an average and maximum risk allowance is calculated. There are two types of risks:

- Fixed Risk – These are events that will either happen in total or not at all e.g. whether additional fuel tanks will be required to be removed. If it happens, the maximum cost will be incurred; if not, then no risk will be incurred. The maximum risk allowance will be the cost if the risk eventuates, whilst the average cost = maximum cost * probability of its occurrence.

- Variable Risk – These are events that will occur but the extent is uncertain (e.g. depth of contaminated soil). The maximum risk allowance, which is assumed to have a 10% chance of being exceeded, is estimated based on past experience or records. The average risk allowance is estimated as the value that has a 50% chance of being exceeded, and may have a mathematical relationship to the maximum or estimated separately. This 50% level is chosen on the rationale that the worst values for all risks will not occur but rather there will be swings and roundabouts effects of the totality of the risk events identified.