Western Copper Corporation

CARMACKS COPPER PROJECT
YUKON TERRITORY

PRELIMINARY DETAILED CLOSURE AND RECLAMATION PLAN

Prepared by:

ACCESS
CONSULTING GROUP
www.accessconsulting.ca

May 2009

EXECUTIVE SUMMARY

Western Copper Corporation and their wholly owned subsidiary company Carmacks Copper Ltd. (Western Copper) are currently moving forward with the development of the Carmacks Copper Project, located in the Yukon Territory, 38 km directly northwest of the Village of Carmacks.

The "Carmacks Copper Project" consists of the development of an open pit, heap leach and copper extraction facility and events pond, crushing plant, waste rock storage area, soil stockpiles, drainage ditches and sediment control ponds, and support facilities, the general arrangement of which is shown in Figure 1-3.

The Carmacks Copper Project is subject to approvals under the provision of the Yukon Waters Act (YWA) and the Yukon Quartz Mining Act (YQMA). The issuance of Water and Quartz Mining Licenses require submission of a Reclamation and Closure Plan. As such, this Preliminary Detailed Closure and Reclamation Plan has been developed under the requirements of the YWA, YQMA and Yukon Government Mine Site Reclamation and Closure Policy.

The Carmacks Copper Project in its current form was submitted for review to YESAB on February 27, 2006. At that date, the Company filed a formal Project Proposal with YESAB which included a Conceptual Closure and Reclamation Plan (Updated 2006 – Project Proposal, Appendix F).

The original Conceptual Closure and Reclamation Plan was prepared in June 1997 and modified in May 2005, and later in August 2006 (Revision No.1), in October 2006 (Revision No.2), in November 2007 (Revision No.3), and in December 2008 to reflect the current status of the project and planned conceptual closure measures. This version (May 2009) presents preliminary detailed, prescriptive information on closure and reclamation and incorporates the YESAB recommendations of July 2008 and Yukon Government decisions of September 2008 and April 2009 (issuance of Quartz Mining Licence QML-0007) that followed the review of the earlier versions.

Closure Philosophy

Keeping in line with objectives for environmental and social responsibility, Western Copper intends to implement an environmentally sound and technically feasible decommissioning and reclamation plan for the Carmacks mine. Closure planning and implementation at a mine site will be undertaken with appropriate environmental care while respecting local laws, first nations agreements, and the public interest and ensuring that the Company's high environmental standards are achieved. Necessary environmental protection measures have been adopted in the development of this Plan to ensure that a healthy environment exists after mine closure. The Company's operating approach is consistent with the goals of Sustainable Development and Social Responsibility.

The goal at closure is to be able to achieve the above objectives in a "walk-away" scenario, that is, one in which there will be no further requirements for monitoring and maintenance. It is envisaged that a period of post closure "active care" will be required until it has been satisfactorily demonstrated from the results of site monitoring that reclamation measures have achieved the required outcomes and are self-sustaining. Based on technical studies, the long-term objective of a "walk-away" closure condition has been shown to be technically feasible. At this time an initial active care system is proposed to rinse and neutralize the heap, followed by a passive care system. The overall closure and reclamation plan for the project is shown in conjunction with the general site plan in Figure 1-3.

The principle of progressive reclamation is key to the Company's closure philosophy. Resources required for specific progressive reclamation activities will be incorporated into operational planning, and their completion will be scheduled into yearly operational targets. The schedule for progressive reclamation will be dependant upon the progress of mining activities, and is therefore not presented in this version of the Plan, however, an outline of key components or activities planned for progressive reclamation are provided.

To ensure that the overall closure philosophy can be achieved, the following guiding principles and objectives were emphasized during the development of this plan:

- protection of public health and safety;
- implementation of environmental protection measures that prevent adverse environmental impact;
- ensuring final land use is retuned to a state similar to what pre-existed the mine, which is essentially wilderness used for traditional and cultural pursuits;
- incorporation in the Preliminary Detailed Closure and Reclamation Plan of the YESAB recommendations of July 2008 and Yukon Government decisions of September 2008 and April 2009 following review of the plan;
- future planned Closure and Reclamation Plan progress meetings providing the opportunity to LSC First Nation and Selkirk First Nation to be informed of the progress of the Closure and Reclamation activities

For the Carmacks Copper Project these closure principles and objectives have become part of the design process to ensure both physical stability and chemical stability of the site in the long term. Mine design, development and progressive reclamation will be undertaken in a manner to ensure that the amount of work required at the end of mine life to achieve the above principles is minimized.

This document describes preliminary details for developing closure and reclamation measures of the Carmacks Copper Mine. The scenarios addressed include current site status (to end of 2008), access road construction, end of mine construction, end of mine life, as well as temporary shutdown.

Also described in this document are the monitoring programs and engineering designs that have been incorporated into the proposed project development for reclamation and closure planning purposes. It is expected that the Preliminary Detailed Closure and Reclamation Plan will be modified during the detailed design procress or as data and experience is obtained through operation of the facilities. At this time, construction engineering plans are not yet available for development of all components of the mine. It is expected that as the site is brought into production and operation, this Plan will be updated with more detailed engineering drawings for closure planning.

Closure Measures and Estimated Costs

Closure objectives and measures and estimated costs associated with the various components slated for reclamation (reclamation components) on the Carmacks property have been identified for the following mine component and related facilities:

- Open Pit;
- Heap Leach Facility;
- Waste Rock Storage Area and Sediment Pond;
- Mine Infrastructure; and
- Access and Haul Roads.

Cost estimates have been prepared different phases in the life of the mine for the purpose of establishing the basis for the provision of security:

- Current Site Status (end of 2008): reclamation and closure costs for the site at present are estimated at $80,300. This provides for $29,000 to reclaim the camp area, $20,000 for roads and trails, $13,000 for the heap leach pad area and $11,000 for backfilling and reclaiming trenches, plus an additional 10% contingency.

- Access Road Construction: costs to reclaim the main access road and associated borrow areas are estimated at $175,257.

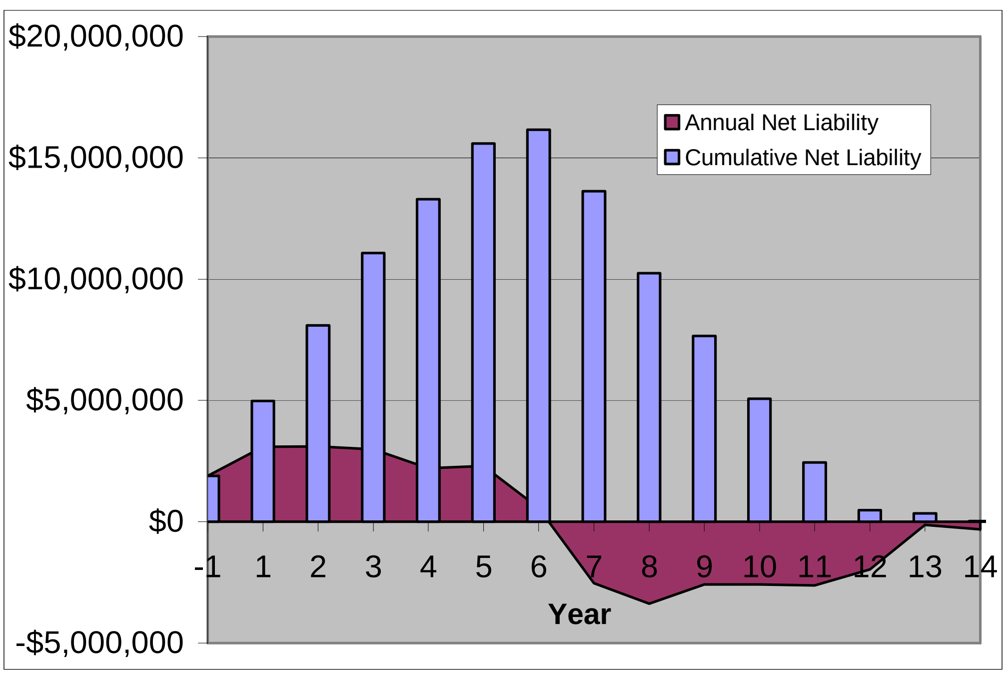
- End of Mine Construction: costs to reclaim and close the mine site at end of the construction phase are estimated at $2,946,000 which includes 15% for contingencies.

- End of Mine Life (Year 7): End of Mine Life closure costs are estimated to total $22,484,000 and include $1,103,000 for site management; $23,000 for open pit reclamation; $17,591,000 for the heap leach facility and associated ponds; $740,000 for waste rock storage area and sediment pond and $248,000 for access and haul roads closure. Infrastructure amounts to another $735,000 in reclamation costs and a further 10% for contingencies is also included. The Life of Mine total closure costs do not include any consideration for progressive reclamation during the operation.

A preliminary estimate of the maximum closure liability net of cost associated with progressive reclamation – the Cumulative Net Liability – was prepared and a Peak Cumulative Net Liability was identified.

- Cumulative and Peak Cumulative Net Liability: A yearly breakdown of estimated annual closure costs is provided and shows that closure costs will increase gradually during construction and operation of the Mine. The Closure cost and associated liability will peak after 7 years at $16,160,000 (net of progressive reclamation cost). As 85% of the estimated end of mine closure costs are related to the reclamation and closure of the heap, the build-up of the heap closure cost and associated liability is a good proxy for estimating the build-up of the closure liability over the life of mine.

The following chart shows the estimate of the distribution of the Net Annual Liability and of the Cumulative Net Liability over the full life cycle of the project:



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1. INTRODUCTION

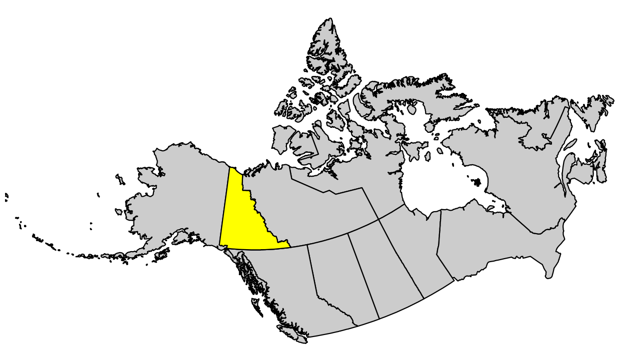
1.1 PROJECT SUMMARY

Western Copper Corporation (Western Copper) and their wholly owned subsidiary company Carmacks Copper Ltd. are currently moving forward with the development of the Carmacks Copper Project (Project), located in the Yukon Territory, 38 km directly northwest of the Village of Carmacks. Figure 1-1 shows the general project location within the Yukon, while Figure 1-2 shows the location on a smaller scale proximate to the Village of Carmacks and the Yukon River.

The “Carmacks Copper Project” consists of the development of an open pit, heap leach and copper extraction facility and events pond, crushing plant, waste rock storage area, soil stockpiles, drainage ditches and sediment control ponds, and support facilities, the general arrangement of which is shown in Figure 1-3.

1.2 CONTEXT AND HISTORY OF CLOSURE AND RECLAMATION DOCUMENTATION

The Executive Committee of the Yukon Environmental and Socio-Economic Assessment Board (YESAB) has completed its assessment of the potential environmental and socio-economic effects of the project and issued a Screening Report and Recommendation on July 18, 2008. The conclusion of the Executive Committee was that practical means have been identified to prevent or reduce to an acceptable level potentially significant adverse effects of the project. The Executive Committee recommended that the project be allowed to proceed, subject to specified terms and conditions. The recommendations were confirmed in a Decision Document issued by Yukon Government on September 12, 2008. The terms and conditions of the Screening Report, respecting closure and reclamation, have been incorporated into this plan.



Western Copper Corporation

ACCESS

Detailed Closure and Reclamation Plan

Carmacks Copper Project
Yukon Territory

Drawn By: HD	**Figure 1-1**
Checked By: NS/DC	Date: June 2008

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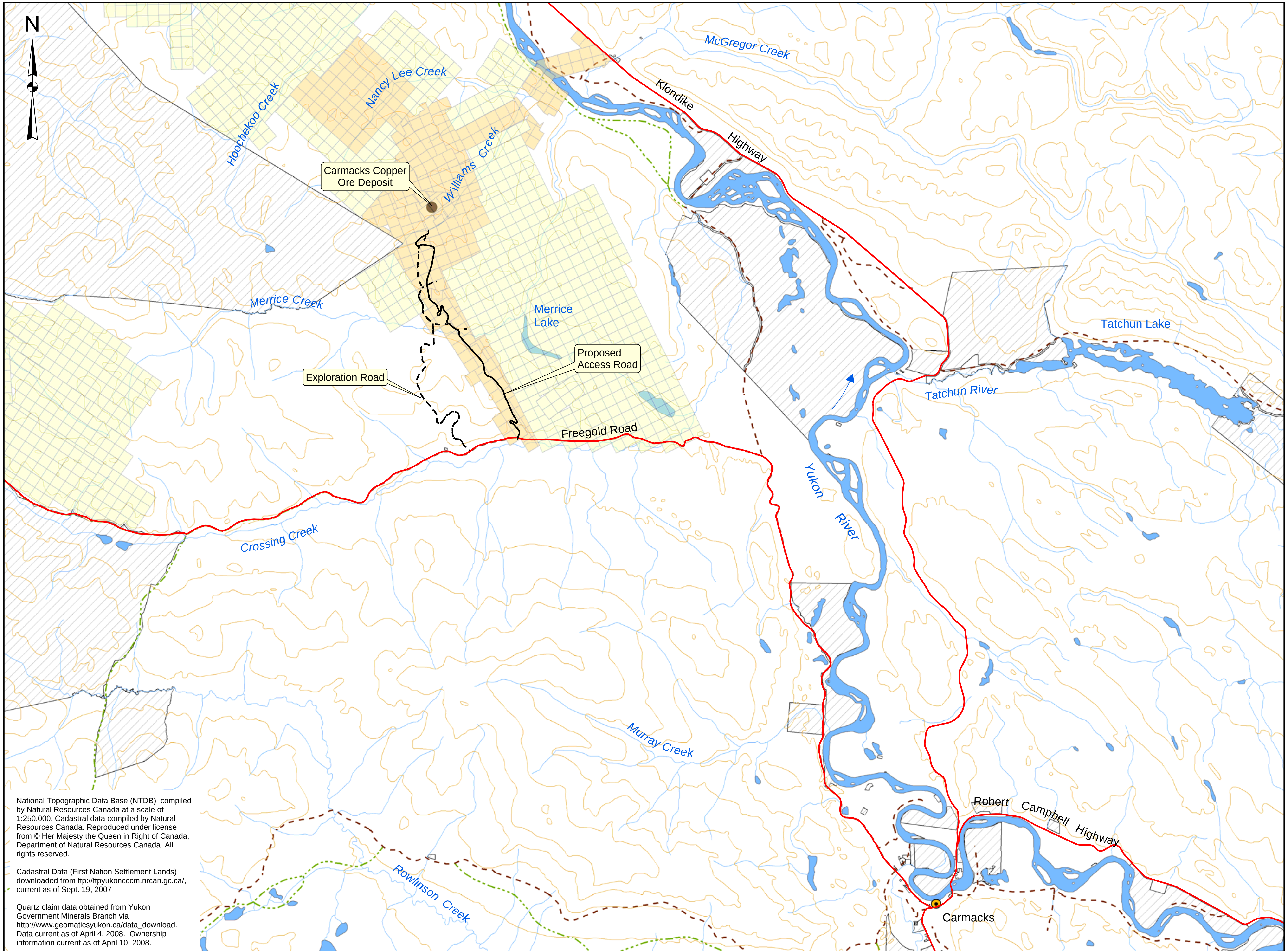

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:250,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Cadastral Data (First Nation Settlement Lands) downloaded from ftp://ftpyukoncccm.nrcan.gc.ca/, current as of Sept. 19, 2007

Quartz claim data obtained from Yukon Government Minerals Branch via http://www.geomaticsyukon.ca/data_download. Data current as of April 4, 2008. Ownership information current as of April 10, 2008.

Detailed Closure and Reclamation Plan

Carmacks Copper Project Yukon Territory

Western Copper Corporation

Legend:

- Town
- Water Course
- Limited-used Road
- Road
- Trail
- Contour
- Little Salmon/Carmacks First Nation Settlement Lands
- Western Copper Corporation Quartz Claims
- Other Quartz Claims
- Water Body

UTM Zone 8 NAD83 Meters
NTS Sheet: 115I

Regional Project Area Overview

Figure Number:

1-2

Scale:

1:150,000
(when plotted on 11x17 inch paper size)

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Drawn by: HD	Checked By: NS/DC
Date: June 2008	

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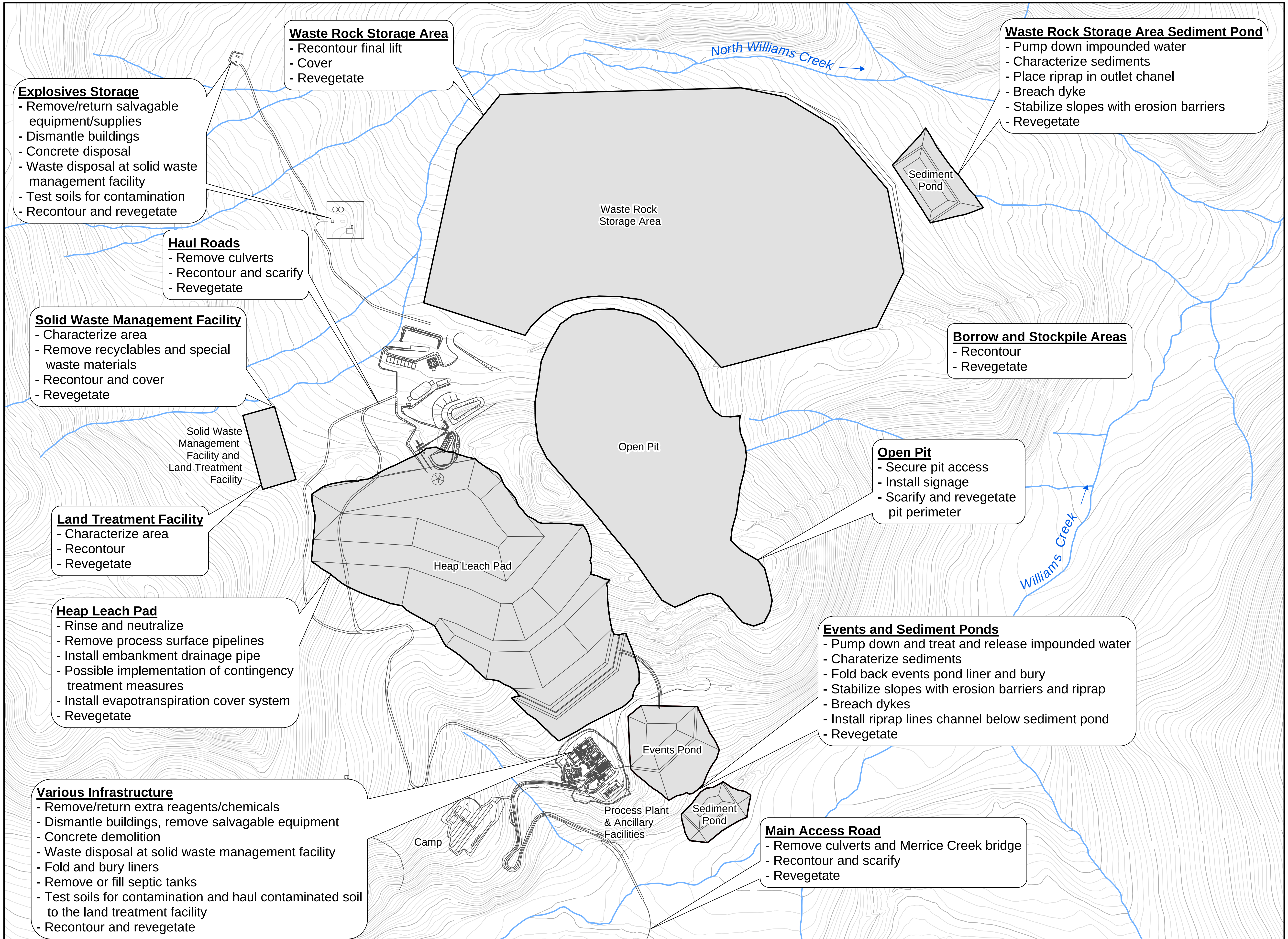

Detailed Closure and Reclamation Plan

Carmacks Copper Project Yukon Territory

Western Copper Corporation

NOTES:

Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 105I/07

Mine site layout provided by M3 Engineering & Technology Corp., "Carmacks Copper Project Site Grading Civil Plan", Drawing 100-CI-011 P4

Overall Site Reclamation & Closure Plan

Figure Number:

1-3

Scale:

1:10,000

(when plotted 11"x17")

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Drawn by: HD	Checked by: DC/NS
Date: October 2008	

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The Carmacks Copper Project is subject to approvals under the provision of the Yukon Waters Act (YWA) and the Yukon Quartz Mining Act (YQMA). The issuance of Water and Quartz Mining Licenses require submission of a Reclamation and Closure Plan. As such, this Preliminary Detailed Closure and Reclamation Plan has been developed under the requirements of the YWA, YQMA and Yukon Government Mine Site Reclamation and Closure Policy.

The Carmacks Copper project in its current form was submitted for review to YESAB on February 27, 2006. At that date, the Company filed a formal Project Proposal with YESAB which included a Conceptual Closure and Reclamation Plan (Updated 2006 – Project Proposal, Appendix F).

The original Conceptual Closure and Reclamation Plan was prepared in June 1997 and modified in May 2005, and later in August 2006 (Revision No.1), in October 2006 (Revision No.2), and in November 2007 (Revision No.3) to reflect the current status of the project and planned conceptual closure measures. This version (May 2009) presents more detailed, prescriptive information on closure and reclamation and incorporates the YESAB recommendations of July 2008 and Yukon Government decisions of September 2008 that followed the review of the earlier versions.

1.3 CLOSURE PHILOSOPHY

Western Copper acknowledges YG's mandate and specifications for mine site closure and reclamation. As such, the Company has developed this closure plan in detail to address regulatory and government policy and the scope set forth for closure and reclamation in the YESAB Executive Committee Final Screening Report and Recommendation for the Carmacks Copper Project, Section 9.0 - Closure and Reclamation. Closure measures addressed in the Preliminary Detailed Closure and Reclamation Plan (the "Plan") are elaborated on here together with new and additional information.

Keeping in line with objectives for environmental and social responsibility, Western Copper intends to implement an environmentally and technically sound decommissioning and reclamation plan for the Carmacks mine. Closure planning and implementation at the mine site will be undertaken with appropriate environmental care while respecting local laws, first nations agreements, and the public interest and ensuring that the Company's high environmental standards are achieved. Necessary environmental protection measures have been adopted in the development of this Plan to ensure that a healthy environment exists after mine closure. The Company's operating approach is consistent with the goals of Sustainable Development and Social Responsibility.

> *"Our projects will be developed in a manner that respect and protect the environment and enhance benefits to Yukon and Yukon communities. We recognize that this is vital to our company's existence, progress and continued development."*
> *"Western Copper Corporation in its everyday operation takes positive action to protect the safety of its workers and to conserve natural resources while minimizing the impact on the environment. We are applying appropriate technology and are conducting ourselves responsibly at all stages of mining: exploration, mine development, mine production and processing, decommissioning and reclamation." Company Profile and Projects Overview – October 2008 – Page 6*

The goal at closure is to be able to achieve the above objectives in a "walk-away" scenario, that is, one in which there will be no further requirements for monitoring and maintenance. It is envisaged that a substantial period of post closure "active care" will be required until it has been satisfactorily demonstrated from the results of site monitoring that reclamation measures have achieved the required outcomes and are self-sustaining. Based on technical studies, the long-term objective of a "walk-away" closure condition has been shown to be technically feasible. Once the effectiveness of each mitigation measure is assured, then management of the site can be safely reduced to a level that is consistent with closure. It is anticipated that final determination of the effectiveness of closure measures for passive and eventual walk-away status will be the subject of review and concurrence with regulatory agencies. Under the YQMA, the company would then apply for a certificate of closure from Yukon Government (YG). At this time an initial active care system is proposed to rinse and neutralize the heap, followed by a passive care system. The overall closure and reclamation plan for the project is shown in conjunction with the general site plan in Figure 1-3.

The principle of progressive reclamation is key to the Company's closure philosophy. Resources required for specific progressive reclamation activities will be incorporated into operational planning, and their completion will be scheduled into yearly operational targets. The schedule for progressive reclamation will be dependant upon the progress of mining activities, and is therefore not presented in this version of the Plan, however, an outline of key components or activities planned for progressive reclamation are provided.

To ensure that the overall closure philosophy can be achieved, the following guiding principles and objectives were emphasized during the development of this plan:

- protection of public health and safety;
- implementation of environmental protection measures that prevent adverse environmental impact;
- ensuring final land use is retuned to a state similar to what pre-existed the mine, which is essentially wilderness used for traditional and cultural pursuits;
- incorporation in the Preliminary Detailed Closure and Reclamation Plan of the YESAB recommendations of July 2008 and Yukon Government decision of September 2008 that followed the review of the Conceptual Closure and Reclamation plan included in the Carmacks Copper Project Description filed with YESAB in February 2007;
- providing for future Closure and Reclamation Plan progress meetings with LSC First Nation and Selkirk First Nation to be informed of the progress of the Closure and Reclamation activities.

For the Carmacks Copper Project these closure principles and objectives have become part of the design process to ensure both physical stability and chemical stability of the site in the long term. Mine design, development and progressive reclamation will be undertaken in a manner to ensure that the amount of work required at the end of mine life to achieve the above principles is minimized.

This document describes preliminary details for developing closure and reclamation measures of the Carmacks Copper Mine. The scenarios addressed include initial site construction, temporary shutdown and final closure.

Also described in this document are the monitoring programs and engineering designs that have been incorporated into the proposed project development for reclamation and closure planning purposes. It is expected that the Preliminary Detailed Closure and Reclamation Plan will be modified during the detailed design process or as data and experience is obtained through operation of the facilities. At this time, construction engineering plans are not yet available for development of all components of the mine. As the site is brought into production and operation, this Plan will be updated with more detailed engineering drawings for closure planning.

1.4 SCOPE OF THE CLOSURE PLAN

With the closure philosophy guiding development of the Plan, it has been scoped to fulfil requirements anticipated under the future acquisition of a Quartz Mining Licence.

To achieve all criteria associated with closure of mine workings at Carmacks, a review of pertinent historical information relating to the Carmacks site and operation was undertaken. Table 1-1 Selected Closure References List, presents a listing of reports and other information sources that are related to and/or have been prepared specifically for the Carmacks Copper Project. Many of these documents were consulted and reviewed to assist preparation of this Plan and are cited in the text.

The approach taken in the presentation of this Plan is to provide a brief description of each mine component and the closure objectives and measures related to that component. Previous work or reports on the project have been referenced without repeating details so that this document is focused specifically on closure and reclamation objectives. Consideration has also been given to technical information contained in the reports of the YESAB experts.

Closure objectives can be considered in terms of the following major areas:

- objectives associated with (geo)chemical stability;
- objectives associated with water quality;
- objectives associated with physical stability; and,
- objectives associated with land use, aesthetics and public health and safety.

For the Carmacks Copper Project, the main focus of the closure plan is to meet the objectives for chemical stability and for water quality.

At mine closure, there will be no major water retaining structures, diversions or tailings impoundments for which physical stability must be ensured in the long term. The only facilities for which physical stability must be addressed will be the spent ore heap, waste rock storage area and associated water management facilities.

For most of the site, reclamation of the disturbed areas of the mine site and waste rock storage area raise no particular difficulties that are specific to a heap leach project. The primary concerns are the control of erosion and public safety.

Closure and reclamation of the spent ore heap requires special consideration in that the ore has been chemically and physically altered from its in-situ condition. Reclamation of the spent ore heap is discussed herein primarily in terms of the considerations associated with water chemistry. The characteristics of the spent ore determine the treatment process steps required to meet the water quality objectives by achieving effluent discharge standards at the end of the mine life.

Table 1-1 Selected Closure References List

Report Title / Topic	Author	Date
Guidelines for Reclamation/Revegetation in the Yukon	C. Kennedy	1993
Metallurgy of the Williams Creek Oxide Copper Deposit	Beattie Consulting Ltd.	1994 May
Carmacks Copper Project, Report on Pilot Scale Column Testing of the Williams Creek Oxide Deposit	Beattie Consulting Ltd.	1996 Feb
Report on Evaluation of the Mineralogy of a sample of Carmacks Acid Leach Residue	Lawrence, Richard W.	1996 May

Report Title / Topic	Author	Date
Western Copper Holdings Leaching and Decommissioning of Samples from Carmacks Oxide Copper Project	Beattie Consulting Ltd.	2001 Feb
Carmacks Copper Project Performance Standards and Design Criteria Parameters	Western Silver Corporation	2004 Aug
Development of Westcoast Biotech Sulphur Process to Carmacks Ore	Westcoast Biotech	2005 Apr
Yukon Mine Site Reclamation and Closure Policy for New Mines	Energy, Mines & Resources, Government of Yukon	2006
Technical Design Memorandum – Solution Storage/Events Pond Sizing	Alexco Resource Corp.	2006 Jan
Detoxification and Rinsing Testwork Report	Alexco Resource Corp.	2006 Jan
Williams Creek Site Hydrology Update – Memorandum CCL-CC6	Clearwater Consultants Ltd.	2006 Jan
Water Balance Update – Memorandum CCL-CC7 (used to develop 2008 site wide water balance)	Clearwater Consultants Ltd.	2006 Feb
Technical Memorandum – Review of Documents and Meeting Notes related to Mineralogy of Leach Residues	Lawrence Consulting Ltd.	2006 May
Memorandum – Heap Rinsing Additional Information	Alexco Resource Corp.	2006 Jun
Neutralization Test Work on Process Solutions	Canadian Environmental & Metallurgical Inc.	2006 Jun
Williams Creek Geochemistry	Gubala, Chad (PhD)	2006 Aug
Western Silver – Rinsed Column Mineralogy	CANMET	2006 Aug
Provisional Assessment of ARD Potential of Selected Rock Samples	Access Consulting Group	2006 Nov
Carmacks Copper Project Socio-economic Effects Assessment	Vector Research and Research Northwest	2006 Nov
Carmacks Tall Column Test	Westcoast Biotech	2007 Jan
Technical Memorandum - Existing Design Criteria	Golder Associates Ltd.	2007 Jan
Draft Preliminary Design Report - Heap Leach Facility	Golder Associates Ltd.	2007 Mar
Process Water Treatability Study Report Neutralization Testwork on Process Solutions	Canadian Environmental & Metallurgical Inc.	2007 Mar
Carmacks Copper Project Operational Treatment System	Western Copper Corporation	2007 May
Carmacks Copper Project Copper Mine and Process Plant NI 34-101 Technical Report Feasibility Study	M3 Engineering & Technology Corp.	2007 May
Technical Memorandum - Preliminary Hydrogeologic Assessment, Heap Leach Pad Zone	Golder Associates Ltd.	2007 May
Sequential Leaching and Other Characterization of Drill Ore Samples	PRA	2007 June
Williams Creek Natural Attenuation Capacity	Gubala, Chad (PhD)	2007 June
Memorandum – Solution Treatment for Closure	Western Copper Corporation	2007 June
Structural Steel, Concrete and Civil Design Criteria	M3 Engineering & Technology Corp.	2007 July
Evaluation of the Freegold Road and Preliminary Traffic Management Plan	Yukon Engineering Services Inc.	2007 July
Preliminary Surface Water Management Plan	Golder Associates Ltd.	2007 November
Yukon Mine Site and Reclamation Closure Policy Financial and Technical Guidelines	Energy, Mines & Resources, Government of Yukon	2008 Jan
Report on 2007 Geotechnical Investigation	Golder Associates Ltd.	2008 Apr

Report Title / Topic	Author	Date
Technical Memorandum - Results of the Static Geochemical Testwork	Golder Associates Ltd.	2008 Mar
Bench Scale Treatability Study Report Neutralization Testwork	Canadian Environmental & Metallurgical Inc.	2008 Mar
Rinsing and Neutralization of 2 Sets of Bio-leach Columns using Field Simulation Tests	PRA	2008 Mar
Carmacks Copper Review (Revision 2) (of heap leach pad detoxification)	EcoMetrix Incorporated	2008 Mar
Response to YESAB Supplementary Information Request dated 27 Feb 2008	Western Copper Corporation	2008 Mar
Williams Creek Treated and Closure Waters Discharge Régime and Recommendations	Gubala, Chad (PhD)	2008 Mar
Letter Report Re: Site Specific Water Quality Objective for Copper in Williams Creek	Minnow Environmental Inc.	2008 Mar
Report on Preliminary Design - Waste Rock Storage Area	Golder Associates Ltd.	2008 Apr
Evaluation of Water Quality and Development of Background-Based Site-Specific Water Quality Objectives for Williams Creek	Minnow Environmental Inc.	2008 May
Draft Report on Site Water Balance	Golder Associates Ltd.	2008 June
Waste Management Plan – Construction Version	Access Consulting Group	2008 June
Health and Safety & Emergency Response Guide - Construction Version	Access Consulting Group	2008 June
ARD Protocol for Evaluation of Construction Materials - Construction Version	Access Consulting Group	2008 June
Wildlife Protection Plan - Construction Version	Access Consulting Group	2008 October
Heritage Resources Protection Plan - Construction Version	Access Consulting Group	2008 October
Environmental Monitoring Program - Construction Version	Access Consulting Group	2008 October
Construction Site Plan	Access Consulting Group	2008 October
Rinsing of Leached Copper Columns	PRA	Ongoing

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND AND LOCATION

The Carmacks Copper Project is a proposed open pit copper mine and heap leach solvent extraction and electrowinning (SX/EW) processing facility being developed by Western Copper. The orebody is located in the Yukon Territory, about 38 km northwest of the Village of Carmacks, or 192 km north of Whitehorse (see previous Figures 1-1 and 1-2). Western Copper is 100% owner of 338 claims on the Carmacks Copper property (Figure 1-2). The property is presently accessible via a 13-kilometre exploration road that leads north from Kilometre 33 of Freegold Road, the secondary government-maintained roadway from Carmacks. A new access road is planned which will circumvent the current one.

A basic engineering study prepared by Kilborn Engineering Ltd. (Kilborn) in 1997 shows that the Carmacks Copper Project is feasible at prices above U.S.$1.10/lb copper. In May 2007, M3 Engineering & Technology Corp. completed an updated NI 43-101 Technical Report Feasibility Study and concluded that the Carmacks Copper oxide mineral occurrence can be successfully exploited by conventional open pit mining followed by heap leaching, solvent extraction and electrowinning. The Company believes that the outlook for long term copper demand is favourable, and this provides an opportunity for Western Copper, their shareholders, local First Nations and communities, and the Yukon Territory to benefit from the project development. Approximately 33,000,000 pounds (14,500 tonnes) of copper will be produced per year for the planned six year mine life.

The project is presently in the permitting stage with a YESAB Screening Report and Recommendation issued July 18, 2008 and on September 12, 2008, a YG Decision Document which recommends the project proceed subject to recommended terms and conditions of mitigation measures. The Company is moving forward with the permitting processes so that development can proceed on a timely basis. The project requires both a Quartz Mining Production License and a Water Use License to enable project development. This closure plan is a part of that process, and is a necessary requirement under a Quartz Mining License.

2.2 CURRENT STATUS

The current level of development at the site is considered minimal. In 1997 the heap leach pad and new project access road were grubbed and stripped. No further development work on the access road has occurred since that time, however much of the heap area has been re-cleared to accommodate the exploration program and geotechnical investigations. The existing exploration access road continues to be maintained. A small exploration camp was constructed in 2007. Activities conducted on the site to date have included: continued exploration and resource delineation, geotechnical drilling and environmental monitoring activities.

2.3 PLANNED MINING OPERATIONS OVERVIEW

The Carmacks Copper Project is an open pit copper mine and solvent extraction and electrowinning (SX/EW) processing facility. The deposit contains an open pit mineable reserve of about 10.6 million tonnes at an average grade of 1.04% total copper. The project will include an open pit, heap leach and copper extraction facility, waste rock storage area (WRSA), events pond, drainage ditches, sediment control ponds, roads, construction camp, soil stockpiles, borrow areas, and miscellaneous facilities to support mining operations. A crushing plant will also be constructed for ore and fill processing.

Mine operations in the open pit will be carried out using conventional mining equipment with a stripping ratio of 5.4 tonnes of waste to 1 tonne of ore (5.4:1). It is estimated that active mining will be undertaken for six years, producing about 60 million tonnes of waste rock, and 10.6 million tonnes of copper ore. Geochemical testing of the waste rock and spent ore indicates that the material is non-acid generating.

Crushed oxide ore will be conveyed and placed on a lined heap leach pad to produce about 14,500 tonnes (33 million pounds) of copper per year, at a recovery rate of 85%.

Each production year, the pad will be loaded over an 8 month period and leached year round. Copper in solution will be recovered from the leached oxide ore.

Raffinate (weak acid solution – 1% H_2SO_4) will be applied to the surface of the ore by a system of buried drip emitters. This weak solution will percolate through the ore, gradually leaching the copper. After reaching the bottom of the ore pile, the copper enriched solution (pregnant leachate solution) will be collected in a network of pipes located over the first liner at the bottom of the heap. It will then flow either directly to the Solvent Extraction and Electrowinning (SX/EW) section of the process plant, or to the events pond below the heap. The copper enriched solution will be treated in the solvent extraction section of the process plant to purify and concentrate the weak copper-enriched leach solution to a more concentrated copper solution suitable for electrowinning. High purity copper cathodes with a 99.9% copper content are produced in the electrowinning section of the process plant and will be transported via truck to market.

Water supply for the project will come from wells in the Williams Creek valley. Process water makeup will be sourced from surface run-off sediment ponds located below the WRSA and leach pad areas. Power will be generated initially on-site by diesel generators until Yukon Energy Corporation can supply power to the site via a transmission power line.

Sulphuric acid required in the copper extraction process and added to the leach solution will be produced on site in the acid plant section of the process plant at a rate of 145 metric tonnes per day.

In addition to the mining and process facilities, the site facilities will include: water supply wells and distribution system, power supply and distribution, fire protection, fuel storage, acid storage, sewage treatment, communications system, administration offices, operations camp, gatehouse/first-aid, truck shop and laboratory.

Table 2-1 below presents an overview of the project.

After mining ceases, site infrastructure will be dismantled and removed from the property. Where appropriate, slopes on the heap will be recontoured, covered with stockpiled overburden material, and revegetated. Flat portions of the WRSA will be covered and natural and seed growth of native species encouraged. Roads and disturbed areas will be scarified and revegetated. When leaching is no longer economic, the heap will be rinsed and neutralized and an evaporative transpiration soil cover will be installed. The heap will be rinsed with water and then neutralized with an alkali solution until effluent discharge standards are met. Based on lab scale testwork, heap rinsing and neutralization is expected to take between four and ten years to complete. Active water treatment using conventional lime treatment technology (high density sludge treatment) will be used to reduce the heap solution inventory. Once heap effluent discharge standards are achieved, long-term passive treatment is proposed as a contingency for final closure.

Table 2-1 Carmacks Copper Project Overview

Carmacks Copper Project Overview	
Location	44 km by gravel road northwest of the Village of Carmacks, Yukon: Freegold Road (31 km from Nordenskiold Bridge) and a new mine access road (13 km).
Land Position	Western Copper 100% owner of 338 claims on the Carmacks Copper Property.
Mining Method	Conventional open pit mine
Copper Recovery Process	Heap leach and solvent extraction/electrowinning process (SX/EW)
Production Life	Open pit = 6 years Heap Leach Pad = 7 years
Total Project Life	24 years: Years -2 & -1: 1st & 2nd year construction Years 1 – 7: mine operation Years 7 – 22: closure and monitoring

Carmacks Copper Project Overview	
	Water Use Licence to span 25 years
Annual Copper Production	Average production capacity of about 14,500 tonnes (33 million pounds) per year of cathode copper.
Ore Production Rate	1.77 million tonnes of ore per year; peak of 13.3 million tonnes ore and waste per year
Preproduction Stripping	2 million tonnes
Mine Waste Rock	Waste rock storage area is approximately 70 ha and will store the 55.7 million tonnes of waste rock with a capacity up to 70 million tonnes.
Ore Mining and Placement Schedule	Ore mining for the equivalent of 220 days per year; Leaching & processing year round – 365 days per year.
Heap Leach Pad Area	38.2 ha
Events pond capacity	160,000 m^3
Water Supply	Wells located in the bedrock confined aquifer underlying Williams Creek drainage.
Water Requirements	~ 900 m^3/day: 60 m^3/day = potable (groundwater) 650 m^3/day = process - maximum average (groundwater) 190 m^3/day = road watering (runoff & mine water)
Water Use Requested (to cover contingencies)	1,125 m^3/day
Water Treatment	High Density Sludge process plant – built during mine construction
Maximum Water Treatment Rate	107 m^3/h during operations; 255 m^3/h during closure (after plant expansion).

2.4 CLOSURE AND RECLAMATION OF A COPPER HEAP LEACH FACILITY

Foresight into the reclamation and closure stage of the heap leach pad has lead to it being designed to protect both surface water and regional groundwater during operations and in the long term. Operational experience from the Brewery Creek Mine heap leach facility has been used in assessing winter operations and closure in a northern setting. Detailed information on heap draindown and neutralization was used in the design of laboratory testwork for the project (Alexco, 2006). The heap leach pad has been designed to provide a stable facility during extreme precipitation events, winter conditions, and design seismic events both during operation and after closure. Preliminary design and construction details for the heap are provided in Golder Associates Ltd, March 2007, *Heap Leach Facility Preliminary Design Report.* Existing design criteria accounts for regional design factors and climate and is presented in a Technical Memorandum prepared by Golder (January 10, 2007). The Company has also specifically pilot tested winter heap leaching with ore from Carmacks Copper. Although there is not a lot of northern experience with decommissioning a copper oxide heap leach facility numerous heap leach operations have operated in cold climates. This information has been used in the design of heap leach operations and planning for closure of the Carmacks Copper project.

Detailed laboratory testwork has been undertaken to demonstrate rinsing and neutralization of heap leach pad. A summary of the rinsing and neutralization process and testwork that provides the foundation for the heap leach pad closure costing is provided in Appendix A. This information demonstrates that the heap leach pad can be successfully rinsed and neutralized. Additional testwork will be ongoing throughout mine operations to refine the rinsing and neutralization processes and closure cost estimates.

3. ENVIRONMENTAL SETTING

Table 3-1 provides an overview of the project area and environmental setting information for the study area. This table provides a summary of physical Project location information, geographic reference, access route, watershed drainage, special designations, and key environmental features within the study area.

Table 3-1 Project Area Overview and Environmental Setting

Project Area Overview and Environmental Setting	
Region:	Yukon
Topographic Map Sheets:	- NTS 115 I/01
Geographic Location Name Code:	- Carmacks Copper Project
Latitude:	- 62° 21' N
Longitude:	- 136° 41' W
Drainage Region:	- Yukon River
Significant Watersheds:	- Williams Creek and its tributary, Nancy Lee Creek
Nearest Communities:	- Carmacks, Yukon (approx. 38km directly northwest of the Village of Carmacks)
Road Access:	- Currently via a 13 km exploration road that leads north from km 33 of the secondary, government-maintained roadway (Freegold Road) from Carmacks. New access road planned.
First Nations Traditional Territory:	- Little Salmon Carmacks First Nation and Selkirk First Nation Traditional Territories. Traditional use for hunting, trapping and fishing
Surrounding Land Status:	- Little Salmon Carmacks First Nation Settlement Lands and Federal Crown Land
Special Designations:	- Lhutsaw Wetland Habitat Protection Area located approx. 17 km NE of Minto Landing (outside the project area)
Ecoregion:	- Yukon Plateau (Central Ecoregion)
Study Area Elevation:	- Broad valley and rounded ridge crests; topographic relief for the entire property is 515 m. In the immediate area of the No. 1 zone, topographic relief is 230 m. Elevations range from 485 m at the Yukon River to 1,000 m on the western edge of the claim block
Vegetation Communities:	- White spruce, black spruce, paper birch, trembling aspen, poplar, lodgepole pine, feathermoss, willows and ericaceous shrubs, sedge, sphagnum tussocks, sagewort grasses, forbs
Wildlife Species:	- Moose, Caribou, Wolf, Grizzly Bear, Black Bear, Lynx, Coyote, Red Fox, Wolverine, Marten, Mink, Ermine, River Otter, Beaver, Snowshoe Hare, Red Squirrel, Ground Squirrel, Porcupine; Bird Species: Grouse, Golden eagle,

Project Area Overview and Environmental Setting	
	American kestrel, spruce and ruffed grouse
Wildlife Habitat Types:	- Yukon River Valley Floodplain & Slopes, Willow Dominant Wetlands, Spruce Dominant Wetlands, Aspen Dominant Uplands, Conifer Dominant Uplands, Steep Grassy Slopes, Cliffs
Fish Species (lower Williams Creek / Yukon River):	- Juvenile Chinook salmon (Oncorhynchus tshawytscha), arctic grayling (Thymallus arcticus), slimy sculpins (Cottus cognatus), longnose suckers (Catostomus catostomus), burbot (Lota lota), and northern pike (Esox lucius)
Permafrost:	- The study area lies within the discontinuous permafrost subzone
Surficial Materials:	- Up-slope of Williams Creek: coarse textured colluvium, medium textured glacial till and minor fluvioglacial materials; Upland area: weathered bedrock with minor side-slope drainages incised into bedrock with infilling by fluvial sediments and capped by a veneer of organic accumulation, coarse sandy and rubbly soils; gentle slopes are poorly drained and covered by a veneer of organic accumulation; Loess and volcanic ash deposits cover extensive portions of the study area.
Known Heritage Resources:	- An old mine adit on lower Williams Creek with associated log cabin remains from mining activity from the 1930's or 1940's. The adit and associated remains are located approximately 4 km away from the mine site; an old horse trail leads further down from this cabin to a cabin on the banks of the Yukon River which was probably used as an ore transfer station for river transport.
Site Climate:	- Temp. ranges from -27.5°C (January daily average) to 15.5°C (July daily average). Mean annual precipitation at Williams Creek Site is 338.4mm (196.5mm rainfall, 141.9mm snowfall)

4. RECLAMATION PLANNING

A systematic approach to decommissioning and closure reclamation is intended for the Carmacks Copper Project. This section of the Plan provides reclamation objectives and the overall reclamation strategy for the Carmacks site. Also provided is information regarding planned reclamation and revegetation optimization programs, and details and observations on reclamation and revegetation to date. Section 5 then addresses specific closure measures proposed for the discrete mine components.

The Company will implement progressive reclamation measures where possible during mine construction and operations. This approach will not only provide valuable reclamation success feedback for use in advanced/final closure, but progressive reclamation will reduce final reclamation liability and costs and shorten the overall reclamation implementation schedule. These progressive efforts will also help reduce slope erosion through physical slope stabilization by means of revegetation efforts, enhancing ultimate reclamation success.

4.1 OVERARCHING CLOSURE OBJECTIVES

The primary closure objectives at the Carmacks mine site include:

- protection of public health and safety;
- implementation of environmental protection measures that prevent adverse environmental impact by;
  - undertaking mining planning to incorporate progressive reclamation;
  - providing short and long term slope stabilization and erosion control on linear and non-linear disturbances;
  - ensuring the long-term chemical stability of residual mining components including the spent ore on the heap leach pad and the waste rock storage area to minimize effects to downstream aquatic resources;
  - ensuring the long-term physical stability of key structures such as the waste rock storage area and spent ore on the heap leach pad;

  - conducting post closure monitoring of the site and adaptive management to assess effectiveness of closure measures for the long term;
- ensuring final land use is retuned to a state similar to what pre-existed the mine, which is essentially wilderness used for traditional and cultural pursuits;
- meaningful participation of the LSCFN and SFN in the planning and progress monitoring of the Closure and Reclamation activities to ensure appropriate and effective closure measures;
- developing a cost effective closure plan that works towards a walk-away closure scenario for most or all mine components; and
- passive post closure monitoring and management of the site until the former mine presents evidence of an environmentally benign site, in which case a walk-away closure scenario will be realized.

The overall goal of closure at the Carmacks site is to leave the area as a self-supporting ecosystem, ensuring that land use after closure is compatible with the surrounding lands, and that the site vegetation returns to a state as near as possible to that in existence prior to mining activities.

These closure objectives are reflective of the guidelines derived from the YG's Reclamation and Closure Policy, the development of which saw contribution from all Yukon First Nations.

4.2 PROGRESSIVE RECLAMATION

Progressive reclamation or those reclamation activities conducted during mining operations are an important part of mine closure planning and implementation. Progressive reclamation limits the environmental liability and thus reduces the ongoing risk carried by the company through:

- providing remediation to reduce or eliminate chemically hazardous material and sources of chemical contamination;
- stabilizing potential sources of erosion and sediment release;
- initiating slope stability measures to enable reclamation;

- replanting and reseeding disturbed areas not scheduled for rework;
- concurrently rinsing accessible leached sections of the heap leach pad to reduce final heap rinsing requirements;
- providing testing sites for reclamation optimization to serve as an indicator of reclamation success;
- reducing the total area requiring reclamation at the end of active mining activities; and
- reducing mine closure security requirements as closure liability is reduced progressively.

Progressive reclamation activities will take place at every possible opportunity during mine construction and operations. Initially during site construction these activities will be limited to stockpiling surface overburden and soil materials for future use in stabilization and revegetation of disturbed areas resulting from mine development activities. These areas include slopes along the main access and site roads and disturbed areas located around the camp and plant site. In addition, once the old exploration camp is no longer needed, these buildings and associated infrastructure would be decommissioned. These areas would be monitored as part of the reclamation research program to further understand local site conditions and reclamation success.

4.3 RECLAMATION OPTIMIZATION

Ongoing reclamation optimization is an important component of the reclamation planning process, providing an indication of reclamation success. Reclamation optimization will focus primarily on three areas: heap leaching, rinsing and neutralization, water treatment and sludge testing and the revegetation aspect of reclamation.

4.3.1 Heap Leaching

The heap will be designed, built and managed in such a manner as to enable the first cell created to model the heap leach process and its various phases at a field-scale level. The model cell will demonstrate the process phases from leaching, to rinsing, to neutralization and to later reclamation phases. The exact details of the design and operation of the model cell will be determined later and a detailed test plan describing the modelling of each of the heap leach phases will be presented to regulators prior to commencement of operation of the model cell. The purposes of the model cell will be to optimize the leaching process and the subsequent heap rinsing and neutralization as it pertains to the entire operation and closure for the heap.

The plan for the model cell will describe how the cell will be isolated from the main pile so that flow volumes and chemistry can be accurately related to processes taking place in the leaching and rinsing of the pile. The model cell plan and procedures will be designed to examine:

- acid consumption, recovery of copper and solution management throughout the pile during the leaching phase;
- ore agglomeration and solution infiltration characteristics;
- drain-down characteristics of the leached pile;
- rinsing protocol to obtain thorough flushing including measurement of rinse volumes and rinsing and neutralization timeframes;
- HDS water treatment system performance, process optimization and sludge characterization;
- neutralization of the heap including reagent type, quantities and effluent chemistry;
- long-term drain-down characteristics of the neutralized pile;
- cover placement and infiltration performance; and
- contingency treatment performance.

Results obtained from the operation of the model cell will be compared to the results from earlier laboratory testing on an on-going basis in order to assess the performance of all phases of the heap leach process. If results obtained from the model cell are seen to diverge from the expected performance (based on laboratory testing) at any stage then an adaptive management plan will be implemented to adjust operating conditions in a logical and methodical manner to bring performance to within the expected parameters. The adaptive management plan will outline monitoring parameters, contingency measures, triggers for implementation and feedback reporting. The adaptive management plan will be explained in detail in the submissions to the regulators.

The overall objectives of establishing this initial model cell will be to provide practical heap operating experience, information on rinse solution application methods, times and volumes early in the mine life in order to allow time to adjust operational plans and detail the schedule for the final closure. This will allow for the development of a more accurate security payment schedule.

4.3.2 Heap Rinsing and Neutralization

In addition to establishing the above initial model cell, laboratory testwork for heap closure and reclamation optimization will build on information obtained during earlier column leaching, rinsing and subsequent solution treatment testwork and the baseline characterization studies program. This testwork will enhance site progressive reclamation and refine the overall method for reclaiming the heap.

Heap leaching, rinsing, neutralization, and passive treatment requirements in the long term are the main areas to be further optimized for heap closure. Laboratory testing continues to be done in order to:

- develop representative spent ore (leached) samples;
- evaluate spent ore (leached) heap rinsing with water and requirements for copper removal from water (untreated) rinse solutions;
- optimize rinse and rest cycles;
- optimize sodium carbonate addition;
- design contingency measures such as a long term infiltration gallery or bioreactor; and
- test sludge stability for possible on-site disposal.

It is expected that a number of column tests will be set up during mine operations at the property to continue to refine and test closure rinsing and neutralization.

4.3.3 Water Treatment and Sludge Testing

Water treatment optimization will continue based on the information obtained during testing of column rinse solutions. There are a number of potential options to be investigated to optimize water treatment, which are dependent on the types of reagents utilized:

- air for oxidation prior to precipitation;
- caustic soda;
- soda ash may be useful as a later stage treatment for removal of some metals such as cadmium;
- sodium phosphate for iron removal;
- limestone and lime;
- TMT (trimercapto-s-triazine, trisodium salt) as an additive for metal removal and sludge stabilizer;
- Portland cement and fly ash as alternative alkali sources and to form a more “cemented” sludge than with alkali addition alone.

Actual process solutions will be collected from the field and column test to enable optimization of the long term treatment plant required at the end of the heap leach phase.

4.3.4 Revegetation

Key to long term reclamation success with self-sustaining vegetation is site-specific revegetation testwork. In order to establish a successful revegetation program, the Company will initiate a systematic program to assess and provide information on:

a) a further inventory of available soils around the site (particularly the overburden material) and their physical characteristics;

b) the nutrients in the available soils - while fertilizers will likely be necessary to encourage quick initial establishment of healthy growth, the plant mixtures used must be capable of sustaining long term growth without the aid of artificial fertilizers;

c) practical seed mixes - while it is known what seed types have been used at the site previously and what types of plants have been naturally revegetating the site, further reviews and investigations are necessary to confirm the appropriate seed mixes that should be used. The ultimate seed mixtures will be developed using:

- knowledge of the naturally occurring vegetation and soil conditions;
- an inventory of naturally occurring seed sources on site;
- results from revegetation activities to date;
- existing literature on regional revegetation science; and
- information gained from revegetation test plot trials on site.

d) the effect of slope and aspect on revegetation success, and if necessary the subsequent effect of erosion control measures; and

e) the potential for metals uptake by the plants on the growth media over the heap – influenced by different plant varieties and species, heap neutralization, cover designs and other environmental conditions. Sampling of plant tissues from heap test plots will be conducted to assist in designing the revegetation program, and existing literature and research regarding plant metal uptake and foraging patterns will be incorporated into the seed mix design.

The true benefits of reclamation testwork will be realized if the information obtained and knowledge gained is incorporated into larger scale reclamation projects as quickly as possible.

Revegetation test plots will be established at locations of varying slope and aspect and a monitoring schedule implemented. Further planning of the test program will be conducted once project authorizations are obtained. Monitoring of the plots would take place annually in August by a vegetation specialist. The following parameters will be monitored at each plot during the annual inspections:

- established photo hubs will documented photographically and growth success and species present will be documented;
- vegetation samples will be collected from the plots for ICP metals scan to assess metals uptake; and

- soil samples will be collected from plots and analyzed for ICP metals, available nutrients and general parameters such as soil pH and alkalinity.

In addition, natural revegetation success at other locations on the site will be tracked and incorporated into the final reclamation revegetation plan.

Further discussion on natural vegetation and growth media, revegetation trials, and seed composition are provided in Appendix B.

5. CLOSURE MEASURES

This section presents a discussion of the closure objectives and measures associated with the various components slated for reclamation (reclamation components) on the Carmacks property. The approach to each subsection is to present a description of each mine component and related facilities so that readers do not have to refer back to previous reports or information. Potential closure objectives and planned closure measures to ensure long term physical and chemical stability are then discussed. For further details, references are also provided for previous reports or supporting documentation.

Figure 1-3 presents the ultimate overall site plan for main project components as proposed at the end of mine life. Summaries of the various closure measures are provided for features or groups of features on the general arrangement plan and discussed below.

The disturbed area has been divided into reclamation components as follows:

- Open Pit;
- Heap Leach Facility, including;
  - Heap rinsing
  - Water treatment
  - Sludge disposal
  - Contouring and soil cover
  - Events and Sediment Ponds
- Waste Rock Storage Area and Sediment Pond;
- Process Plant and Ancillary Facilities;
- Mine Camp and Related Infrastructure;
- Truck Shop Service Complex;
- Miscellaneous Sites and Facilities; and
- Access and Haul Roads.

In addition to the closure measures proposed in the following sections, the *Yukon Mine Site and Reclamation Closure Policy* Technical Guidelines also provide direction on reclamation and closure objectives for key features of a mine. The Technical Guidelines applicable to the Carmacks Copper project and their main objectives are listed in Table 5-1. The Guidelines themselves may be referenced for principal legal requirements, policy detail pursuant to the Yukon Mine Site Reclamation and Closure Policy, as well as possible strategies for achieving the desired objectives, which have been considered in the development of this Closure Plan.

Table 5-1 Yukon Mine site and Reclamation Closure Policy Technical Guidelines Applicable to the Carmacks Copper Project

Technical Guideline #	Topic	Objectives
T-01	Water Retention & Sediment Control Structures	To ensure decommissioning of water retention and sediment control structures, and the appurtenances, in such a way that drainage at, and adjacent to the side, is stable in the long term.
T-02	Watercourses	Restore watercourses to meet current water management objectives.
T-03	Water Quality	To prevent contamination of receiving environments.
T-04	Site Contamination	To prevent exposure to and mobilization of substances that pose a risk to human health and the environment through physical and chemical stability.
T-05	Acid Rock Drainage Potential	Walk away scenario with respect to acid rock drainage and metal leaching. Reliance on long-term active treatment is not considered acceptable for reclamation and closure planning.
T-08	Terrain Hazards	Remaining terrain hazards should present no more significant hazard to people and wildlife than is present in the surrounding vicinity.
T-09	Mine Rock Piles	Reclaimed rock piles and dumps must be physically and chemically stable in the long term to prevent erosion, subsidence or collapse, and such that dump runoff and surface drainge meet legal requirements.
T-10	Roads & Other Access	Protection of public safety is key objective. In decommissioning linear infrastructure the intention is to enable human and wildlife utlization in the area to revert to pre-development levels and types, all other factors being equal. If, however, an alternate future land use has been identified for the site, or population in the area has increased, alternative objectives may be identified in the approved reclamation and closure plan.

Technical Guideline #	Topic	Objectives
T-11	Erosion Control	Objective of erosion control is physical stability, such that upon closure, slopes, excavations and other disturbed lands are in a condition that will limit the incidence of soil erosion, slumping and other instabilities that are likely to impede revegetation of a reclaimed site, pose a threat to public safety, lead to wildlife mortality, or cause excessive sediment loads to enter nearby water bodies.
T-12	Revegetation	To ensure physical stability and to prevent a temporary loss of wildlife habitat utilization from becoming permanent, through the re-establishment of a vegetative mat (food source, hide, etc.) leading to self-sustaining native vegetation.
T-13	Mine Infrastructure	The objective following closure is to ensure physical stability and to remove potential threats to public health and safety; including identification and removal of hazards and hazardous materials.
T-14	Heap Leach Pads	Decommissioned heaps must be physically and chemically stable in the long term.
T-15	Temporary Closure Site Conditions	To ensure public health and safety and protection of the environment in the event of a temporary closure and to manage risks associated with the potential abandonment of a site.
T-16	Geological Values & Heritage	Ensuring post-closure access to geological information identified leading up to and during mineral development and production at a mine site.

5.1 OPEN PIT

The mine consists of a single open pit from which approximately 10.6 million tonnes of ore and up to 57.7 million tonnes of waste rock will be extracted. The location and configuration of the pit is shown in Figure 1-3.

5.1.1 Closure Objectives

At closure, the primary objective regarding the open pit will be to restrict access to the pit and to limit associated safety issues.

However; a lesser concern at closure deals with water chemistry in the pit during flooding. While it will be monitored, water quality concerns associated with the pit water are not anticipated in the long term (see Golder Associates Technical Memorandum Re: Results of the Static Geochemical Test Work, March 27, 2008). Waste rock and therefore the pit wall rock is not acid generating and has a natural alkaline pH as shown in the above named report and supported by more recent testwork. As a result any water accumulated at the bottom of the pit is expected to be neutral to alkaline, and this will be further confirmed by work performed during the life of the mine. It is possible that there may be limited quantities of dissolved metals associated with some portion of the water draining from the pit walls in the pit pond; however, given that overall the pit water is anticipated to be alkaline, it is reasonable to expect that the metals will precipitate out or be present at very low concentrations.

5.1.2 Closure Measures

To control inadvertent access by subsistence and recreational land users, the pit access road will be completely blocked off with large boulders and signage erected. In select areas around the pit perimeter where access could be a hazard, large boulders will also be placed and signage erected. Areas along the top perimeter of the pit which were disturbed during initial stripping will be first scarified and then revegetated as required to reduce erosion and encourage regrowth of native plant species.

Monitoring of pit water chemistry and groundwater wells will be done regularly during operation. Since the data to-date indicate that any water chemistry issues would be associated with metal leaching rather than long-term acid generation, monitoring during operation should indicate whether there are long-term concerns that need to be addressed and how this might best be accomplished.

5.2 HEAP LEACH FACILITY

The heap leach facility is designed for the valley heap leach method which involves preparation and placement of the ore on a double lined pad behind a confining embankment. Leaching of the ore is performed with subsequent lifts progressing up slope. The heap is engineered to hold approximately 13.3 million tonnes of oxide copper ore.

The pad itself covers an area of approximately 38.2 ha and comprises an engineered double composite liner system with leak detection and recovery system in the lower section and a single liner with leak detection and recovery system in the upper elevations. A 5 m high berm will be constructed along the western perimeter of the pad and a bench will be cut into the natural slope on the eastern side of the facility to define the eastern extent. There is a double lined events pond, also with leak detection and recovery, downstream of the heap leach pad.

Runoff around the facility is diverted in ditches and routed to a sediment control pond. The design also includes a foundation drainage system installed beneath the heap leach pad to intercept and remove potential shallow groundwater flow, although no natural groundwater springs have been encountered to date.

Normally, solution will flow directly from the heap to the process plant. However, during high-rainfall or high-precipitation events, or at other times when the plant cannot accept solution, the flow will be directed from the heap to the events pond. The events pond will have a capacity of approximately 160,000 m^3 and occupies roughly 2.7 ha, while the sediment pond occupies an additional 0.8 ha. The events pond comprises a foundation drainage system independent of the leach pad drainage system, a prepared basin surface, an earthfill confining embankment, and lining of the basin facility with a double composite liner system with LDRS. The embankment for the events pond has the same structural section and foundation conditions as the confining embankment for the leach pad.

Foresight into the reclamation and closure stage of the heap leach pad has lead to it being designed to protect both surface water and regional groundwater during operations and in the long term. It has also been designed to provide a stable facility during extreme precipitation events and design seismic events both during operation and after closure. Preliminary design and construction details for the heap are provided in Golder Associates Ltd, March 2007, *Heap Leach Facility Preliminary Design Report.* Existing design criteria for regional design factors and climate, the heap leach facility including events pond and sediment ponds is presented in a Technical Memorandum prepared by Golder (January 10, 2007).

5.2.1 Closure Objectives

In the closure of a heap leach facility, objectives to be met include:

- insuring physical stability of the leach pile;
- insuring chemical stability of the leach pile;
- managing water for the heap and events and sediment ponds;
- controlling erosion and dust from the heap;
- reducing water infiltration with an evapotranspiration cover and revegetation of the heap; and
- decommissioning of the events and sediment ponds.

The primary focus for the Carmacks Copper heap leach facility closure activities are rinsing and neutralization and resulting water chemistry. Specifically, the closure activities are designed to address water management areas including:

- the potential presence of residual acidity and dissolved metals in the heap leach pad and thus;

- potential for metals leaching;
- ore weathering and leach recovery; and
- production of sludge through water treatment.

Residual Acidity and Dissolved Metals

At the conclusion of the mine life, there is the possibility for residual sulphate salts to reside in the heap leach pad. This could produce a certain quantity of dissolved metals associated as contaminants, and thus result in some acidic drainage from the pile. However, test studies show that the spent ore samples, once rinsed and neutralized, are net acid consuming with very low sulphide sulphur content, and leach residues contain essentially no iron sulphide. Thus, limited metals leaching is anticipated from the spent heap.

Ore Decrepitation and Leach Recovery

Ore decrepitation and precipitation reactions can result in lower permeability zones in the heap. In these localized zones, the lower permeability will result in lower metal recovery and less complete rinsing both for decommissioning and in the long term, to infiltrating solutions. Thus, formation of precipitates and particle degradation must be limited both during operation and decommissioning.

Production of Sludge through Water Treatment

Sludge produced from water treatment will be handled in a manner designed to mitigate any environmental and health hazard.

5.2.2 Heap Leach Pad Closure Measures

The heap closure and treatment is a three-phase process: The first phase is the concurrent rinsing phase which takes place while leaching is still in progress on other parts of the heap. The second stage of rinsing and neutralization will take place once all leaching has been completed. The third and final phase is the covering of the heap once sections have been satisfactorily rinsed. The steps in these closure phases are outlined below:

1. Concurrent rinsing is implemented in areas (cells) of the heap where leaching is completed and will not be covered by additional lifts;
2. Concurrent rinse solution is allowed to combine with the pregnant leach solution to be processed through the plant and then irrigate other portions of the heap;
3. When copper extraction is no longer economical, the water treatment plant is expanded and the heap discharge will be directed to the high density sludge (HDS) water treatment process;
4. Initial sludge produced from HDS system is placed in temporary storage location north of heap;
5. Treated rinse solution is recirculated back into the heap for further rinsing, or released as required;
6. Once residual acidity flushed and pH stabilized, the heap is rinsed with a sodium carbonate solution;
7. Rinsing continues until cells neutralize - pH stabilizes and solution reaches a quality suitable for discharge to the environment;
8. Sludge from treated rinse solutions and temporary storage area is added to neutralized areas of the heap;
9. Rinsing stopped when all cells neutralized;
10. Contingency measures for passive heap effluent treatment are implemented if required; and
11. Heap is recontoured and an evapotranspiration cover placed over heap and revegetated.

Testwork indicates that a “walk-away” closure scenario for heap decommissioning is technically feasible in the long term. The proposed closure measures at this time are based initially on demonstrated active care technology followed by implementation of a passive care system to ensure the long term chemical stability of the heap prior to a full walk-away closure.

The process to decommission the heap leach facility is described in further detail in the following sections.

5.2.2.1 Final Leaching

After the last ore is stacked, the heap will continue to be irrigated at the standard irrigation rate of 450-600 m^3/h. Excess water collected in the heap due to precipitation will discharge from the heap with the irrigation solution (450-600 m^3/h + precipitation rate) and will be sent to the process plant to recover copper. A portion of the SX raffinate, as required for water balance purposes, will be directed to the events pond, where it will be treated through the HDS plant and recycled or discharged to Williams Creek. The sludge from the HDS plant will be piped to a temporary sludge storage area or any rinsed and inactive areas of the heap where it will not come in contact with the heap irrigation solution. Returning raffinate to the heap will be adjusted with acid to optimize copper leaching.

5.2.2.2 Concurrent Rinsing

The objectives of rinsing the heap are to displace soluble metals contained in the pore waters of the heap, raise the pH of the heap and stabilize the residual metals that could migrate from the heap through meteoric waters after the heap has been decommissioned and to ensure that acceptable levels are met for discharge into receiving waters. The operational plan is to be able to concurrently rinse the heap, i.e. commence rinsing sections of the heap as soon as practically possible after a given section has been completely leached, while still leaching other cell of the heap in order to ensure maximum time efficiency for final heap closure.

Process solution will continue to be recirculated and copper extracted until it is no longer economical to do so. When areas are identified for rinsing, the operational plan is to introduce rinse water obtained from the sources of makeup water (i.e. pit dewatering, waste rock storage area runoff) as well as fresh water wells to areas (cells) of the heap where leaching is complete and where no further ore stacking is planned. This will not compromise the water balance on the heap leach. In other words, the water applied for concurrent rinsing will combine with the pregnant leach solution, be treated by SX/EW and then return to the heap as raffinate + make-up water.

It is anticipated that approximately 60% of the heap could be partially rinsed concurrently based on analysis of the tonnes of ore that will be available in earlier heap stages and will not be covered over with additional ore. By adding fresh water to these areas, partial rinsing will take place.

This first stage of rinsing will be a limited rinse employing 0.15 m^3 per tonne of ore of rinse water – to match the make-up water requirements. Tests show that by applying this quantity of rinse water the solute concentration will drop by an order of magnitude, at which point these areas will be left to drain until final rinsing. The water added for rinsing will drain into the bottom of the heap and be combined with other leach solutions to form the Pregnant Leachate Solution (PLS). The PLS will be sent to the process plant for copper recovery. This process is shown schematically in Figure 5-1. Figures 5-2 and 5-3 respectively show a cross section and plan view of the heap leach pad where concurrent rinsing is planned.

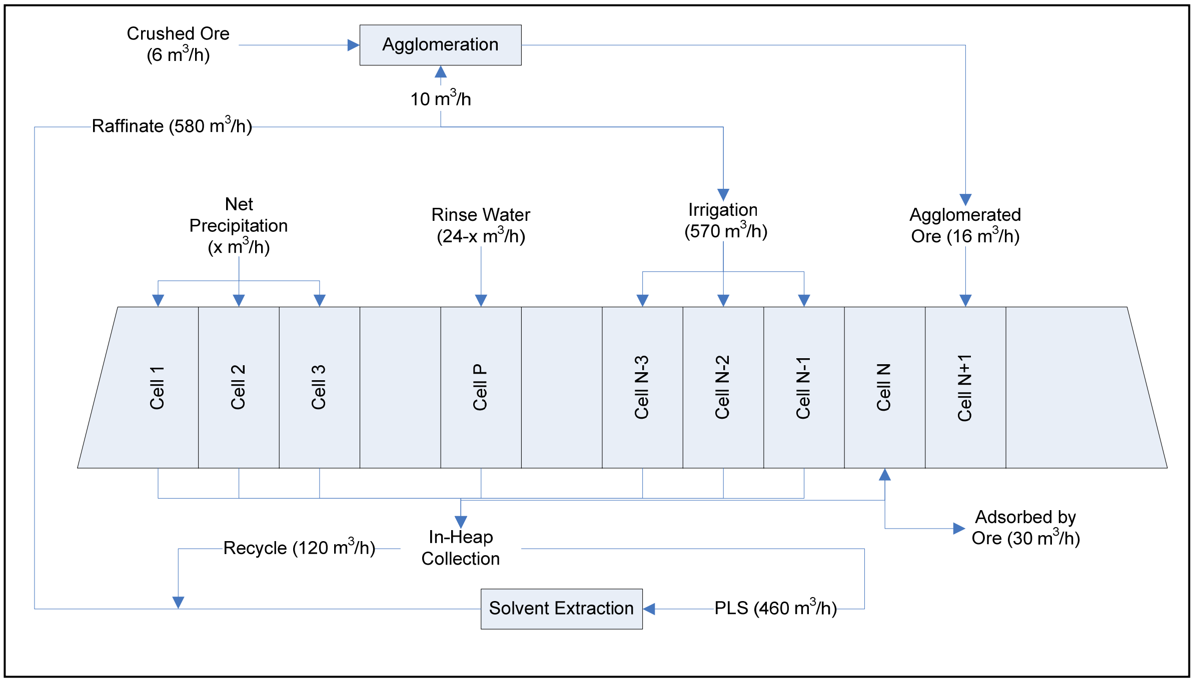


Figure 5-1 Solution Flowsheet Around Heap During Concurrent Rinsing

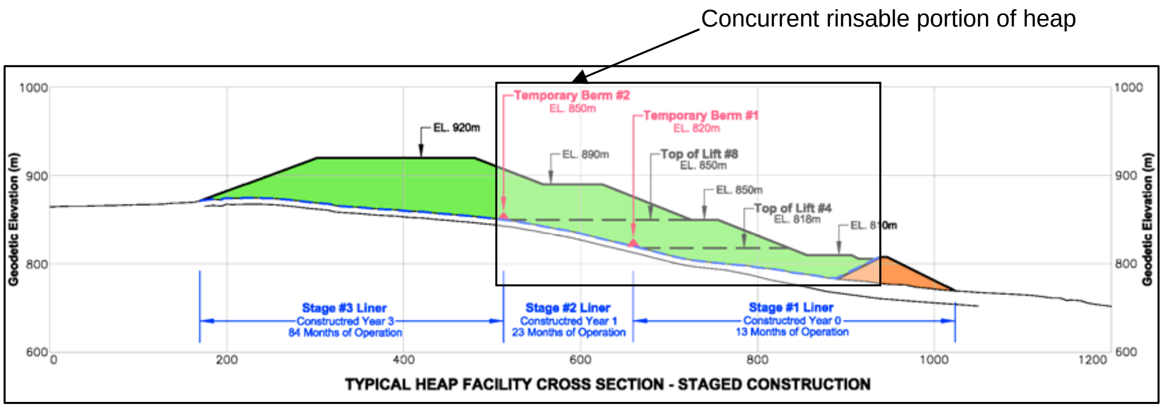


Figure 5-2 Typical Heap Facility Cross Section Showing Concurrent Rinsable Portion

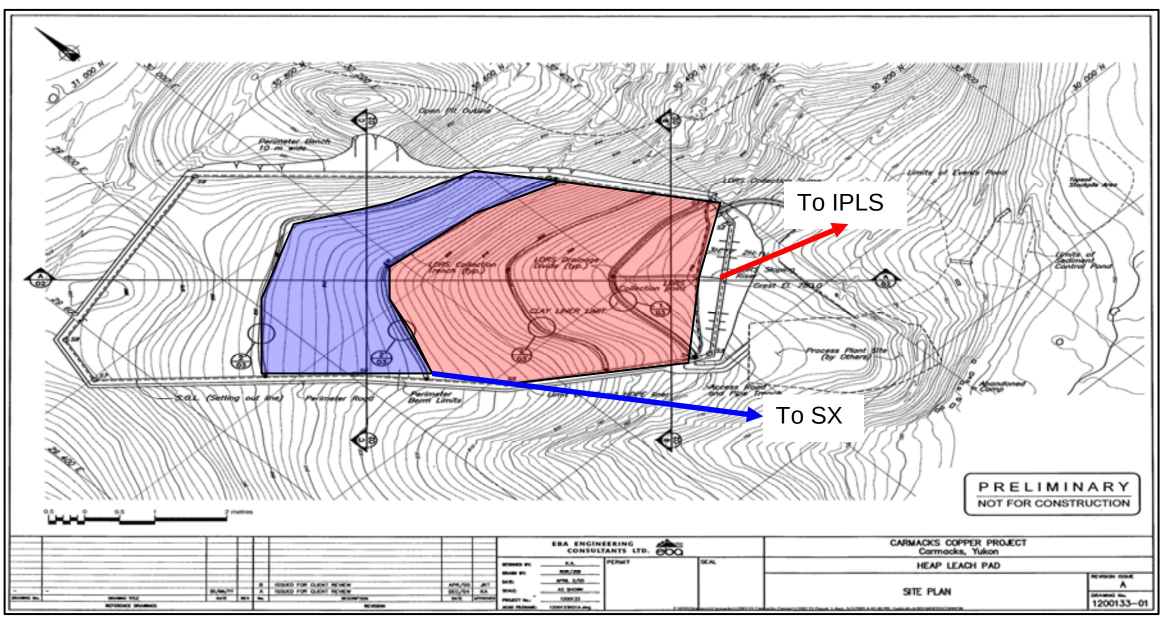


Figure 5-3 End of Mine Rinsing Plan

5.2.2.3 Closure Rinsing

Once copper extraction is no longer economical and the majority of free acid has been consumed through solution recirculation, the process plant will be largely decommissioned with raffinate pumps left in the indoor raffinate pond for the circulation of solution to the heap, and the reclamation water treatment facility will be brought into operation, and closure rinsing will be initiated.

During closure rinsing, discharge from the heap will be directed to the HDS water treatment facility and dissolved minerals will be precipitated using lime. The treatment plant will be designed and operated to produce a discharge that will meet all applicable discharge standards.

Most of the treated water will be recirculated to the heap to form the primary rinse solution, and the remaining treated water will be discharged as necessary to maintain the water balance.

Rinse solution will be applied to the top of the heap through drip emitters already in place from the leaching operation. The drip emitters will be relocated from time to time to obtain a more thorough flushing of the heap. The flow rate to the heap will be the same as the discharge from the water treatment plant minus the amount needed to be discharged due to precipitation. Only excess solution from precipitation will be discharged via a bleed stream from the sediment pond, which will be monitored for quality and will be allowed to drain into Williams Creek.

In order to more effectively rinse the heap, a “counter-current” rinsing system will be used. The solution collection at the bottom of the heap will be designed such that discharge solution from various areas of the heap can be segregated from each other. Primary rinse solution from the water treatment plant will be applied to the heap, collected in the in-heap collection system used during the leaching phase and then re-applied as a secondary rinse solution to rinse other areas of the heap. The discharge from the secondary rinse solution will then be collected in a diverted collection system and directed to the water treatment facility. This concept is shown in Figure 5-4.

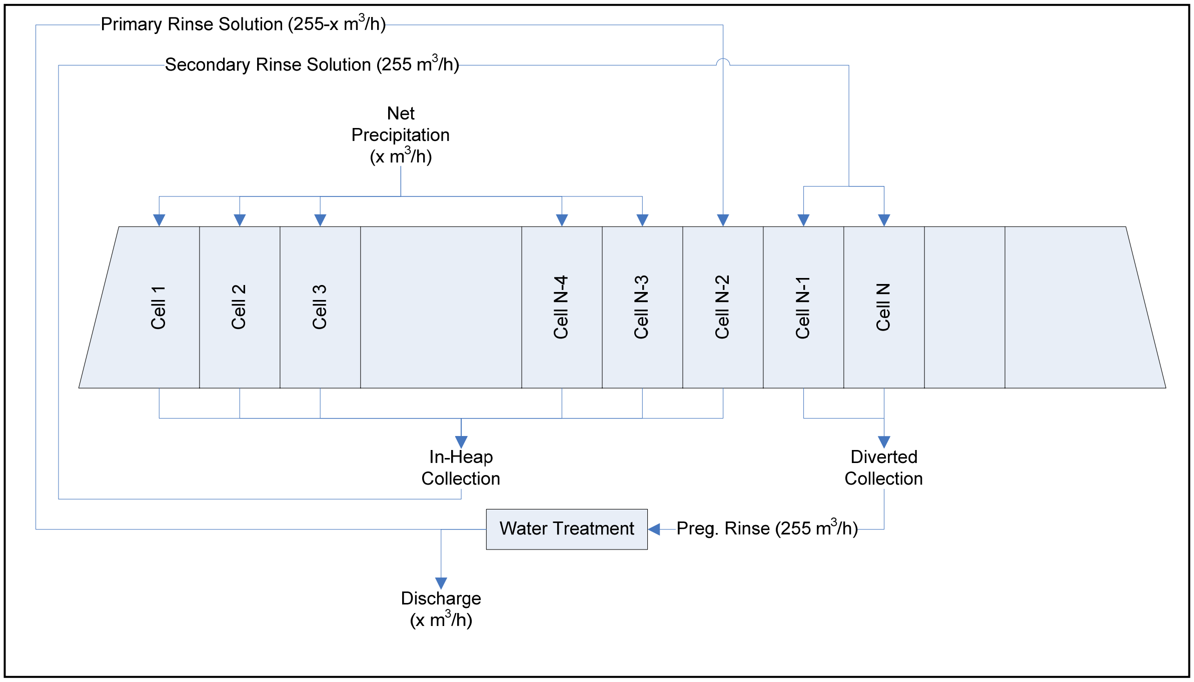


Figure 5-4 Water Flowsheet Around Heap During Closure Rinsing

Most of the water required for closure rinsing will come from the water treatment plant discharge with the balance coming from precipitation. Water used for rinsing the heap will report to the water treatment plant, have any dissolved solids removed and be recycled to the heap to be used as rinse water. Fresh water will only be required to makeup water lost to evaporation and water will only be discharged when required by the water balance due to excessive precipitation.

Once residual acidity has been flushed from the heap and the pH stabilizes, the heap will be irrigated with a sodium carbonate solution. This will be added to the water treatment plant discharge that will be used as rinse solution and will follow the same procedure as before with the discharge from the heap being treated in the water treatment facility and the discharge from the treatment plant being recirculated with excess solution discharged to Williams Creek as required by the water balance. This concept is shown in Figure 5-5.

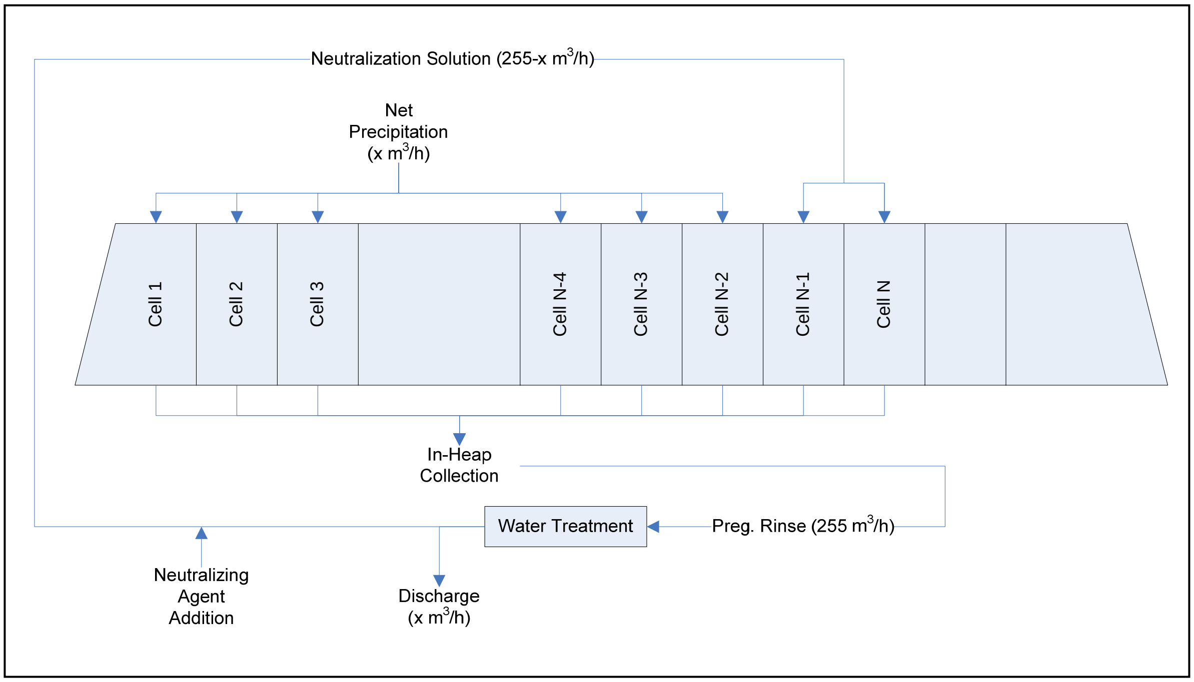


Figure 5-5 Water Flowsheet Around Heap During Neutralization

Rinsing and neutralization will cease when the effluent consistently reaches a quality suitable for direct discharge to the environment. Once effluent analysis indicates that the concentration of metals and the pH levels are in the required range, the cell will be drilled to extract samples from various parts of the cell at various depths. These samples will be analyzed to determine that the rinsing has been thorough. If areas are discovered that indicated incomplete rinsing, the cell (or part of it) will be re-rinsed and the process repeated until satisfactory results are achieved. This may include ripping selected areas of the heap surface and relocating drip emitters and making adjustments to their spacing to improve the effectiveness of rinsing. This procedure is standard practice in the industry for analyzing heap leach facilities to determine when leaching is complete in cells. It was also used at the Brewery Creek mine in assessing the completion of rinsing.

It is anticipated that rinse times to flush the heap will be approximately 4.5 years. Estimates by others show closer to 10 years of year-round rinsing to neutralize the heap. The volumes and timing of rinsing will be confirmed by on-going testwork.

Once the heap is neutralized, irrigation will be stopped, and the heap will be allowed to drain. Standpipes will be removed from the heap, a drainage channel will be built from the bottom of the heap to the events pond, and the heap will be covered. Discharge from the events pond will be directed to the sediment pond and then to Williams Creek.

If necessary, a number of contingency measures are planned to polish the final effluent coming off the heap and are discussed in the Heap Cover and Final Closure section 5.2.2.7 below. The conceptual final heap water flowsheet is shown in Figure 5-6.

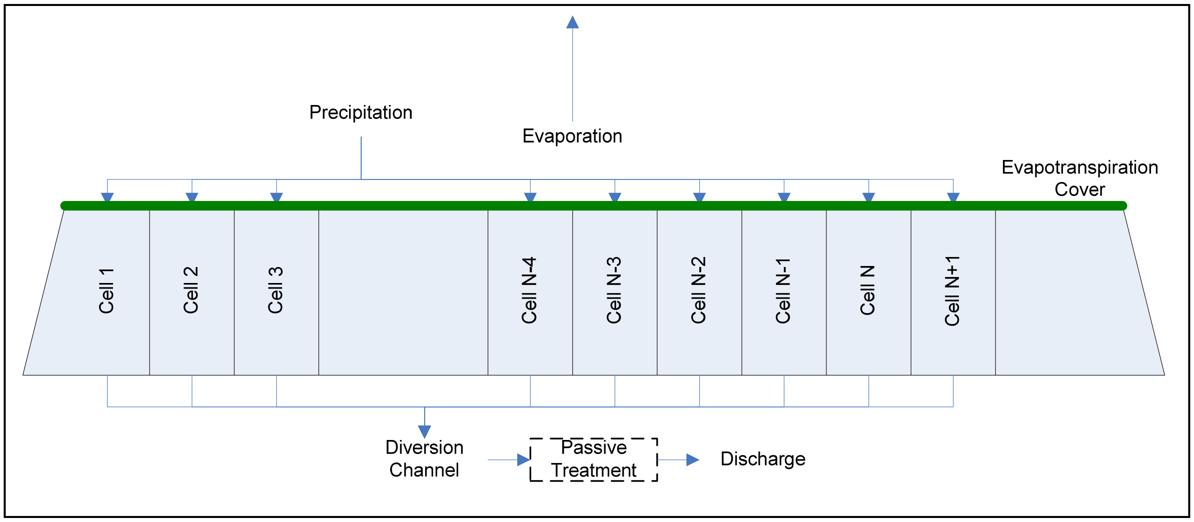


Figure 5-6 Final Water Flowsheet Around Heap

5.2.2.4 Water Treatment

Before the end of leaching operations, the existing high density sludge (HDS) contingency water treatment plant in place during operations will be expanded to increase the capacity to suit closure conditions. The expanded reclamation duty plant will have a treatment capacity sufficient to recycle water for rinsing the heap and handle seepage and any contaminated run-off from the area of the closed leach pad. The anticipated treatment rate will be 255 m^3/h. HDS treatment systems are chosen for their robust and proven operation; this system is appropriate for continuous duty and long-term treatment requirements. The contingency treatment plant is described within the Water Treatment System Report (October 2008).

Seepage will be collected from the leach pad gravity drain pipes, taking advantage of the double liner and collection systems installed for the heap leach operation. The area of the leach pad behind the confining embankment serves as the low point collection point for the entire pad area. Seepage will either be pumped or drain from the leach pad via gravity pipeline through a metering system into the events pond. From the events pond seepage will flow into the two water treatment reactors operating in series. The seepage passes through neutralization reactors 1 and 2 and emerges at a controlled pH of 8.5 – 10.0. Slurried lime is added to a pre-mix tank, along with some of the recycled precipitated solids. This lime mixture is then added to the first reactor tank to perform the pH adjustment.

The resultant slurry will be treated by a mechanically driven clarifier. Clarifier under-flow will be re-circulated to the pre-mix tank. The clarifier sludge product will be bled from the re-circulating under-flow to sludge disposal in the heap or other destination based on testwork results. Clarifier overflow will discharge to the sediment ponds below the heap, for final discharge to the environment. Figure 5-7 shows a flowsheet for the reclamation duty water treatment plant.

A flocculant mixing and dosing system will be enclosed in an existing building adjacent the clarifier. This building will also include a small control room, the motor control center room and a laboratory. Other facilities in the building will include plant and instrument air compressors, and backup diesel electric generators.

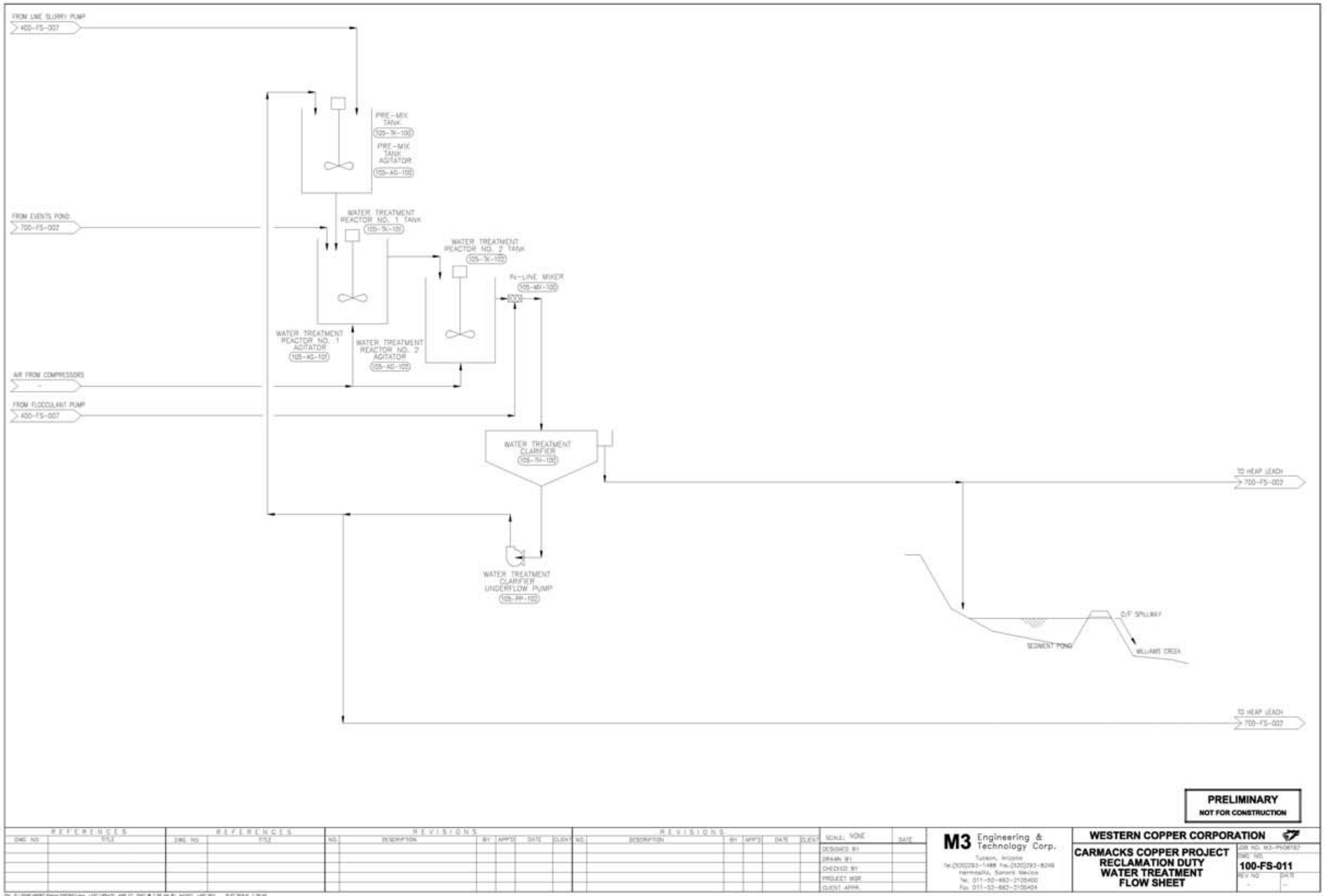


Figure 5-7 Reclamation Duty Water Treatment Flowsheet

Except for large ponds and related equipment, and outside storage pads, all process tanks and equipment will be protected from the elements and will operate automatically with minimal operator assistance. The operating schedule for the water treatment plant will be year round during the rinsing and neutralization of the heap and the plant will remain operational until the heap is detoxified.

Final closure of the water treatment plant is discussed in Section 5.4.2.

5.2.2.5 Sludge Management

Although several options for storing and handling the sludge have been identified, storage of the sludge in leached and rinsed areas of the heap currently is the preferred option as it has the following benefits:

- Easy to implement;
- Rinsed and neutralized areas of the pad will be adequately alkaline to protect sludge from re-dissolution;
- The heap leach pad is lined and contains a leak detection system, which will allow a high level of control over the drainage solution; and
- Does not require any additional site disturbance.

During the concurrent rinsing in the operational phase of heap leaching, no water is treated but simply reapplied to the heap as make-up, thus no sludge will be generated under normal conditions. However, in this phase, sludge may be produced by the emergency treatment of water due to an unplanned event such as an extreme storm. This sludge would contain significant copper values and thus would be mixed thoroughly with any new ore added so that the copper could be recovered. No storage for this sludge is necessary.

The sludge formed during the closure phase will be tested for environmental stability and if analysis indicates that the sludge is unstable (considered very unlikely) the sludge will be removed from site to an approved facility.

During the first part of the closure rinsing phase, rinsing and neutralization of an initial sludge storage area will be completed. This area will be within the heap configuration and lined and is expected to be no more than 15% of the total ore stacked on the heap. At the end of leaching, it is expected that the contaminates to be rinsed from the heap will be fairly evenly distributed throughout the heap, and thus the amount of sludge produced from rinsing this 15% of the heap will be equal to 15% of the total sludge volume, or a maximum of 15% x 220,000 tonnes = 33,000 tonnes of sludge.

In this initial stage of the final rinse, no area of the heap is available for sludge storage and the sludge will therefore be placed in a temporary storage area to the north of the heap. The storage area will be formed by constructing earth berms and lining the base and sides of the area to contain the sludge. Although not anticipated, if additional capacity is required it will be relatively simple to increase the storage capacity by increasing the height of the earth berms.

The sludge will be transported to the temporary storage area by pumping from the water treatment thickener underflow along a temporary HDPE pipeline within the lined area of the pad. This is common industry practice for handling treatment sludges. The density of the sludge at this stage is approximately 1 kg/m^3 and has a water content of approximately 70%. The consistency of the sludge will be similar to yogurt.

The sludge contained in the temporary storage area will settle over time and a portion of the water contained in the sludge will evaporate with the result that the consistency of the sludge will gradually thicken. The extent to which the sludge thickens or solidifies will depend to some extent on weather conditions. Thickening can also be hastened by removing surface water accumulation and turning the surface layer in the summer months to encourage evaporation. The nature of the sludge at the time it is finally placed on the heap cannot be accurately predicted but it is expected that it will have attained sufficient density to facilitate removal by truck and shovel operation.

Once the initial area is completely rinsed, rinsing will move to other areas in sequence and the sludge generated in the treatment plant will be deposited on the surface of the heap: first on this initial rinsed area on the heap, and then on other areas of the heap as they become rinsed.

The third phase will commence when sufficient area has been rinsed and sludge applied to facilitate an effective recontouring of the heap surface. At that time, recontouring of the heap will commence with the sludge being mixed in the upper layers of the heap. The final evapotranspiration cover will then be applied and the area reseeded. Once the sludge is placed on the heap and the heap covered, the sludge will be contained for closure and immobilized.

The final sludge handling plan has not been engineered in detail, but will consist of:

- Ripping the top of a leached, and rinsed area of the heap for receiving the sludge;
- Piping sludge to this prepared area;
- Depositing sludge over this area to 1 – 2 m depth;
- Allowing the sludge to drain and dry;
- Mixing sludge with the heap material (likely during the recontouring phase); and
- Covering the heap with topsoil and vegetation.

5.2.2.6 Heap Contingency Measures

As stated previously, once the pH of the heap effluent has stabilized during the washing of the heap with water, the heap will be neutralized with a sodium carbonate solution. When the heap discharge meets all required discharge limits, the sodium carbonate addition will cease. Monitoring will confirm heap effluent quality to ensure performance standards are met. A number of contingency measures are planned to polish the final effluent coming off the heap as it is expected that even with a cover the heap will continue to discharge over the long term.

Column studies were run to evaluate water chemistry improvements as a result of fresh water rinsing followed by alkaline rinsing of leached heap materials. Two columns received this rinsing program, and after the alkaline rinsing was complete, fresh water pulses were added to evaluate water chemistry from treated heap materials during typical precipitation events. Results of this testwork are attached to Western Copper's Water Treatment System Report (October 2008).

The column tests showed treatment of the primary metals of concern (Cu, Ni, Pb, and Zn) by the rinsing and alkalinity addition program meeting MMER standards. During closure, after the rinsed and neutralized heap discharge meets MMER standards, the heap will be monitored and the closure water treatment plant will remain operational in the unlikely event that the discharge contaminant levels increase. If the heap drainage water quality does not continually meet discharge standards, then contingency water treatment and polishing of effluent will be put into effect which potentially includes limestone drains, biological treatment cells, infiltration galleries, and wetlands.

The objective of a contingency treatment system would be to treat metals from the rinsed and neutralized heap discharge in an initially semipassive and eventually fully passive system. The nature of the semipassive system would be to replenish reagents as required, and monitor inflow and outflow chemistry. After operation for some time, the system should contain sufficient reactivity with metals to not need continued replenishment of reagents. At that time, the monitoring period would continue in order to demonstrate that the treatment system can operate completely passively. After a sufficient monitoring period showing continued adherence to discharge standards, closure would be considered complete.

The selection between limestone drains, biological treatment cells, infiltration galleries, and wetlands will be based on a number of factors for each one, primarily the specific metals requiring removal from the residual drainage. Conceptually multiple treatment processes could be added in series.

- A limestone drain would be utilized if metals in the drainage could readily be removed by creation of neutral pH and some dissolved alkalinity. For example, copper may be treated this way. A limestone drain would also provide redundancy to maintain neutral pH in the discharge. A limestone drain that is adequately sized would be a passive system, i.e., no additional reagents would need to be added.

- A biological treatment cell would be utilized if metals in the drainage could be most efficiently removed as a metal sulfide. Copper, nickel, lead and zinc are all efficiently removed in a biological sulfate reducing (i.e., sulfide producing) treatment cell. Other metals can also be readily removed in a sulfate reducing system. A biological treatment cell would be located in the events pond or the sediment pond, and would consist of a dosing system to add a soluble carbon source to the heap drainage as it entered the pond, a clean rock fill in the pond to provide surface substrate for microbial activity, and a drainage structure to allow year-round discharge from the pond. Residence time would be several months in the pond, which would be sufficient for the microbes to reduce sulfate in the drainage to soluble sulfide, and the soluble sulfide would react with soluble metals and precipitate the metals as metal sulfide precipitates within the pore spaces of the rock in the pond. Iron in the discharge and in the rocks would in time be the source for a buildup of amorphous iron sulfides, which would continue to react with and remove metals after soluble carbon sources have ceased to be added to the ponds. Note that the metal sulfide precipitates would be present under anoxic conditions and would not react to form acid mine drainage.

- An infiltration gallery could serve the same purpose as a biological treatment cell, but would be utilized if the flow is low enough and an area with permeable soils is close to the heap. In this case, a leach field would be constructed to infiltrate water, a dosing system would be placed in line so that the water sent to the infiltration gallery would have an adequate dose of organic carbon so that the desired amount of sulfate reduction and metal sulfide precipitation would take place in the infiltrated water. A groundwater monitoring network would be established to monitor treatment, and active dosing would cease when the drainage rate is low enough and the amorphous iron sulfides are built up to sustain a passive treatment system.

- Treatment wetlands would be employed as a polishing step after a limestone drain or a biological treatment cell, if pH reduction (from strongly alkaline waters) is desired or if aeration after biological treatment is desired prior to discharge to surface waters. These wetlands would be passive and would rely on the natural activity of plants and aeration cascades to aerate the water.

The location of the limestone drain and the biological treatment cell would likely be in the events pond. It is adequately sized to allow sufficient residence time for treatment. An infiltration treatment system would be located downgradient of the events pond in a suitable location with permeable soils. A wetland system could be installed in the events pond, the sediment pond, or created as natural features between the ponds and discharge to surface water.

It is estimated if a limestone drain were to be used that it would be sized to handle freshet conditions, i.e., flow up to 25,825 m^3/month (as per Clearwater Consultants (2006) water balance update for closure conditions). A residence time of several days would be more than sufficient to provide contact of the heap drainage with limestone and to provide space for the metal precipitates to be removed without clogging the system and causing short circuiting. For these purposes, a limestone drain of approximately 15,000 m^3 of large size (>2 inch) limestone rock would be placed in the events pond and the drainage from the heap would be allowed to flow through this rock. By directing the flow to the base of the limestone and allowing it to upflow to a standing water condition over the top of the rock, and then flow out of the pond, a passive system could be installed that would not require maintenance.

For a biological treatment cell, rock from the mine that is permeable, has low mineralization, and few fines would be placed into the events pond with a header system to distribute the flow into the rock. A dosing tank would be placed near the drainage point from the heap and organic carbon would be dosed into the heap drainage based on flow from the heap, so that a constant dosage rate would be maintained. The stoichiometry of the amount of sulfate reduction required to achieve the desired metals precipitation would determine the amount of organic carbon that would be added to the heap drainage.

Similar to the limestone drain, the amount of rock placed in the pond would be adequate for several days contact between the water and the rock prior to discharge. The biological treatment cell would be designed to allow upflow through the rock, and several feet of free water would be allowed to stand over the top of the rock prior to flow out of the pond. Up to 30,000 m^3 of rock would be placed in the cell, providing approximately

10 days residence time. Monitoring locations (within the treatment cell and at the cell decant) would be used to demonstrate treatment system performance. Test work of the treatment process could be used to refine the amount of rock placed in the pond, and to determine the residence time required in contact with the rock to obtain complete treatment.

An infiltration gallery has the same basic design as a biological treatment cell, with the difference that rather than placing rock in the pond, natural soils and materials under and adjacent to the infiltration trenches provide the residence time for the sulfate reduction and metals precipitation processes. In addition, many natural soils have some natural attenuation properties, which would provide a redundancy in the treatment system. Monitoring locations in the groundwater downgradient of the infiltration trenches would be used to demonstrate that the treatment system is performing appropriately for metals removal.

A wetlands treatment cell may have several different configurations depending on the desired purpose. For re-aeration, such as after a biological treatment cell, exposure of open water to the air may be sufficient, or an aeration cascade could be placed downgradient of the pond and achieve the same purpose. If off-gassing of carbon dioxide from a limestone treatment system or from a biological treatment cell is desired, to allow further polishing of some metals that could precipitate under aerobic conditions, a shallow pond or a series of cascades and settling ponds could achieve that result.

These treatment systems could be combined in several ways. For instance, limestone could be the rock substrate placed in a biological treatment cell, if alkalinity addition were desired. A wetland cell may provide benefits for aeration and polishing of limestone drain or biological treatment cell treated water. The specific configuration will be determined based on the chemistry observed at the end of the rinsing and heap neutralization program, if any treatment is required.

5.2.2.7 Heap Cover and Final Closure

Following heap rinsing the top surface of the heap leach pad will be re-graded to promote the controlled runoff of precipitation, to eliminate areas where ponding of water may occur, and to minimize seepage. 75% of the surface area will have an average slope of 40% or steeper and 25% of the surface area will have an average slope of 7% or steeper. These types of slopes are consistent with the topography of the undisturbed area adjacent to the heap.

The top surface of the heap will then be covered with a store and release / evapotranspiration cover system to minimize the amount of water which infiltrates into the heap and encourage deep rooted plants to take up water. The advantage of a store and release cover is that a low permeability compacted layer is not required to reduce infiltration levels to acceptable and manageable long term rates.

Heap covers are designed generally to control infiltration into the heap as a means of controlling the transport of metals or other substances from the heap. In the case of Carmacks Copper, testing has shown that the heap residue is stable and not acid generating and thus metals release from the neutralized heap will meet acceptable criteria for discharge to the environment. However, it is considered best management practices to prevent infiltration into the heap.

The primary purpose of the cover at Carmacks Copper is to prevent infiltration and support the revegetation of the heap and maintain a stable surface. A 0.5 m thick cover is proposed at this stage but more detailed design will be completed, taking into account the materials available on site. This can be compared to the Brewery Creek Mine heap leach pad where an engineered designed cover was constructed on the heap with a cover thickness of 0.4 m. It is understood that this cover is functioning well.

Cover material will be sourced from appropriate stockpiled material or borrow areas.

Complete rinsing of a given area of the heap is necessary before construction of the cover in that area can commence. Areas of the heap will become available for covering on a sequential basis. In practical terms, the earliest an area would be available for placement of cover material would be in the year following the complete satisfactory rinsing of an area which is estimated to be in the second year following the completion of ore placement on the pad. Other areas would then become available each year following the completion of rinsing in the area. On this basis, total cover placement would therefore be complete in the year following completion of rinsing. Since rinsing is projected to take 4.5 years following completion of ore placement, this could be in the fifth year if weather conditions are satisfactory at the time. The heap leach pad cover will be installed after rinsing and neutralization is complete.

Monitoring will confirm heap effluent quality to ensure performance standards are met. In the unlikely event that heap drainage water quality does not meet discharge standards, contingency water treatment and polishing of effluent will be put into effect. Contingency measures include: limestone drains, biological treatment cells and infiltration galleries.

5.2.3 Events and Sediment Ponds Closure Measures

The objective of decommissioning water retention and sediment control structures is to ensure drainage at, and adjacent to the site is stable in the long term and to the extent possible does not impede natural drainage (Technical Guidelines, Mine Site Reclamation and Closure Policy).

Surface runoff collection ditches and the events and sediment ponds will remain operational until vegetation on the heap leach store and release cover has reached a self sustaining growth and suspended solids are not an issue in the surface runoff flows. At that time, diversion ditches to the sediment pond will have any liners removed and subsequently recontoured and revegetated. Water impounded in the ponds will be pumped down and discharged to the environment meeting applicable effluent discharge standards. Sediment in the ponds will be stabilized and samples collected and analyzed to determine characteristics of this waste and thus dictate how it is to be handled and relocated. The events pond double liner will be folded back on itself to contain any sediments and permanently buried.

The ponds will be breached and dikes levelled to prevent water from being impounded and slopes will be stabilized with erosion barriers and riprap. An overburden layer will be placed over top, contoured and vegetated.

5.3 WASTE ROCK STORAGE AREA

The waste rock storage area (WRSA) is located immediately north of the open pit on a gentle, north-east facing slope (see Figure 1-3). The site was chosen to minimize haul distance from the pit, ensure stable foundation conditions, and also to minimize potential impact on existing surface drainage courses.

The WRSA design is briefly summarized below, and described in detail in Golder Associates *"Report on Preliminary Design, Waste Rock Storage Area, Carmacks Copper Project, Western Copper Corporation, Yukon"* (April 2008). This report includes design drawings, consideration of foundation preparation, dump sequencing, contingencies for increased stability, water balance and water management, stability analysis, proposed monitoring, and an outline of reclamation proposed.

<u>Design Objectives</u>

The principal objectives for the design of the WRSA are as follows:

- Provide a geotechnically stable and cost-effective configuration for staged waste rock storage with particular attention to permafrost and foundation conditions;
- Minimize potential effects to the groundwater system and surface runoff flows during the life of the mine operation and in the long term by providing collection ditches and a sediment control pond;
- Develop the facility in stages to allow for ground thawing and drainage and progressive reclamation;
- Incorporate field observation and performance monitoring during the initial stages of waste rock placement to ensure on-going stability and performance of the WRSA; and
- Provide adequate contingencies to deal with localized instabilities which may arise from areas of potentially thaw unstable foundation.

<u>Design Basis</u>

The following assumptions were made for the final design of the WRSA;

- A design capacity of 60 million tonnes placed at 2.0 t/m^3;
- Annual waste rock production of approximately 7.5 million tonnes;
- Hauling and placing of mine waste rock occurs year round;
- Placement of waste material in 20 meter lifts with interim slopes at 1.4 or 1.5H:1V, by end-dumping from the face of an advancing lift; and
- Material waste comprised of coarse, durable granodiorite and biotite gneiss rock types.

The following design parameters have been used for the design of the sediment control pond for the WRSA:

- Provide storage for the 1 in 10 year 24 hour storm event; and
- Provide a spillway that can safely pass the 1 in 200 year 24 hour storm event.

5.3.1 Closure Objectives

The objectives of physical stability associated with the waste rock storage area are primarily associated with the design and construction of the dumps on potentially thaw unstable ground. These objectives are addressed as part of construction of the dumps and are not closure objectives although monitoring, as set out in the WRSA design report, will continue during closure to ensure design assumptions are valid. At closure, the remaining physical objectives of the WRSA are:

- control of erosion; and,
- water management.

Objectives of chemical stability that are relevant to closure include:

- drainage water chemistry; and,
- potential for metals leaching to develop over time.

Because results of static and kinetic testing of waste rock show that the waste rock has low acid generating and metals leaching potential, the potential for acid generation and mobilization of metals from the waste rock is not significant. Golder Associates *"Report on Preliminary Design, Waste Rock Storage Area, Carmacks Copper Project, Western Copper Corporation, Yukon"* (April 2008) provides a summary of geochemical testwork and results. As part of on-going testwork, further samples will be selected during operations to confirm the above.

5.3.2 Closure Measures

Progressive reclamation of the WRSA will be initiated during the early stages of production as this will lower final reclamation costs, improve short term stability, and reduce surface erosion and sedimentation. The following are recommendations for progressive reclamation and final closure of the WRSA:

- maintain sloped grading of bench surfaces to minimize surface water infiltration and erosion of downstream slopes;
- the operational slopes, consisting of benches and raises, will be maintained at a stable 2.25H:1V configuration and will not be re-graded at closure. Leaving the benches as flat areas at the bottom of the slopes prevents problems associated with grading of long slopes and helps to reduce erosion and channelling issues associated within one long steep slope;
- maintain surface water collection ditches and the sediment control pond to control surface drainage during operations and reclamation;
- surface runoff collection ditches and the sediment control pond will remain operational until vegetation on the storage area has reached a self sustaining growth;
- use organic material removed from the area pre-mining to cover flat areas of the WRSA and encourage natural and seed growth of native species.

The flat bench areas of the WRSA will be seeded and lodgepole pine encouraged on areas facing south and east, and white spruce on areas facing to the north. The flat surfaces will be covered with 0.3 to 0.5 m of material that was stripped from the area before mining. This material will have been stockpiled around the WRSA and will be used to encourage revegetation. Initial seeding will include native seed mixtures to minimize erosion and provide time for native trees to revegetate the area. While revegetation will be encouraged on the WRSA slopes, it is not proposed at this time to reseed these areas but to monitor them for erosion and take appropriate action is any is noted. Since testing to date indicates that neither acid generation nor metal leaching will occur in the WRSA and surface water quality objectives will be met, a complete cover to reduce surface infiltration (evapotranspiration cover) is not considered necessary. The objective of covering the flat benches is to minimize erosion and return the area to a vegetative cover similar to the native vegetation in the area.

Establishment of the cover will commence during the later stages of mine operation in areas of the WRSA where the final design elevations have been achieved (lower benches, flat surfaces). This will allow additional time to monitor the success of the initial cover application and if necessary refine the soil and seed application techniques before completing the application of the cover.

Surface water (snow melt and rain water) will be managed off the west side of the WRSA down the main access ramp, and on the east and north sides of the WRSA in lined rock engineered channels. Drainage ditches and the sediment pond to the east of the WRSA will be removed from service or de-constructed (pond dikes levelled and breached) once the above revegetation is established and is successful and suspended solids are not an issue in surface runoff flows. Monitoring during operations will be performed on an on-going basis to evaluate long-term drainage water chemistry from the waste rock storage area.

The cost estimate prepared for closure and reclamation of the waste rock storage area includes the cost to recontour the final lift, place overburden from stockpiles (assuming 50% progressive reclamation during operations) and reclaim the sediment pond. Estimated closure costs are presented in Section 8.

5.4 PROCESS PLANT AND ANCILLARY FACILITIES

This section addresses decommissioning measures for the process plant and ancillary facilities in the immediate vicinity that support plant activities. These include:

- Sulphuric acid plant;
- Solvent extraction and electrowinning building;
- Water treatment plant;
- Diesel generator site;
- Diesel and kerosene storage area;

- Booster pump building and pumphouses/pipelines; and
- Plant site pad.

5.4.1 Closure Objectives

The objective for decommissioning mine infrastructure is to ensure physical stability and to remove potential threats to public health and safety, including identification and removal of hazards and hazardous materials. Concern regarding physical stability of these structures at closure will be mitigated for the most part by their disassembly and removal from the site. Water treatment facilities will remain intact until the heap leach pad has been neutralized and water quality is appropriate for release to the environment.

Chemical stability objectives for this area and facilities would arise primarily from contamination, if any, of surrounding soils by fuel and reagents.

5.4.2 Closure Measures

The process plant and ancillary facilities not required for reclamation and water treatment purposes will be dismantled and removed. Water treatment facilities will remain intact until the heap leach pad has been rinsed and neutralized and water quality is appropriate for release to the environment. The solvent extraction and electrowinning facility will also play a role in the early stage of reclamation of the heap leach pad and will be removed only after it is no longer required.

Ultimately, buildings and foundations will be dismantled and the site on which the process plant and other buildings were located will be returned to pre-mining conditions. All machinery, equipment, and storage tanks will be cleaned and removed from the site or disposed of in an approved manner. All salvageable equipment will be removed from the plant for reuse before demolition, and any leftover chemicals and reagents will be returned to the supplier or if not returnable sent to a facility capable of handling the chemical or reagent. A salvage program will be employed before the end of mine life to minimize on site disposal of facilities. It is expected that all facilities will be disposed of by auction or contractor for salvage value. All ancillary site facilities including the camp, truck shop service complex, and crushing plant will be salvaged and equipment and buildings or infrastructure removed.

Unused supplies will be returned for credit once the processing facilities have been shut down. Propane tanks and hardware items will be returned to the supplier. The water wells, supply lines (not buried), and all power cables and overhead power lines and poles will be salvaged. Any buried infrastructure remaining such as water pipes will be identified on site closure maps. All concrete structures, foundations and slabs will be removed and levelled to surface as required and covered with soils and overburden and revegetated. Non-salvageable demolition materials will be disposed of in approved manner which may include burial in the waste rock storage area or disposal within the on site solid waste facility.

Fuel will be required for closure and any remaining product will be returned to the fuel supplier at the end of active reclamation activities. The fuel storage area liner will then be folded and buried. Any contamination of soils by fuel, chemicals or concentrates will be documented through a final site contamination assessment. Contaminated soil will be removed and/or remediated on site in an approved manner.

Areas will be recontoured to establish runoff patterns as per the final drainage plan for the site. Compacted areas will be scarified and reseeded.

5.5 MINE CAMP AND RELATED INFRASTRUCTURE

The main construction work force will be housed in a new camp to be constructed to the west of the access road and truck scale. The camp will be a typical modular unit camp with accommodation, kitchen, dining and recreational facilities for 200 hourly employees, 35 supervisors and 22 managers. The layout of the camp and its relationship to the other process facilities is shown on Figure 1-3. These facilities will become the operations workforce accommodation the end of construction.

Dry offices will be provided in a separate trailer complex in the operations camp area, complete with separate women's dry offices and assembly areas. Showers, change rooms and individual lockers will be provided. Offices for the mine and maintenance shift supervisors, the drill and blast supervisor and the process maintenance supervisor will be included. The dry offices will be heated with indirect propane-fired unit heaters.

5.5.1 Closure Objectives

As stated previously, the objective for decommissioning mine infrastructure is to ensure physical stability and to remove potential threats to public health and safety, including identification and removal of hazards and hazardous materials. Concern regarding physical stability of these structures, at closure, will be mitigated by their disassembly and removal from the site. Chemical stability objectives for this area and facilities would arise only in the event contamination of surrounding soils by fuel or other wastes was discovered (however these objectives would most likely have been dealt with during operations).

5.5.2 Closure Measures

Closure measures for the campsite include disassembly of the camp modular trailers and related infrastructure. All salvageable material will then be removed from the site. The remaining campsite pad will be recontoured for erosion stabilization, covered in overburden, and revegetated.

Upon closure the septic tanks will be pumped out and the waste will be hauled to an approved disposal facility, as during operations. The tanks will then either be removed or filled with gravel, sand, earth or inert material and covered with local soils. The remaining infrastructure (i.e. piping and related materials, including the septic field) for the two systems will remain buried with locations documented on a final site map.

5.6 TRUCK SHOP SERVICE COMPLEX

A Truck Shop and Warehouse facility will be constructed on a bench of unmineralized pit waste material to the west of the pit (see Figure 1-3). The facilities will comprise a simple insulated fabric covered structure on concrete foundations and concrete base slab.

Adjacent to the Truck Shop will be a truck ready line. Also in the same area will be the main fuel storage facility. It will comprise two tanks 4.5 m x 4.5 m located in a bermed, lined secondary containment compound.

5.6.1 Closure Objectives

As stated previously, the objective for decommissioning mine infrastructure is to ensure physical stability and to remove potential threats to public health and safety, including identification and removal of hazards and hazardous materials. Concern regarding physical stability of these structures at closure will be mitigated by their disassembly and removal from the site. Chemical stability objectives for this area and facilities would arise primarily from contamination of surrounding soils by fuel, chemicals or other wastes.

5.6.2 Closure Measures

Closure measures for the truck shop area include disassembly of the fabric covered structure and related infrastructure. All salvageable material will then be removed from the site. All machinery, equipment, and storage tanks will be cleaned and removed from the site or disposed of in an approved manner. The remaining concrete will be broken-up and levelled to surface and the area and pad will be recontoured for erosion stabilization, covered in overburden and revegetated. Non-salvageable demolition materials will be disposed of in approved manner which may include burial in the waste rock storage area or disposal within the on site solid waste facility.

Fuel will be required during closure activities and any remaining product will be returned to the fuel supplier. The fuel storage area liner will be folded and buried. Any contamination of soils by fuel or chemicals will be documented through a final site contamination assessment. Contaminated soil will be removed and/or remediated on site in an approved manner.

Upon closure the septic tanks will be pumped out and the waste will be hauled to an approved disposal facility, as during operations. The tanks will then either be removed or filled with gravel, sand, earth or inert material and covered with local soils. The remaining infrastructure (i.e. piping and related materials, including the septic field) for the two systems will remain buried.

5.7 MISCELLANEOUS SITES AND FACILITIES

This section addresses decommissioning and closure measures for the miscellaneous buildings and facilities associated with mine workings not addressed in the previous sections. These include:

- Crushing plant and pad;
- Explosives storage;
- Solid waste facility; and
- Land treatment facility.

5.7.1 Closure Objectives

Maintenance of the physical stability of these structures at closure will be mitigated for the most part by their disassembly and removal from the site. Chemical stability objectives for these areas and facilities would arise primarily from contamination of surrounding soils by fuel, chemicals or other wastes.

5.7.2 Closure Measures

Following the completion of mining activities, the buildings and foundations will be dismantled and the site on which the facilities were located will be returned to pre-mining conditions. All salvageable equipment will be removed from the facilities for reuse before demolition, and any leftover chemicals and reagents will be returned to the supplier.

Any contamination of soils by fuel or chemicals will be documented through a final site contamination assessment. Contaminated soil will be removed and/or remediated on site in an approved manner.

Areas will be recontoured to establish runoff patterns as per the final drainage plan for the site. Compacted areas will be scarified and reseeded.

5.7.2.1 Solid Waste Facility

At final closure, the submission to YG of a formal Closure Plan for the solid waste facility will be required documenting the materials contained within and the conditions of the facility. Preceding the final facility reclamation, salvageable materials (tires, metal) may be hauled off site for salvage/recycling. Any hazardous materials will be removed from site to a licenced waste disposal site as per the Company's Special Water Permit. Once the closure plan is approved by YG, the facility will be covered by two compacted layers of 200 mm thick compactable soil material that will be graded and seeded.

5.7.2.2 Land Treatment Facility

The closure of this facility is subject to the submission of a formal Closure Plan to YG, including sampling results that demonstrate the final concentration of contaminants in the soil being treated. It is likely that the land treatment facility Closure Plan will be prepared and submitted some time after final closure of the mine site has begun.

Any contaminated soils will be treated at a land treatment facility to appropriate levels of remediation before being used for reclamation purposes. Generally, once the desired contaminant levels have been reached in the final volumes of treated soil and the Closure Plan has been approved by YG, the soils will be spread over the site, recontoured in place and revegetated.

5.8 ROADS

Roads used for exploration, accessing the site and providing access between various facilities on-site will be reclaimed as necessary once their use is exhausted.

5.8.1 Closure Objectives

The Company expects that the determination of the closure fate of the main access road will be made in consultation with the Little Salmon Carmacks First Nation, Selkirk First

Nation, local trappers, community members and government regulators. For the purposes of preparing a closure cost estimate, this closure plan considers deactivation and reclamation of the 13 km site access road.

In making a final decision about decommissioning the main access road, consideration will be given to the potential requirement for equipment access. Despite the identified closure timing and schedule (Section 7), final access road removal (if selected) would only be undertaken once it is concluded that the site is stable.

The primary consideration for the physical stability of roads at closure will be slope stability where culverts have been removed and intermittent drainage channels have been established through the road alignments which could lead to localized erosion.

5.8.2 Closure Measures

There are no chemical stability concerns with the roads, however, physical stabilization and erosion control measures including revegetation will contribute to the mitigation of any potential geochemical concerns at closure. Closure measures specific to on-site roads, exploration trails and roads, and the main access road are discussed in the sections below and summarized in Table 5-10 with estimated closure costs. A typical haul road and site road reclamation cross-section is shown in Figure 5-8.

5.8.2.1 On-Site Roads Serving Mine Operations

Haul and access roads used on-site during mining operations will be fully reclaimed during closure. Culverts will be removed, and slope surfaces recontoured to reflect the natural topography of the area as well as provide stability. Surfaces will be scarified and revegetated to reflect pre-mining operations to the extent possible.

5.8.2.2 Exploration Trails and Roads

Any exploration trenches, drill pads and trails on the property outside of the mine layout can be reclaimed once exploration is complete as per Western Copper’s Class 4 Mining Land Use Approval LQ00192. Exploration trails are narrower than the exploration road and some limited recontouring and stabilization may be required in locations where potential erosion is a concern but for the most part will be left to allow for natural revegetation. Side-cast material will be recovered with an excavator or backhoe. Exploration trenches will be backfilled and natural ground contours will be re-established.

It is expected that the closure fate of the exploration road currently used to access the site prior to construction will be determined in consultation with government regulators and the local community. The Company does not have the authority nor responsibility for decommissioning this road, as such a cost estimate for this activity has not been provided.

5.8.2.3 Access Road

Western Copper will consult with the Little Salmon Carmacks First Nation and Selkirk First Nation and the community to determine their desire for treatment of the mine access road after closure. Should deactivation of the access road be desired, the following concepts are applicable:

- removal of all culverts,
- removal of Merrice Creek bridge and approaches;
- restoration of drainage patterns; and
- scarification and seeding.

To discourage travel once access control gates have been removed, the road can be bermed and ditched.

The Merrice Creek bridge and culverts will be removed once total closure of the mine is completed and all equipment and salvageable material has been removed. Culvert and bridge removal work is best conducted in late summer/early fall when surface flows are low or non-existent. Culvert removals and bank recontouring works at locations where there is surface flow will include pump around or flow diversions to ensure that work is done in the dry and erosion is prevented.

Experience shows vegetation will re-establish itself in the 30 m wide cleared right-of-way during the life of the mine and only remedial work will be required. As suggested for linear developments, access roads will be tested for revegetation with a seed mixture including a native selection of Yukon plants. Seed proportions will follow those suggested by Kennedy (1993) and will be modified based on reclamation test plots and field trials.

Measures will be taken during design and construction to prevent permafrost degradation along access roads. However, if this occurs, reclamation of affected areas will be completed as necessary. This can usually be accomplished in relatively dry areas that have a thin organic layer, as is the case at this location, by stripping the organic layer, replacing it with a sufficient depth of gravel to restore the natural thermal gradient and revegetating the area.

Regardless of whether or not the access road is deactivated, borrow areas established adjacent to the access road will be reclaimed. Once borrow sources have been exhausted, the area will be scarified, fertilized and seeded.

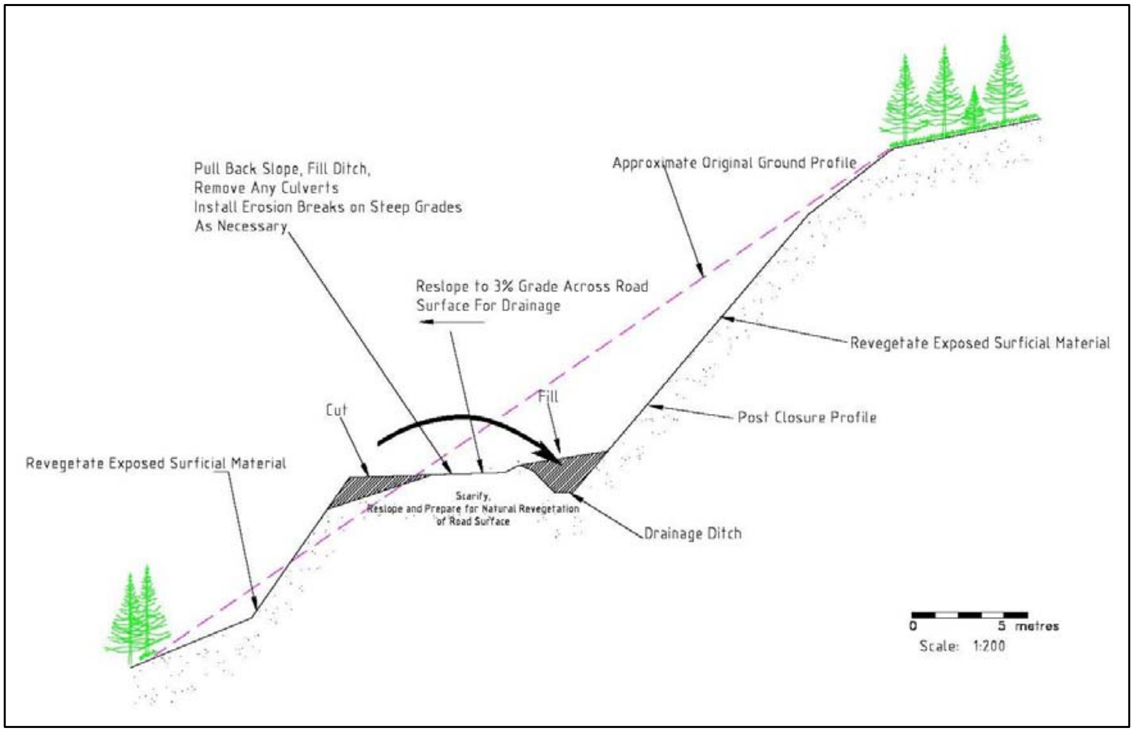


Figure 5-8 Haul Road and Site Road Typical Reclamation Cross-Section

5.9 ADAPTIVE MANAGEMENT PLANNING

A significant amount of data has been collected to document local environmental conditions for the Carmacks Copper property to provide supporting information for environmental assessment and the project's engineering designs. During the operational mine life, the Carmacks Copper Project will be subject to a number of operational monitoring programs that will add extensively to this documentation.

Closure measures presented in the previous sections have been developed and proposed based on the most up to date information collected at the site, and the best interpretation of these data with respect to the projected conditions on the site at final closure. Without doubt these conditions will change as the site progresses through construction, operations and closure. Periodic revisions to this Preliminary Detailed Closure and Reclamation Plan will be required under the Quartz Mining Licence and will address these changing conditions. However, as closure activities progress and monitoring on the site continues, planning mechanisms that can account for and react to changes to conditions governing closure measures need to be in place.

Adaptive management planning (AMP) is a recognized and effective tool to ensure that changing conditions during closure are not subject to static reclamation initiatives, and that closure measures can be adapted to these conditions to achieve desired performance. Western Copper is committed to AMP particularly with respect to closure of the heap leach facility. An AMP for the long term closure of the heap leach facility including contingency treatment measures will be prepared and implemented for closure.

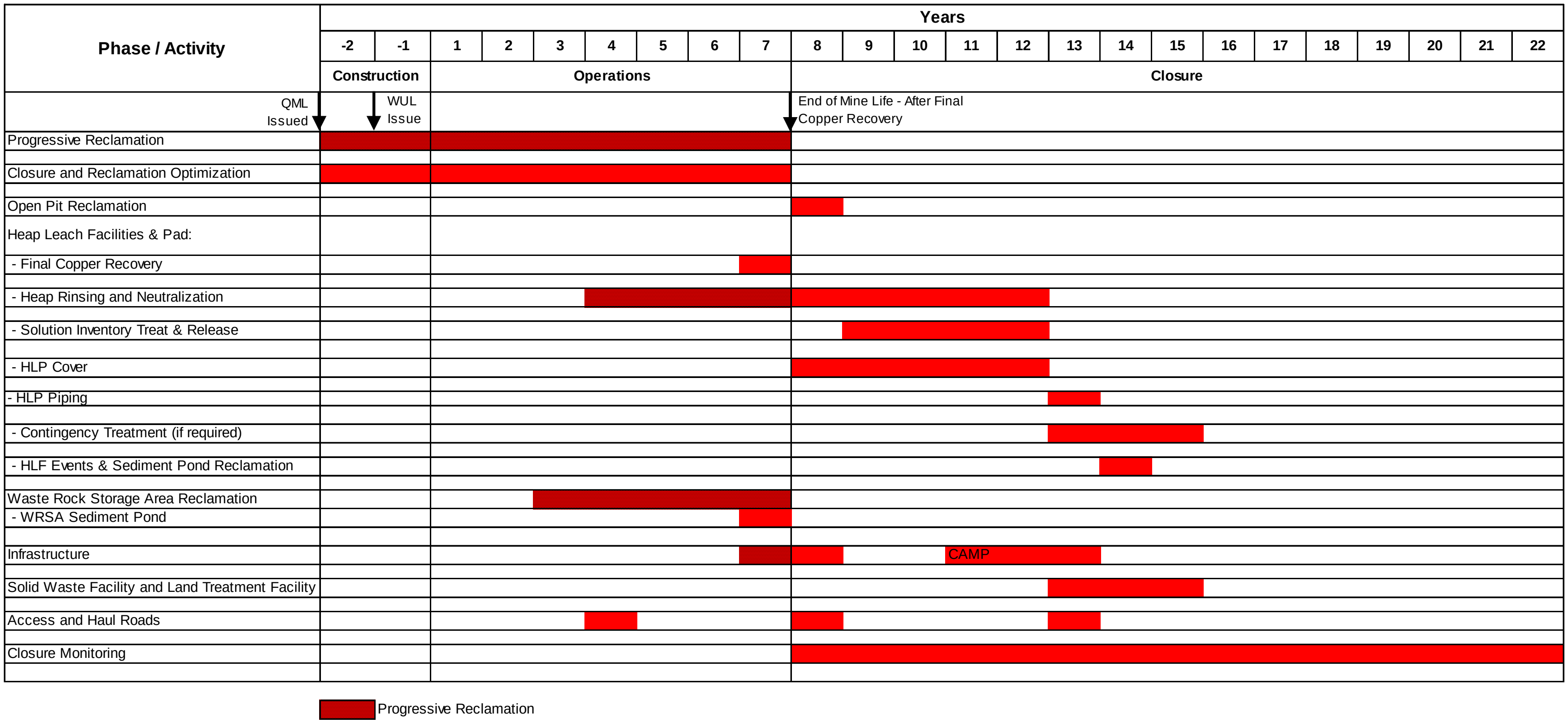
6. CLOSURE IMPLEMENTATION SCHEDULE

Progressive reclamation will begin during operations to promote slope stabilization and reduce erosion during the life of the mine. Disturbed slopes will be stabilized and revegetated. Progressive reclamation of the WRSA will occur during operations.

Figure 6-1 shows the project closure and reclamation schedule. The open pit has a production life of 6 years while the heap can continue to be leached for the first year after open pit mining ceases. When leaching is no longer economical, the heap will be rinsed for an estimated four and a half years with water and then neutralized by a sodium carbonate rinse, then decommissioned and covered with a soil cover. Monitoring of the heap leach pad will continue until the long term predicted water chemistry from the heap effluent meets discharge criteria, at which time the treatment facility and settling pond will be removed, recontoured and revegetated. Equipment and infrastructure will gradually be removed upon closure.

Effluent monitoring, bio-monitoring and geotechnical assessment will occur annually for a minimum of 15 years to ensure that revegetation is successful, that slopes are stable, and heap chemistry is assured. Once final heap closure is attained and monitoring no longer required, the main access road would be scarified and reclaimed subject to further consultation with the local community.

Figure 6-1 Carmacks Copper Project Closure and Reclamation Schedule



7. CLOSURE MANAGEMENT AND MONITORING

The closure phase of the Carmacks Copper mine will commence with the cessation of economic mining of the open pit even though the heap leach pad will continue to be leached for another year or so. Closure management and monitoring of the site will be guided by licence requirements, the performance of physical structures remaining on site and the ability to achieve and demonstrate long-term compliance with effluent discharge standards. Once overall closure performance has been demonstrated for all aspects of decommissioning, the necessity of maintaining licences or permits would be examined. At this point, a Certificate of Closure, under the Quartz Mining Act would be requested. The following sections provide a general outline of the site management approach that will be taken at the Carmacks Copper mine during the closure phase.

A number of personnel will be required on site to implement the various decommissioning and reclamation tasks. Generally these tasks entail closure of mine components, rinsing and neutralization of the heap leach pad, salvage and removal of infrastructure, equipment and reagents, decommissioning of roads and reclamation and revegetation of disturbed lands. A site contamination assessment plan will be prepared leading up to closure which:

- Locates through a site investigation program all contaminated material, if any, on the mine site arising from any operation, transportation, storage, handling or processing;
- Characterizes the type, level and horizontal and vertical extent of the contamination; and
- Proposes methods for dealing with the contamination.

These activities would be undertaken on a seasonal basis and directed by an on-site manager responsible for decommissioning and reclamation of the Carmacks Copper mine.

During site decommissioning, it is anticipated that at least a portion of the existing camp accommodations would remain on site to support site personnel. It is anticipated that during the initial post closure phase, site security requirements will continue with a caretaker remaining on site following seasonal closure of the site. Once the majority of physical reclamation works are performed on the site, the number of employees or contractors required will be reduced and when decommissioning and reclamation activities are completed on the property, security personnel will no longer be required.

7.1 TEMPORARY CLOSURE

In the event of a premature closure, the following monitoring and "care and maintenance" activities (focussed on a temporary closure scenario occurring after mine start-up) will be instigated. In the unlikely event that a temporary closure scenario occurs prior to mine start-up, these proposed temporary closure measures will be applied where applicable to maintain the existing site infrastructure.

Western Copper's priority during any temporary closure scenario will be to ensure that the site remains geochemically and physically stable, secure and safe, monitored and in compliance with applicable licences and legislation. This will include both initial stabilization and then ongoing routine monitoring and maintenance of the site infrastructure and facilities until mining recommences or full closure is initiated.

Table 7-1 provides a summary of the various project components and associated inspection and maintenance activities during any temporary cessation of mining activities.

Table 7-1 Summary of Care and Maintenance Activities and Surveillance During Temporary Cessation of Mining Operations

Project Component	Area of Interest	Care & Maintenance Activities	Monitoring Activities	Monitoring Responsibility	Monitoring Timing/Frequency
Open Pit	Water Management	Maintain diversion ditches around pit.	QML Physical Monitoring Program	Caretaker	As per QML
	Physical Stability	Restrict access to hazardous areas with physical barriers. Maintain perimeter ground interceptor wells if necessary.	QML Physical Monitoring Program	Engineer	Annual
Waste Rock Storage Area	Physical stability	Runoff/Erosion/Sediment control, as required.	QML Physical Monitoring Program	Caretaker	As per QML
		(Progressive reclamation will occur during operations).	Geotechnical Inspection	Engineer	Annual
	Geochemical Stability	Monitor for seepage.	WUL Water Quality Surveillance Program	Caretaker	As per WUL
Heap Leach Pad	Physical stability	Surface water diversion structure repair/maintenance, as required.	Visual inspection elements of Monitoring Program from Heap Leach Facility (HLF) Operating Plan	Caretaker	As per HLF Operating Plan
		Runoff/Erosion/Sediment control, as required.	QML Physical Monitoring Program		
		Dust Control, as required.			
		(Progressive reclamation will occur during operations).	Geotechnical Inspection from QML and HLF Operating Plan	Engineer	Annual
	Water Management	Maintain heap pumping and leaching as per HLF Operating Plan.	WUL Water Quality Surveillance Program and HLF Monitoring as per HLF Operating Plan	Operators	Ongoing
	Geochemical Stability	Monitor for seepage and water quality.	WUL Water Quality Surveillance Program and HLF Monitoring Elements	Caretaker	As per WUL
Process Plant and Other Infrastructure	Buildings, Equipment, and Infrastructure	Copper cathodes removed from site. Secure buildings and maintain necessary equipment onsite for residual leaching.	Visual inspection periodically for signs of instability	Caretaker	Monthly
	Physical Stability	Inspect for site stability.	Structural Inspection	Engineer	Twice Annually
	Water Treatment Plant	Maintain plant and treatment capabilities as required.	WUL Water Quality Surveillance Program	Caretaker	As per WUL
Explosives Facility	Physical stability	Remove bulk explosives from site. As required, repair and replace infrastructure.	Visual inspection periodically for signs of instability.	Caretaker	Monthly
Access Road and Surface Drainage	Entire Route	As required, surface grading and granular amendments, ditch and culvert maintenance.	Visual inspection periodically for signs of instability/erosion	Caretaker	Weekly and after heavy precipitation events
Entire Site	Physical stability	Runoff/Erosion/Sediment control, as required. Road/culvert maintenance as required.	QML Physical Monitoring Program	Caretaker	As per WUL
		(Progressive reclamation will occur during operations).	Geotechnical Inspection	Engineer	Annual
	Water Quality	Retain Contingency Water Treatment System	WUL Water Quality Surveillance Program Continue required monitoring under Metal Mining Effluent Regulations (MMER)	Caretaker	As per WUL and MMER
	Security	Full time site caretaker will check, repair and replace as required: • precautionary signage • security gates – installed at both ends of Access Road	Site Inspection and Security Monitoring of all infrastructure and site elements	Caretaker	Daily: Inspection Sheets included in Annual Reporting
	Miscellaneous Infrastructure	Minimize camp size except for operations and caretaker facilities Inspect power line	Site Inspection and Security Monitoring of all infrastructure and site elements – report any changes to stability/condition of miscellaneous infrastructure.	Caretaker	Daily: Inspection Sheets included in Annual Reporting
	Reporting	Prepare and submit annual report to the Yukon Water Board pursuant to Water Use Licence, including details of temporary closure activities and monitoring.		Western Copper	Annually
		Prepare and submit annual report to YG Mineral Resources Branch pursuant to the Quartz Mining License, including details of temporary closure activities and monitoring.			
		Prepare and submit quarterly monitoring reports to Environment Canada under MMER.			Quarterly, Online RISS Registry

7.1.1 Physical Stability and Geochemical Stability

Progressive reclamation will be implemented on an ongoing basis (Section 4.2) to fulfil the Company's commitment to maintaining site stability and reclaiming areas as soon as operationally possible, therefore reducing both financial and operational liability.

Site infrastructure, including primarily buildings and process equipment and machinery, will be emptied/drained of hazardous reagents and process fluids where appropriate and stabilized for temporary closure based on recommendations from mechanical and chemical suppliers, contractors and engineers. This includes the removal of all hazardous wastes, including waste hydrocarbons, coolants, lubricants, reagents, reagents and process chemicals. The bulk explosives inventory will be removed from site and explosives storage containers and facilities will be inspected regularly.

In the event of suspended operations, the heap leach pad will be maintained and solutions circulated and processed until all economic copper has been recovered. This will require a reduced operations staff of 2 or 3 people to manage pumps and power for the heap leach facility, process plant and water treatment plant. No further reclamation will be carried out until operations recommence or a decision is made to proceed with full closure. Water collection from the heap will continue. Water treatment will be implemented if the water balance requires discharge of water from the pad and ponds.

This temporary decommissioning will only be conducted to a level whereby the infrastructure and mine components are ensured to be stable in the short term (3 years) and whereby mining and processing operations can be resumed in a timely manner should the decision be made to transition back into operations. This will include:

- The retention of essential equipment/assets onsite to maintain infrastructure; and
- The storage of hazardous materials (not waste) in competent primary and secondary containment, to ensure compliance with applicable legislation.

7.1.2 Security and Monitoring

Uncontrolled access to the Carmacks Copper property could pose a risk to the public and to the site assets. As such, a full-time caretaker/monitor (at least 2 individuals trained for a cross-shift) will be housed onsite in a serviced portion of the camp, in addition to the reduced operations staff. Site equipment and vehicles will be kept onsite both for operations staff and caretaker use in care and maintenance activities. Contingency equipment will also be kept onsite should more intensive earthworks be required during the temporary closure period.

During temporary closure the gates located at both ends of the access road will be locked with warning signs erected at the gates and key locations around the site indicating the risks of entry. Site buildings will be locked and secured.

The main access road will be maintained for caretaker and emergency access with equipment retained onsite (grader/loader).

The caretaker(s) will be responsible for:

- Regular inspections of the site to observe and document the condition of, and any changes to: site security and public safety measures, infrastructure, mine components, etc., as well as to document potential emerging environmental or public health and safety objectives;
- Conducting routine physical monitoring activities;
- Regular water quality and flow monitoring;
- Submitting inspection and monitoring reports to managers on a regular basis;
- Responding to any security/safety objectives as required; and
- Conducting routine site maintenance and basic repairs to infrastructure and works as required (snow removal, culvert and road maintenance, building maintenance).

Site inspections and monitoring will be conducted by vehicle when seasonally possible. Some sites may be difficult to access in winter as snow removal would not be reasonable at all locations. Inspection results will be documented on a form and submitted to management on a regular basis. Reports of changes to physical status of any part of the site may warrant a follow-up investigation by managers and/or professional personnel.

The Company's Environmental Monitoring Program and detailed design reports further commit to structural monitoring, which will continue in the event of temporary closure.

Some elements of the monitoring program (geotechnical and structural inspections and non-routine water quality and biological monitoring) will be conducted by appropriate professional personnel, and results of these inspections will be included in annual reports and other required submissions.

7.1.3 Reporting

Monitoring and inspection data collected will be compiled and submitted according to the required annual reporting timeframes for both the Water Use and Quartz Mining Licences.

7.2 SUPERVISION AND DOCUMENTATION OF WORK

All decommissioning and reclamation works will be supervised to ensure that works are constructed according to their design and that this work is properly carried out and documented. The project manager or construction supervisor would supervise all closure works. Daily inspection procedures would be completed to document work progress, deficiencies and completion. Existing plans for spill response or other site internal procedures for fuel handling, waste disposal, fire control and suppression, health and safety and environmental management systems would be used, developed and followed as necessary.

Mine records comprising the extent of open pit workings would be retained by Western Copper. Other site records, files and plans would be archived. Where plans or drawings are required for mine safety reasons, these plans would also be submitted to government mine safety offices or other government departments as required. As-built plans for structures completed for closure would be retained for record and submitted to government agencies and boards.

Upon completion of the decommissioning and reclamation works, a final site plan report (summary text and drawings) will be prepared that will outline the facilities or works remaining on the site following closure. This plan would identify the location of buried concrete structures or scrap and landfill disposal areas. It is expected that this plan would accompany an Application for a Certificate of Closure under the Quartz Mining Act.

7.3 COMPLIANCE MONITORING AND REPORTING

During the active closure phase, environmental and physical compliance monitoring and inspections will continue according to the Water Use Licence or Quartz Mining Licence monitoring programs. It is expected that the amount of environmental and physical monitoring and inspection will decline once all closure measures have been implemented and proven effective. The approach to closure monitoring has been to continue with the present licence monitoring and inspection programs until decommissioning and reclamation measures have been completed and then reduce the frequency of site monitoring and the number of monitoring stations over time as satisfactory closure performance is confirmed.

The schedule for monitoring programs is planned for the 15-year period following year 7 of operations when final copper recovery from the leach pad is complete. For the first 5 years following final copper recovery, routine environmental monitoring will be completed to demonstrate the effectiveness of closure measures and their performance. Thereafter (years 6 to 10) monitoring frequencies would be reduced to periodic inspections with a further reduction of frequency for years 11 to 15. The purposes of these periodic inspections would be to ensure that waste discharges remain compliant, downstream receiving waters are protected and physical structures are performing as designed. Should these inspections identify issues of concern, then plans would be developed to address the concerns.

Based on the results of site monitoring for the 15 year period and in discussion with the Little Salmon Carmacks First Nation and Selkirk First Nation and appropriate regulators, the need for and the frequency of additional site monitoring will be determined at that time. If the results from monitoring indicate that the site is stable with acceptable geotechnical and environmental performance, then Western Copper would propose to decrease the frequency of monitoring further until no longer required. If the results from monitoring indicate there are concerns with either geotechnical conditions at the site or with environmental objectives, then the site would continue to require more frequent monitoring than otherwise proposed and possibly additional remedial work would be required.

Western Copper personnel responsible for the management of the Carmacks Copper mine would continue to meet with regulatory agencies, Little Salmon Carmacks First Nation and Selkirk First Nation, and the community on an as-needed basis to appraise interested parties of decommissioning activities and the results of closure monitoring.

It is expected that a review of the environmental performance of the mine following closure would be made with YG EMR and other interested parties. Once this review is completed, Western Copper would apply to the Minister of YG EMR for a Certificate of Closure for the Carmacks Copper mine under the Quartz Mining Act *Mine Production Regulations.* The Certificate of Closure will confirm that Western Copper has fulfilled their closure obligations for the site.

7.3.1 Heap Cover Monitoring

The purpose of a heap cover monitoring program will be to assess the performance of the heap cover with respect to the criteria outlined in the YG Terrestrial Reclamation Standards. Pertinent data from the surface and ground water monitoring will be assessed to confirm that no adverse water quality trends are developing in the heap that may adversely impact downstream surface waters. Results of the monitoring program will be routinely reported to the Government of Yukon.

A heap adaptive management plan (AMP) will outline the monitoring parameters, implementation triggers, and contingency measures and responses that will be implemented if these are not achieved.

The key factors which the heap AMP will address will be

1. Physical monitoring:
   a. Heap Stability
   b. Cover Erosion
   c. Cover Infiltration
2. Terrestrial monitoring:
   a. Revegetation success
3. Climatic monitoring:
   a. Precipitation
   b. Snowpack
   c. Evaporation

Annual inspections of the heap will be conducted by professionals in the geotechnical (heap stability) and horticulture (revegetation) fields for the first five years following placement of the cover. The inspections will determine if the objectives of heap stability, erosion control, cover infiltration and revegetation have been successful and if not will outline remedial measures to be taken to correct the deficiency and provide for success in subsequent years. The report findings will be forwarded to the Government of Yukon. If the objectives are not achieved in the period, inspections and corrective measures will continue until the Government of Yukon approves. Provisions for monitoring and periodic maintenance of the heap cover have been included in the Project Management closure costing.

7.3.2 WRSA Monitoring

The objective of the Waste Rock Storage Area monitoring program will be to:

- validate the original design data with respect to the geochemical stability of the waste pile;

- continue the program of physical stability documentation that was established during operations; and
- verify the performance of the cover with respect to the reestablishment of vegetation and the control of erosion.

Results of the monitoring program will be reported to the Government of Yukon on a regular basis.

The first item primarily addresses objectives of chemical stability and includes:

- drainage water chemistry; and,
- potential for metals leaching to develop over time.

Because results of static and kinetic testing of waste rock show that the waste rock has low acid generating and metal leaching potential, the potential for acid generation and mobilization of metals from the waste rock is not significant. Golder Associates *"Report on Preliminary Design, Waste Rock Storage Area, Carmacks Copper Project, Western Copper Corporation, Yukon"* (April 2008) provides a summary of geochemical testwork and results. As part of on-going testwork, further samples will be collected during operations to confirm the above. During closure a regular schedule of water sampling and testing from WRSA run-off will be established to confirm the long term geochemical stability of the rock.

Monitoring of the physical stability of the WRSA, as it relates to the design and construction of the dump on potentially thaw unstable ground is primarily an operations objective. However, monitoring will continue past operations into closure to confirm long term stability projections. The nature of the monitoring is described in the Golder Associates design report.

Regular inspections of the WRSA will be conducted to document reestablishment of vegetation on the cover and to determine any areas of erosion during the first five years following placement of the cover. As for the heap leach area, an adaptive management plan will establish guidelines which will determine if erosion control and revegetation have been successful and if not will outline remedial measures to be taken to correct the deficiency and provide for success in subsequent years. The report findings will be forwarded to the Government of Yukon. If the objectives are not achieved during the period, inspections and corrective measures will continue until the Government of Yukon approves. Provisions for monitoring and periodic maintenance of the WRSA have been included in the Project Management closure costing.

7.4 LONG TERM MAINTENANCE

Provisions for maintenance of reclamation tasks such as erosion control and maintenance seeding have been included as part of the long-term closure requirements. Based on physical inspections and monitoring, maintenance works will be planned for and conducted as required to meet closure performance standards and objectives.

8. SUMMARY OF ESTIMATED CLOSURE COSTS

Costing of the proposed closure measures is the basis for the provision of security. Closure and reclamation cost estimates have been prepared for the following phases in the life of the mine:

- Current Site Status – to end of 2008 (Table 8-1);
- Access Road Construction (Table 8-2);
- End of Mine Construction (Tables 8-3-0 to 8-3-10);
- End of Mine Life – Year 7 (Tables 8-4-0 to 8-4-10);
- An annual estimation of the closure liability and progressive reclamation costs are provided in Table 8-5. This annual liability is based upon the mine production schedule outlined in Table 8-6.

Estimated closure cost tables for each of these phases are provided below. Where possible, cost estimates were made using unit cost per volume. Where the use of unit costs proved difficult, then an estimation of equipment and labour hours were used. The unit costs and job hours were derived from Access Consulting Group's professional experience with other closure program costing estimates prepared for Yukon Government security cost calculations and Western Copper's project procurement and operational experiences. Unit Costs are presented in Table 8-0.

Closure costs presented for end of mine life are based on conceptual plans and costed appropriately. As the mine is constructed and operated, this Preliminary Detailed Closure and Reclamation Plan will be reviewed (every two years) and closure costs updated based on more detailed engineering plans.

Contingency costing provisions have been provided to complete heap rinsing and neutralization should this take more that the planned 4.5 year timeframe. This would include additional costs for manpower, support equipment and maintenance, power, road maintenance and project management. This cost has been estimated at $2,675,000, however, for the purposes of this Preliminary Plan this cost estimate has not been included in the overall heap costing as further laboratory testwork and the model cell testing are intended to refine the heap leach pad rinsing and neutralization time period and subsequent costs.

A provision in the *Yukon Mine Site and Reclamation Closure Policy* provides for the opportunity to provide a “Pledge of Assets” against lower risk components of a closure plan. This will be developed with Yukon Government, however, for costing purposes salvage values for end of mine life (year 7) have been estimated at 50% of closure costs for infrastructure including the Process Plant, Camp, Truck Shop, and other miscellaneous facilities. The salvage program will minimize on site disposal of facilities. It is expected that all facilities will be disposed of by a contractor for salvage value. All ancillary site facilities will be salvaged and equipment and buildings or infrastructure removed. Unused supplies will be returned for credit once the processing facilities have been shut down.

Table 8-0 Unit Rate Cost Table

EQUIPMENT RATES		
Bulldozer-small (Cat D6)	$130	per hr
Bulldozer-large (D9H)	$260	per hr
D250E Haul Truck	$220	per hr
Tandem Haul Truck	$110	per hr
235 Excavator	$240	per hr
235 Excavator w Hammer	$275	per hr
16H grader	$220	per hr
Loader-large (Cat 988B)	$250	per hr
Loader-small (Cat 950)	$125	per hr
Tractor Trailer (lowbed)	$130	per hr
30 ton Crane	$160	per hr
Hiab Flatdeck truck	$125	per hr
Pickup Truck	$2,500	per month
Gas Powered Pump	$100	per day
Support Equipment	??	lump sum

PERSONNEL RATES		
Blaster	$60	per hr
General Labourer	$45	per hr
Trades Labourer	$80	per hr
Site Supervisor	$95	per hr
Technician	$75	per hr
Design Engineer	$130	per hr
Environmental Scientist	$95	per hr
Project Manager	$9,700	per month
Camp Labourer	$4,000	per month
Site Caretaker	$6,100	per month
Environmental Monitor	$5,000	per month
Analytical Costs	$500	Unit cost
Misc.	??	lump sum

REVEGETATION RATES		
Revegetation Seed Mix	$13	per kg
Revegetation Seed Mix - 50kg/ha	$510	per ha
Fertilizer	$1	per kg
Fertilizer - 250kg/ha	$250	per ha
Tree Seedlings - 1,000 seedlings/ha	$1,750	per ha
Seed/Fertilizer Application	$1,500	per ha
Revegetation cost per ha. Including application cost	$2,260	per ha

WATER TREATMENT AND DETOX RATES		
Rinse solution pumping	$0.10	cu.m
Akali application (chemical AND solution pumping)	$0.35	cu.m
Water treatment	$0.43	cu.m
Sludge disposal	??	lump sum
Contingency Treatment Measures	??	lump sum

CONTRACTOR UNIT RATES & CAMP COST		
Excavation of Soil	$5	cu.m
Supply and place Geotextile	$7	sq m
Load, haul and place soil cover	$8	cu.m
Haul & Place rock cover	$8	cu.m
Drill, Blast and Screen Rip Rap	$22	cu.m
Load, Haul and Place Soil/Rip Rap	$13	cu.m
HDPE Liner Install	$10	sq m
Erosion barriers	$3	sq m
Freight run to Whitehorse	$1,000	per load
Camp Cost	$70	per day per person
Power and Heat	$5,500	per month
Sundry equipment maintenance	$5,000	yearly
General Administrative expenses	$2,000	per month
Employee Transport Costs	$3,000	per month

Table 8-1 Current Site Status – to end of 2008

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost
1	**Camp Area**						
	Remove salvageable materials	General Labourer	per hr	8	$45	$360	
		Trades Labourer	per hr	4	$80	$320	
		988B Loader	per hr	8	**$250**	$2,000	
	Prepare trailers & remove from site	General Labourer	per hr	8	$45	$360	
		Trades Labourer	per hr	4	$80	$320	
		Tractor Trailer (lowbed)	per hr	16	**$130**	$2,080	
	Dismantle buildings & structures	General Labourer	per hr	32	$45	$1,440	
		Trades Labourer	per hr	8	$80	$640	
		235 Excavator	per hr	8	**$240**	$1,920	
		988B Loader	per hr	8	**$250**	$2,000	
	Fill septic tanks	General Labourer	per hr	8	$45	$360	
		235 Excavator	per hr	4	**$240**	$960	
	Decommission water supply system	General Labourer	per hr	8	$45	$360	
		Trades Labourer	per hr	4	$80	$320	
		235 Excavator	per hr	4	**$240**	$960	
	Decommission groundwater wells	General Labourer	per hr	8	$45	$360	
		235 Excavator	per hr	4	**$240**	$960	
	Remove solid waste to landfill	D250E Haul Truck	per hr	16	**$220**	$3,520	
		235 Excavator	**per hr**	**4**	**$240**	$960	
	Haul fuel tanker offisite	Tractor Trailer (lowbed)	per hr	8	$130	$1,040	
	Recontour & scarify	16H grader	per hr	4	**$220**	$880	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	2	$2,260	$4,520	
	Misc. materials & supplies	Misc.	lump sum	1	$500	$500	$27,140
	Project Management	7% of Total Cost	%		7.00%	$1,900	$1,900
	Sub-Total						**$29,000**
2	**Roads & Trails**						
	Block trails to prevent vehicular access	Bulldozer-small (Cat D6)	per hr	16	$130	$2,080	
	Scarify road surface	16H grader	per hr	24	**$220**	$5,280	
	Erosion barriers	Erosion barriers	per m2	20	$3	$60	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	5	$2,260	$11,300	$18,720
	Project Management	7% of Total Cost	%		7.00%	$1,310	$1,310
	Sub-Total						**$20,000**
3	**Heap Leach Pad Area**						
	Recontour leach pad trenches	Bulldozer-small (Cat D6)	per hr	8	$130	$1,040	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	5	$2,260	$11,300	$12,340
	Project Management	7% of Total Cost	%		7.00%	$864	$864
	Sub-Total						**$13,000**
4	**Trenches**						
	Backfill	235 Excavator	per hr	**24**	**$240**	$5,760	
		Bulldozer-small (Cat D6)	per hr	**16**	**$130**	$2,080	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	1	$2,260	$2,260	$10,100
	Project Management	7% of Total Cost	%		7.00%	$707	$707
	Sub-Total						**$11,000**
	Final Sub-Total						**$73,000**
	Contingency	10% of Final Sub-Total			10.00%		$7,300
	Exploration Program Reclamation Total Estimated Cost						**$80,300**
	* Changes by SJCI are shown in **bold**, including revised unit costs, several new line items and a 10% contingency						

Table 8-2 Access Road Construction

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost
1	**Main Access Road**					
1.1	**Main Access Road (13 km)**					
	Scarify road surface (13 km x 5m)	16H Grader	per hr	150	$220	$33,000
	Remove Merrice Creek bridge crossing	General Labour	per hr	30	$45	$1,350
		235 Excavator	per hr	10	$240	$2,400
		30 ton Crane	per hr	10	$160	$1,600
		Tractor trailer (lowbed)	per hr	10	$130	$1,300
	Stream crossing bank restoration	Misc.	lump sum	1	$1,000	$1,000
	Culvert excavation (11)	235 Excavator	per hr	88	$240	$21,120
	Culvert removal (11)	General Labour	per hr	55	$45	$2,475
		235 Excavator	per hr	88	$240	$21,120
		D250E Haul Truck	per hr	55	$220	$12,100
	Regrade crossing slopes/swales (11)	235 Excavator	per hr	11	$240	$2,640
	Reclaim spoil piles (5)	235 Excavator	per hr	10	$240	$2,400
	Revegetate (13 km x 5m) incl banks & slopes	S&F mix & applicn	per ha	6.5	$2,260	$14,690
	Maintenance S&F after 1 year (25% of areas first done)	S&F mix & applicn	per ha	1.6	$2,260	$3,616
	Enviro monitoring during work at stream crossings	Enviro Monitor	per day	5	$227	$1,136
		Analytical Costs	unit cost	4	$500	$2,000
	Permanent earthen barrier for main access road route	Misc.	lump sum	1	$3,000	$3,000
	Sub Total					**$126,947**
1.2	**Main Access Road Borrow Areas (~50,000m2)**					
	Recontour borrow areas	Cat D9H Dozer	per hr	30	$260	$7,800
	Revegetate sloped areas	S&F mix & applicn	per ha	5	$2,260	$11,300
	Sub Total					**$19,100**
	Total Direct Costs					**$146,047**
1.3	**Overheads**					
	Engineering Control (5% of above sub-total)					$7,302
	Supervision (5% of above sub-total)					$7,302
	Sub Total					**$14,605**
	Final Sub-Total					**$160,652**
	Contingency (10% of Final Sub-Total Excluding Overheads)					**$14,605**
	Estimated Cost of Main Access Road & Related Components					**$175,257**

Table 8-3-0 End of Mine Construction – Summary Cost Estimate

Item No.	Work Item Description	Cost
1	**Mine Site-Open Pit**	
	Secure hillside mine pit access & highwall perimeter	$22,000
2	**HL Facility**	
	Reclaim partially completed empty facility with overliner in place	$98,000
3	**HLF Ponds & Diversions**	
	Reclaim ponds and ditching	$277,000
4	**Waste Rock Storage Area**	
	Reclaim partially completed empty facility	$208,000
5	**Plant and Ancillary Facilities**	
	Remove buildings, facilities and services and reclaim areas	$871,000
6	**Camp**	
	Remove facilities and reclaim area	$193,000
7	**Truck Shop et al**	
	Remove facilities and reclaim area	$129,000
8	**Misc Facilities**	
	Remove facilities and reclaim areas	$178,000
9	**Roads & Trails**	
	Reclaim site roads	$88,000
	Reclaim Main Access Road & related components (see Table 8-2)	$161,000
10	**Site Management**	
	Site Management including monitoring, maintenance during active decom work and 2 year closure & post-closure period	$337,000
	TOTAL DIRECT COSTS	**$2,562,000**
	Contingencies	
	Contingency (15% of above Total Direct Costs)	**$384,000**
	Estimated Total Closure Costs	**$2,946,000**

Table 8-3-1 End of Mine Construction – Open Pit

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
1	**Open Pit**					
	Secure access into pit & highwall perimeter- boulder placement	Cat 235 Excavator	per hr	20	$240	$4,800
		D250E Haul Truck	per hr	20	$220	$4,400
	Revegetate around perimeter of pit	S&F mix & application	per hr	5	$2,260	$11,300
	Install signage	Misc.	lump sum	1	$1,000	$1,000
	Sub-Total					**$22,000**
	Total Estimated Costs in Reclaiming Mine Workings					**$22,000**

Table 8-3-2 End of Mine Construction – Heap Leach Facility

Item No.	Work Item Description	Equipment/Labour	Units	Quantity	Unit Cost	Total Cost (Rounded)
2	**Heap Leach Facility**					
2.1	**Heap Leach Pad (2ha prepared)**					
	Soil cover (loose) over overliner (0.15m thick)	Haul & place	per m3	3000	$8	$24,000
	Recontour remainder of cleared pad area (1/2 of ultimate)	Cat D9H Dozer	per hr	24	$260	$6,240
	Revegetate cleared pad area	S&F mix & applicn	per ha	20	$2,260	$45,200
	Sub Total					**$75,000**
2.2	**Process Piping**					
	Remove pipelines	Trades Labourer	per hr	10	$80	$800
	Sub Total					**$1,000**
2.3	**HLF Embankment Piping**					
	Install embankment drainage piping	Trades Labourer	per hr	10	$80	$800
	Sub Total					**$1,000**
2.4	**HLF Borrow & Stockpile Areas (~10ha)**					
	Recontour areas	Cat D9H Dozer	per hr	20	$260	$5,200
	Revegate sloped areas	S&F mix & applicn	per ha	7	$2,260	$15,820
	Sub Total					**$21,000**
	Total Estimated Closure Cost for Heap Leach Facility Components					**$98,000**

Table 8-3-3 End of Mine Construction – Heap Leach Facility Ponds

Item No.	Work Item Description	Equipment/Labour	Units	Quantity	Unit Cost	Total Cost (Rounded)
3	**Heap Leach Facility Ponds**					
3.1	**Reclaim Events Pond**					
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160
		Gas-powered pump	per day	4	$100	$400
	Misc. supplies & tools	Misc.	lump sum	1	$500	$500
	Characterize sediments	Analytical Costs	unit cost	2	$500	$1,000
	Fold back liner and bury	Cat 235 Hoe	per hr	100	$240	$24,000
		Cat D9H Dozer	per hr	200	$260	$52,000
	Breach dyke, push & contour materials	Push & spread matl	per m3	8000	$5	$40,000
	Stabilize slopes with erosion barriers	Erosion Barrier	per m2	3000	$3	$9,000
	Stabilize slopes with riprap	Load,haul place riprap	per m3	1200	$13	$15,600
	Revegetate	S&F mix & applicn	per ha	4	$2,260	$9,040
	Sub Total					**$154,000**
3.2	**Sediment Pond**					
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160
		Gas-powered pump	per day	3	$100	$300
	Misc. supplies & tools	Misc.	lump sum	1	$500	$500
	Characterize sediments	Analytical Costs	unit cost	1	$500	$500
	Breach dyke, relocate & contour materials	Excavate,haul & place	per m3	3000	$5	$15,000
	Stabilize slopes with erosion barriers	Erosion Barrier	per m2	3000	$3	$9,000
	Install riprap lined channel	Load,haul place riprap	per m3	300	$13	$3,900
	Revegetate	S&F mix & applicn	per ha	3	$2,260	$6,780
	Sub Total					**$38,000**
3.3	**Diversion Ditches**					
	Remove liner	Cat 235 Hoe	per hr	200	$240	$48,000
		General Labourer	per hr	200	$45	$9,000
	Recontour	Cat D9H Dozer	per hr	100	$260	$26,000
	Revegetate	S&F mix & applicn	per ha	1	$2,260	$2,260
	Sub Total					**$85,000**
	Total Estimated Closure Cost for HLF Pond Components					**$277,000**

Table 8-3-4 End of Mine Construction – Waste Rock Storage Area

Item No.	Work Item Description	Equipment/Labour	Units	Quantity	Unit Cost	Total Cost (Rounded)
4	**Waste Rock Storage Area**					
4.1	**WRSA- Part of First Area (5 ha)**					
	Haul and place overburden (0.15m thick)	Haul & place	per m3	7500	$8	$60,000
	Revegetate re-contoured & covered area	S&F mix & applicn	per ha	5	$2,260	$11,300
	Revegetate remaining area of first half of WRSA	S&F mix & applicn	per ha	30	$2,260	$67,800
	Sub Total					**$139,000**
4.2	**WRSA-Stockpile & Borrow Areas (16 ha)**					
	Recontour borrow & stockpile areas	Cat D9H Dozer	per hr	20	$260	$5,200
	Revegate borrow & stockpile sloped areas	S&F mix & applicn	per ha	12	$2,260	$27,120
	Sub Total					**$32,000**
4.3	**WRSA-Sediment Control Pond (2.8 ha)**					
	Place riprap in breached dyke outlet channel	Load, haul & place ripra	per m3	200	$13	$2,600
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160
		Gas-powered pump	per day	4	$100	$400
	Misc. supplies & tools	Misc.	lump sum	1	$500	$500
	Characterize sediments	Analytical Costs	unit cost	2	$500	$1,000
	Breach dyke, push & contour materials	Push & spread mat'l	per m3	3000	$5	$15,000
	Stabilize slopes with erosion barriers	Erosion Barrier	per m2	3000	$3	$9,000
	Revegate area	S&F mix & applicn	per ha	2.8	$2,260	$6,328
	Sub Total					**$37,000**
	Total Estimated Closure Cost for WRSA Components					**$208,000**

Table 8-3-5 End of Mine Construction – Plant and Ancillary Facilities

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
5	**INFRASTRUCTURE: Buildings, Structures and Services**					
5.1	**Sulphuric Acid Plant**					
	Remove salvagable equipment	General Labour	per hr	500	$45	$22,500
		Trades Labour	per hr	450	$80	$36,000
		D250E Haul Truck	per hr	70	$220	$15,400
		Cat 235 Excavator	per hr	50	$240	$12,000
	Load & return reagents/chemicals	General Labour	per hr	75	$45	$3,375
		Misc. Costs	lump sum	1	$2,500	$2,500
	Dismantle building	Cat 235 Excavator	per hr	70	$240	$16,800
		Cat 950 Loader	per hr	70	$125	$8,750
		D250E Haul Truck	per hr	70	$220	$15,400
		Trades Labour	per hr	300	$80	$24,000
		General Labour	per hr	1000	$45	$45,000
	Concrete Demolition	Cat 235 w Hammer	per hr	20	$275	$5,500
		Cat D9H	per hr	20	$260	$5,200
		D250E Haul Truck	per hr	20	$220	$4,400
	Crane Support	30 T Crane	per hr	70	$160	$11,200
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	50	$240	$12,000
		D250E Haul Truck	per hr	100	$220	$22,000
	Misc. supplies & tools	Misc.	lump sum	1	$10,000	$10,000
	Sub-Total					**$272,000**
5.2	**SX & EW Building**					
	Remove salvagable equipment	General Labour	per hr	400	$45	$18,000
		Trades Labour	per hr	300	$80	$24,000
		D250E Haul Truck	per hr	70	$220	$15,400
		Cat 235 Excavator	per hr	50	$240	$12,000
	Load & return reagents/chemicals	General Labour	per hr	100	$45	$4,500
		Misc. Costs	lump sum	1	$2,500	$2,500
	Dismantle building	Cat 235 Excavator	per hr	70	$240	$16,800
		Cat 950 Loader	per hr	10	$125	$1,250
		D250E Haul Truck	per hr	140	$220	$30,800
		Trades Labour	per hr	300	$80	$24,000
		General Labour	per hr	1000	$45	$45,000
	Concrete Demolition	Cat 235 w Hammer	per hr	20	$275	$5,500
		Cat D9H	per hr	20	$260	$5,200
	Crane Support	30 T Crane	per hr	70	$160	$11,200
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	50	$240	$12,000
		D250E Haul Truck	per hr	100	$220	$22,000
	Misc. supplies & tools	Misc.	lump sum	1	$2,000	$2,000
	Sub-Total					**$252,000**
5.3	**Water Treatment (Operational Phase) Plant**					
	Remove salvagable equipment	General Labour	per hr	70	$45	$3,150
		Trades Labour	per hr	40	$80	$3,200
	Load & return reagents/chemicals	General Labour	per hr	50	$45	$2,250
		Misc. Costs	lump sum	1	$2,000	$2,000
	Dismantle building	Cat 235 Excavator	per hr	35	$240	$8,400
		Cat 950 Loader	per hr	10	$125	$1,250
		D250E Haul Truck	per hr	70	$220	$15,400
		Trades Labour	per hr	40	$80	$3,200
		General Labour	per hr	200	$45	$9,000
	Concrete Demolition	Cat 235 w Hammer	per hr	20	$275	$5,500
		Cat D9H	per hr	20	$260	$5,200
	Crane Support	30 T Crane	per hr	10	$160	$1,600
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	40	$240	$9,600
		D250E Haul Truck	per hr	80	$220	$17,600
	Misc. supplies & tools	Misc.	lump sum	1	$10,000	$10,000
	Sub-Total					**$97,000**
5.4	**Power House and Power Lines**					
	Remove salvagable equipment from genset hut & substation	General Labour	per hr	100	$45	$4,500
		Trades Labour	per hr	80	$80	$6,400
	Salvage & remove powerline & poles (between work areas)	Unit Costs	per km	2.5	$11,000	$27,500
	Dismantle substation building	Cat 235 Excavator	per hr	5	$240	$1,200
		Cat 950 Loader	per hr	5	$125	$625
		D250E Haul Truck	per hr	10	$220	$2,200
		Trades Labour	per hr	20	$80	$1,600
		General Labour	per hr	20	$45	$900
	Concrete demolition	Cat 235 w Hammer	per hr	20	$275	$5,500
		Cat D9H	per hr	10	$260	$2,600
		Cat 235 Excavator	per hr	10	$240	$2,400
	Crane Support	30 T Crane	per hr	5	$160	$800
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	10	$240	$2,400
		D250E Haul Truck	per hr	20	$220	$4,400
	Misc. supplies & tools	Misc.	lump sum	1	$2,000	$2,000
	Sub-Total					**$65,000**

Table 8-3-5 End of Mine Construction – Plant and Ancillary Facilities (Cont'd)

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
5.5	**Industrial Reagents, Fuels & Waste**					
5.5.1	Empty & clean bulk fuel tanks	General Labour	per hr	80	$45	$3,600
	Remove contents to licensed facility	Unit Cost	lump sum	1	$5,000	$5,000
	Remove bulk fuel storage, piping and pumping facilities	Cat 235 Excavator	per hr	40	$240	$9,600
		Trades Labour	per hr	60	$80	$4,800
		General Labour	per hr	80	$45	$3,600
		Cat 950 Loader	per hr	20	$125	$2,500
	Fold & bury containment liner	Cat 235 Excavator	per hr	20	$240	$4,800
		Cat D9H Dozer	per hr	50	$260	$13,000
5.5.2	Remove Kerosene Storage Tanks (Empty)	General Labour	per hr	80	$45	$3,600
	Fold & bury containment liner	Cat 235 Excavator	per hr	10	$240	$2,400
		Cat D9H Dozer	per hr	20	$260	$5,200
		Cat 950 Loader	per hr	10	$125	$1,250
	Sub-Total					**$59,000**
5.6	**Water Supply**					
	Remove salvageable equipment incl pipeline & pumps	General Labour	per hr	48	$45	$2,160
		Trades Labour	per hr	98	$80	$7,840
		D250E Haul Truck	per hr	30	$220	$6,600
		Cat 235 Excavator	per hr	20	$240	$4,800
	Dismantle buildings	Cat 235 Excavator	per hr	20	$240	$4,800
		Cat 950 Loader	per hr	10	$125	$1,250
		D250E Haul Truck	per hr	10	$220	$2,200
		Trades Labour	per hr	8	$80	$640
		General Labour	per hr	16	$45	$720
	Misc. supplies & tools	Misc.	lump sum	1	$1,000	$1,000
	Sub-Total					**$32,000**
5.7	**Misc. Facilities**					
	Dismantle control trailer	General Labour	per hr	40	$45	$1,800
		Trades Labour	per hr	10	$80	$800
		Cat 235 Excavator	per hr	10	$240	$2,400
	Laboratory-Lab-pac of chemicals & reagents	Misc.	lump sum	1	$2,000	$2,000
	Dismantle Lab Building	General Labour	per hr	40	$45	$1,800
		Trades Labour	per hr	10	$80	$800
		Cat 235 Excavator	per hr	10	$240	$2,400
	Dismantle office trailer	General Labour	per hr	40	$45	$1,800
		Trades Labour	per hr	10	$80	$800
		Cat 235 Excavator	per hr	10	$240	$2,400
	Remove salvageable equipment from buildings	General Labour	per hr	60	$45	$2,700
		Trades Labour	per hr	30	$80	$2,400
	Scrap haul to solid waste facility	General Labour	per hr	20	$45	$900
		Cat 235 Excavator	per hr	30	$240	$7,200
		D250E Haul Truck	per hr	60	$220	$13,200
	Sub-Total					**$43,000**
5.8	**Plant Site Pad (2.2 ha)**					
	Test sites for soil contamination	Environmental Scientis	per hr	10	$95	$950
	Laboratory analyses	Analytical costs	unit cost	3	$500	$1,500
	Remove contaminated soils to Land Treatment Facility	Load, haul & dump	per m3	500	$13	$6,500
	Recontour area and slopes to bury footings	Cat D9H Dozer	per hr	100	$260	$26,000
	Revegetate	S&F mix & applicn	per ha	2.2	$2,260	$4,972
	Sub-Total					**$40,000**
5.9	**Misc. Site Clean-Up**					
	Site Clean-up crew (for overall site)	General Labour	per hr	240	$45	$10,800
	Sub-Total					**$11,000**
	Total Estimated Costs to Dismantle Infrastructure: Buildings, Structures and Services					**$871,000**

Table 8-3-6 End of Mine Construction – Camp

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
6	**CAMP & RELATED FACILITIES**					
6.1	**Camp & Related Facilities**					
	Remove salvageable equipment	General Labour	per hr	280	$45	$12,600
		Trades Labour	per hr	70	$80	$5,600
	Dismantle water supply system (p'house, above ground pipin	General Labour	per hr	40	$45	$1,800
		Trades Labour	per hr	20	$80	$1,600
		Cat 235 Excavator	per hr	20	$240	$4,800
	Dismantle electrical substation & area wiring, remove poles	Misc.	lump sum	1	$15,000	$15,000
	Dismantle buildings & associated structures	General Labour	per hr	700	$45	$31,500
		Trades Labour	per hr	100	$80	$8,000
		Cat 235 Excavator	per hr	80	$240	$19,200
		Cat 950 Loader	per hr	10	125	1,250
	Remove propane tanks	General Labour	per hr	4	$45	$180
		Trades Labour	per hr	8	$80	$640
		Cat 235 Excavator	per hr	2	$240	$480
	Concrete Demolition	General Labour	per hr	20	$45	$900
		Cat 235 w Hammer	per hr	10	$275	$2,750
		Cat D9H Dozer	per hr	10	$260	$2,600
		Cat 235 Excavator	per hr	5	$240	$1,200
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	80	$240	$19,200
		General Labour	per hr	20	$45	$900
		D250E Haul Truck	per hr	120	$220	$26,400
	Sub-Total					**$157,000**
6.2	**Sewage Disposal Systems**					
	Remove system including filling of below ground components	General Labour	per hr	18	$45	$810
	Support for above work & recontouring area	Cat 235 Excavator	per hr	12	$240	$2,880
		D250E Haul Truck	per hr	18	$220	$3,960
	Sub-Total					**$8,000**
6.3	**Camp Pad (0.5ha)**					
	Test sites for soil contamination (prep, sampling, write-up)	Environmental Scientist	per hr	15	$95	$1,425
	Laboratory analysis	Analytical costs	unit cost	3	$500	$1,500
	Remove contaminated soils to Land Treatment Facility	Load, haul & dump	per m3	300	$13	$3,900
	Recontour area and slopes to bury footings	Cat D9H Dozer	per hr	50	$260	$13,000
		Cat 235 Excavator	per hr	25	$240	$6,000
	Revegetate	S&F mix & applicn	per ha	1	$2,260	$2,260
	Sub-Total					**$28,000**
	Total Estimated Costs to Close Camp Facilities					**$193,000**

Table 8-3-7 End of Mine Construction – Truck Shop Service Complex

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
7	**TRUCK SHOP SERVICE COMPLEX**					
7.1	**Truck Shop (~1000m2)**					
	Remove salvageable equipment	General Labour	per hr	80	$45	$3,600
		Trades Labour	per hr	20	$80	$1,600
		D250E Haul Truck	per hr	20	$220	$4,400
		Cat 235 Excavator	per hr	20	$240	$4,800
	Dismantle Buildings	General Labour	per hr	100	$45	$4,500
		Trades Labour	per hr	10	$80	$800
		Cat 235 Excavator	per hr	15	$240	$3,600
		Cat 950 Loader	per hr	15	$125	$1,875
	Crane Support	30 T Crane	per hr	25	$160	$4,000
	Concrete Demolition	Cat 235 w Hammer	per hr	20	$275	$5,500
		Cat D9H Dozer	per hr	10	$260	$2,600
	Scrap haul to solid waste facility	General Labour	per hr	10	$45	$450
		Cat 235 Excavator	per hr	10	$240	$2,400
		D250E Haul Truck	per hr	20	$220	$4,400
	Sub-Total					**$45,000**
7.2	**Fuel Storage Facilities (~500m2)**					
	Empty & clean bulk fuel tanks	General Labour	per hr	60	$45	$2,700
	Remove to licensed facility	Unit Cost	lump sum	1	$7,500	$7,500
	Remove bulk fuel storage, piping and pumping facilities	Cat 235 Excavator	per hr	40	$240	$9,600
		Trades Labour	per hr	30	$80	$2,400
		General Labour	per hr	50	$45	$2,250
		Cat 950 Loader	per hr	10	$125	$1,250
	Concrete Demolition	Cat 235 w Hammer	per hr	10	$275	$2,750
		Cat 235 Excavator	per hr	5	$240	$1,200
		Cat D9H Dozer	per hr	5	$260	$1,300
	Fold & bury containment liner	Cat 235 Excavator	per hr	20	$240	$4,800
	Support for above work & recontouring area	Cat D9H Dozer	per hr	20	$260	$5,200
	Sub-Total					**$41,000**
7.3	**Sewage Disposal Systems**					
	Remove system including filling of below ground components	General Labour	per hr	10	$45	$450
		Cat 235 Excavator	per hr	10	$240	$2,400
		Truck D250E	per hr	15	$220	$3,300
	Sub-Total					**$6,000**
7.4	**Service Complex Pad (~7 ha)**					
	Test sites for soil contamination	Environmental Scientis	per hr	20	$95	$1,900
	Laboratory analysis	Analytical costs	unit cost	3	$500	$1,500
	Remove contaminated soils to Land Treatment Facility	Load, haul & dump	per m3	600	$13	$7,800
	Recontour area and slopes to bury footings	Cat D9H Dozer	per hr	40	$260	$10,400
	Revegetate	S&F mix & applicn	per ha	7	$2,260	$15,820
	Sub-Total					**$37,000**
	Total Estimated Costs to Close Truck Shop Service Complex					**$129,000**

Table 8-3-8 End of Mine Construction – Miscellaneous Facilities

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
8	**MISCELLANEOUS FACILITIES**					
8.1	**Crushing Plant-Portable**					
	Remove salvagable equipment	General Labour	per hr	60	$45	$2,700
		Trades Labour	per hr	10	$80	$800
		D250E Haul Truck	per hr	10	$220	$2,200
		Cat 235 Excavator	per hr	5	$240	$1,200
	Dismantle portable crusher and conveyors	General Labour	per hr	100	$45	$4,500
		Trades Labour	per hr	40	$80	$3,200
		Cat 235 Excavator	per hr	20	$240	$4,800
	Crane Support	30 T Crane	per hr	20	$160	$3,200
	Scrap haul to solid waste facility	Cat 235 Excavator	per hr	10	$240	$2,400
		D250E Haul Truck	per hr	20	$220	$4,400
		General Labour	per hr	40	$45	$1,800
	Sub-Total					**$31,000**
8.2	**Crushing Plant Pad (2.5 ha)**					
	Test sites for soil contamination	Environmental Scientist	per hr	40	$95	$3,800
	Laboratory analysis	Analytical costs	unit cost	6	$500	$3,000
	Remove contaminated soils to Land Treatment Facility	Load, haul & dump	per m3	600	$13	$7,800
	Recontour area and slopes to bury footings	Cat D9H Dozer	per hr	80	$260	$20,800
		Cat 235 Excavator	per hr	40	$240	$9,600
	Revegetate	S&F mix & applicn	per ha	2.5	$2,260	$5,650
	Sub-Total					**$51,000**
8.3	**Explosives Storage (~2000 m2)**					
	Remove salvageable equipment	General Labour	per hr	100	$45	$4,500
		Trades Labour	per hr	50	$80	$4,000
	Dismantle Building (50m2)	General Labour	per hr	100	$45	$4,500
		Trades Labour	per hr	25	$80	$2,000
		Cat 950 Loader	per hr	10	$125	$1,250
		Cat 235 Excavator	per hr	10	$240	$2,400
	Concrete Demolition	Cat 235 w Hammer	per hr	8	$275	$2,200
		Cat 235 Excavator	per hr	4	$240	$960
		Cat D9H Dozer	per hr	4	$260	$1,040
	Recontour area and slopes to bury footings	Cat D9H Dozer	per hr	8	$260	$2,080
	Scrap haul to soild waste facility	General Labour	per hr	10	$45	$450
		Cat 235 Excavator	per hr	4	$240	$960
		D250E Haul Truck	per hr	8	$220	$1,760
	Revegetate	S&F mix & applicn	per ha	0.5	$2,260	$1,130
	Sub-Total					**$29,000**
8.4	**Solid Waste Management Facility (50% of ultimate 1 ha)**					
	Characterization study	Misc.	unit cost	5	$100	$500
	Closure plan - development, submission, permitting	Misc.	lump sum	1	$2,000	$2,000
	Remove recyclables & Special Waste materials	Misc.	lump sum	1	$1,000	$1,000
	Recontour area	Cat D9H Dozer	per hr	4	$260	$1,040
	Haul & place overburden cap (.2m thick with 50% void)	Load haul & place matl	per m3	3000	$13	$39,000
	compact cap (two lifts)	Cat D9H Dozer	per hr	4	$260	$1,040
	Revegetate	S&F mix & applicn	per ha	0.5	$2,260	$1,130
	Sub-Total					**$46,000**
8.5	**Land Treatment Facility**					
	Costs to operate facility - 5 years (turn-over, nutrient addition)	Misc.	lump sum	5	$3,000	$15,000
	Sampling	Analytical costs	unit cost	20	$100	$2,000
	Closure plan - development, submission, securing release permit	Misc.	lump sum	1	$2,000	$2,000
	Recontour area	Cat D9H Dozer	per hr	4	$260	$1,040
	Revegetate	S&F mix & applicn	per ha	0.5	$2,260	$1,130
	Sub-Total					**$21,000**
	Total Estimated Costs for Reclaiming Miscellaneous Facilities					**$178,000**

Table 8-3-9 End of Mine Construction – Site Roads and Trails

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
9	**Site Roads and Trails**					
9.1	**Road to Explosives Storage**					
	Culvert excavation	235 Excavator	per hr	4	$240	$960
	Culvert removal	General Labour	per hr	8	$45	$360
		235 Excavator	per hr	4	$240	$960
		D250E Haul Truck	per hr	4	$220	$880
	Regrading crossing slopes/swales	235 Excavator	per hr	25	$240	$6,000
		Cat D9H Dozer	per hr	25	$260	$6,500
	Scarify road surface	16H Grader	per hr	20	$220	$4,400
	Revegetate	S&F mix & applicn	per ha	0.8	$2,260	$1,808
	Sub Total					**$22,000**
9.2	**Haul Road from Plant Site to Truck Shop Area (~3.2 km)**					
	Culvert excavation	235 Excavator	per hr	8	$240	$1,920
	Culvert removal	General Labour	per hr	16	$45	$720
		235 Excavator	per hr	8	$240	$1,920
		D250E Haul Truck	per hr	8	$220	$1,760
	Regrading crossing slopes/swales	235 Excavator	per hr	35	$240	$8,400
		Cat D9H Dozer	per hr	35	$260	$9,100
	Scarify road surface	16H Grader	per hr	30	$220	$6,600
	Revegetate	S&F mix & applicn	per ha	1.6	$2,260	$3,616
	Sub Total					**$34,000**
9.3	**Road From HLF to Plant Site (~1.4 km)**					
	Regrade slopes	235 Excavator	per hr	20	$240	$4,800
		Cat D9H Dozer	per hr	20	$260	$5,200
	Scarify road surface	16H Grader	per hr	10	$220	$2,200
	Revegetate	S&F mix & applicn	per ha	0.7	$2,260	$1,582
	Sub Total					**$14,000**
9.4	**Road From Camp Site to Plant Site (~1 km)**					
	Culvert excavation	235 Excavator	per hr	12	$240	$2,880
	Culvert removal	General Labour	per hr	24	$45	$1,080
		235 Excavator	per hr	12	$240	$2,880
		D250E Haul Truck	per hr	12	$220	$2,640
	Regrading crossing slopes/swales	235 Excavator	per hr	10	$240	$2,400
		Cat D9H Dozer	per hr	10	$260	$2,600
	Scarify road surface	16H Grader	per hr	10	$220	$2,200
	Revegetate	S&F mix & applicn	per ha	0.5	$2,260	$1,130
	Sub Total					**$18,000**
9.5	**Main Access Road**					
	not applicable (covered previously)					
9.6	**Main Access Road Borrow Areas**					
	not applicable (covered previously)					
	Total Estimated Cost of Reclaiming Site Road & Trails					**$88,000**

Table 8-3-10 End of Mine Construction – Site Management

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost (Rounded)
10	**Site Management**					
10.1	**Project G & A**					
	Pre-Closure Planning and Organization	Management	per mo	2	$9,700	$19,400
	Sub Total					**$19,000**
10.2	**On Site Management**					
	Site Manager (1 yr x 8 mos/yr)	Labour	per mo	8	$9,700	$77,600
	Camp Cost	Misc.	per manday	1,096	$70	$76,720
	Vehicle for Manager/security	Pickup Truck	per mo	8	$2,500	$20,000
	Sub Total					**$174,000**
10.3	**Compliance Monitoring & Reporting**					
	Environmental Monitor					
	yrs 1-2: half time 8 mos, 4d/mo 4mos per yr		per mo	10	$5,000	$50,000
	Water Quality Monitoring					
	yrs 1-2 (4 per year)					
	Analyses	Misc.	per qrtr	8	$2,000	$16,000
	Disbursements (non-analytical)	Misc.	per qrtr	8	$500	$4,000
	Geotechnical Inspection - Yrs 2 & 3 (contracted)	Miscellaneous	per yr	2	$10,000	$20,000
	Reclamation Inspection - Yrs 2 & 3 (contracted)	Misc.	per yr	2	$5,000	$10,000
	Sub Total					**$100,000**
10.4	**Contaminated Site Assessment Plan**					
	Prepare plan based on site sampling results (costed elsewhere)	Misc.	lump sum	1	$5,000	$5,000
	Sub Total					**$5,000**
10.5	**Post Closure Maintenance**					
	Misc maintenance to remaining site features	Misc.	per yr	2	$5,000	$10,000
	Revegetation mntce (25% of original areas)	Misc.	per ha	13	$2,260	$29,380
	Sub Total					**$39,000**
	Total Estimated Cost for Post Closure Site Management					**$337,000**

Table 8-4-0 End of Mine Life – Summary Cost Estimate

Item No.	Description	Cost
1	**OPEN PIT** - Secure hillside mine pit access & highwall perimeter	**$23,000**
2	**HEAP LEACH FACILITY**	**$17,295,000**
2.1	Heap Leach Pad Rinsing and Neutralization	$15,897,000
2.2	Heap Leach Pad Cover (296,800 m2)	$1,370,000
2.3	Process Piping	$4,000
2.4	Heap Embankment Piping	$3,000
2.5	HLF Borrow & Stockpile Areas (~10 ha)	$21,000
3	**HLF EVENTS AND SEDIMENT PONDS**	**$296,000**
3.1	Reclaim Events Pond (~26,800 m2)	$164,000
3.2	Reclaim HLF Sediment Pond (~8,200 m2)	$41,000
3.3	Diversion Ditches To HLF Sediment Control Pond	$91,000
4	**WASTE ROCK STORAGE AREA**	**$740,000**
4.1	Waste Rock Storage Area - Recontour, Cover & Seed (690,600 m2)	$666,000
4.2	WRSA Stockpile and Borrow Areas (16 ha)	$35,000
4.3	WRSA Sediment Control Pond (~28,000 m2)	$39,000
5	**PLANT AND ANCILLARY FACILITIES (reduced by 50% for salvage value)**	**$467,000**
5.1	Sulfuric Acid Plant	$291,000
5.2	Solvent Extraction & Electrowinning Building	$270,000
5.3	Water Treatment Plant (Operational Phase)	$104,000
5.4	Power House and Power Lines	$70,000
5.5	Industrial Reagents, Fuels & Waste	$64,000
5.6	Water Supply	$34,000
5.7	Misc. Facilities	$46,000
5.8	Plant Site Pad (2.2 ha)	$43,000
5.9	Misc. Site Clean-Up	$12,000
6	**CAMP (reduced by 50% for salvage value)**	**$103,000**
6.1	Camp & Related Facilities	$168,000
6.2	Sewage Disposal Systems	$8,000
6.3	Camp Pad (0.5 ha)	$30,000
7	**TRUCK SHOP SERVICE COMPLEX (reduced by 25% for salvage value)**	**$70,000**
7.1	Truck Shop (~1,000 m2)	$48,000
7.2	Fuel Storage Storage Facilities (~500 m2)	$44,000
7.3	Sewage Disposal Systems	$7,000
7.4	Service Complex Pad (~7 ha)	$40,000
8	**MISCELLANEOUS FACILITIES (reduced by 25% for salvage value)**	**$95,000**
8.1	Crushing Plant-Portable	$33,000
8.2	Crushing Plant Pad (2.5 ha)	$54,000
8.3	Explosives Storage (~2,000 m2)	$31,000
8.4	Solid Waste Management Facility (50% of ultimate 1 ha)	$49,000
8.5	Land Treatment facility	$23,000
9	**ACCESS AND HAUL ROADS**	**$248,000**
9.1	Road To Explosives Storage (8,000 m2)	$23,000
9.2	Haul Road from Plant Site To Truck Shop Service Complex (~3.2 km)	$36,000
9.3	Road From HLF to Plant Site (~1.4 km)	$15,000
9.4	Road From Camp Site to Plant Site (~1 km)	$19,000
9.5	Main Access Road (13 km)	$135,000
9.6	Main Access Road Borrow Areas (~5,000 m2)	$20,000
12	**SITE MANAGEMENT**	**$1,103,000**
12.1	Onsite Management	$821,000
12.2	Compliance Monitoring and Reporting	$205,000
12.3	Contaminated Site Assessment Plan	$15,000
12.4	Post Closure Maintenance	$62,000
	TOTAL	**$20,440,000**
	CONTINGENCIES	
	Contingency (10% above total costs)	$2,044,000
	TOTAL ESTIMATED CLOSURE COSTS	**$22,484,000**

Table 8-4-1 End of Mine Life – Open Pit

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
1	**OPEN PIT**						
	Secure access into pit & highwall perimeter - boulder placement	235 Excavator	per hr	20	$240	$4,800	
		D250E Haul Truck	per hr	20	$220	$4,400	
	Revegetate around edge of pit	Revegetation cost per ha. Including application cost	per ha	5	$2,260	$11,300	
	Install Signage	Misc.	lump sum	1	$1,000	$1,000	$21,500
	Project Management	7% of Total Cost			7.00%	$1,505	$1,505
	Total Estimated Cost in Reclaiming Open Pit						**$23,000**

Table 8-4-2 End of Mine Life – Heap Leach Facility

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	HEAP LEACH FACILITY						
2.1	**Heap Leach Pad Rinsing and Neutralization**						
	Rinse	Rinse solution pumping	cu.m	7,950,000	$0.10	$795,000	
	Akali Neutralization	Akali application (chemical)	tonnes	54,060	$200	$10,812,000	
	Water Treatment	Water treatment	lump sum	1	$2,000,000	$2,000,000	
	Water Treatment labour	Water treatment	lump sum	1	$900,000	$900,000	
	Sludge Handling	Sludge disposal	lump sum	1	$50,000	$50,000	
	Analytical Costs	Analytical Costs	Unit cost	200	$500	$100,000	
	Contingency Treatment Measures	Contingency Treatment Measures	lump sum	1	$200,000	$200,000	$14,857,000
	Project Management	7% of Total Cost	%		7.00%	$1,039,990	$1,039,990
	Sub-Total						**$15,897,000**
2.2	**Heap Leach Pad Cover (296,800 m^2)**						
	Recontour heap leach pad area	Bulldozer-large (D9H)	per hr	100	$260	$26,000	
	Top with overburden and soil (0.5m)	Load, haul and place soil cover	cu.m	148,400	$8	$1,187,200	
	Heap Cover Revegetate	Revegetation cost per ha. Including application cost	per ha	29.7	$2,260	$67,122	$1,280,322
	Project Management	7% of Total Cost	%		7.00%	$89,623	$89,623
	Sub-Total						**$1,370,000**
2.3	**Process Piping**						
	Remove pipelines	Trades Labourer	per hr	30	$80	$2,400	
	Misc. Supplies & Tools	Misc.	lump sum		??	$1,500	$3,900
	Project Management	7% of Total Cost	%		7.00%	$273	$273
	Sub-Total						**$4,000**
2.4	**Heap Embankment Piping**						
	Install embankment drainage pipe	General Labourer	per hr	60	$45	$2,700	$2,700
	Project Management	7% of Total Cost	%		7.00%	$189	$189
	Sub-Total						**$3,000**
2.5	**HLF Borrow & Stockpile Areas (~10 ha)**						
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
		Revegetation cost per ha. Including application cost	per ha	7	$2,260	$15,820	$21,020
	Project Management	7% of Total Cost	%		7.00%	$364	$364
	Sub-Total						**$21,000**
	Total Estimated Cost in Reclaiming Heap Leach Pad						**$17,295,000**

Table 8-4-3 End of Mine Life – Heap Leach Facility Ponds

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	HLF EVENTS AND SEDIMENT PONDS						
3.1	**Reclaim Events Pond (~26,800 m^2)**						
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160	
		Gas Powered Pump	per day	4	$100	$400	
	Misc. supplies & tools	Misc.	lump sum	1	$500	$500	
	Characterize sediments	Analytical Costs	Unit cost	2	$500	$1,000	
	Fold back liner and bury	235 Excavator	per hr	100	$240	$24,000	
		Bulldozer-large (D9H)	per hr	200	$260	$52,000	
	Breach dyke, push & contour materials	Excavation of Soil	cu.m	8,000	$5	$40,000	
	Stabilize slopes with erosion barriers	Erosion barriers	sq m	3,000	$3	$9,000	
	Stabilize slopes with riprap	Load, Haul and Place Soil/Rip Rap	cu.m	1,200	$13	$15,600	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	4	$2,260	$9,040	$153,700
	Project Management	7% of Total Cost	%		7.00%	$10,759	$10,759
	Subtotal:						**$164,000**
3.2	**Reclaim HLF Sediment Pond (~8,200 m^2)**						
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160	
		Gas Powered Pump	per day	3	$100	$300	
	Misc. supplies & tools	Misc.	lump sum	1	$500	$500	
	Characterize sediments	Analytical Costs	Unit cost	1	$500	$500	
	Breach dyke, relocate and contour materials	Excavation of Soil	cu.m	3,000	$5	$15,000	
	Stabilize slopes with erosion barriers	Erosion barriers	sq m	3,000	$3	$9,000	
	Install riprap lined channel	Load, Haul and Place Soil/Rip Rap	cu.m	300	$13	$3,900	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	3	$2,260	$6,780	$38,140
	Project Management	7% of Total Cost	%		7.00%	$2,670	$2,670
	Subtotal:						**$41,000**
3.3	**Diversion Ditches To HLF Sediment Control Pond**						
	Remove liner	235 Excavator	per hr	200	$240	$48,000	
		General Labourer	per hr	200	$45	$9,000	
	Recontour	Bulldozer-large (D9H)	per hr	100	$260	$26,000	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	1	$2,260	$2,260	$85,260
	Project Management	7% of Total Cost	%		7.00%	$5,968	$5,968
	Sub-Total						**$91,000**
	Total Estimated Cost in Reclaiming HLF Events and Sediment Ponds						**$296,000**

Table 8-4-4 End of Mine Life – Waste Rock Storage Area

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	WASTE ROCK STORAGE AREA						
4.1	**Waste Rock Storage Area - Recontour, Cover & Seed (690,600 m^2)**						
	Haul and place overburden (0.15m thick)	Load, haul and place soil cover	cu.m	51,825	$8	$414,600	
	Roll crest and recontour	Bulldozer-large (D9H)	per hr	200	$260	$52,000	
	Revegetate flat surfaces of WRSA	Revegetation cost per ha. Including application cost	per ha	69.1	$2,260	$156,166	$622,766
	Project Management	7% of Total Cost	%		7.00%	$43,594	$43,594
	Sub-Total						**$666,000**
4.2	**WRSA Stockpile and Borrow Areas (16 ha)**						
	Recontour borrow & stockpile areas	Bulldozer-large (D9H)	per hr	20	$260	$5,200	
	Revegetate borrow & stockpile areas (25% area seeded)	Revegetation cost per ha. Including application cost	per ha	12.0	$2,260	$27,120	$32,320
	Project Management	7% of Total Cost	%		7.00%	$2,262	$2,262
	Sub-Total						**$35,000**
4.3	**WRSA Sediment Control Pond (~28,000 m^2)**						
	Place riprap in breached dyke outlet channel	HDPE Liner Install	sq m	200	$10	$2,000	
	Pump down impounded water	General Labourer	per hr	48	$45	$2,160	
		Load, Haul and Place Soil/Rip Rap	cu.m	4	$13	$52	
	Misc. Supplies & Tools	Misc.	lump sum	1	$500	$500	
	Characterize sediments	Analytical Costs	Unit cost	2	$500	$1,000	
	Breach dyke, push and contour materials	Excavation of Soil	cu.m	3,000	$5	$15,000	
	Stabilize slopes with erosion barriers	Erosion barriers	sq m	3,000	$3	$9,000	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	2.8	$2,260	$6,328	$36,040
	Project Management	7% of Total Cost	%		7.00%	$2,523	$2,523
	Sub-Total						**$39,000**
	Total Estimated Cost in Reclaiming Overburden and Waste Rock Dumps						**$740,000**

Table 8-4-5 End of Mine Life – Plant and Ancillary Facilities

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	PLANT AND ANCILLARY FACILITIES						
5.1	**Sulfuric Acid Plant**						
	Remove salvageable equipment	General Labourer	per hr	500	$45	$22,500	
		Trades Labourer	per hr	450	$80	$36,000	
		D250E Haul Truck	per hr	70	$220	$15,400	
		235 Excavator	per hr	50	$240	$12,000	
	Load and return extra reagents/chemicals	General Labourer	per hr	75	$45	$3,375	
		Misc.	lump sum	1	$2,500	$2,500	
	Dismantle Building	235 Excavator	per hr	70	$240	$16,800	
		Loader-small (Cat 950)	per hr	70	$125	$8,750	
		D250E Haul Truck	per hr	70	$220	$15,400	
		Trades Labourer	per hr	300	$80	$24,000	
		General Labourer	per hr	1000	$45	$45,000	
	Concrete Demolition	235 Excavator w Hammer	per hr	20	$275	$5,500	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
		D250E Haul Truck	per hr	20	$220	$4,400	
	Crane Support	30 ton Crane	per hr	70	$160	$11,200	
	Scrap haul to solid waste facility	235 Excavator	per hr	50	$240	$12,000	
		D250E Haul Truck	per hr	100	$220	$22,000	
	Misc. Supplies & Tools	Misc.	lump sum	1	$10,000	$10,000	$272,025
	Project Management	7% of Total Cost	%		7.00%	$19,042	$19,042
	Subtotal:						**$291,000**
5.2	**Solvent Extraction & Electrowinning Building**						
	Remove salvageable equipment - pipeline/pumps	General Labourer	per hr	400	$45	$18,000	
		Trades Labourer	per hr	300	$80	$24,000	
		D250E Haul Truck	per hr	70	$220	$15,400	
		235 Excavator	per hr	50	$240	$12,000	
	Load & return extra reagents/chemicals	General Labourer	per hr	100	$45	$4,500	
		Misc.	lump sum	1	$2,500	$2,500	
	Dismantle Building	235 Excavator	per hr	70	$240	$16,800	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
		D250E Haul Truck	per hr	140	$220	$30,800	
		Trades Labourer	per hr	300	$80	$24,000	
		General Labourer	per hr	1000	$45	$45,000	
	Concrete Demolition	235 Excavator w Hammer	per hr	20	$275	$5,500	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
	Crane Support	30 ton Crane	per hr	70	$160	$11,200	
	Scrap haul to solid waste facility	235 Excavator	per hr	50	$240	$12,000	
		D250E Haul Truck	per hr	100	$220	$22,000	
	Misc. Supplies & Tools	Misc.	lump sum	1	$2,000	$2,000	$252,150
	Project Management	7% of Total Cost			7.00%	$17,651	$17,651
	Subtotal:						**$270,000**
5.3	**Water Treatment Plant (Operational Phase)**						
	Remove salvageable equipment	General Labourer	per hr	70	$45	$3,150	
		Trades Labourer	per hr	40	$80	$3,200	
	Load & return extra reagents/chemicals	General Labourer	per hr	50	$45	$2,250	
		Misc.	lump sum	1	$2,000	$2,000	
	Dismantle Building	235 Excavator	per hr	35	$240	$8,400	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
		D250E Haul Truck	per hr	70	$220	$15,400	
		Trades Labourer	per hr	40	$80	$3,200	
		General Labourer	per hr	200	$45	$9,000	
	Concrete Demolition	235 Excavator w Hammer	per hr	20	$275	$5,500	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
	Crane Support	30 ton Crane	per hr	10	$160	$1,600	
	Scrap haul to solid waste facility	235 Excavator	per hr	40	$240	$9,600	
		D250E Haul Truck	per hr	80	$220	$17,600	
	Misc. Supplies & Tools	Misc.	lump sum	1	$10,000	$10,000	$97,350
	Project Management	7% of Total Cost	%		7.00%	$6,815	$6,815
	Subtotal:						**$104,000**
5.4	**Power House and Power Lines**						
	Remove salvageable equipment	General Labourer	per hr	100	$45	$4,500	
		Trades Labourer	per hr	80	$80	$6,400	
	Salvage and remove powerline and poles (between work areas)	Unit Costs	per km	2.5	$11,000	$27,500	
	Dismantle Substation Building	235 Excavator	per hr	5	$240	$1,200	
		Loader-small (Cat 950)	per hr	5	$125	$625	
		D250E Haul Truck	per hr	10	$220	$2,200	
		Trades Labourer	per hr	20	$80	$1,600	
		General Labourer	per hr	20	$45	$900	
	Concrete Demolition	235 Excavator w Hammer	per hr	20	$275	$5,500	
		Bulldozer-large (D9H)	per hr	10	$260	$2,600	
		235 Excavator	per hr	10	$240	$2,400	
	Crane Support	30 ton Crane	per hr	5	$160	$800	
	Scrap haul to solid waste facility	235 Excavator	per hr	10	$240	$2,400	
		D250E Haul Truck	per hr	20	$220	$4,400	
	Misc. Supplies & Tools	Misc.	lump sum	1	$2,000	$2,000	$65,025
	Project Management	7% of Total Cost	%		7.00%	$4,552	$4,552
	Subtotal:						**$70,000**

Table 8-4-5 End of Mine Life – Plant and Ancillary Facilities (Cont'd)

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
5.5	**Industrial Reagents, Fuels & Waste**						
5.5.1	Empty & clean bulk fuel tanks	General Labourer	per hr	80	$45	$3,600	
	Remove contents to licenced facility	Unit Costs	lump sum	1	$5,000	$5,000	
	Remove bulk fuel storage, piping & pumping facilities	235 Excavator	per hr	40	$240	$9,600	
		Loader-small (Cat 950)	per hr	20	$125	$2,500	
		Trades Labourer	per hr	60	$80	$4,800	
		General Labourer	per hr	80	$45	$3,600	
	Fold & bury containment liner	235 Excavator	per hr	20	$240	$4,800	
		Bulldozer-large (D9H)	per hr	50	$260	$13,000	
5.5.2	Remove Kerosene Storage Tanks (Empty)	General Labourer	per hr	80	$45	$3,600	
	Fold & bury containment liner	235 Excavator	per hr	10	$240	$2,400	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	$59,350
	Project Management	7% of Total Cost	%		7.00%	$4,155	$4,155
	Subtotal:						**$64,000**
5.6	**Water Supply**						
	Remove salvageable equipment incl pipeline & pumps	General Labourer	per hr	48	$45	$2,160	
		Trades Labourer	per hr	98	$80	$7,840	
		D250E Haul Truck	per hr	30	$220	$6,600	
		235 Excavator	per hr	20	$240	$4,800	
	Dismantle Building	235 Excavator	per hr	20	$240	$4,800	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
		D250E Haul Truck	per hr	10	$220	$2,200	
		Trades Labourer	per hr	8	$80	$640	
		General Labourer	per hr	16	$45	$720	
	Misc. Supplies & Tools	Misc.	lump sum	1	$1,000	$1,000	$32,010
	Project Management	7% of Total Cost			7.00%	$2,241	$2,241
	Subtotal:						**$34,000**
5.7	**Misc. Facilities**						
	Dismantle control trailer	General Labourer	per hr	40	$45	$1,800	
		Trades Labourer	per hr	10	$80	$800	
		235 Excavator	per hr	10	$240	$2,400	
	Laboratory -Lab-pac of chemicals & reagents	Misc.	lump sum	1	$2,000	$2,000	
	Dismantle Lab Building	General Labourer	per hr	40	$45	$1,800	
		Trades Labourer	per hr	10	$80	$800	
		235 Excavator	per hr	10	$240	$2,400	
	Dismantle office trailer	General Labourer	per hr	40	$45	$1,800	
		Trades Labourer	per hr	10	$80	$800	
		235 Excavator	per hr	10	$240	$2,400	
	Remove salvageable equipment from buildings	General Labourer	per hr	60	$45	$2,700	
		Trades Labourer	per hr	30	$80	$2,400	
	Scrap haul to solid waste facility	General Labourer	per hr	20	$45	$900	
		235 Excavator	per hr	30	$240	$7,200	
		D250E Haul Truck	per hr	60	$220	$13,200	$43,400
	Project Management	7% of Total Cost			7.00%	$3,038	$3,038
	Subtotal:						**$46,000**
5.8	**Plant Site Pad (2.2 ha)**						
	Test soils for contamination	Environmental Scientist	per hr	10	$95	$950	
	Laboratory Analysis	Analytical Costs	Unit cost	3	$500	$1,500	
	Remove contaminated soils to Land Treatment Facility	Load, Haul and Place Soil/Rip Rap	cu.m	500	$13	$6,500	
	Re-contour area and slopes to bury footings	Bulldozer-large (D9H)	per hr	100	$260	$26,000	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	2.2	$2,260	$4,972	$39,922
	Project Management	7% of Total Cost	%		7.00%	$2,795	$2,795
	Subtotal:						**$43,000**
5.9	**Misc. Site Clean-Up**						
	Site Clean-up crew (for overall site)	General Labourer	per hr	240	$45	$10,800	
	Project Management	7% of Total Cost	%		7.00%	$756	$756
	Subtotal:						**$12,000**
	Total Estimated Cost in Reclaiming Plant and Ancillary Facilities						**$934,000**
	Total Reduced by Salvage Value (50% of Decommissioning and Reclamation Costs)						**$467,000**

Table 8-4-6 End of Mine Life – Camp

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	CAMP						
6.1	**Camp & Related Facilities**						
	Remove salvageable equipment	General Labourer	per hr	280	$45	$12,600	
		Trades Labourer	per hr	70	$80	$5,600	
	Dismantle water supply system (p'house, above ground piping)	General Labourer	per hr	40	$45	$1,800	
		Trades Labourer	per hr	20	$80	$1,600	
		235 Excavator	per hr	20	$240	$4,800	
	Dismantle electrical substation & area wiring, remove poles	Misc.	lump sum	1	$15,000	$15,000	
	Dismantle buildings & associated structures	General Labourer	per hr	700	$45	$31,500	
		Trades Labourer	per hr	100	$80	$8,000	
		235 Excavator	per hr	80	$240	$19,200	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
	Remove propane tanks	General Labourer	per hr	4	$45	$180	
		Trades Labourer	per hr	8	$80	$640	
		235 Excavator	per hr	2	$240	$480	
	Concrete Demolition	General Labourer	per hr	20	$45	$900	
		235 Excavator w Hammer	per hr	10	$275	$2,750	
		Bulldozer-large (D9H)	per hr	10	$260	$2,600	
		235 Excavator	per hr	5	$240	$1,200	
	Scrap haul to Solid Waste Facility	D250E Haul Truck	per hr	120	$220	$26,400	
		General Labourer	per hr	20	$45	$900	
		235 Excavator	per hr	80	$240	$19,200	$156,600
	Project Management	7% of Total Cost			7.00%	$10,962	$10,962
	Subtotal:						**$168,000**
6.2	**Sewage Disposal Systems**						
	Remove system including filling of below ground components	General Labourer	per hr	18	$45	$810	
	Support for above work & recontouring area	235 Excavator	per hr	12	$240	$2,880	
		D250E Haul Truck	per hr	18	$220	$3,960	$7,650
	Project Management	7% of Total Cost			7.00%	$536	$536
	Sub-Total						**$8,000**
6.3	**Camp Pad (0.5 ha)**						
	Test sites for soil for contamination (prep, sampling, write-up)	Environmental Scientist	per hr	15	$95	$1,425	
	Laboratory Analysis	Analytical Costs	Unit cost	3	$500	$1,500	
	Remove contaminated soils to Land Treatment Facility	Load, Haul and Place Soil/Rip Rap	cu.m	300	$13	$3,900	
	Re-contour area and slopes to bury footings	Bulldozer-large (D9H)	per hr	50	$260	$13,000	
		235 Excavator	per hr	25	$240	$6,000	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	1	$2,260	$2,260	$28,085
	Project Management	7% of Total Cost	%		7.00%	$1,966	$1,966
	Sub-Total						**$30,000**
	Total Estimated Cost in Reclaiming the Camp						**$206,000**
	Total Reduced by Salvage Value (50% of Decommissioning and Reclamation Costs)						**$103,000**

Table 8-4-7 End of Mine Life – Truck Shop Service Complex

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	TRUCK SHOP SERVICE COMPLEX						
7.1	**Truck Shop (~1,000 m^2)**						
	Remove salvageable equipment	General Labourer	per hr	80	$45	$3,600	
		Trades Labourer	per hr	20	$80	$1,600	
		D250E Haul Truck	per hr	20	$220	$4,400	
		235 Excavator	per hr	20	$240	$4,800	
	Dismantle buildings	General Labourer	per hr	100	$45	$4,500	
		Trades Labourer	per hr	10	$80	$800	
		235 Excavator	per hr	15	$240	$3,600	
		Loader-small (Cat 950)	per hr	15	$125	$1,875	
	Crane Support	30 ton Crane	per hr	25	$160	$4,000	
	Concrete Demolition	235 Excavator w Hammer	per hr	20	$275	$5,500	
		Bulldozer-large (D9H)	per hr	10	$260	$2,600	
	Scrap haul to solid waste facility	General Labourer	per hr	10	$45	$450	
		235 Excavator	per hr	10	$240	$2,400	
		D250E Haul Truck	per hr	20	$220	$4,400	$44,525
	Project Management	7% of Total Cost	%		7.00%	$3,117	$3,117
	Subtotal:						**$48,000**
7.2	**Fuel Storage Storage Facilities (~500 m^2)**						
	Empty & clean bulk fuel tanks	General Labourer	per hr	60	$45	$2,700	
	Remove to licenced facility	Misc.	lump sum	1	$7,500	$7,500	
	Remove bulk fuel storage, piping & pumping facilities	235 Excavator	per hr	40	$240	$9,600	
		Trades Labourer	per hr	30	$80	$2,400	
		General Labourer	per hr	50	$45	$2,250	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
	Concrete Demolition	235 Excavator w Hammer	per hr	10	$275	$2,750	
		235 Excavator	per hr	5	$240	$1,200	
		Bulldozer-large (D9H)	per hr	5	$260	$1,300	
	Fold & bury containment liner	235 Excavator	per hr	20	$240	$4,800	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	$40,950
	Project Management	7% of Total Cost	%		7.00%	$2,867	$2,867
	Subtotal:						**$44,000**
7.3	**Sewage Disposal Systems**						
	Remove system including filling of below ground components	General Labourer	per hr	10	$45	$450	
		235 Excavator	per hr	10	$240	$2,400	
		D250E Haul Truck	per hr	15	$220	$3,300	$6,150
	Project Management	7% of Total Cost			7.00%	$431	$431
	Sub-Total						**$7,000**
7.4	**Service Complex Pad (~7 ha)**						
	Test soils for contamination	Environmental Scientist	per hr	20	$95	$1,900	
	Laboratory Analysis	Analytical Costs	Unit cost	3	$500	$1,500	
	Remove contaminated soils to Land Treatment Facility	Load, Haul and Place Soil/Rip Rap	cu.m	600	$13	$7,800	
	Re-contour area and slopes to bury footings	Bulldozer-large (D9H)	per hr	40	$260	$10,400	
	Revegetate Pad	Revegetation cost per ha. Including application cost	per ha	7	$2,260	$15,820	$37,420
	Project Management	7% of Total Cost	%		7.00%	$2,619	$2,619
	Subtotal:						**$40,000**
	Total Estimated Cost in Reclaiming the Truck Shop Service Complex						**$139,000**
	Total Reduced by Salvage Value (50% of Decommissioning and Reclamation Costs)						**$70,000**

Table 8-4-8 End of Mine Life – Miscellaneous Facilities

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	MISCELLANEOUS FACILITIES						
8.1	**Crushing Plant-Portable**						
	Remove salvageable equipment	General Labourer	per hr	60	$45	$2,700	
		Trades Labourer	per hr	10	$80	$800	
		D250E Haul Truck	per hr	10	$220	$2,200	
		235 Excavator	per hr	5	$240	$1,200	
	Dismantle portable crusher & conveyors	General Labourer	per hr	100	$45	$4,500	
		Trades Labourer	per hr	40	$80	$3,200	
		235 Excavator	per hr	20	$240	$4,800	
	Crane Support	30 ton Crane	per hr	20	$160	$3,200	
	Scrap haul to Solid Waste Facility	235 Excavator	per hr	10	$240	$2,400	
		D250E Haul Truck	per hr	20	$220	$4,400	
		General Labourer	per hr	40	$45	$1,800	$31,200
	Project Management	7% of Total Cost			7.00%	$2,184	$2,184
	Subtotal:						**$33,000**
8.2	**Crushing Plant Pad (2.5 ha)**						
	Test soils for contamination	Environmental Scientist	per hr	40	$95	$3,800	
	Laboratory Analysis	Analytical Costs	Unit cost	6	$500	$3,000	
	Remove contaminated soils to Land Treatment Facility	Load, Haul and Place Soil/Rip Rap	cu.m	600	$13	$7,800	
	Recontour area & slopes to bury footings	Bulldozer-large (D9H)	per hr	80	$260	$20,800	
		235 Excavator	per hr	40	$240	$9,600	
	Revegetate Pad	Revegetation cost per ha. Including application cost	per ha	2.5	$2,260	$5,650	$50,650
	Project Management	7% of Total Cost	%		7.00%	$3,546	$3,546
	Subtotal:						**$54,000**
8.3	**Explosives Storage (~2,000 m2)**						
	Remove salvageable equipment	General Labourer	per hr	100	$45	$4,500	
		Trades Labourer	per hr	50	$80	$4,000	
	Dismantle Building (50m2)	General Labourer	per hr	100	$45	$4,500	
		Trades Labourer	per hr	25	$80	$2,000	
		Loader-small (Cat 950)	per hr	10	$125	$1,250	
		235 Excavator	per hr	10	$240	$2,400	
	Concrete Demolition	235 Excavator w Hammer	per hr	8	$275	$2,200	
		235 Excavator	per hr	4	$240	$960	
		Bulldozer-large (D9H)	per hr	4	$260	$1,040	
	Re-contour area and slopes to bury footings and establish drainage	Bulldozer-large (D9H)	per hr	8	$260	$2,080	
	Scrap haul to Solid Waste Facility	General Labourer	per hr	10	$45	$450	
		D250E Haul Truck	per hr	8	$220	$1,760	
		235 Excavator	per hr	4	$240	$960	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.5	$2,260	$1,130	$29,230
	Project Management	7% of Total Cost	%		7.00%	$2,046	$2,046
	Subtotal:						**$31,000**
8.4	**Solid Waste Management Facility (50% of ultimate 1 ha)**						
	Characterization study	Misc.	lump sum	1	$500	$500	
	Closure plan - development, submission, permitting	Misc.	lump sum	1	$2,000	$2,000	
	Remove recyclables and special waste materials	Misc.	lump sum	1	$1,000	$1,000	
	Recontour area	Bulldozer-large (D9H)	per hr	4	$260	$1,040	
	Haul & place overburden cap (0.2m thick with 50% void)	Load, Haul and Place Soil/Rip Rap	cu.m	3,000	$13	$39,000	
	compact cap (two lifts)	Bulldozer-large (D9H)	per hr	4	$260	$1,040	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.5	$2,260	$1,130	$45,710
	Project Management	7% of Total Cost	%		7.00%	$3,200	$3,200
	Subtotal:						**$49,000**
8.5	**Land Treatment facility**						
	Costs to operate facility - 5 years (turn-over, nutrient addition)	Misc.	lump sum	5	$3,000	$15,000	
	Sampling	Analytical Costs	Unit cost	20	$100	$2,000	
	Closure plan - development, submission, securing release permit	Misc.	lump sum	1	$2,000	$2,000	
	Recontour area	Bulldozer-large (D9H)	per hr	4	$260	$1,040	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.5	$2,260	$1,130	$21,170
	Project Management	7% of Total Cost	%		7.00%	$1,482	$1,482
	Subtotal:						**$23,000**
	Total Estimated Cost in Reclaiming Miscellaneous Sites and Facilities						**$190,000**
	Total Reduced by Salvage Value (50% of Decommissioning and Reclamation Costs)						**$95,000**

Table 8-4-9 End of Mine Life – Access and Haul Roads

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	ACCESS AND HAUL ROADS						
9.1	**Road To Explosives Storage (8,000 m^2)**						
	Culvert excavation	235 Excavator	per hr	4	$240	$960	
	Culvert removal	General Labourer	per hr	8	$45	$360	
		235 Excavator	per hr	4	$240	$960	
		D250E Haul Truck	per hr	4	$220	$880	
	Regrading crossing slopes/swales	235 Excavator	per hr	25	$240	$6,000	
		Bulldozer-large (D9H)	per hr	25	$260	$6,500	
	Scarify road surface	16H grader	per hr	20	$220	$4,400	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.8	$2,260	$1,808	$21,868
	Project Management	7% of Total Cost			7.00%	$1,531	$1,531
	Subtotal:						**$23,000**
9.2	**Haul Road from Plant Site To Truck Shop Service Complex (~3.2 km)**						
	Culvert excavation	235 Excavator	per hr	8	$240	$1,920	
	Culvert removal	General Labourer	per hr	16	$45	$720	
		235 Excavator	per hr	8	$240	$1,920	
		D250E Haul Truck	per hr	8	$220	$1,760	
	Regrading crossing slopes/swales	235 Excavator	per hr	35	$240	$8,400	
		Bulldozer-large (D9H)	per hr	35	$260	$9,100	
	Scarify road surface	16H grader	per hr	30	$220	$6,600	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	1.6	$2,260	$3,616	$34,036
	Project Management	7% of Total Cost			7.00%	$2,383	$2,383
	Subtotal:						**$36,000**
9.3	**Road From HLF to Plant Site (~1.4 km)**						
	Regrade slopes	235 Excavator	per hr	20	$240	$4,800	
		Bulldozer-large (D9H)	per hr	20	$260	$5,200	
	Scarify road surface	16H grader	per hr	10	$220	$2,200	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.7	$2,260	$1,582	$13,782
	Project Management	7% of Total Cost			7.00%	$965	$965
	Subtotal:						**$15,000**
9.4	**Road From Camp Site to Plant Site (~1 km)**						
	Culvert excavation	235 Excavator	per hr	12	$240	$2,880	
	Culvert removal	General Labourer	per hr	24	$45	$1,080	
		235 Excavator	per hr	12	$240	$2,880	
		D250E Haul Truck	per hr	12	$220	$2,640	
	Regrading crossing slopes/swales	235 Excavator	per hr	10	$240	$2,400	
		Bulldozer-large (D9H)	per hr	10	$260	$2,600	
	Scarify road surface	16H grader	per hr	10	$220	$2,200	
	Revegetate	Revegetation cost per ha. Including application cost	per ha	0.5	$2,260	$1,130	$17,810
	Project Management	7% of Total Cost			7.00%	$1,247	$1,247
	Subtotal:						**$19,000**
9.5	**Main Access Road (13 km)**						
	Scarify road surface (13 km x 5 m)	16H grader	per hr	150	$220	$33,000	
	Remove Merrice Creek bridge decking and span	General Labourer	per hr	30	$45	$1,350	
		235 Excavator	per hr	10	$240	$2,400	
		30 ton Crane	per hr	10	$160	$1,600	
		Tractor Trailer (lowbed)	per hr	10	$130	$1,300	
	Stream crossing bank restoration	Misc.	lump sum	1	$1,000	$1,000	
	Culvert excavation (11)	235 Excavator	per hr	88	$240	$21,120	
	Culvert removal (11)	General Labourer	per hr	55	$45	$2,475	
		235 Excavator	per hr	88	$240	$21,120	
		D250E Haul Truck	per hr	55	$220	$12,100	
	Regrade crossing slopes/swales (11)	235 Excavator	per hr	11	$240	$2,640	
	Reclaim spoil piles (5)	235 Excavator	per hr	10	$240	$2,400	
	Revegetate (13 km x 5 m) incl banks & slopes	Revegetation cost per ha. Including application cost	per ha	6.5	$2,260	$14,690	
	Revegetation maintenance after 1 year (25% of areas first done)	Revegetation cost per ha. Including application cost	per ha	1.6	$2,260	$3,616	
	Environmental monitoring during work at stream crossings	Environmental Monitor	per day	5	$227	$1,136	
		Analytical Costs	Unit cost	4	$500	$2,000	
	Permanent earthen barrier for main access road route	Misc.	lump sum	1	$3,000	$3,000	$126,947
	Project Management	7% of Total Cost	%		7.00%	$8,204	$8,204
	Subtotal:						**$135,000**
9.6	**Main Access Road Borrow Areas (~5,000 m^2)**						
	Recontour borrow areas	Bulldozer-large (D9H)	per hr	30	$260	$7,800	
	Revegetate sloped areas	Revegetation cost per ha. Including application cost	per ha	5.0	$2,260	$11,300	$19,100
	Project Management	7% of Total Cost	%		7.00%	$1,337	$1,337
	Sub-Total						**$20,000**
	Total Estimated Cost for Road Closures						**$248,000**

Table 8-4-10 End of Mine Life – Site Management

Item No.	Work Item Description	Equipment / Labour	Units	Quantity	Unit Cost	Cost	Total Cost (Rounded)
	SITE MANAGEMENT						
10.1	**Onsite Management**						
	Project Management and Engineering - Included in PM Costs in each Closure Component						
	Pickup truck	Pickup Truck	per month	40	$2,500	$100,000	
	Sundry equipment maintenance	Sundry equipment maintenance	yearly	5	$5,000	$25,000	
	Power and heat	Power and Heat	per month	40	$5,500	$220,000	
	General Administrative expenses	General Administrative expenses	per month	40	$2,000	$80,000	
	Camp Costs	Camp Cost	per day per person	5,655	$70	$395,850	
	Subtotal:						**$821,000**
10.2	**Compliance Monitoring and Reporting**						
	Water Quality Monitoring (Post Mine Closure)						
	Years 1-5 (monthly)	Misc.	monthly	60	$2,000	$120,000	
	Years 6-10 (quarterly - spring/summer/fall)	Misc.	quarterly	15	$2,000	$30,000	
	Years 11-15 (once annually - post spring freshet)	Misc.	yearly	5	$2,000	$10,000	
	Disbursements (non-labour/non-analytical)	Misc.	lump sum	15	$2,000	$30,000	
	Biological Monitoring - Closure implementation						
	Years 1-5 (Every 2 Years)	Misc.	yearly	3	$3,000	$9,000	
	Years 6-10 (Every 2 Years)	Misc.	yearly	2	$3,000	$6,000	
	Subtotal:						**$205,000**
10.3	**Contaminated Site Assessment Plan**						
	Develop Plan	Misc.	lump sum	1	$3,000	$3,000	
	Assessment Reporting	Misc.	lump sum	1	$2,000	$2,000	
	Miscellaneous soils testing	Analytical Costs	Unit cost	20	$500	$10,000	
	Subtotal:						**$15,000**
10.4	**Post Closure Maintenance**						
	Manage Land Treatment Facility and Testing	Misc.	per year	3	$4,000	$12,000	
	Misc. Maintenance work related to the site after closure (access road, covers, revegetation)	Misc.	per year	5	$10,000	$50,000	
	Subtotal:						**$62,000**
	Total Estimated Cost for Post Closure Site Management						**$1,103,000**

Table 8-5 Annual Estimate of Closure Liability and Progressive Reclamation Costs

Item No.	Description	End of Mine Life (Year 7)	Year														
			-1	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1	**OPEN PIT**	**$23,000**	$23,000								-$23,000						
2	**HEAP LEACH FACILITY**	**$17,295,000**	$233,840	$2,844,331	$2,841,115	$2,857,194	$2,842,723	$2,844,331	$2,831,468								
2.1	Heap Leach Pad Rinsing and Neutralization	$15,897,000					-$635,624	-$635,624	-$2,180,195	-$2,180,195	-$2,180,195	-$2,180,195	-$2,180,195	-$2,180,195	-$1,544,571		
2.2	Heap Leach Pad Cover (296,800 m2)	$1,370,000									-$274,000	-$274,000	-$274,000	-$274,000	-$274,000		
2.3	Process Piping	$4,000														-$4,000	
2.4	Heap Embankment Piping	$3,000														-$3,000	
2.5	HLF Borrow & Stockpile Areas (~10 ha)	$21,000														-$21,000	
3	**HLF EVENTS AND SEDIMENT PONDS**	**$296,000**	$296,000														-$296,000
4	**WASTE ROCK STORAGE AREA**	**$740,000**	$256,634	$73,276	$99,236	$99,150	$99,228	$96,480	$15,996								
4.1	Waste Rock Storage Area - Recontour, Cover & Seed (690,600 m2)	$666,000				-$133,200	-$133,200	-$133,200	-$133,200	-$133,200							
4.2	WRSA Stockpile and Borrow Areas (16 ha)	$35,000								-$35,000							
4.3	WRSA Sediment Control Pond (~28,000 m2)	$39,000								-$39,000							
5	**PLANT AND ANCILLARY FACILITIES (reduced by 50% for salvage value)**	**$467,000**	$467,000								-$467,000						
6	**CAMP (reduced by 50% for salvage value)**	**$103,000**	$103,000											-$34,333	-$34,333	-$34,333	
7	**TRUCK SHOP SERVICE COMPLEX (reduced by 50% for salvage value)**	**$70,000**	$70,000								-$70,000						
8	**MISCELLANEOUS FACILITIES (reduced by 50% for salvage value)**	**$95,000**	$95,000								-$95,000						
9	**ACCESS AND HAUL ROADS**	**$248,000**	$248,000				-$82,667				-$82,667					-$82,667	
	ANNUAL LIABILITY	**$19,340,000**	$1,790,000	$2,920,000	$2,940,000	$2,960,000	$2,940,000	$2,940,000	$2,850,000								
	PROJECT MANAGEMENT	**$1,110,000**	$100,000	$170,000	$170,000	$170,000	$170,000	$170,000	$160,000								
	TOTAL ANNUAL LIABILITY		**$1,890,000**	**$4,980,000**	**$8,090,000**	**$11,220,000**	**$14,330,000**	**$17,440,000**	**$20,450,000**								
	ANNUAL RECLAMATION	**-$19,300,000**	$0	$0	$0	-$130,000	-$850,000	-$770,000	-$2,310,000	-$2,390,000	-$3,190,000	-$2,450,000	-$2,450,000	-$2,490,000	-$1,850,000	-$120,000	-$300,000
	PROJECT MANAGEMENT	**-$1,120,000**	$0	$0	$0	-$10,000	-$50,000	-$40,000	-$130,000	-$140,000	-$190,000	-$140,000	-$140,000	-$140,000	-$110,000	-$10,000	-$20,000
	TOTAL ANNUAL RECLAMATION		**$0**	**$0**	**$0**	**-$140,000**	**-$1,040,000**	**-$1,850,000**	**-$4,290,000**	**-$6,820,000**	**-$10,200,000**	**-$12,790,000**	**-$15,380,000**	**-$18,010,000**	**-$19,970,000**	**-$20,100,000**	**-$20,420,000**
	ANNUAL NET LIABILITY		$1,890,000	$3,090,000	$3,110,000	$2,990,000	$2,210,000	$2,300,000	$570,000	-$2,530,000	-$3,380,000	-$2,590,000	-$2,590,000	-$2,630,000	-$1,960,000	-$130,000	-$320,000
	CUMULATIVE NET LIABILITY		$1,890,000	$4,980,000	$8,090,000	$11,080,000	$13,290,000	$15,590,000	$16,160,000	$13,630,000	$10,250,000	$7,660,000	$5,070,000	$2,440,000	$480,000	$350,000	$30,000

Table 8-6 Mine Production Schedule

		Year							
		-1	1	2	3	4	5	6	TOTAL
Mine Production Schedule:									
Ore Ktonnes	(ktonnes)	248	1,521	1,767	1,777	1,768	1,769	1,761	10,611
Dilution	(ktonnes)	27	142	167	177	168	169	110	960
Recovered Copper	(%)	0.841	0.860	0.891	0.936	0.999	0.979	1.054	0.953
Total Copper	(%)	0.996	1.026	1.067	1.111	1.185	1.162	1.297	1.140
Soluble Copper Ox	(%)	0.855	0.871	0.899	0.958	1.030	1.007	1.040	0.967
Sulfide Copper	(%)	0.142	0.155	0.168	0.153	0.155	0.154	0.257	0.173
Gold	(g/t)	0.341	0.425	0.533	0.579	0.606	0.518	0.531	0.529
Silver	(g/t)	3.55	4.19	4.96	5.28	5.51	4.81	5.67	5.05
Total Ktonnes	(ktonnes)	2,000	10,000	13,250	13,250	13,250	12,933	3,612	68,295
Waste Ktonnes	(ktonnes)	1,752	8,479	11,483	11,473	11,482	11,164	1,851	57,684
Waste to Ore Ratio	(none)	7.1	5.6	6.5	6.5	6.5	6.3	1.1	5.4
Proposed Leach Pad Stacking Schedule:									
Ore Ktonnes	(ktonnes)		1,769	1,767	1,777	1,768	1,769	1,761	10,611
Recovered Copper	(%)		0.856	0.891	0.936	0.999	0.979	1.054	0.953
Total Copper	(%)		1.020	1.067	1.111	1.185	1.162	1.297	1.140
Soluble Copper	(%)		0.868	0.899	0.958	1.030	1.007	1.040	0.967
Sulfide Copper	(%)		0.152	0.168	0.153	0.155	0.154	0.257	0.173
Recovered Copper	(klbs)		33,387	34,709	36,668	38,938	38,180	40,919	222,803

Western Copper Corporation

CARMACKS COPPER PROJECT
YUKON TERRITORY

PRELIMINARY DETAILED CLOSURE AND RECLAMATION PLAN

APPENDIX A

Heap Leach Closure: Test Studies and Background Information

1. INTRODUCTION

This appendix provides summary information on the extensive research and testwork that has been completed for heap leach facility closure issues. Specifically, information is provided on the following:

- treating residual process and rinse solutions to remove acid and dissolved metals;
- neutralization of residual acidity in the rock mass;
- potential for acid rock drainage from sulphide oxidation;
- ore weathering; and
- sludge disposal from treatment plant.

The testwork addressing each of the above geochemical issues is discussed in depth in Lawrence and Beattie, 1996 and Beattie, 2001 and more recently in the *Detoxification and Rinsing Testwork Report* (January 2006) and subsequent memorandum (re: Heap Rinsing Additional Information) (June 2006) prepared by Alexco Resource Corp. Western Copper's *Water Treatment System Report* (October 2008) describes the high density sludge (HDS) treatment process and treatability testwork conducted on process and rinse solutions, and resulting sludge produced. The testing and conclusions are briefly summarized below to provide explanation of proposed closure measures.

2. RECLAMATION ISSUES

2.1 Heap Rinsing and Neutralization

At the completion of the initial leach testing program in 1996, the two metallurgical test columns were each rinsed over a 6 or 12 month period (for columns PC2 and PC1 respectively) with fresh water and then alkaline solutions, to evaluate requirements for rinsing at closure. Testing was also done to evaluate water treatment (neutralization) to reduce acidity and precipitate dissolved metals from both process (raffinate) and rinse solutions.

Testwork showed that a combination of rinsing (neutralization) and water treatment is required to remove residual process solutions, reduce the release of dissolved metals from the heap rinse solutions and meet water quality discharge requirements. Water treatment using lime neutralization was partially successful at removing dissolved metals and acidity from the process and rinse solutions. Briefly, the 1996 heap decommissioning investigations indicated that:

- rinsing with water can remove the majority of the acidity and dissolved metals from the heap;
- longer term flushing with neutralized rinse solutions does not achieve "acceptable" discharge quality in the rinse solutions as metal concentrations remain elevated (e.g. Cu at > 20 mg/L) and pH values acidic (pH < 4.5);
- conventional alkali addition for water treatment is effective in removing dissolved metals and acidity from both raffinate and rinse solutions; and
- re-circulation of neutralized rinse solutions appears to significantly and adversely affect the geochemistry of the spent ore, resulting in weathering of the gangue, buffering of drainage water at pH 4, and rendering ineffective further removal of copper from the spent ore.

More recent evaluation of the metallurgical data, water chemistry and further detoxification testwork conducted by Beattie, 2001 on spent ore indicated that:

- process solutions can be rinsed from the columns using water rinses (without pH adjustment);
- in the latter stages of rinsing, pH is controlled by weathering reactions in the alumino-silicate minerals, clays and feldspars with the dominant control primarily aluminium and silicate ions in solution;
- these alumino-silicates could also contribute to the apparent residual neutralization capacity of the spent ore;
- neutralization of the drainage water further accelerates the natural weathering of these minerals and changes the solution chemistry;

- Sodium carbonate is effective at altering the leached solids so that effluents have a neutral pH (not buffered at pH 4 as previously experienced). This condition appears to be stable over extended time periods; and
- the most effective rinsing procedure for the spent heap appears to be to recirculate the solutions until the free acid is consumed, most of the iron precipitates, and the copper concentration in solution becomes uneconomic to recover. At this point the leach solution should be neutralized with lime to precipitate sulphate and other deleterious constituents before being discharged. The heap should then be rinsed with water continuously or in a series of pulses with rest periods in between to allow dissolved sulphate, copper etc to diffuse from the rock particles. An effluent of pH 4 can be expected with this procedure. To achieve higher pH values, the addition of a base is required and sodium carbonate appears to be the most effective addition.

Test columns completed in 2005 and reported by Alexco in 2006 (Alexco, 2006a) were designed to take advantage of the previous detoxification testwork and results are summarized below.

The 2005 test results (Alexco, 2006) provide evidence of significant progress and demonstration of the ability to effectively rinse and neutralize the Carmacks Copper spent ore material. Most significantly are the results of Column 9 demonstrating all the parameters in the *Metal Mining Effluent Regulations* (MMER) list of standards for direct discharge were met. Conclusions of testwork indicate:

- the use of sodium carbonate (Na_2CO_3) over lime (CaO) is superior for alkaline addition and no plugging problems were observed with Na_2CO_3 as was the case with CaO;
- allowing the spent ore to rest after leaching is complete and before initial water rinsing provides a higher initial pH compared to commencing water rinsing immediately;
- additional water pulses continued to reduce soluble copper levels to the point where MMER standards were met;

- MMER standards were met within reasonable timelines of 200 column days;
- pulsing of water appears to be more effective at removal of soluble species than constant irrigation, likely due to increased time for copper to diffuse out of the pore spaces and creation of new solution pathways;
- the addition of a carbon source did not provide any obvious benefit for stabilization of copper;
- the optimum rinsing process appeared to consist of:
    - initial water rinsing to flush residual acidity;
    - adjustment of pH by rinsing with an alkaline solution of sodium carbonate;
    - continued pulsing of fresh water followed by rest periods until copper has reached acceptable levels.
- environmental testwork indicated the residual acid from leaching was effectively rinsed and the spent ore has no acid generating potential, consistent with the oxide nature of the material; and
- it has been demonstrated to be technically feasible to
    - rinse the free acidity and
    - reduce metals to acceptable standards.

Alexco Resource Corp., *Detoxification and Rinsing Testwork Report and Memorandum – (Heap Rinsing Additional Information)* demonstrates the technical feasibility of detoxifying the spent ore and discusses the methodology for scale up of the rinsing and neutralization testwork, expected time lines and how the testwork predictions are typically applied using industry best practices. The anticipated rinse time to neutralize the heap is 4.5 years although estimates by others indicate as much as 10 years may be required.

Process Research Associates, Report, March 16, 2008, *Rinsing and neutralization of 2 sets of bio-leach columns using field simulation tests – Carmacks Project Yukon Territories* reported on two columns that were leached with elemental sulfur to produce acid were rinsed with water and partially neutralized (Process Research Associates, March 2008). These columns were not completely leached before the testing commenced and still contained elemental sulfur that was oxidizing during the rinsing process, so the results have questionable applicability to the closure of the Carmacks heap. (It should be noted that no elemental sulfur is planned to be added to the Carmacks heap.) Only Column 2 produced results that merit discussion.

Column 2, was rinsed with gypsum saturated water with a bactericide added to stop the oxidation of elemental sulfur. Column 2 was constructed of two 4.6 m sections (section A and B) connected in series to achieve 9.2 m of total height. Column diameter was 30 cm and the columns contained 985.4 kg of ore. Prior to rinsing, copper extraction had reached 70.6%.

This work did show that rinsing with a gypsum saturated solution could reduce copper and free acid to similar levels as water not saturated with gypsum.

In 2007 a series of new leaching tests, followed by rinsing and neutralization testwork, was started (*Process Research Associates, December 2008*). Each of the columns tested contained 30 kg of ore crushed to a P80 of 1.3 cm and was 1 m high by 10 cm in diameter. Two columns were tested for rinsing and neutralization – Columns 3 and 6. Both columns had been leached to greater than 80% copper extraction. The goal of these tests was to mimic the planned rinsing and neutralization methods as closely as possible.

The results showed that after rinsing with gypsum saturated water and sodium carbonate,

- neutral pH's and copper concentrations below MMER levels were maintained;
- initial rinse volumes of 1.5 or 3.0 L/kg appeared to work equally well before neutralization with an additional 1.0 L/kg of 5 g/L sodium carbonate solution.

For Column 6, the concentrations of sodium carbonate fed to and leaving the column were measured to achieve a better understanding of the amount of soda ash required to raise the pH to levels required to precipitate copper. Based on the results, it appears that

- 3.9 kg/t sodium carbonate (soda ash) is required to neutralize the leached ore.

2.2 Ore Weathering

Weathering and resultant physical degradation of ore during leaching and rinsing with neutralized solutions resulted in an increase in fines in column tests (Lawrence and Beattie, 1996). Precipitates were reported to have formed as a result of acid leaching in the early leach stages (Lawrence and Beattie, 1996). Precipitates also formed as a result of the neutralization reactions, some of which were recycled to the column in the early stages of the treated water rinsing. The particle degradation and formation of precipitates within the column would limit permeability in local areas which could reduce both the leach recovery and local rinsing and neutralization.

During operation, however, reagent addition will be controlled to limit degradation and precipitation reactions. Testwork conducted in 2006 indicates that initial rinsing followed by neutralization with sodium carbonate and then subsequent rinsing is the approach to successful decommissioning of the heap. Testing will continue through development and operations to optimize the rinsing and neutralization procedures.

2.3 Metal Leaching and Acid Generation Potential

Samples of composite ore for the metallurgical testing program were tested to determine acid generation and metal leaching potential. Details of the testing are presented in IEE Addendum, Section 4.2.4 (Hallam Knight Piesold, June 1995). Results show that ore samples are net acid consuming with very low sulphur content. Tests reported by Lawrence (Lawrence and Beattie, 1996) show neutralizing potential (NP) values ranging from 7.3 to 54 kg $CaCO_3$/t at the conclusion of leaching. Mineralogical analysis of leach residues indicates essentially no residual iron sulphide.

Further testwork conducted by Alexco indicates that once residual acid from leaching was effectively rinsed, the spent ore residue has very low sulphide sulfur concentrations (0.02%) and the spent ore has very low or no acid generating potential which is consistent with the oxide nature of the material.

In 2008, the contents of Column 3 (see Section 2.1 above, third last paragraph) after rinsing and neutralization were further tested by Golder and Associates (Golder, 2008).

The column was split into two samples – a sample representing the top half of the column, and a sample representing the bottom half of the column. The samples were then subjected to standard humidity cell tests. The copper concentration from the humidity cell tests indicate that copper concentrations from both the top and bottom of the column remain below MMER limits.

Thus, no net acid generation from sulphide oxidation is anticipated from the spent heap. Further metallurgical and heap decommissioning testing will continue as part of the reclamation research program.

2.4 Sludge Disposal

The testing of chemical stability of treatment sludges is discussed in Lawrence and Beattie (1996), Hallam Knight Piesold (1995), and most recently by CEM, 2008 (see Attachment B to Western Copper's Water Treatment System Report). Note that the principle components of the solution that will be treated at heap closure will be Al, Mg, Fe, Mn and Si as well as minor amounts of the transition metals Cu and Zn all present as sulfates. During treatment with lime, all of these components will be precipitated as either hydroxides, oxyhydroxides, or hydroxysulfates with exception of silica that will precipitate as a silicate. The exact compositions of the precipitates are difficult to determine due to their amorphous nature. The primary components of the sludge will be gypsum formed from reaction of the calcium in the lime with sulfate, unreacted lime, and held up moisture.

Additional water treatment testing has been conducted on the raffinate (Alexco 2006, CEMI 2007) and the decommissioning solutions to evaluate both treatment chemistry (reagent requirements) and sludge production and chemical stability of sludge. These solutions and precipitates were generated from actual process solutions obtained from column testwork. It is expected that additional testwork will be conducted during operations to further characterize the sludge and refine the disposal option.

Treatability testwork (CEMI, 2008) on rinse solutions produced sludge that was sent for ABA and Whole Rock analysis and also the Synthetic Precipitation Leaching Procedure.

The sludge is mainly composed of calcium with other metals including copper, aluminum and iron present in relatively lower concentrations as metal hydroxides. Further testing on sludge produced from representative rinse solutions during operations will detail the nature of the sludge more closely and dictate precipitate handling.

Western Copper will continue to conduct additional research into the chemical stability of closure precipitates and treatment plant sludges as part of their reclamation research program and is committed to defining an acceptable method, consistent with the nature of the sludge and then current legislation, for the safe disposal of the material for mine closure.

Based on storage options practiced by other operations using the HDS process (as noted within Western Copper's Water Treatment System Report), an attractive option for sludge management at the end of the mine would be depositing the sludge into areas of the leach pad where closure and rinsing of that heap area is complete. The leach pad is ideal for final disposal and storage of the sludge due to its lined containment and leak detection system. In addition, after the heap is rinsed, neutral pH conditions will ensure sludge stability is maintained. Another option is to mix the sludges from the treatment system with cement to create a solid stable mixture (solidification). Following closure, the events pond and sediment ponds will be drained and any sludges would be solidified. The events pond double liner will be folded back on itself to contain the sediments and permanently buried. Sediments in the heap leach facility and waste rock storage area sediment ponds will be characterized and handled appropriately. An overburden layer will be placed over top and vegetated.

Western Copper Corporation

CARMACKS COPPER PROJECT

YUKON TERRITORY

PRELIMINARY DETAILED CLOSURE AND RECLAMATION PLAN

APPENDIX B

Site Revegetation and Reclamation

Natural Vegetation and Growth Media

Natural revegetation has been observed at the site since clearing and grubbing activities took place in the late 1990's. Recent reseeding of disturbed slopes along the exploration road has also proven successful and it will be important to further document natural re-vegetation successes. Information developed on site can be supplemented with information obtained from other mine reclamation programs in the Yukon and other northern jurisdictions. Considerable research has been carried out into the reclamation and revegetation of disturbed lands in the Yukon, including operating and abandoned mines, and mineral exploration sites. Much of this information is in the public domain and is well presented in guidance documents:

- Mine Reclamation in Northwest Territories and Yukon (INAC, 1992)
- Guidelines for Reclamation / Revegetation in the Yukon (Kennedy, 1993)
- Handbook of Reclamation Techniques in the Yukon (Laberge Environmental Services, 1999)

Vegetation and soils in the project area have been characterized and documented. The mine site and facilities (estimated to be less than 200 ha) are located in an area dominated by white spruce on well drained slopes; black spruce on poorly drained slopes; and lodgepole pine in several areas of previously burned vegetation. Stands are interspersed with paper birch, trembling aspen, and poplar.

Feathermoss dominates the understorey in dense black spruce stands, with willows and ericaceous shrubs in more open stands. Sedge and sphagnum tussocks are common in poorly drained areas. Ground cover on south facing slopes consists of sagewort; grasses and forbs occur in gullies and draws containing trembling aspen.

The natural vegetation found on undisturbed sites around the mine generally indicate the underlying soil properties, including texture, drainage, and pH, and the level of available nutrients. Plants require as a minimum, a medium that will allow roots to penetrate, that will retain adequate moisture, and that contains levels of nutrients for successful growth. It will therefore be important to determine the characteristics of overburden to be used to reclaim the mine site areas thus providing a growth medium, particularly from the open pit as it is the largest source of material for reclamation of the site. Overburden will be loaded with an excavator, hauled and spread by trucks, then spread with a dozer equipped with wide tracks, to provide for minimal compaction of the overburden.

The thickness of overburden required to retain moisture is expected to be 25 cm (0.25 m). This will be confirmed by trial, as the depth of growth media placed will be varied and soil moisture measurements compared with revegetation success on test plots will suggest an optimum depth of overburden placement for revegetation measures.

Soils in the project area support growth but soil cover is relatively thin and not enough overburden can be stockpiled to cover all disturbed areas for closing reclamation. Work is still required to characterize the available soils and nutrients addition to use other disturbed sources as a cover material.

Revegetation Trials

The seed mixtures under consideration for reclamation of erosion susceptible areas are:

- lodgepole pine on the south and east facing slopes; and,
- white spruce on the north and west facing slopes.

Both of these mixtures comprise native seed mixtures of Yukon wheatgrass, violet wheatgrass, northern fescue, arctic lupine, yellow locoweed, and glaucous bluegress. Nutrient amendments will be added as necessary.

The pad will be revegetated with seed mixtures compatible with the mixed deciduous/coniferous vegetation areas. Native plant species in this association will include Yukon wheatgrass, northern fescue, violet wheatgrass, sheep fescue, glaucous bluegrass, sweetgrass, and arctic lupine. This will be optimized based on test plots.

Results from the test plot trials will also confirm:

- optimum seeding times (experience at other mine sites in the Yukon indicates that fall/snow seeding should be done to optimize initial vegetation growth);
- optimum growth media (overburden) covering depth; and

- fertilizer and soil amendment (e.g. lime, wood fiber, mulches) requirements to amend nutrient content of the growth media (overburden).

Since test plot information is normally based on small scale optimum conditions, the information acquired from test plots must be applied successfully on a successively larger scale before they can be deemed applicable. These scale-ups are termed reclamation trials and are normally applied to areas of 1 to 2 ha in size. A series of reclamation trials will be implemented before mine closure on areas that have been completed, for example, inactive portions of the WRSA, unused exploration roads, and margins of site roads or disturbed areas. Information obtained from reclamation trials can then be scaled up to reclaim areas as they become available for progressive reclamation during operation. In this manner, the Company will be able to optimize species composition and ensure self-sustaining vegetation communities for closure.

Seed Composition

The establishment of an initial ground cover of graminoids has historically been viewed as a desirable objective on most disturbed areas to stabilize slopes and control soil erosion. Graminoids are all grasses and grass-like plants, including sedges and rushes. Reclamation and revegetation efforts on site will ensure that this objective is achieved; however, the establishment of existing or natural vegetative communities and species is also another desirable objective. Based on recent reclamation research, it is noted that there is typically an abundance of natural seed or reproductive seed material available from local surroundings, and that these naturally occurring seed sources should be considered as part of any reclamation programs.

Evidence indicates that revegetation by the seeding of sod-forming grass species will inhibit the invasion of the area's natural colonizing species by competing for space, light, nutrients, sunlight and moisture. Seeding predominantly with native species should aid in ensuring that the later successional stages of vegetative cover appear. The creation of shrub willow islands can also enhance natural succession.

The nutrient uptake by northern native seed varieties on nutrient deficient soil is usually more effective than nutrient uptake by southern agronomic species. However, seeding with agronomic species at Carmacks Copper may be required because of the high cost and limited availability of northern native revegetation species. Native species may be substituted with agronomic species, however, native species are recommended and require approximately one half the weight in seed as the agronomic species (adapted from Kennedy 1993).

In the larger, more open disturbed areas at the minesite (borrow areas, process plant and camp site area), where natural seed sources are less available, the seeding/planting of indigenous shrub species (primarily willows, birch and alders) may be required to encourage the later seral stages of plant succession on these sites. Shrub species would be planted concurrently with the revegetation plot trial plantings.