

OCTOBER 2009



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**BROCKMAN RESOURCES LIMITED
CONCEPTUAL CLOSURE PLAN**

**BROCKMAN RESOURCES
MARILLANA IRON ORE PROJECT
CONCEPTUAL CLOSURE PLAN**



brockman
resources.

October 2009

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EXECUTIVE SUMMARY

Brockman Iron Pty Ltd (Brockman) proposes the Marillana Iron Ore Project (the Project). The Project is located approximately 100 km northwest of Newman, in the Hamersley Iron Ore Province in the Pilbara region of Western Australia.

The Project will consist of conventional open pit mining operations, wet ore processing, stockpiling and the establishment and maintenance of an accommodation village and supporting infrastructure. The mine is anticipated to yield up to 19 Mtpa over 20 years. Ore will be transported by rail to Port Hedland, where it will be exported to world markets.

Brockman proposes to develop the Project which consists of a 700-750 Mt iron ore mine, processing facility and associated infrastructure within the Hamersley Iron province in the Pilbara region of Western Australia, approximately 100 km from the town of Newman.

Waste and fines rejects disposal will consist of two waste rock stockpiles (WRS), a fines rejects storage (FRS) facility and in-pit disposal of waste rock after year 2 and fines rejects after year seven of operation. The waste material has been assessed by Graeme Campbell and Associates to be Non-Acid Forming (NAF), therefore, the waste rock and fines are not expected to have significant potential for acid generation.

Final landforms will include the two WRS facilities, the FRS, a contoured pit filled to above the pre-mining water table to avoid the potential for pit lakes, flood protection levees and bunding, two run-of-mine (ROM) pads and possibly some diverted streams.

This *Conceptual Closure Plan* (CCP) forms part of the documentation that is to be submitted for environmental assessment with the Brockman Marillana Iron Ore Project Public Environmental Review.

Closure, either at the end of the mine life or running concurrently with mining activities, is a critical component of mine management and ensures there are no ongoing adverse environmental or other impacts. By developing closure strategies as part of the planning stages of the project, Brockman is demonstrating that areas impacted by the project will be left in a condition acceptable to regulators, post-mining land users and community stakeholders.

Planning for mine closure seeks to address the social, environmental, financial and safety aspects of mine closure. The aim is to prevent or minimise long-term impacts and to create a self-sustaining natural ecosystem or alternate land use based on an agreed set of objectives (ANZMEC, 2000). In undertaking mine closure activities at areas impacted by the project, Brockman will fulfil the following objectives:

- Ensure, as far as practicable, that rehabilitation achieves a long term, safe, stable and functioning landform which is consistent with the surrounding landscape and pre-existing environmental values.
- Conduct effective consultation to enable stakeholders, including regulatory agencies, non-government organisations and other interested parties, to have their interests considered during the mine closure process.
- Ensure that commitments made to stakeholders and regulators are fulfilled.
- Ensure that public safety is protected.

- Minimise negative impacts to the surrounding environment.
- Ensure legislative requirements are met.
- Re-establish landforms and vegetation communities to meet the agreed post-mining land use requirements.
- Achieve closure completion criteria, as confirmed by monitoring, to allow for effective and complete relinquishment of tenements.
- Fulfil all commitments in this CCP.
- Release Brockman Iron from further liability.

The CCP will be updated throughout the anticipated 20 year life of mine in order to consider changing stakeholder requirements and environmental impacts. A Final Closure Plan will be drafted two years prior to mine closure.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of a *Conceptual Closure Plan* (CCP) is to identify the key objectives for mine closure to guide project development and design (ANZMEC, 2000).

This CCP outlines closure issues related to the infrastructure and activities incorporated with the mining, processing, and disposal of waste ore for Brockman's Marillana Iron Ore Project (the Project).

The aim of this CCP is to provide a strategic planning framework for the closure of the Project by:

- Identifying those aspects relating to decommissioning and closure which may impact on the environment, health and safety.
- Providing a basis for consultation with responsible authorities and identified stakeholders regarding the post-mining land uses of the project area and the development of agreed completion criteria.
- Developing management strategies to be implemented as part of the project's design, construction and operation to minimise impacts and site closure requirements.
- Identifying preliminary closure costs to establish adequate financial provisions.
- Providing details of the management strategies to be implemented by Brockman to the appropriate responsible authorities and the community to confirm completion criteria are met.

This closure plan will be reviewed and improved at least every five years over the life of the Project to consider changes in site conditions, operations, technology and community expectations.

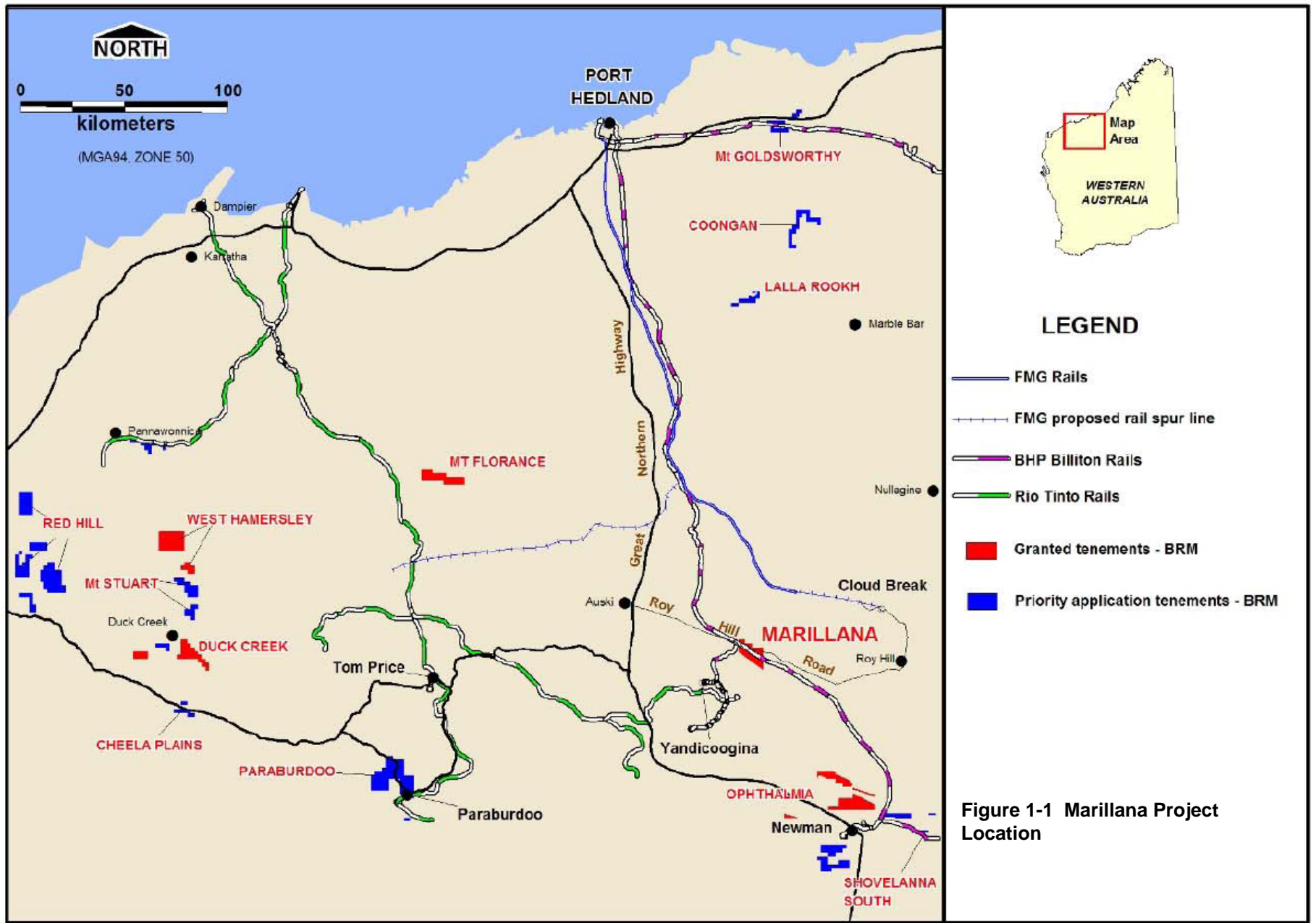
1.2 PROJECT LOCATION

The Project is located within the Pilbara region of Western Australia approximately 100 km northwest of the township of Newman (Figure 1-1). The Project is located within E47/1408 and is subject to applications M47/1414 and M47/1419. All tenements are held by Brockman Iron Pty Ltd (Brockman) a wholly owned subsidiary of ASX listed company Brockman Resources Limited.

The tenement covers 95 km² of the Fortescue Valley and borders the Hamersley Range, where extensive areas of supergene iron ore mineralisation are developed within the dissected Brockman Iron Formation which caps the range.

The main access to the project site is via the Great Northern Highway and the unsealed Munjina – Roy Hill Road. Approximately 58 km along the Munjina – Roy Hill road the BHP Billiton rail line into the Yandi mine intersects the road. The northern boundary of the tenement is a further 1 km west of this rail line intersection.

The Project lies south of the Fortescue Marsh, and is intersected by distributaries of the Weeli Wolli creek delta.



1.3 PROJECT COMPONENTS

Brockman proposes to develop the Project which consists of a 700-750 Mt iron ore mine, processing facility and associated infrastructure. The Project will comprise:

- An open cut iron ore mine producing 17-19 Mt of ore per annum.
- Above ground overburden and fines rejects storage facilities.
- In-pit disposal of mine waste after year two of operation.
- In-pit disposal of fines rejects after year seven of operations.
- Crushing, screening and processing facilities.
- A train loading facility.
- An accommodation camp for 550 personnel.
- A bore field to supply potable water to the accommodation and offices.
- Offices, workshops, a laboratory and supporting infrastructure including an explosives facility, landfill, water treatment plant and bulk fuel storage.

The table below highlights the key aspects of the project.

Table 1-1 Key Aspects of the Marillana Iron Ore Project

Key Aspect	Description
Mining Operations	
Proposed commencement	2012
Project life span	20 years
Anticipated year of decommissioning	2032
Size of ore body	700-750 Mt
Ore type	Hematite Detrital and Channel Iron Deposit
Ore mining rate	37.5 Mtpa
Total mining rate	80-90 Mtpa
Total estimated production (refined ore)	17-19 Mtpa
Average Stripping ratio (overburden : ore)	1.4:1
Mine Pit	
Depth of pit	40-80 m Below surface
Depth of water table	20-38 m Below surface
Total pit area	1,655 ha
Overburden stockpiles	587 ha
Ore Stockpiles	13 ha
Topsoil stockpiles	78 ha
Processing Requirements	

Crushing (and Screening)	Yes
Beneficiation Process	Wet Gravity beneficiation
Product Characteristics	Hematite Detrital and Channel Iron Deposit
Processing area footprint (incl. stockyard and rail loop)	234 ha
Fines Rejects Storage	247 ha
Mine Site Infrastructure	
On-site camp	15 ha
Waste Water Treatment and landfill	15 ha
Power source	On site diesel-NG/LNG dual fuel generators
Anticipated Power Requirement	35 MW
Water source	Pit de-watering
Miscellaneous Infrastructure footprint	148 ha
Total estimated area of clearing	2,931 ha
Anticipated annual water requirement	
Processing	7,250 MLpa
Dust suppression	1,400 MLpa
Accommodation	60 MLpa

2.0 CLOSURE OBJECTIVES

Closure objectives outlined in the Australia and New Zealand Minerals and Energy Council (ANZMEC/MCA) Strategic Framework for Mine Closure (2000) include:

- To enable all stakeholders to have their interests considered during the mine closure process.
- To ensure the process of closure occurs in an orderly, cost effective and timely manner.
- To ensure the cost of closure is adequately represented in company accounts and that the community is not left with a liability.
- To ensure there is clear accountability and adequate resources for the implementation of the closure plan.
- To establish a set of indicators that will demonstrate the successful completion of the closure process.
- To reach a point where the company has met agreed completion criteria to the satisfaction of the responsible authorities.

Brockman are committed to fulfilling the above objectives, and in undertaking closure activities at the Marillana project site, Brockman will fulfil the following project specific objectives:

- Ensure, as far as practicable, that rehabilitation achieves a long term, safe, stable and functioning landform which is consistent with the surrounding landscape and pre-existing environmental values.
- Conduct effective consultation to enable stakeholders, including regulatory agencies, non-government organisations and other interested parties, to have their interests considered during the mine closure process.
- Ensure that commitments made to stakeholders and regulators are fulfilled.
- Ensure that public safety is protected.
- Minimise negative impacts to the surrounding environment.
- Ensure legislative requirements are met.
- Re-establish landforms and vegetation communities to meet the agreed post-mining land use requirements.
- Achieve closure completion criteria, as confirmed by monitoring, to allow for effective and complete relinquishment of tenements.
- Fulfil all commitments in this Closure Plan.
- Release Brockman Iron from further liability.

Project closure objectives will be achieved by:

- Establishing through survey and investigation a baseline of the environment prior to project disturbance.
- Allocating appropriate cost and resource provision requirements.
- Planning mining and associated activities to best fit with closure concepts.

- Consulting with stakeholders to determine post closure land use and completion criteria for the project areas.
- Undertaking environmental monitoring to ensure that rehabilitation techniques have been successful in achieving post closure land-use criteria.

3.0 LEGAL OBLIGATIONS

Mine closure is subject to both federal and state legislation and Brockman is required to meet legal obligations during design, operation and closure phases of the Project.

The Marillana Iron Ore Project is being assessed by the Department of Mines and Petroleum (DMP) under the *Mining Act 1978* and by the Environmental Protection Authority under the *Environmental Protection Act 1986* through a Public Environmental Review (PER). This CCP is consistent with the environmental objectives outlined in the Marillana Iron Ore Project PER document.

This plan aims to incorporate requirements under the *Mining Act 1978* and fulfil the conditions placed on Brockman's Marillana tenements.

Additional legislation that may be applicable to mine closure is included in Table 3-1.

Table 3-1 Legislation Applicable to Closure and Responsible Government Agencies

Legislation	Responsible Government Authority	Aspect
Commonwealth Legislation		
<i>Environmental Protection & Biodiversity Conservation Act 1999</i>	Department of Environment, Water, Heritage and the Arts	Rare flora and fauna,.
<i>Native Title Act 1993</i>	National Native Title Tribunal	Aboriginal rights
<i>Protection of Moveable Cultural Heritage Act 1986</i>	Protection of Moveable Cultural Heritage Act 1986	Protection of moveable cultural artefacts
<i>National Greenhouse and Energy Reporting Act 2007</i>	Department of Climate Change	Climate change
State Legislation		
<i>Aboriginal Heritage Act 1972</i>	Department of Indigenous Affairs	Archaeological and ethnographic heritage
<i>Agricultural and Related Resources Protection Act 1976</i>	Department of Agriculture, Western Australia	Weeds and feral pest animals
<i>Bush Fires Act 1954</i>	Bush Fires Board	Wild fire control
<i>Conservation and Land Management Act 1984</i>	Department of Environment and Conservation	Flora and fauna / habitat / weeds / pests / diseases
<i>Contaminated Sites Act 2003</i>	Department of Environment and Conservation	Management of pollution
<i>Country Areas Water Supply Act 1947.</i>	Department of Water	Water resources supply
<i>Dangerous Goods Safety Act 2004</i>	Department of Consumer and Employment Protection	Dangerous goods management
<i>Environmental Protection Act 1986</i>	Department of Environment and Conservation	Environmental impact assessment and management

Legislation	Responsible Government Authority	Aspect
<i>Explosives and Dangerous Goods Act 1961</i>	Department of Consumer and Employment Protection	Explosives and dangerous goods, transport and management
<i>Health Act 1911</i>	Department of Health	Human health management
<i>Heritage of Western Australia Act 1990</i>	Heritage Council of Western Australia	European heritage management
<i>Local Government Act 1995</i>	Shire of East Pilbara	Development approvals and management
<i>Local Government (Miscellaneous Provisions) Act 1960</i>	Shire of East Pilbara	Community issues / resources / facilities
<i>Occupational Safety and Health Act 1984</i>	Department of Consumer and Employment Protection	Occupational safety and health
<i>Public Works Act 1902</i>	Department of Housing and Works	Development approvals and management
<i>Soil and Land Conservation Act 1945</i>	Department of Agriculture	Protection of soil resources
<i>Water and Rivers Commission Act 1985</i>	Department of Water	Protection of surface and groundwater
<i>Waterways Conservation Act, 1976</i>	Department of Water	Protection of surface and groundwater
<i>Wildlife Conservation Act 1950</i>	Department of Environment and Conservation	Protection of indigenous wildlife
<i>Rights in Water and Irrigation Act 1914</i>	Department of Water	Access to and use of water resources

3.1 GUIDELINES AND CODES OF PRACTICE

The Guidelines and Codes of Practice outlined below have been used in the preparation of this document, and contain material relevant to this plan:

General/
Closure ANZMEC/MCA (2000), *Strategic Framework for Mine Closure*. Australian and New Zealand Minerals and Energy Council and Minerals Council of Australia. Canberra, ACT.

Chamber of Minerals and Energy of Western Australia Inc (1999) *Mine Closure Guidelines for Minerals Operations in Western Australia*.

Department of Industry and Resources, (2006). *Guidelines for Mining in Arid Environments*.

Department of Industry and Resources, (2006). *Guidelines for Mining Proposals in Western Australia*.

Minerals Council of Australia (2000) *Code for Environmental Management*.

	<p>Department of Tourism, Industry and Resources, (2006). <i>Mine Closure and Completion: Leading Practice Sustainable Development Program for the Mining Industry.</i></p> <p>Ministerial Council of Minerals and Petroleum Resources, Minerals Council of Australia (2003). <i>Strategic Framework for Tailings Management.</i></p> <p>EPA Guidance No. 33 (2008). <i>Environmental Guidance for Planning and Development.</i></p> <p>Department of Mines and Energy, (1997). <i>Safety Bund Walls around Abandoned Open Pit Mines.</i></p>
Water	<p>Water and Rivers Commission, (2000). <i>Mine Void Resource Issues in Western Australia.</i></p> <p>Department of Water, (Draft, February 2009). <i>Pilbara Water in Mining Guideline.</i></p> <p>National Health and Medical Research Council (2004). <i>Australian Drinking Water Guidelines.</i></p> <p>ANZECC / ARMCANZ (2000). <i>Australian New Zealand Guidelines for Fresh and Marine Water Quality.</i></p> <p>Water and Rivers Commission (2000). <i>Statewide Policy No. 5 Environmental Water Provisions for Western Australia.</i></p> <p>EPA Position Statement No. 4. Environmental Protection of Wetlands.</p>
Tailings and Waste	<p>Department of Industry and Resources (2001). <i>Environmental Notes on Mining Waste Rock Dumps.</i></p> <p>Department of Industry and Resources (1999) <i>Guidelines on the Safe Design and Operating Standards for Tailings Storage.</i></p> <p>Department of Tourism, Industry and Resources (2007). <i>Tailings Management.</i></p> <p>Water and Rivers Commission (2000). <i>Water Protection Guidelines No. 2- Mining and Mineral Processing- Tailings facilities.</i></p> <p><i>Australian Standard 1940 – The Storage and Handling of Flammable and Combustible Liquids (AS 1940-1993)</i></p>
Rehabilitation	<p>Australian Mining Industry Council (1989), <i>Mine Rehabilitation Handbook.</i></p> <p>Department of Tourism, Industry and Resources, (2006). <i>Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry.</i></p> <p>Environment Australia (1998). <i>Landform Design for Rehabilitation.</i></p>
Flora and Fauna	<p>National Strategy for Ecologically Sustainable Development (1992) Commonwealth of Australia.</p> <p>EPA Position Statement No. 6: Towards Sustainability.</p>

EPA Guidance Statement No. 55 Implementing Best Practice in proposals submitted to the EIA process.

EPA Position Statement No 3: Terrestrial Biological Surveys as an element of Biodiversity Protection.

EPA Position Statement No. 2 Environmental Protection of Native Vegetation in WA.

EPA Position Statement No. 9 Environmental Offsets.

EPA Guidance Statement No. 51. Terrestrial Flora and Vegetation Surveys Environmental Impact Assessment in WA.

EPA Guidance Statement No. 54. Consideration of Subterranean Fauna in Groundwater and Caves during EIA in WA.

EPA Guidance Statement No. 3. Separation Distances between Industrial and Sensitive Land Uses.

EPA Guidance Statement No. 56. Terrestrial Fauna Surveys for Environmental Impact Assessment in WA.

4.0 PRE AND POST MINING ENVIRONMENT

4.1 EXISTING ENVIRONMENT

The project area lies on the Fortescue valley floor to the northeast of the Hamersley Range. The area is flat lying and consists of mainly transported colluvium and alluvium deposits, with minor outcrops of canga and Archaean Wittenoom Dolomite. The combined thickness of the transported cover is up to 80 m and it hosts the targeted detrital deposits.

The Fortescue Marsh runs through a broad valley (The Fortescue Valley) probably formed by the preferential erosion of the Mt McRae, Mount Sylvia and Wittenoom Formations of the adjacent ranges. The Fortescue valley is bounded by the Chichester ranges to the North and the Hamersley ranges to the south.

The main aquifers in the area and those that are the primary concern to this project are the superficial Channel Iron Deposits (CID) and pisolites which are present in the Tertiary Detrital material, along with the underlying Paraburdoo Member Dolomite basement. Groundwater levels vary from 40 m below ground level (mbgl) along the slopes of the Hamersley Ranges, decreasing to 10-20 mbgl through the Marsh 20 km to the north of the Project.

The project area occupies a predominantly moderately to significantly disturbed landscape, with some pockets of minimally disturbed areas at the base of the Hamersley Ranges (*ecologia*, 2009). Pastoralism has been the dominant land use in the past and is likely to have caused some degradation to the land and vegetation, particularly surrounding the Weeli Wolli creek.

Investigations undertaken during 2007-2009 by *ecologia* Environment and Aquaterra indicate that the project area contains the following significant environmental aspects:

- Weeli Wolli creek flows from the SE to the NW of the project area, and eventually empties into the Fortescue Marsh, some 20 km to the north of the tenement. Several small creeks flow from the Hamersley Ranges into Weeli Wolli creek.
- One species of Priority 3 Flora (*Goodenia nuda*) was recorded in low densities (< 2% cover) at two locations on the site.
- A regionally significant dune community (Priority Ecological Community).
- Two DEC conservation significant vertebrate fauna species were recorded at numerous locations within the project area; the Australian Bustard (*Ardeotis australis*) and the Rainbow Bee-eater (*Merops ornatus*).
- Six species of subterranean invertebrate fauna (troglofauna) have been recorded from within the project area. It is likely that the site supports a community spread across the tenement, probably extending across the site from the base of the range to the southern extent of the Weeli Wolli creek, and northwards along the base of the Ranges.
- Three species of subterranean aquatic invertebrate fauna (stygofauna) have been recorded from the project area. The one species that could be fully identified is found throughout the broader Marillana - Weeli Wolli drainage channel.

- Groundwater is generally low in salinity (<2,000 mg/L TDS), with the watertable up to 40 mbgl and flowing in a north to north-westerly direction across the tenement.

4.2 POST MINING ENVIRONMENT

Final land use is expected to comprise of pastoralism with some restricted zones to ensure the future safety of people and wildlife.

The landscape will comprise rehabilitated waste and fines rejects stockpiles, with final slopes ensuring long-term stability, a pit that has been backfilled above the pre-mining water table and contoured to mimic the natural landforms. Surface drainage will be reinstated where possible or diverted to reduce the likelihood of ponding after heavy rains.

Brockman will undertake further community consultation to develop and define the end land use options for its operations and also undertake environmental, social and economic assessments to ensure the selected options are sustainable.

An overview of the conceptual options for closure and rehabilitation of the major mining features is provided in the following sections.

5.0 STAKEHOLDER CONSULTATION

ANZMEC (2000) highlights the importance of enabling all stakeholders to have their interests considered during the closure process.

Brockman has been in consultation with the key responsible authorities, non-government organisations (NGO's) as well as local communities (such as Nyiyaparli and Martu Idja Banjima) since the commencement of the feasibility studies.

Ongoing consultation with responsible authorities, the general public, private landowners, interested NGO's and other stakeholders will continue throughout the operation of the mine and the closure process. The closure process will not be viewed as complete until commitments made by Brockman to stakeholders concerning site closure have been met.

Stakeholders that have been identified as having an interest in the closure aspects of the Project have been identified in Table 5-1.

Table 5-1 Stakeholder consultation.

Stakeholder Group	Contact Name	Interest
Department of Environment and Conservation	Murray Baker, Nic Woolfrey	Site contamination, landform and surface water restoration.
Department of Environment and Conservation	Murray Baker, Brad Durrant	Subterranean fauna.
Department of Water	Gary Humphries, Darryl Abbott	Impacts on groundwater.
Department of Indigenous Affairs	Cesar Rodriguez	Impacts on indigenous heritage assets.
Department of Mines and Petroleum	Demelza Dravnieks	Conceptual and final closure plan.
Nyiyaparli	Rodney, Nichole	Land use and heritage values
Martu Idja Banjima	Rick Callaghan	Land use and heritage values
Shire of East Pilbara	Bill Hardy, Gabrielle Pieraccini	Decommissioning, waste management.
Marillana Station	Barry Grate, Lee Drayton	End land use
Environmental Protection Authority	Vanessa Angus, Ray Claudius	All closure issues.

The CCP will be reviewed based on input from stakeholders to ensure all parties are agreed on final land use, decommissioning and rehabilitation procedures.

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6.0 PLANNING

A key objective of ANZMEC (2000) is to ensure that the process of closure occurs in an orderly, timely and cost-effective manner.

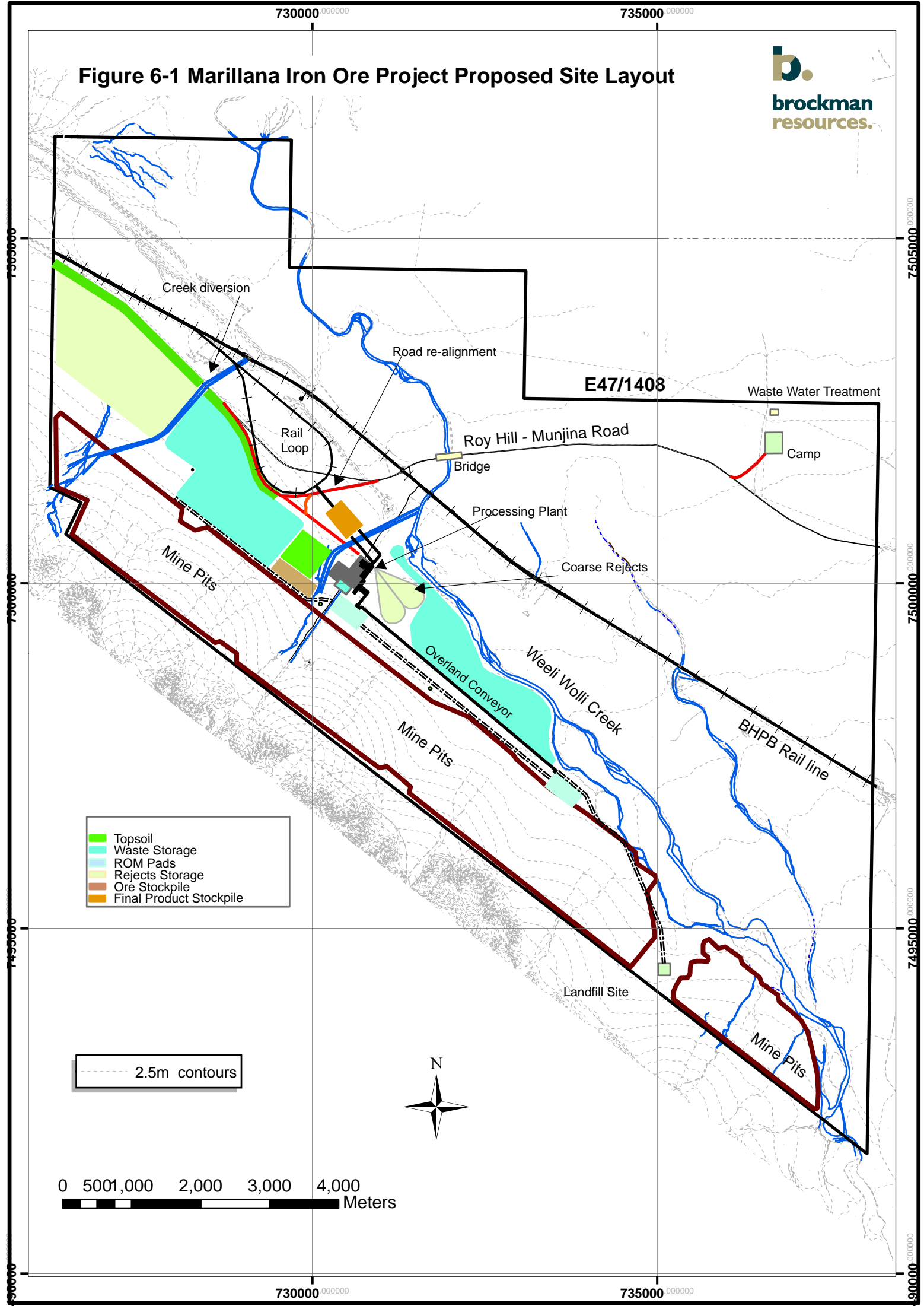
Mine closure should be integral to the life-of-mine plan, should reflect a risk-based approach and should be reviewed and updated as required. Brockman have ensured that mine closure strategies have been incorporated into each stage of the planning process, from planning and design, to construction, operations and decommissioning.

Brockman has undertaken extensive public consultation (Section 5) throughout the planning stage of the proposal concerning final landforms, and all Marillana work areas and associated construction will be in compliance with the appropriate legislation.

Mine infrastructure including haul roads, plants, power station, administration buildings, workshops, water supply, the FRS and overburden stockpiles have been planned to consider the following, which may influence the success of mine closure:

- Alignment with natural topographic landforms in the area.
- Use of pre disturbed areas to minimise the impact of clearing on native vegetation.
- Minimise impacts on groundwater levels and quality.
- Avoidance of threatened flora (i.e. *Goodenia nuda*).
- Consideration of natural drainage lines and flooding zones.
- Avoidance of indigenous heritage sites.

Figure 6-1 Marillana Iron Ore Project Proposed Site Layout



6.1 RISK ASSESSMENT

A comprehensive risk assessment was undertaken to inform all environmental management documents in April 2009. The methodology used is outlined in Appendix 1.

The assessment highlighted the following as having the potential to influence mine closure:

- waste landform (waste rock stockpiles, tailings storage facility) design and location;
- topsoil storage;
- impacts of mine infrastructure to surface water flows and water quality during flood events;
- impacts to groundwater from dewatering and disposal;
- vegetation disturbance and weed dispersal;
- handling and storage of hazardous materials and remediation of fuel and chemical spills;
- progressive rehabilitation with appropriate species; and
- financial provisioning for mine closure

Consequently preliminary controls have been developed (and described in Section 7) to manage the extent to which these factors may impact on closure objectives and completion criteria.

Brockman have developed and will use the following 'hierarchy of control' methodology in planning for project closure:

- elimination of risk;
- substitution with a lower risk;
- engineering to reduce the impact of the risk;
- administrative procedures and training; and
- remediation to mitigate impacts.

6.2 PROJECT CONDITION REPORTS

In order to appropriately determine closure objectives, survey and investigation work has been conducted including:

- flora and fauna surveys including stygofauna, troglofauna and short range endemics;
- hydrogeology assessments on the impact of groundwater extraction, surface water flows and water quality;
- geochemical and physical analysis of waste rock material; and
- heritage studies including archaeological and ethnographic heritage surveys.

The data gathered from these assessments has been used to inform this CCP.

6.3 SUMMARY OF PROJECT CLOSURE CRITERIA

Completion criteria are an agreed set of environmental indicators, which upon being met, will demonstrate that agreed outcomes have been achieved and hence the site may be deemed closed. These criteria are inextricably linked to management and monitoring programmes.

Brockman will consult with all stakeholders and interested parties throughout the life of the project to ensure the agreed completion criteria are and / or will be met, or alternatives agreed to as necessary.

The proposed completion criteria for the Project have been developed taking into consideration the following factors:

- public health and safety;
- regulatory requirements;
- Brockman's Environmental Policy;
- expectations of stakeholders;
- geotechnical stability and the suitability of final landforms;
- sustainability of revegetated areas and surrounding ecosystems;
- no unapproved disturbance of heritage areas; and
- post-closure land use objectives.

The preliminary closure criteria and interim rehabilitation targets are summarised in Table 6-1 below, and detailed aspects are contained in the remaining sections of this document.

Table 6-1 Marillana Iron Ore Project Closure Criteria.

Aspect	Criteria	Interim Rehabilitation Target
Contamination	C1. There shall be no contamination of ground or surface water from inappropriate storage or handling of chemicals and hydrocarbons. C2. Known contaminated sites have been remediated to agreed levels as soon as possible and prior to site handover.	An ongoing life of mine surface monitoring program demonstrates that pollutant levels at potential contaminated sites are within regulatory requirements.
Decommissioning	C3. Project infrastructure that is not required for post closure land use will be removed or disposed of appropriately.	Infrastructure has been removed and rehabilitation commenced to simulate the pre-disturbance state as closely as possible.
Final Landforms	C4. Above-ground waste storage will be minimised by utilising the pit for waste storage. C5. Final landforms will be developed such that they will remain structurally and chemically stable, safe to humans and fauna and self-sustaining. C6. Landforms conform to the	Safety and abandonment structures are in place and final landforms have been shaped to agreed design criteria.

Aspect	Criteria	Interim Rehabilitation Target
	<p>requirements of agreed post-closure land use.</p> <p>C7. The pit will not adversely affect groundwater quality by ensuring that no permanent open water voids result from the project.</p>	
Surface Water	<p>C8. No change in the long term quantity or quality of surface water reaching the Weeli Wolli creek as a direct result of operations at the Marillana project site.</p>	<p>Monitoring program for surface water indicates no significant change in level and quality as compared to pre-disturbed state.</p> <p>Photographic evidence that diversions of surface water flow have been returned to a state consistent with the pre-disturbed state.</p>
Groundwater	<p>C9. The quality and quantity of groundwater has been maintained, so that existing and potential environmental values, including ecosystem maintenance, are protected.</p>	<p>The life of mine monitoring program for groundwater indicates no significant change in level and quality as compared to pre-disturbed state.</p>
Native Vegetation and Topsoil	<p>C10. Impacted areas will be returned to self-sustaining vegetation communities and fauna habitats that reflect pre-disturbed state.</p> <p>C11. Noxious weeds will be managed in line with mining best practice in the Pilbara.</p> <p>C12. Topsoil remains viable and has the capacity to support a safe, stable and functioning ecosystem that meets the requirements of the post-mining land use.</p>	<p>Deep ripping and/or moonscaping have been conducted in rehabilitation areas.</p> <p>Flora species have been identified for use in rehabilitation and seed collection, and reflect principles of vegetation succession.</p> <p>Permanent photographic record points and monitoring/analog transect locations have been defined.</p> <p>Rehabilitation areas have been closed to traffic access and signposted.</p> <p>Adequate topsoil / alternate subsoil material has been provisioned and stored in advance of mine closure.</p>
Aesthetics and Heritage	<p>C13. Ensure that aesthetic values and public experience of the landscape are considered, and measures are adopted to reduce the visual impacts on the landscape.</p> <p>C14. Maintain and protect any significant landscape, indigenous heritage and geo-heritage values.</p>	<p>GPS photographic monitoring locations are established and show progressive integration of rehabilitated areas with the natural environment.</p>

6.4 COSTS AND RESOURCES

The ANZMEC (2000) objective for financial provision is to ensure the cost of closure is adequately represented in company accounts and that the community is not left with a liability. ANZMEC (2000) also states that clear accountability and adequate resources must be provided for the implementation of the closure plan.

Planning for closure commenced in the feasibility stage and will continue throughout the life of the mine.

Development of a final closure cost model will incorporate the following actions:

- Conduct technical review and analysis of risk and cost benefit.
- Quantify subjective factors and analyse aspects with uncertainty.
- Manage closure of the project as a self-funded operation and the project business plan includes costs, revenues, profit / loss and cash flows.
- Assess closure costs in terms of economic, technical, and social feasibility.
- Determine that closure does not incur long-term liabilities to Brockman or to the community.
- Comprehensively review costs on a regular pre-determined basis and taking inflation into account.
- Determine that closure financial provisioning remains flexible to cope with unexpected events, new technologies, operational change or change in community or regulator expectations.
- Determine that cost estimates include management of the project related social and environmental issues.
- Include associated monitoring and long-term site management costs.
- Determine that closure cost estimates don't rely on return from sale of assets and salvage value.
- Provision for adequate form and amount of surety and upon closure, determine that requirements for release of surety are met.
- Periodically review assurance levels re-adjusted as closure needs, environmental risks or economic factors dictate.

Brockman's preliminary cost estimates and closure schedule will be developed to a +/- 15% level of accuracy during its definitive study commencing in November 2009.

Brockman will establish a closure provision in accordance with the requirements of *Australian Accounting Standards Board 137 - Provisions, Contingent Liabilities and Contingent Assets*.

7.0 GENERAL REHABILITATION AND CLOSURE STRATEGIES

The rehabilitation and closure aspects considered for the Marillana Project include contamination, decommissioning, landform construction, surface and groundwater, rehabilitation, visual amenity and heritage.

7.1 CONTAMINATED SITES

Acid forming waste rock or fines rejects and hazardous materials such as fuels, process reagents, lubricants, detergents, explosives, solvents and paints can be detrimental to plant growth and may result in contamination of both surface and groundwater. If these materials are not properly managed, they may have the potential to cause atmospheric, soil or water contamination and could potentially pose ongoing risks to human health and the environment (DoIR, 2006).

Under the *Contaminated Sites Act 2003* a site is considered to be contaminated if it has a substance present at above background concentrations that presents, or has the potential to present, a risk of harm to human health, the environment or any environmental value.

There are no recognised contaminated sites within the project footprint.

Waste rock and fines rejects have been assessed as non-acid forming (NAF) and therefore pose negligible risk of site contamination or environmental degradation.

The potential exists for contamination to occur during the life of the Project due to the handling and storage of hydrocarbons and chemicals. This potential will be minimised by ensuring hazardous materials are stored in contained areas and any spills of these materials are cleaned up promptly and appropriately.

Potential contamination sources may include the landfill facility, workshops, plant and fuel storage facilities. Potential impacts identified in the environmental risk assessment for the proposal and relevant to closure include:

- Contamination of soil, groundwater and surface water sources within the Marillana region as a result of the inappropriate storage or handling of chemicals or hydrocarbons.
- Adverse impacts to troglofauna and/or stygofauna as a result of soil or groundwater contamination.
- Adverse impacts to the vegetation lining Weeli Wolli creek.
- Adverse impacts to Fortescue Marshes resulting from surface or groundwater contamination.

7.1.1 Objectives

The objectives for management of contaminated sites are to:

- Provide for the safe storage, disposal and treatment of residual chemical wastes and residues.
- Ensure any contamination that occurs is investigated and remediated as soon as possible.

- Any significant spills will be reported to the Department of Environment and Conservation (DEC) and recorded through Brockman's incident reporting system.

7.1.2 Completion Criteria

The following completion criteria for contaminated locations will be observed before or during closure:

- The extent and severity of site contamination has been determined.
- Contaminating infrastructure has been removed.
- A timeframe for implementation of remediation strategies has been set.
- Appropriate remediation methods are adopted and implemented.
- All known contaminated waters and soils have been remediated.
- Specific criteria will be determined relative to each contamination situation. The specific criteria will be developed in consultation with the appropriate regulatory body.

C1. There shall be no contamination of local ground or surface water from inappropriate storage or handling of chemicals and hydrocarbons on site.

C2. Known contaminated sites will be remediated to agreed levels as soon as possible and prior to site handover.

7.1.3 Management Actions

To reduce the risk of soil or water contamination and to ensure that the site is remediated to agreed standards, Brockman will:

- Audit areas where contamination is likely to occur on a regular basis.
- Develop criteria to be met by remediation and a timeframe for remediation activities.
- Determine appropriate remediation methods in consultation with the DEC together with other agencies as appropriate.
- Implement remediation in compliance with relevant standards.
- Undertake monitoring and/or testing using appropriate, recognised methods, to demonstrate reduction of any contamination to acceptable levels using an independent auditor.
- Obtain regulatory sign off that the remediation process has been effective and the site is no longer contaminated.
- Keep appropriate records of all actions and results.

7.2 DECOMMISSIONING

During the decommissioning phase of the Project, all infrastructure that cannot be used by another party will be removed or buried and the disturbed areas rehabilitated. Decommissioning will comprise the safe dismantling and removal of infrastructure, the appropriate disposal of waste materials and the return of impacted

areas to a variety of vegetation types and fauna habitats that simulate the pre-disturbance state as closely as possible or other agreed post-mining land use.

This could include the removal of:

- crushing and screening plant, and processing buildings;
- fuel and bulk storage facilities and associated pipe work;
- workshops;
- dewatering equipment;
- power station;
- explosives magazine;
- offices and accommodation village; and
- support infrastructure such as water pipelines.

Where the removal of non-visible infrastructure, or features that have been incorporated into the natural landscape may cause more environmental damage than if left in situ, then their retention will be discussed with the relevant authorities.

7.2.1 Objectives

The objectives for decommissioning are to:

- Remove or dispose appropriately of project infrastructure that will not be required for post closure land uses.
- Modify, as required, any infrastructure that will remain to ensure its long term safety and stability.
- Dispose of all waste material appropriately and in accordance to agreed outcomes.

7.2.2 Completion Criteria

The following are the desired outcomes concerning Project decommissioning:

- Appropriate removal and/or modification of all required infrastructure.
- Stable long term structural integrity is achieved.
- Public and environmental health and safety is protected.
- Local ground and surface water characteristics are preserved.
- Successful rehabilitation occurs to support sustainable habitat for native fauna and flora.
- Consideration of post closure land uses is undertaken.

C3. Project infrastructure that is not required for post closure land use will be removed or disposed of appropriately.

7.2.3 Management Actions

To ensure appropriate decommissioning of Project infrastructure, Brockman will:

- Through consultation identify what infrastructure will remain and what will be removed.

- Ensure that any Project infrastructure that will not be used by a post closure land user will be removed.
- Decommission any ancillary Project infrastructure including water reticulation supplying potable and process waters including any bore field as required.
- Rehabilitate disturbed areas to suit post closure land uses and to reflect pre-disturbance condition.

7.3 DEVELOPMENT OF LANDFORMS

With the size and scale of operations, the project will have a significant impact on the surrounding areas. Changing the existing landform with the mining of the pit void and construction of the mine waste dump will be the most significant visual impact of the mining operation.

Potential impacts identified in the environmental risk assessment for the proposal and relevant to closure include:

- Erosion of fines rejects facilities outer walls exposing and mobilising fines rejects.
- Final landforms are not stable and do not resemble pre-mining landforms.
- Erosion of final landforms and sedimentation of surface or flood waters.

7.3.1 Objectives

The objectives for management of final landforms are to:

- Maintain and protect any significant landscape, indigenous heritage and geo-heritage values and maintain the integrity, ecological functions and environmental values of the soil, drainage lines and landforms.
- Meet post-mining land use requirements.

7.3.2 Completion Criteria

The following are the desired outcomes concerning the development of landforms:

- Landforms around the mine have been shaped and rehabilitated as per stakeholder consultation and condition requirements.
- The mine pit has been backfilled to at least 2 m above the pre-mining water table, and the above-ground fines rejects storage and overburden stockpiles are stable, safe and shaped to mimic local landforms.
- The potential for erosion has been countered where possible and natural drainage lines have been restored.
- All project infrastructure has been removed and rehabilitation of the site to final land use requirements has been completed.

C4. Above-ground waste storage will be minimised by utilising the pit for waste storage.

C5. Final landforms will be developed such that they will remain structurally and chemically stable, safe to humans and native fauna and self-sustaining.

C6. Landforms conform to the requirements of agreed post-closure land use.

C7. The pit will not adversely affect groundwater quality by ensuring that no permanent open water voids result from the project.

7.3.3 Management Actions

Brockman will undertake public consultation throughout the planning stage of the proposal concerning final landforms and all project work areas.

To ensure the development of safe and environmentally appropriate landforms and to minimise long-term visual impacts resulting from the project, Brockman will:

- Establish completion criteria, including landform design, for each landform.
- Implement rehabilitation methods to achieve the required landform.
- Revegetate the site to the required land-use objective.
- Sloped landforms will be covered with topsoil and then deep ripped to a minimum of 1 m on contour.
- Ensure rip lines are horizontal for the entire length.
- Monitor the site to determine that agreed outcomes are being achieved.
- Undertake remedial action as necessary to remedy any deviation from the required objective.
- Record all actions at the site.

A major cause of erosion on newly created landforms is the lack of adequate drainage control. Therefore design and construction of drainage control measures will take into account the predicted 1 in 100 ARI flood events.

To ensure final landforms are geotechnically stable, not prone to erosion and able to be successfully rehabilitated a concave slope profile has been designed. However, soil characteristics, rainfall, drainage and topography are all contributing factors that have to be taken into account in determining the optimal slope angle and slope length.

Reshaping of landforms aims to produce slopes with angles, lengths and shapes compatible with the surrounding landscape, suitable for the proposed land use and not prone to an unacceptable rate of erosion. On finalisation of the project, the following landforms will require earth works reshaping:

- waste rock dumps;
- fines rejects storage;
- mine pit and in-pit wastes;
- ROM pads;
- flood protection levees;
- borrow pits; and
- haul roads.

Specific closure strategies for key infrastructure is described in section 8.

7.4 SURFACE WATER

Surface water drainage lines flowing off the Hamersley Range will be affected by the development of infrastructure and waste dumps, which may in turn impact the nearby Weeli Wolli creek system. Some vegetation units occur on these drainage lines and are likely to be influenced by changes in surface water flow.

Permanent changes to the pattern of flows due to post closure landforms are likely to result in geomorphic changes to drainage lines around and downstream of the mine site. The degree of change will depend on how post closure flows are distributed compared to the natural distribution of flows. Brockman's aim is to ensure post closure flows are as close as possible to natural conditions.

Figure 7-1 illustrates the operational and post closure management of surface waters in relation to some of the mine infrastructure, in this case the waste rock dumps.

Potential impacts identified in the environmental risk assessment for the proposal and relevant to closure include:

- drainage stability and erosion of mine closure landforms; and
- permanent changes to the pattern of overland and sheet flow and the subsequent changes to vegetation distribution.

7.4.1 Objectives

The closure objectives for surface waters are:

- To restore baseline flow regimes in areas affected by mining and closure works.
- To maintain baseline surface water quality.
- To ensure stability of permanent diversions, creek reconstructions and other constructed water management works left after mine closure.
- To ensure stability of drainage from landforms created by mining.
- The integrity, ecological functions and environmental values of wetlands and drainage systems interacting with the proposal are maintained.
- Contaminated waters have been controlled and contained on site to prevent entry into groundwater, natural drainage systems and surrounding vegetation and remediation has been undertaken as necessary.

7.4.2 Completion Criteria

The following are the desired outcomes concerning surface water:

- Water use related infrastructure has been effectively decommissioned, as per agreed post land use intentions, and natural drainage patterns are reinstated as far as possible dependent on site layout and water management scenarios.
- Surface water drainage has been reinstated to mimic pre-mining drainage.

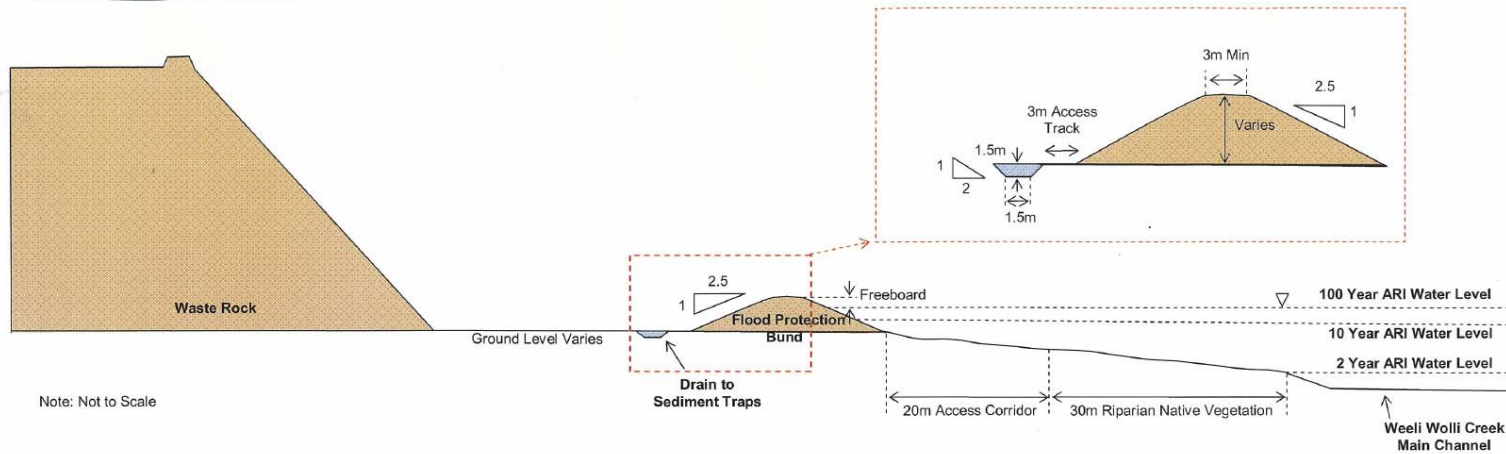
C8. No change in the long term quantity or quality of surface water reaching the Weeli Wolli creek as a direct result of operations at the Marillana project site.

7.4.3 Management Actions

To ensure the appropriate management of surface water during and post mine closure, Brockman will:

- Construct a series of diversion drains to redirect water around or through the mine site. Once downstream of the mine site, flow would be diverted back to the original drainage course wherever possible.
- Diversion channels will be designed with sufficient capacity for a nominated rainfall event, while minimising earthworks and the channel footprint.
- Channels will be the appropriate width and depth and have a bed gradient and side batters to minimise channel velocities and ensure a stable channel profile.
- Ensure all waste rock stockpiles are bunded appropriately to contain internal surface water runoff for treatment and to divert external surface water.
- Develop and implement a monitoring program for surface water level and quality.
- Implement systems and practices to avoid pollution events during the operational life of the mine.
- Immediately manage all pollution events to reduce impact on surface and ground water.
- Remove and or control sources of pollution.
- Rehabilitate all disturbed areas relevant to the project to reduce erosion and facilitate integration into the natural drainage system.
- Record all actions and results.

Cross Section - Operational



Cross Section - Post Mine Closure

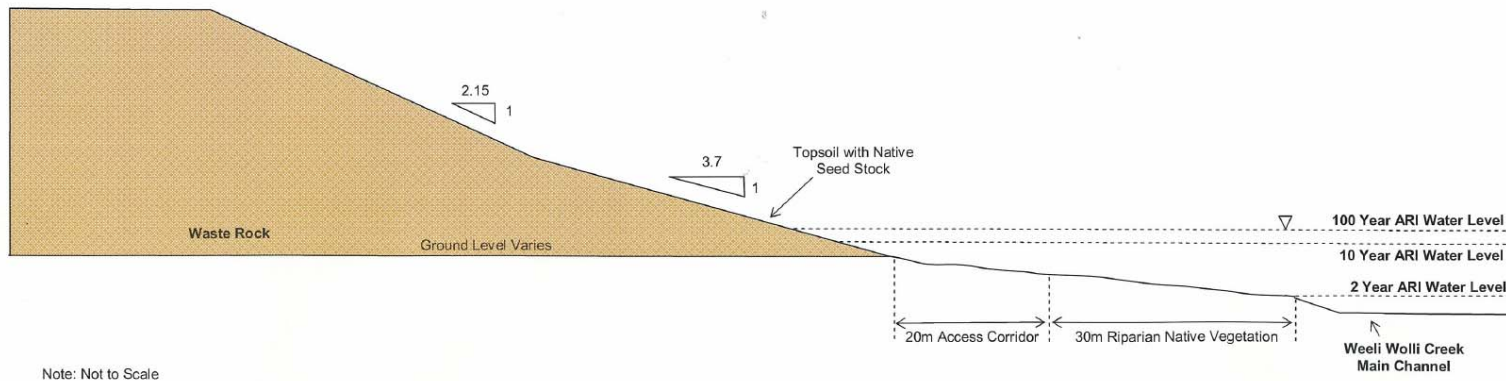


Figure 7-1 Cross Section of Waste Rock Disposal to Weeli Wollie Creek

7.5 GROUNDWATER

Potential impacts to groundwater arising from the proposal and relevant to closure include:

- Lasting disruption to the natural groundwater flow processes as a result of mining operations.
- Pollution from chemical and hydrocarbon materials and waste water streams from the operation.
- Increases in salinity caused by the concentration of salts by evaporation of water in mined-out pit voids.

Following cessation of dewatering, natural recharge and inflow processes will result in water levels recovering to pre-mining levels. All areas mined below the water table will be in-filled to at least two metres above original water table level (and in some cases up to 20 m). Overall water level changes are generally less than 2.5 m and are focused on the areas directly up and downstream of the backfill zone.

Consequently, there are unlikely to be any significant long-term impacts on water quality or groundwater flow as a result of this proposal. Numerical groundwater modelling has been undertaken to simulate the closure strategy and confirm the viability of the preferred closure option.

7.5.1 Objectives

The closure objectives for groundwater are:

- The quality and quantity of ground and surface waters is maintained, so that existing and potential environmental values, including ecosystem maintenance are protected.
- Hydraulic continuity along the aquifer system will be reinstated post closure.

7.5.2 Completion Criteria

The following are the desired outcomes concerning groundwater:

- Contaminated waters have been controlled and contained on site to prevent entry into groundwater and remediation has occurred.
- Groundwater levels, quality and flow processes return to pre-mining conditions.

C9. The quality and quantity of ground water will be maintained, so that existing and potential environmental values, including ecosystem maintenance are protected.

7.5.3 Management Actions

To ensure the appropriate management of groundwater during and post mine closure, Brockman will:

- Backfill the pit to above the pre-mining regional water level to prevent long term salinisation of groundwater.

- Prevent groundwater pollution and contamination through appropriate waste management practices, as outlined in the Project Environmental Management Plan (EMP) 5.12 and 5.13.
- Plan the in-pit storage of waste rock and fines to facilitate the restoration of hydraulic continuity along the aquifer system.
- Develop and implement a monitoring program for groundwater level and quality.

7.6 REHABILITATION OF NATIVE VEGETATION AND TOPSOIL

Minimising or controlling the disturbance footprint of the Project is the most effective method for ensuring that closure objectives with respect to a functioning ecosystem are met. Vegetation disturbance refers to the direct impact of clearing as well as indirect disturbance through the spread of weeds, fire, altered hydrology, soil or water contamination and dust.

Rehabilitation is the process used to repair the impacts of mining on the environment. The long-term objectives of rehabilitation can vary from simply converting an area to a safe and stable condition, to restoring the pre-mining conditions as closely as possible to support the future sustainability of the site (DoIR, 2006b).

Rehabilitation normally comprises the following:

- Developing designs for appropriate landforms for the mine site.
- Creating landforms that will behave and evolve in a predictable manner, according to the design principles established.
- Establishing appropriate sustainable ecosystems.

7.6.1 Objectives

The closure objectives for rehabilitation are:

- Minimise the loss of native vegetation and plant communities.
- Protect Priority flora (*Goodenia nuda*) within the project area.
- Ensure that rehabilitation achieves a safe, stable and functioning ecosystem that meets the requirements of the post-mining land use.
- Undertake progressive rehabilitation to minimize open areas as far as possible and reduce the likelihood of weed infestation.
- Weed outbreaks as a result of project activities have been assessed and controlled in a manner agreed with stakeholders and responsible authorities.
- Rehabilitation measures and methods utilised comply with agreed and approved rehabilitation management guidelines.
- Practices fulfil commitments made to stakeholders and regulators regarding closure outcomes.

7.6.2 Completion Criteria

The following are the desired outcomes concerning the rehabilitation of native vegetation:

- Brockman will comply with and ANZMEC-MCA Strategic Framework for Mine Closure (2000), to return the mine site to a viable, and wherever practicable, self-sustaining ecosystem that is adequately financed, implemented and monitored within all jurisdictions.
- Overburden stockpiles and disturbed sites have been constructed according to the approved design criteria.
- Rehabilitation has occurred progressively where possible and areas have been revegetated to meet the agreed post-mining land uses.

C10. Impacted areas will be returned to self-sustaining vegetation communities and fauna habitats that reflect pre-disturbed state.

C11. Noxious weeds will be managed in line with mining best practice in the Pilbara.

C12. Topsoil remains viable and has the capacity to support a safe, stable and functioning ecosystem that meets the requirements of the post-mining land use.

7.6.3 Management Actions

To ensure the project site is adequately rehabilitated during mine operation and post mine closure, Brockman will:

- Control clearing in accordance with the Project EMP.
- Rehabilitation will be carried out progressively over the life of the project.
- Rip on contours to relieve compaction, reduce erosion and improve water infiltration. Deep ripping will be undertaken where the soil or waste material is of low permeability. In areas where the soil or waste material is of high permeability scarifying on contours will be undertaken. On steep slopes this may require terracing or benching. All ripping, terracing or benching will be surveyed to ensure that they are on contours.
- Re-establish stable landforms with erosion control measures for long term stability will be undertaken.
- Where available, topsoil will be utilised to provide a foundation into which native vegetation will be planted and/or seeded. Topsoil or other suitable material will be applied at an appropriate depth, in the order of 100 mm where practicable, to achieve revegetation.
- Direct seeding and/or planting will be undertaken to encourage vegetation growth to stabilise surfaces and aid the integration of landforms into the surrounding landscape and ecosystems. Seeding and/or planting will be undertaken prior to the wet season (as soon as possible after earthworks) using seed and plants native to the project area.
- Local provenance seeds will be collected from the impacted Marillana project area prior to disturbance. Local provenance seeds will be stored separately and used in their respective local areas during rehabilitation.
- Rehabilitation monitoring will be carried out until revegetation meets the designated completion criteria and is signed off by the DMP. In response to monitoring results, infill planting and weed control will be implemented as necessary.

- A visual inspection of rehabilitated areas will be carried out following rain to ensure that any potential erosion issues are identified early and can be repaired before they become severe.
- Photographic monitoring will be undertaken. This will consist of establishing fixed photographic points (adequately marked with a long lasting item such as metal star picket) and taking photographs from each of these points.
- Quantitative assessment of the progress of revegetation will be undertaken. Replicate monitoring quadrats (20 m x 20 m) will be established and total plant species richness and plant cover index will be recorded.
- Reporting procedures will be established to ensure that results of all trials and actions are properly recorded, referenced, and available for other personnel and for long-term reference.

7.7 VISUAL AMENITY AND HERITAGE

As there are no known registered heritage sites nor any identified ethnographic or archaeological sites within the project footprint on the tenement, the impacts of the project on indigenous heritage are likely to be negligible. However there is the possibility that sites or values may yet be identified.

Due to the isolated nature of the project location and the use of the Munjina-Roy Hill Rd largely by mining traffic, it is not anticipated that the project will have a significant impact on visual amenity of locals or tourists.

However the mine will result in highly visible, permanent changes to the landscape, and Brockman are committed to reducing these visual impacts and maintaining post closure the amenity and original uses of the area.

7.7.1 Objectives

- Ensure that aesthetic values and public experience of the landscape are considered, and measures are adopted to reduce the visual impacts on the landscape.
- Protect as far as possible the heritage values of the area.

7.7.2 Completion Criteria

The following are the desired outcomes concerning aesthetics and indigenous heritage:

- Aboriginal heritage sites have not been disturbed without approval from the Department of Indigenous Affairs (DIA) and the areas traditional custodians.
- All sites have been signed off by stakeholders and responsible authorities.

C13. Ensure that aesthetic values and public experience of the landscape are considered, and measures are adopted to reduce the visual impacts on the landscape.

C14. Maintain and protect any significant landscape, indigenous heritage and geo-heritage values.

7.7.3 Management Actions

To ensure that amenity values of the area are maintained, Brockman will:

- Consult with relevant stakeholders throughout the life of the project to determine appropriate end land use.
- Shape stockpiles to mimic local landforms.
- Re-instate streams where practicable.
- Implement the project Cultural Heritage Management Plan throughout the life of the project.

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8.0 SPECIFIC CLOSURE STRATEGIES

Where specific closure strategies are required, closure objectives, strategies and completion criteria have been developed to deal with these aspects. These project components are listed in the following section and they will be decommissioned and rehabilitated in accordance with Section 7 of this document.

8.1 PIT CLOSURE

Open cut mining is proposed for the project. The proposed mine pit will have a footprint of approximately 1,655 ha, a strike length of 16 km and a depth of up to 70 m. The pit will intercept the groundwater table, which is approximately 30 mbgl at the western end of the orebody, and 20 mbgl at the eastern end of the orebody, and dewatering will be required. Dewatering rates are estimated to be approximately 2000 kL/d over the life of the Project.

The pit will be mined in a series of stages with progressive backfilling of waste rock occurring after year two and fines rejects occurring after year seven of operation. It is estimated that 110 million bank cubic metres (Mbcm) of waste and coarse rejects will be hauled to external waste dumps and 528 Mbcm of coarse rejects and waste into the pit. 52 million loose cubic meters (Mlcm) of fines rejects will be stored in the surface FRS, and 88.3 Mlcm of fines rejects will be backfilled into the pit, contoured and rehabilitated.

Waste will be hauled from external waste storages on closure to fill the final void to between 2 and 20 m above the pre-existing water table. Figure 8-1 shows the conceptual backfill schedule.

Geotechnical investigations will be undertaken to determine the optimum final landform of the mine pit walls, to ensure stability and aesthetic suitability of the final landform and diverted drainage lines re-instated as far as possible.

In order to minimise inadvertent public access to abandoned open pits:

- An abandonment bund wall will be constructed around the perimeter of open pit voids greater than 5 m in depth.
- The bund wall will be constructed outside the area designated as being susceptible to wall collapse.
- The location and design of the abandonment bund will be in accordance with “Safety Bund Walls around Abandoned Open Pit Mines” (DoIR, 1997).

The movement of mine waste will be programmed such that the final pit shapes, both above and below the pit rim will be achieved as part of the mining process. Double handling of waste will be avoided as much as possible. Where required, additional earthworks will be undertaken on those areas of the pit walls that are safely accessible to improve long term structural stability and facilitate revegetation. On completion of material placement topsoil will be spread and the surface ripped along the contour (parallel to the slope) and seeded with seeds of local provenance.

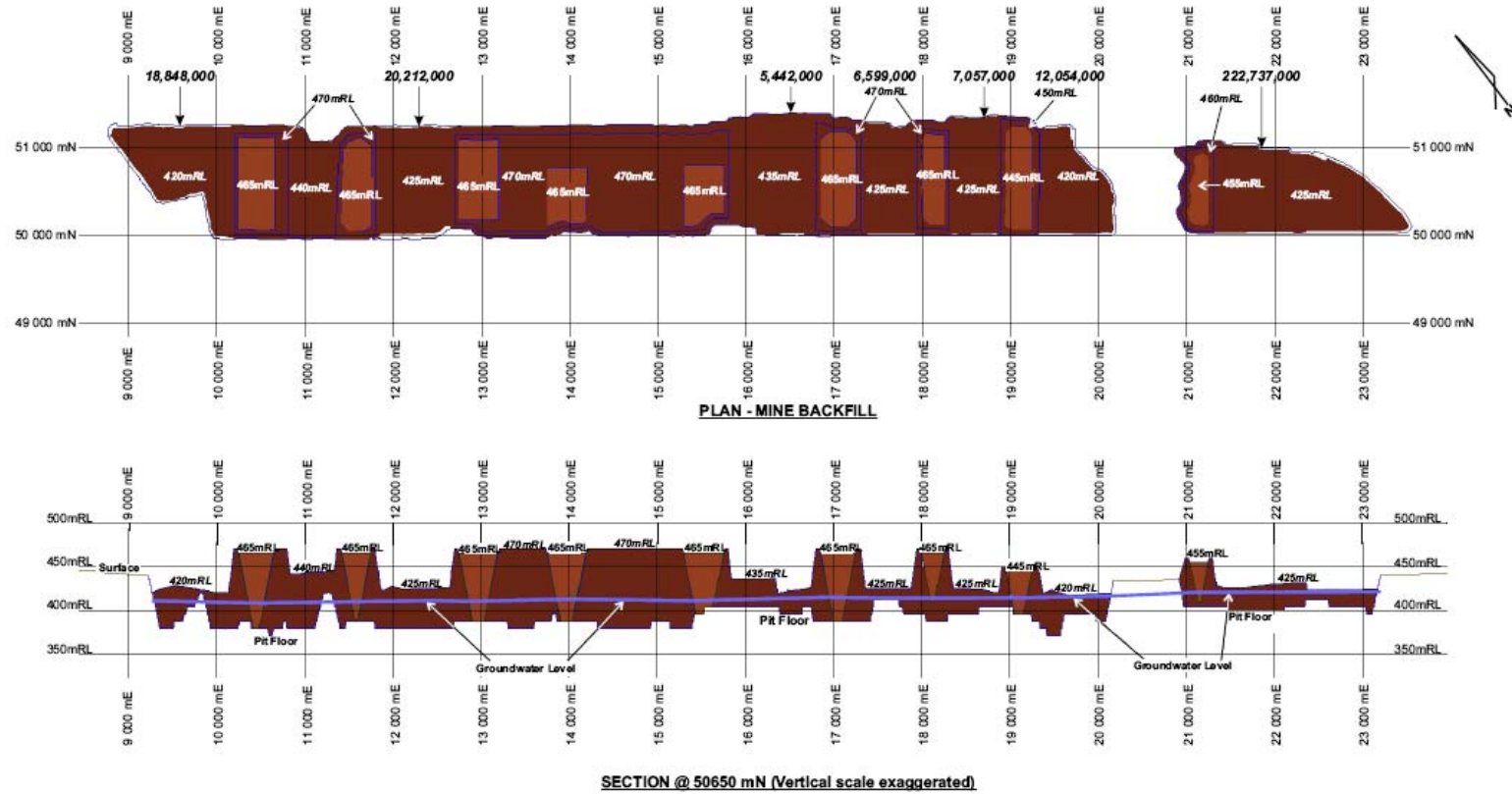


Figure 8-1 Concept Design for Backfill

8.2 FINES REJECTS STORAGE

The fines rejects storage (FRS) design concept comprises both above ground storage and in-pit storage of fines rejects (tailings). For the first seven years of production fines rejects will be stored in an above ground FRS, an integrated waste landform that will be constructed within a mine waste dump. After year seven fines rejects will be stored in-pit along with coarse rejects waste.

The operational design of the above-ground FRS has been aimed at:

- Optimising the removal of surface water for return to the processing plant.
- Maximising tailings density and storage capacity by undertaking cyclic deposition for the above ground storages.
- Minimising land disturbance and potential seepage.

The above-ground FRS has concave design slopes ranging from 1:2.15 to 1:3.7 which have been developed as a result of research into erosion of such facilities in order to maximise stability (Figure 8-2).

The in-pit FRS (IFRS) facilities have been designed to store fines rejects, with storage cells constructed within the mine waste placed within the pit (Figure 8-1). Coarse rejects will also be incorporated into the mine waste and fines rejects stream and stored within the pit from years 7 to 20.

The conceptual design of the above ground section of these facilities has a 40 m wide crest, 5 m above the final surface of the rejects. Once fine rejects deposition has been completed and little further settlement is expected, the top surface of the storages will be capped with a layer of mine waste rock (0.5 m nominal thickness) in order to minimise dust generation from the dried fine rejects surface and provide support for topsoil for re-vegetation of the top surface.

Topsoil removed from the FRS area during the construction of the facilities will be redeployed on the final surfaces of the above-ground FRS to assist with rehabilitation, where appropriate. The downstream slopes of the final embankments will be covered with topsoil, contour ripped, seeded with native species and fertilised as appropriate.

At final closure, the decant structures will be sealed by:

- backfilling of the slotted concrete pipe annulus with dried fine rejects
- removal of the slotted concrete pipes and filter rock to the level of the surrounding fine rejects, and
- capping of the central area of the FRS using clayey mine waste.

A spillway will be required for decommissioning the above ground storages to control the release of excess water on the facility surface resulting from large rainfall events. The design of the spillway will be prepared during the final rehabilitation planning stage.

The IFRS will be rehabilitated to store rainfall from most precipitation events within the cover systems for subsequent release by a combination of evaporation and evapotranspiration. Surface water controls will remain in place post closure to ensure significant erosion of fines materials does not occur.

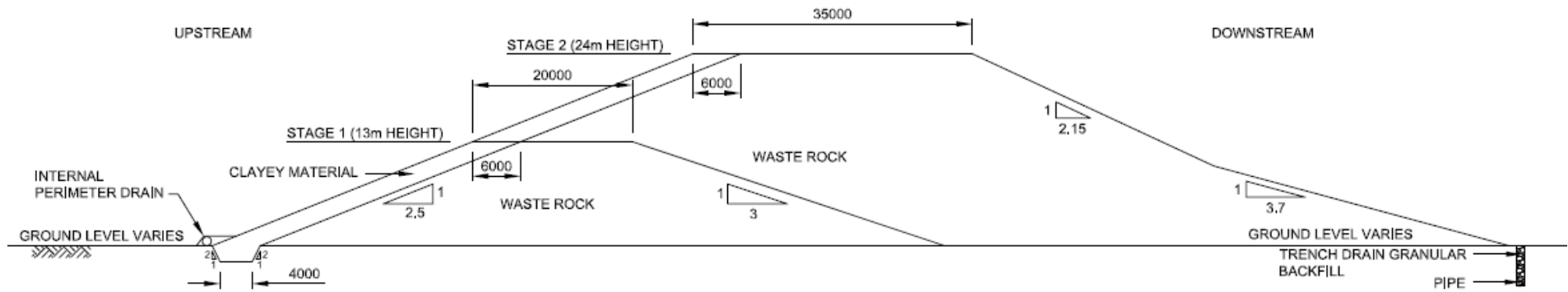


Figure 8-2 Cross Section of the Proposed Above Ground FRS and Waste Dump Design

8.3 WASTE ROCK STOCKPILES

Stockpiles will be designed to minimise erosion, mimic local landforms where practicable and ensure that no single part of the stockpile has to discharge excess amounts of storm water.

Specifically, waste rock dumps will be designed, constructed and operated to:

- retain water, minimise runoff, and enhance the establishment of self-sustaining native vegetation;
- incorporate a rounded footprint to conform to surrounding natural landforms;
- consider, the physical nature of material and landform stability, chemical nature of waste materials, associated pollution prevention, integration into surrounding landscape and revegetation issues;
- incorporate windrows will be used along the crest of slopes to prevent erosion of the slopes. Toe windrows will be used to contain eroded material if needed; and
- reduce the potential for erosion and incorporate protective bunding and diversion drains.

The ex-pit waste dump will have concave slopes as per Figure 8-2 and will be built to these final shapes as part of the materials placement. Dumps that will be relocated prior to mine closure may be constructed with slope angles of 37° while dumps that will be left in place after mine closure will have a maximum slope of 20°.

8.4 LANDFILL

A minor landfill will be established to manage the disposal of putrescible and inert wastes. The landfill has been located in an area that poses minimal impact on surface and ground water, and to reduce the potential for pollution (Figure 6-1).

The main issues associated with the closure of the landfill site area are:

- ground or surface water contamination due to the release of leachate from the site; and
- stability of the landfill area as subsidence occurs.

While in operation the following will be undertaken to ensure the landfill site impacts are managed:

- Only inert, general and putrescible waste will be disposed of in the landfill. All hazardous material will be disposed of according to government guidelines.
- The landfill has been sited and designed to prevent surface water from draining into the landfill. Diversion drainage structures will be used to divert stormwater flows away from the landfill area.
- Surface water and groundwater monitoring will be undertaken if deemed to be necessary to determine any impacts to water quality. If changes in water quality are identified the DEC will be notified and an action plan developed.
- Adequate separation distance will be maintained between the base of the landfill and the water table.

- To facilitate consolidation of the landfill to minimise subsidence, waste material will be compacted in layers not exceeding 500 mm thickness. Waste will be covered by a depth of soil no less than 230 mm and compacted. Not only will this facilitate consolidation of the waste material but ensure other impacts such as fire, pests and odour are minimised.

All infrastructure associated with landfill site will be removed. Once the infrastructure is removed a contaminated site assessment will be undertaken as per section 7.1. If soil or water contamination is identified a remediation plan will be developed and agreed with the DEC.

Disturbed areas will be contoured to ensure they blend into the surrounding landscape and to control rainfall run-off. Areas will then be rehabilitated as per Section 7.6.

8.5 WATER SUPPLY INFRASTRUCTURE

Consideration of available water resources and their sustainability has been incorporated into project planning. Water from pit dewatering will be directed in the first instance for re-use in the process plant and for dust suppression, however potable water will need to be extracted via two bores to service general office requirements and the accommodation. It is anticipated that potable water use will total 60ML/pa.

The location of water supply infrastructure is yet to be confirmed, but is likely to include:

- pumps & gen-sets;
- delivery pipelines;
- turkeys-nest(s);
- storage tanks;
- distribution pipelines; and
- the borefield.

This infrastructure will be removed or decommissioned to the satisfaction of regulatory authorities and to reduce potential impacts on native flora and fauna post mine closure.

8.6 SEWAGE INFRASTRUCTURE

The waste water infrastructure to be used during the life of the project for routine maintenance and storage and during line inspections will be decommissioned at closure. The sewage tanks will be pumped out and removed or broken up and buried *insitu*. The sewage treatment plant will be removed from site.

All monitoring required by statutory authorities will be continued with annual reviews on the need to maintain or cease the monitoring programs.

8.7 FUEL AND EXPLOSIVES FACILITIES

A small amount of standard mining explosives and accessories will be required for limited blasting in the pit. These will be contained in licensed facilities and managed according to requirements of the *Dangerous Goods Safety Act 2004*.

Magazines will be contained to ensure there is no contamination of ground or surface water due to storage of explosives, and all infrastructure associated with explosives storage will be removed at the completion of mining.

Hydrocarbons will be required for mobile plant operation and maintenance and as such fuel storage, and lubricant storage facilities will be located on site. .

To prevent contamination of soils and water from the storage of fuel, hydrocarbons and chemicals, fuel and bulk storage facilities will be fully contained. Facilities will be designed and maintained to be compliant with all aspects of *AS 1940 - The Storage and Handling of Flammable and Combustible Liquids*. Monitoring bores will be established surrounding the hydrocarbon storage to ensure no significant impacts to groundwater.

All infrastructure and materials associated with fuel and bulk storage facilities will be effectively demobilised in liaison with the appropriate stakeholders.

A contaminated sites assessment will be conducted and all required remediation undertaken on completion of mining.

8.8 POWER SUPPLY INFRASTRUCTURE

The power supply to the project will be via mixed fuel (diesel-natural gas) powered generators.

The following generation and transmission related structures on the project will require decommissioning:

- generators and associated plant;
- substations; and
- overhead transmission lines.

At the conclusion of mining, all power generating and supply infrastructure will be decommissioned and removed from site unless otherwise agreed.

General surface treatment, soil remediation and rehabilitation works will then be implemented as described in Section 7.1 and 7.6.

8.9 BORROW PITS, ROADS AND TRACKS

At the completion of mining at Marillana, access roads that have not been rehabilitated as part of the progressive rehabilitation programmes will be rehabilitated (including removal of portions of road embankment where necessary) to blend in with surrounding topography. Where necessary road surfaces will be reshaped and ripped where necessary to allow free drainage and minimise interference with natural surface flows.

Dependent on landholder and government requirements, the access route may be left as an access route to the Marillana area, or rehabilitated.

Borrow pits are progressively rehabilitated during the operational life of the mine, or following closure of the pit. Sides of the borrow pits will be battered to a slope equal to or less than 20°. Where required, culvert diversion drains and upslope windrows will be used to divert surface flow from entering pits and contributing to waterlogging or erosion.

Borrow pits will then be ripped and spread with topsoil as per section 7.6.

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9.0 MONITORING, REPORTING AND RECORDS

The implementation of a monitoring programme is crucial in recording the success or otherwise of the completion criteria, as well as validating agreed criteria for relinquishment. Monitoring may address the following areas:

- biological (flora and fauna);
- surface and groundwater;
- remediation of contaminated sites and acid rock drainage issues;
- public safety; and
- landform stability.

Post-closure monitoring programs will be developed in consultation with appropriate regulatory agencies, and will aim to inform the development of agreed actions if it is determined through monitoring that closure completion criteria not being met. Monitoring will be undertaken by Brockman until the agreed completion criteria have been met.

Reporting procedures will be established to ensure that results of all trials and actions including remediation works and monitoring of revegetation are properly recorded, referenced, and available for other personnel and for long-term reference.

The following records will be kept to enable assessment of closure completion and rehabilitation:

- geological records, including drilling and exploration data;
- plans and surveys of surface facilities;
- location, quantities and types of waste disposed in the area;
- results of rehabilitation as identified in monitoring;
- additional maintenance conducted post-closure;
- contamination reports;
- water quality reports;
- engineering reports regarding the stability of final landforms;
- other site specific surveys or studies; and
- this CCP.

These records will be made available to relevant authorities as required.

10.0 CONTINGENCY PLANNING

In the event of a temporary suspension of mine operations, the *Mines Safety and Inspection Regulations 1995* will be utilised to guide development of a suspension plan. The Department of Mines and Petroleum (DMP) will be notified of the nature of the suspension and measures in place that will limit impact to the environment and ensure health and safety requirements are met.

The suspension plan will not consist of a full rehabilitation and closure strategy but will incorporate interim measures. In the event that a decision to decommission operations is made during a suspension period, closure strategies outlined in this CCP will be implemented in full in consultation with the relevant authorities.

As a minimum the suspension plan would include:

- Maintenance of drainage structures to limit erosion events and sedimentation of surface water.
- Removal of chemicals, hydrocarbons and other hazardous substances. This includes assessment of containment facilities and bunds to ensure contamination is not possible.
- Provision of maintenance staff / caretakers to monitor mine conditions.
- Ensure adequate on-site facilities for any staff remaining at the operations.
- Revision of reporting procedures and consultation with regulators regarding mine suspension.
- Removal of domestic and industrial waste products, and waste facilities.
- Provision of adequate signage, safety measures and security to ensure no un-authorized access to the mine site.

10.1 WALKAWAY

In the situation of sudden (unplanned) closure, a decommissioning plan will be immediately prepared and implemented with input from the CCP, taking into account the site's non-operational status. Where provision accounts are inadequate to fund the full closure requirements, funds will be provided from other company sources. Figure 10-1 illustrates a provisional sudden closure strategy.

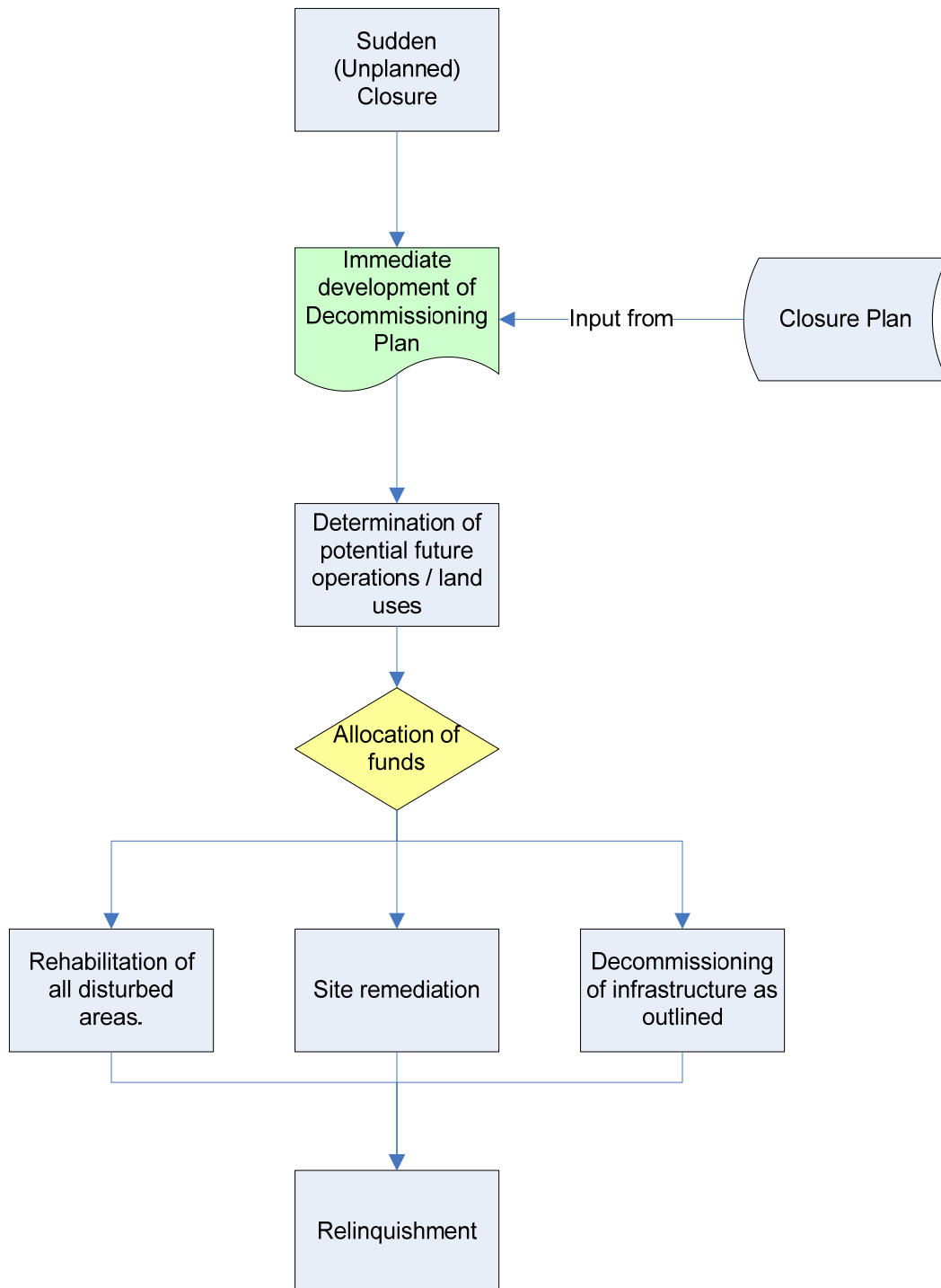


Figure 10-1 Sudden Closure Strategy

10.2 TEMPORARY CLOSURE

Mining activity may cease and shut down on a temporary basis, with the assumption that the operation will recommence in the near future. A decommissioning plan will be immediately prepared and implemented with input from the CCP, taking into account the potential for future operations. The CCP will be reviewed, as it may be required to be implemented if circumstances remain adverse to reopening the operation.

Rehabilitation will be undertaken on all disturbed areas, where possible and economically practicable, and site remediation works will be undertaken to prevent potential off-site contamination. The site will be placed under care and maintenance until such time as the operation recommences or it is closed indefinitely. Figure 10-2 illustrates a provisional temporary closure strategy.

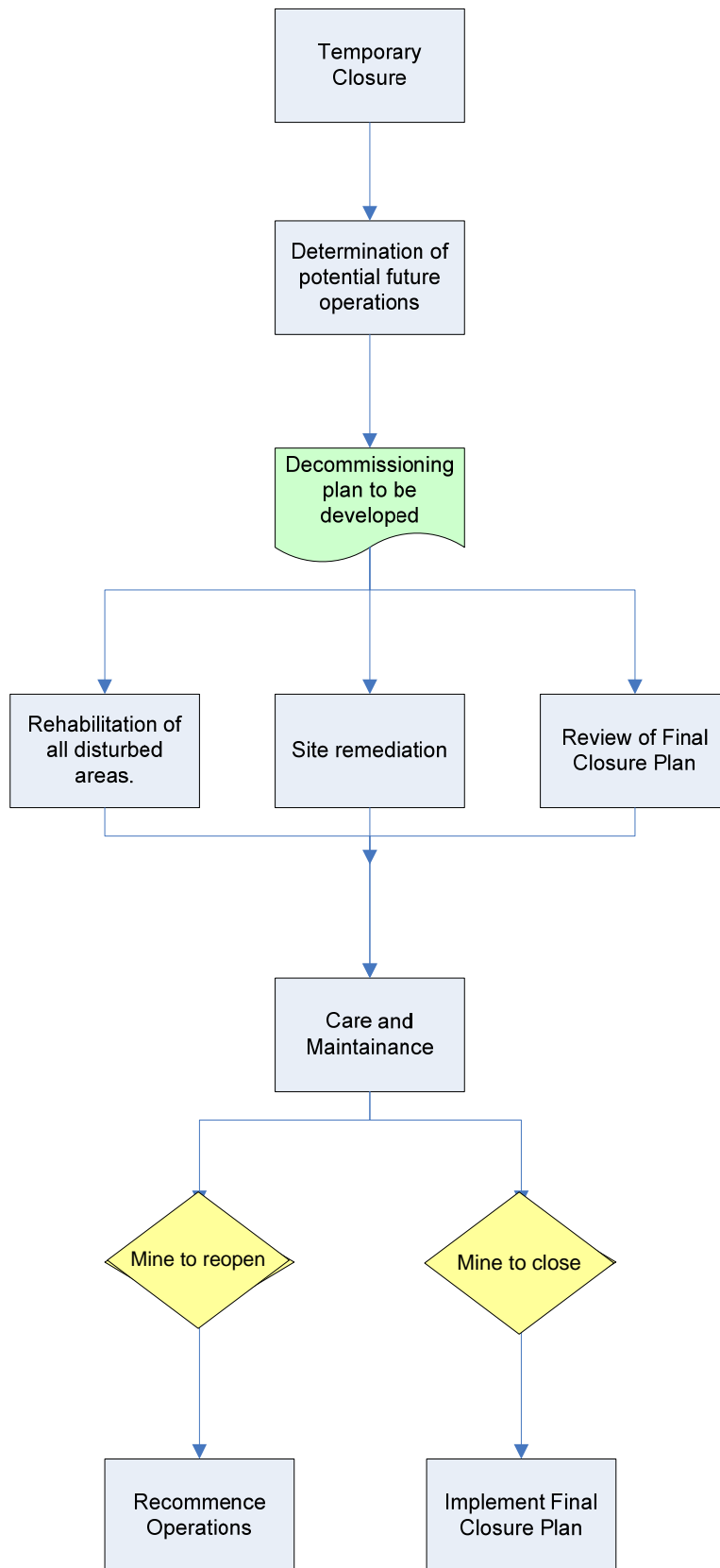


Figure 10-2 Temporary Closure Strategy

10.3 RELINQUISHMENT

The unconditional performance bond(s) lodged with the DMP will be retired when the rehabilitation has met all completion criteria and standards set out in approval documents, annual environmental reports and decommissioning plans. Once the rehabilitated area is safe, stable, erosion is comparable to the surrounding areas and the biological system is sustainable under a range of seasonal conditions representative of that climate (DMP, 2008), the management and maintenance of the site will rest with the subsequent owners or the State.

11.0 REVIEW AND REVISION

The CCP will be reviewed throughout the life of the project and revised into a full Closure Plan at least two years prior to the planned closure of the Marillana Project.

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APPENDIX 1
RISK ASSESSMENT METHODOLOGY

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Consequence Ranking

Level		Consequence (<i>example</i>)
1	Insignificant	No lasting effect. Low level impacts on biological or physical environment. Limited damage to minimal area of low significance.
		<i>Individual mortality (i.e. roadkill).</i>
2	Minor	Minor effects on biological or physical environment. Minor short-medium term damage to small area of limited significance.
		<i>Removal of a small proportion of habitat for a short period of time.</i>
3	Moderate	Moderate effects on biological or physical environment but not affecting ecosystem function. Moderate short-medium term widespread impacts.
		<i>Removal of a large proportion of habitat that will be rehabilitated as suitable habitat in the future.</i>
4	Major	Serious environmental effects with some impairment on ecosystem function. Relatively widespread medium-long term impacts.
		<i>Removal of habitat to the threshold required to maintain a viable population.</i>
5	Catastrophic	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment
		<i>Excessive removal of habitat beyond the threshold required to maintain a viable population.</i>

Likelihood Ranking

Level		Likelihood
5	Almost certain	The incident is expected to occur most of the time (<i>i.e.</i> every time).
4	Likely	The incident will probably occur in most circumstances (<i>i.e.</i> quarterly).
3	Moderate	The incident should occur at some time (<i>i.e.</i> once every few years)
2	Unlikely	The incident could occur at some time during the life of the project.
1	Rare	The incident may occur only in exceptional circumstances and may never happen.

Risk Matrix

		Consequences				
		1	2	3	4	5
Likelihood		Insignificant	Minor	Moderate	Major	Catastrophic
5	Almost certain	5	10	15	20	25
4	Likely	4	8	12	16	20
3	Moderate	3	6	9	12	15
2	Unlikely	2	4	6	8	10
1	Rare	1	2	3	4	5

Impact Definitions

—	High impact	Senior management involvement, planning and significant DEC / EPA input will be required.
—	Moderate impact	Senior management attention required and the DEC / EPA must be consulted with.
—	Low impact	Manage by routine procedures.

Other Definitions

Definitions	
Activity	<i>broad mine site activity, operation</i>
Aspect	<i>interaction with the environment, contributing factor, cause</i>
Event	<i>risk event, result of the aspect</i>
Impact	<i>outcome of the risk occurring</i>
Management	<i>operational control to mitigate impact</i>
Residual Risk	<i>level of risk assigned to an activity after management controls are taken into account</i>



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