



# GRANGE RESOURCES LIMITED


DRAFT CONSTRUCTION

ENVIRONMENTAL MANAGEMENT PLAN



*Providing sustainable environmental strategies,  
management and monitoring solutions  
to industry and government.*



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## 1.0 INTRODUCTION

### 1.1 Purpose

The Southdown Magnetite Project is located approximately 90 km east, north-east of Albany in South Western Australia. Grange Resources Limited (“Grange”) proposes to develop an open-cut Magnetite mine at the Southdown Magnetite Deposit as a result of a successful feasibility study. The infrastructure required includes mining and ore concentrating facilities near Wellstead, a pipeline for transporting magnetite concentrate as a slurry from the mine site to the Port of Albany, a filter plant, concentrate storage shed and ship loading facilities at a new berth at the Port. The mine will consist of an open pit, tailings dam, waste rock dump, ore stockpiles and a plant area for crushing, grinding, screening and magnetic separation processes together with maintenance and administrative activities.

Grange expects to produce 6.6 million tonnes per annum (mtpa) of magnetite concentrate from this operation. Electricity required for the project will be supplied by an external provider. Water usage will be from pit dewatering and rainfall harvesting. Recycling of waters extracted from the slurry to the plant along a dedicated water return pipe, will reduce overall plant water demand.

This Construction Environmental Management Plan (CEMP) addresses potential environmental impacts and management procedures relevant to the construction activities of the Project. It forms a part of the operational control procedures for the Grange Construction Environmental Management System (CEMS) which is aligned to the internationally recognised standard ISO 14001:2004.


Compliance with commitments outlined in this document will be internally audited by Grange and subject to external audits by the relevant regulatory agencies, including the Department of Environment and Conservation (DEC), and the Department of Industry and Resources (DoIR).

### 1.2 Overview

It is envisaged that construction activities for the Southdown Magnetite Project will commence in 2007 and be completed by 2010.

Key characteristics of the construction phase of the project are:

- Land clearing for construction of the processing plant and pipeline;
- Construction of the mine processing plant and associated facilities;
- Construction of the pipeline infrastructure facilities;
- Construction at the Albany port of the filter plant, concentrate storage shed, conveyor systems and ship loading facilities and associated infrastructure;
- Establishment and operation of a pit dewatering bore field;

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- Operation and maintenance of construction equipment;
- Management of contractors;
- Decommissioning and rehabilitation of temporary construction areas / facilities; and
- Compliance with legal and other requirements.

## **2.0 ENVIRONMENTAL MANAGEMENT PROCEDURES**

The environmental management procedures detailed in this CEMP form the basis of the operational control procedures for construction.

The procedures detail the objectives, management actions, performance indicators, monitoring and reporting requirements for each relevant environmental aspect associated with construction activities for the Southdown Magnetite Project.

A periodic review and document revision will be undertaken to ensure currency and effectiveness of management procedures.

**EMP - 01** Aboriginal Heritage

Project Wide

**Objectives**

- To ensure where possible that construction activities do not adversely affect indigenous historical and cultural sites and that any site disturbances comply with relevant heritage legislation.

**Regulatory Permits/Approvals**

- Approval for disturbance to heritages sites in accordance with Section 18 of the *Aboriginal Heritage Act 1972-1980*.

**Management**


- In consultation with Aboriginal custodians and Native Title claimants, a management programme for Aboriginal sites will be implemented. This programme will involve identification of sites, management of approved disturbance and cross cultural awareness programs for employees.
- Aboriginal heritage surveys shall be undertaken by competent and appropriate persons for all areas to be impacted by the project.
- Identified Aboriginal sites shall not be disturbed unless approval for disturbance has been obtained.
- Disturbance to sites shall be in accordance to conditions of Section 18 approvals.
- Sites requiring protection shall be demarcated on the ground if appropriate, and on site maps. Exclusion zones around these sites shall be established and communicated to personnel.
- Employees and contractors shall complete a site induction prior to commencement of work. The induction shall inform personnel of nearby sites (if appropriate), and their legal obligations to protect sites and/or disturb sites according to approved procedures.
- Employees and contractors will promptly report any Aboriginal sites in the vicinity of the operations of the Company. Where sites are identified, they will be avoided.
- Qualified Anthropologists/Archaeologists will be used to assess sites as circumstances dictate and require.
- Consultations with appropriate custodians shall be maintained throughout the construction phase of the project.

**Performance Targets**

- No unapproved disturbance to Aboriginal sites.

**Monitoring**


- Periodic inspections will be undertaken to ensure compliance with the *Aboriginal Heritage Act 1972-1980*.

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- Routine monitoring of known Aboriginal heritage sites shall be undertaken by the Site Manager to ensure disturbance to these areas has not occurred.

**Reporting**

- Any new suspected heritage sites will be reported immediately to the Site Manager.
- Unauthorised interference with identified Aboriginal sites of significance will be reported to the relevant custodians and authorities.

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<b>EMP - 02</b> Social Issues and Public Access	Pipeline and Port
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To ensure that existing and planned recreational uses are not compromised by construction activities.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Public notices shall be sent out prior to temporary disruptions to roads and public access and noise emissions.</li> <li>Communication channels for public comments and complaints shall be established and maintained. These channels shall be made known to the community.</li> <li>Where existing roads or fences are intersected by construction activities, suitable warnings and crossings (bypasses) will be constructed and maintained.</li> <li>Any fences and tracks affected by construction work will be restored.</li> <li>Where practicable alternative access shall be established for permanent disruptions to recreational use / access.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Minimal disruptions to the community.</li> <li>Prompt response to complaints and comments from the public.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>The Site Manager will regularly inspect construction areas to ensure that remedial actions as part of resolution of public complaints are addressed in a timely manner.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Community complaints shall be documented and reported as required.</li> </ul>	

**EMP - 03 Flora and Vegetation**

Project Wide

**Objectives**

- To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts from construction activities and improvement in knowledge.
- No net loss of environmental values. Where possible, achieve a net environmental gain.

**Regulatory Permits/Approvals**

- Approval from the Department of Environment and Conservation shall be obtained prior to clearing of Significant Flora or vegetation units of conservation significance.
- Approval from the Department of Environment and Heritage shall be obtained prior to significant impacts on species protected under the Environmental Protection and Biodiversity Conservation Act 1999.

**Management**


- Bi-seasonal flora and vegetation assessments have been conducted to determine the project's local and regional impacts on vegetation units and flora species.
- Where necessary, additional targeted surveys shall be conducted to determine locations and abundance of significant flora and vegetation units.
- The Department of Environment and Conservation shall be consulted regarding the management of Rare, Priority and Significant Flora.
- Where practicable, the project design shall incorporate the principles of avoiding and minimising clearing of significant flora and vegetation units.
- Where appropriate a Threatened Flora Management and Conservation Plan shall be developed and implemented for the project.
- Locations of rare and significant flora species shall be incorporated into a site / project map and communicated to project personnel.
- Personnel shall be provided with training and tools to assist in their general awareness and understanding of species of conservation significance.
- Environmental offsets for necessary clearing of flora and/or vegetation of significance shall be investigated and implemented in consultation with stakeholders.

**Performance Targets**

- No unapproved impacts to flora and vegetation of significance.
- Net environmental gain for the project.

**Monitoring**


- The Site Manager shall regularly inspect construction areas to ensure:

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- Only authorised clearing is being undertaken; and
- Significant Flora and vegetation is not impacted without prior written approval from the Department of Environment and Conservation.

**Reporting**


- Unauthorised impact to Significant Flora will be reported and managed as an incident as per the CEMS procedures.
- Unauthorised impacts to species of significance will be reported to regulatory authorities.

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<b>EMP - 04</b> Terrestrial Fauna	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts from construction activities and improvement in knowledge.</li> </ul>	
<p><b>Regulatory Permits/Approvals</b></p> <ul style="list-style-type: none"> <li>Approval from the Department of Environment and Conservation shall be obtained prior to impacts to significant fauna.</li> <li>Approval from Department of Environment and Heritage shall be obtained prior to significant impacts on species protected under the EPBC Act.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Bi-seasonal fauna assessments have been conducted to determine the project's local and regional impacts on fauna species and populations.</li> <li>Where necessary, additional targeted surveys shall be conducted to determine habitat locations and abundance of significant fauna species.</li> <li>The Department of Environment and Conservation shall be consulted regarding the management of Rare, Priority and Significant Fauna.</li> <li>Where practicable, the project design shall incorporate the principles of avoiding and minimising impacts to fauna and their habitats.</li> <li>Where appropriate a Threatened Fauna Management and Conservation Plan shall be developed and implemented for the project.</li> <li>Locations of rare and significant fauna species shall be incorporated into a site / project map and communicated to project personnel.</li> <li>Foundation holes, drill holes and trenches shall be covered, fenced, banded or otherwise capped to prevent fauna entrapment. Where appropriate fauna egress matting shall be installed.</li> <li>Wherever possible barbed wire shall not be used on the project. This is to minimise harm to bats.</li> <li>Holes and excavations shall be inspected regularly for trapped fauna. Uninjured trapped fauna will be released by a competent person with the appropriate the Department of Environment and Conservation permits.</li> <li>Native fauna shall not be captured, taken, fed or harmed without the appropriate permits.</li> <li>Domestic pets shall not be allowed on the project footprint.</li> <li>Sightings of feral animals shall be reported to the Site Manager and records maintained.</li> <li>Personnel shall be provided with training and tools to assist in their general awareness and understanding of species of conservation significance.</li> <li>Disturbed areas will be rehabilitated as soon as practicable to facilitate fauna habitat restoration.</li> </ul>	

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<ul style="list-style-type: none"> <li>• Environmental offsets for necessary impacts to fauna of significance shall be investigated and implemented in consultation with stakeholder.</li> </ul>
<p><b>Performance Indicators</b></p> <ul style="list-style-type: none"> <li>• No preventable fauna fatalities during construction.</li> <li>• No unapproved impacts to fauna of conservation significance.</li> </ul>
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>• Disturbed areas shall be checked for rehabilitation potential on a routine and ongoing basis by the Site Manager.</li> <li>• Inspections of pit boundary fences, and trenches shall be undertaken regularly by the Site Manager.</li> <li>• Monitoring of known habitats and ranges of Significant Fauna shall be undertaken periodically at intervals as agreed with the Department of Environment and Conservation.</li> </ul>
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>• Fauna deaths as a result of construction activities shall be recorded and reported as required.</li> <li>• All fauna road kills will be reported to the Site Manager.</li> </ul>

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<b>EMP - 05</b> Weed and Dieback Management	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts from construction activities and improvement in knowledge.</li> <li>To prevent the introduction and spread of weeds and dieback within the project area.</li> </ul>	
<p><b>Management</b></p> <p><i>Prevention</i></p> <ul style="list-style-type: none"> <li>Prior to land disturbance, surveys shall be undertaken to determine the types and extents of existing weed infestations, and the dieback status of the area.</li> <li>Weed and dieback maps with relevant status boundaries shall be produced for the project. This information shall be superimposed on the site plan.</li> <li>Where required, intra-project hygiene boundaries shall be established to prevent the spread of weeds and dieback within the project area. These boundaries shall be clearly demarcated on site and equipped with clean down facilities.</li> <li>A list and means of identification (including photographs) of significant weed species will be made available to relevant personnel.</li> <li>Equipment will be cleaned to remove soil, vegetation, rock and debris prior to arrival to site. Records of this process shall be maintained by completing a <b>Mobilisation Hygiene Certificate</b>.</li> <li>Approval for earth moving equipment to mobilise to site shall be dependent on completion of hygiene requirements.</li> <li>Environmental induction of all employees/contractors will include awareness of dieback issues, identification of weed species/reporting of infestations and hygiene procedures.</li> </ul> <p><i>Weed Control</i></p> <ul style="list-style-type: none"> <li>A weed control program will be implemented in ground disturbance areas where introduced species are present. Where required, infestations will be controlled by spot spraying or manual removal if necessary.</li> <li>Spot spraying will be undertaken on areas within freehold land boundaries only if prior consent is obtained from the relevant landowner. The Site Manager will authorise the implementation of any control programme within freehold land boundaries, on the basis of consultation with the landowner.</li> <li>Any new weed populations that arise in the project area as a result of the construction works shall be removed.</li> <li>Weed infestation quarantine areas will be demarcated by the Site Manager, and access will be prohibited.</li> <li>Any equipment or vehicle considered to have been working in a weed risk area</li> </ul>	

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will be cleaned down before remobilising.

- Mobile clean-down facilities will be provided.

**Performance Targets**

- Where required, control or eradication is achieved for known weed populations.
- There are no persistent new introductions or spread of weeds or dieback as a result of the project.

**Monitoring**

- Weed infestation status surveys will be conducted by the Site Manager.
- The Site Manager will monitor weed hygiene compliance as per the CEMS.
- A dieback and targeted weed survey will be conducted at the completion of construction in each work area and repeated in the following growing season.

**Reporting**

- New infestations of weeds will be reported by personnel and investigated by the Site Manager.
- Incidents relating to a failure in hygiene processes will be reported as per the CEMS.

**EMP - 06** Topsoil Management

Project Wide

**Objective**

- To maintain the integrity, ecological functions and environmental values of soil and landform.
- To ensure that rehabilitation achieves an acceptable standard compatible with the intended land use and consistent with appropriate criteria.

**Management**

- A plan will be prepared showing all major (> 1 ha) areas requiring topsoil removal prior to commencement of stripping.
- The top 150 mm of topsoil will be stripped prior to land disturbance, wherever it is present and safely accessible.
- Where practicable, topsoil will not be stripped when wet as this can lead to compaction and loss of soil structure.
- Topsoil shall be applied promptly to areas being rehabilitated. If stripped topsoil exceeds rehabilitation requirements at that time, excess topsoil will be stockpiled for later use.
- Topsoil stockpiles shall be constructed (no higher than 2 m) and managed to preserve its biological activity.
- Topsoil stockpiles shall be located within the same weed and dieback status area as the source of the material.
- If possible, stockpiles will be spread and scarified to encourage germination and seed bank enrichment during this time.
- To minimise airborne dust from topsoil stockpiles, non-saline water will be applied when required. Surfaces will be monitored to ensure crusting does not inhibit seed germination, which also serves to reduce wind erosion.

**Performance Targets**


- All available topsoil and vegetation directly returned or stockpiled for later use.

**Monitoring**


- Regular inspections will be undertaken by the Site Manager to ensure that topsoil is being removed and stockpiled in the appropriate locations.

**Reporting**

- Information on areas disturbed and volume of topsoil stripped will be recorded by the Site Manager.

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<b>EMP - 07</b> Land Disturbance Control	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To prevent unapproved land disturbance from construction activities.</li> <li>To minimise the extent and significance of impacts from land disturbance.</li> </ul>	
<p><b>Regulatory Permits/Approvals</b></p> <ul style="list-style-type: none"> <li>Native Vegetation Clearing Permit in compliance with <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> or as part of PER approval.</li> <li>Approved DoIR Mining Proposal and payment of performance bonds.</li> <li>Bed and Banks Permits for disturbance to beds and banks of waterways.</li> <li>Section 18 Approvals for disturbance to Aboriginal sites.</li> <li>Department of Environment and Conservation approvals for removal of Significant Flora and Fauna.</li> </ul> <p><b>Internal Permits/Approvals</b></p> <ul style="list-style-type: none"> <li>Internal approval for land disturbance shall be issued by the Site Manager prior to any clearing activities.</li> </ul> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>Only the minimum area required by the project shall be disturbed.</li> <li>Personnel shall undergo environmental induction training which discusses the importance of minimising vegetation clearing and disturbance.</li> <li>Locations of Aboriginal sites, significant flora, significant vegetation units, significant fauna habitats, river crossings, and quarantine boundaries shall be demarcated on site plans as part of the internal land disturbance approval. These areas shall be managed according to relevant permits and management plans.</li> <li>Topsoil management for the land disturbance shall be described as part of the internal approval process.</li> <li>Prior to commencement of works, areas to be disturbed shall be demarcated in the field by a reference to design / site plans. This will constitute a hold point requiring written approval from the Site Manager.</li> <li>Vehicles and machinery shall only use designated tracks/roads.</li> <li>Where possible, raised blade disturbance shall be conducted to minimise vegetation removal.</li> <li>Vegetation when removed shall either directly placed on disturbed areas or be mulched and stockpiled for use during rehabilitation.</li> <li>Vegetation shall not be burnt without written approval of the Site Manager.</li> <li>Rehabilitation shall be undertaken as soon as practicable after land disturbance.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>No unapproved land disturbance.</li> </ul>	

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### Monitoring

The Site Manager shall regularly inspect construction areas to ensure:


- Land Disturbance Plans are followed;
- Disturbance limits are adequately demarcated; and
- Only authorised disturbance is being undertaken.

### Reporting

- Unauthorised clearing shall be reported and managed as an incident as per the CEMS procedures.
- Land disturbance outside of approved project areas shall be reported to the relevant local and state authorities.


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<b>EMP - 08</b> Haul Roads and Access Tracks	Project Wide
<p><b>Objective</b></p> <ul style="list-style-type: none"> <li>To minimise direct adverse impacts on flora, fauna, vegetation and natural surface water systems.</li> </ul>	
<p><b>Management</b></p> <p><i>Planning</i></p> <ul style="list-style-type: none"> <li>Where practicable, existing roads and tracks shall be used in preference to clearing new areas.</li> <li>Routes will be located, whenever possible, along contours and on the lower slopes of hills to minimise earth movement and erosion potential.</li> <li>Haul roads and access tracks will be designed to avoid, where practicable, drainage lines and dense vegetation stands.</li> <li>Where practicable, creek crossings will be approached from a perpendicular angle and with a gentle gradient.</li> <li>Tracks will be designed and constructed to avoid unnecessary obstruction to water ways and drainage lines.</li> <li>Disturbance to riverine vegetation will be minimised.</li> </ul> <p><i>Construction</i></p> <ul style="list-style-type: none"> <li>Erosion will be minimised by breaking windrows to allow drainage.</li> <li>Haul roads will be cambered to channel surface water run-off from the road and allow surface water flow through the existing area by using culverts and floodways.</li> <li>Where possible, clearing will not be carried out for tracks which are intended for 'once-only use'.</li> <li>Grading of tracks will be minimised and used only on rough, long sections of cleared tracks.</li> <li>Access tracks will be made to the minimum width possible without impacts to driver safety.</li> <li>Deep cutting into the soil profile will be avoided where possible.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>No evidence of unnecessary access tracks or unapproved access tracks.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>Regular inspections by the Site Manager shall be undertaken to verify that the haul roads and access tracks are used and maintained to the above requirements.</li> </ul>	


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**Reporting**


- Major erosion events of the haul roads and access tracks will be reported and remedied.
- Unapproved access tracks shall be reported and investigated by the Site Manager.

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<b>EMP - 09</b> Borrow Pits and Quarries	Project Wide
<p><b>Objective</b></p> <ul style="list-style-type: none"> <li>To maintain the integrity, ecological functions and environmental values of soil and landform.</li> <li>To ensure that aesthetic values are considered and measures adopted to reduce visual impacts on the landscape to as low as reasonable practicable.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Where possible, borrow pits and quarries shall be located behind physical terrain and/or vegetation belts or otherwise in areas that would reduce its visual impact.</li> <li>Where possible, borrow pits and quarries shall not be located in areas where their presence would impact on surface drainage patterns.</li> <li>Where possible, trees and heavy stands of vegetation shall be avoided.</li> <li>Where possible, each borrow pit and quarry will not exceed 1 ha in surface area.</li> <li>Access to borrow pits and quarries will be from a single track only.</li> <li>The removal of borrow material will be limited to inside the designated pit area.</li> <li>Drainage and erosion control structures will be developed around the pit to control the impact of substantial rainfall events.</li> <li>Borrow pits and quarries shall be rehabilitated as soon as possible after use, and shall be landscaped to best fit into the existing environment.</li> <li>The final depth of borrow pits and quarries shall not be more than 2 m.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Minimal visual impact from borrow pits and quarries.</li> <li>Free draining and safe structures are achieved as part of borrow pit and quarry rehabilitation.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>Monitoring of rehabilitation will occur as noted in the <b>Rehabilitation EMP</b>.</li> <li>The Site Manager will verify compliance with this procedure as part of routine site inspections.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Non-compliance with borrow pit and quarry specifications shall be reported by personnel and investigated by the Site Manager.</li> </ul>	

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<b>EMP - 10 Mine Waste Dumps</b>	Project Wide
<p><b>Objective</b></p> <ul style="list-style-type: none"> <li>To maintain the integrity, ecological functions and environmental values of soil and landform.</li> <li>To ensure that aesthetic values are considered and measures adopted to reduce visual impacts on the landscape to as low as reasonable practicable.</li> </ul>	
<p><b>Management</b></p> <p><i>Mine Waste dump design</i></p> <ul style="list-style-type: none"> <li>A waste dump design and management plan will be prepared prior to construction taking into account the final mine closure plan.</li> <li>Where possible and feasible, waste dumps will be constructed to abut existing hills and slopes.</li> <li>Waste dumps located near drainage channels will be monitored and rock armoured if necessary to prevent scouring and erosion.</li> <li>Where required, windrows will be used along the toe and crest of slopes to prevent erosion of the face from surface water run-off. Bottom windrows will help contain eroded material.</li> <li>Where practicable, waste dumps will be constructed with a rounded footprint and blended into existing hill slopes.</li> </ul> <p><i>Acid forming materials</i></p> <ul style="list-style-type: none"> <li>Acid forming materials that are present in waste rock material shall be managed in accordance with DoIR requirements.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Compliance with the DoIR guidelines on waste dump construction.</li> <li>Minimal visual impact of waste dumps.</li> <li>100% isolation of acid forming materials.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>Monitoring of rehabilitation will occur as noted in the <b>Rehabilitation EMP</b>.</li> <li>The Site Manager will inspect and maintain drainage and erosion control structures during the rainfall season.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Waste dump plans shall be approved by the Site Manager prior to the commencement of construction.</li> <li>Major erosion occurrences are to be reported to the Site Manager and investigated as per the CEMS procedures.</li> </ul>	

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<b>EMP - 11</b> Working near the Marine Environment	Port
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the integrity, ecological functions and environmental values of the seabed and coast.</li> <li>To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Personnel shall be made aware of the potential of unplanned discharge and its impacts to the marine environment during construction activities.</li> <li>Hydrocarbons and chemicals at the port shall be secondarily contained regardless of volume.</li> <li>Appropriate and sufficient spill clean up equipment shall be available at work areas, and be used to remove spills as they occur.</li> <li>Hydrocarbon and chemical transfers shall not be conducted near or over water without a documented risk assessment and approval from the Site Manager.</li> <li>Wherever possible water interfacing with construction activities at the port shall be contained and reused in the process.</li> <li>Waste materials shall be appropriately contained and removed from the area on a routine basis.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>No evidence of spills or litter.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>The Site Manager shall inspect work areas for inappropriate management of waste, hydrocarbons and chemicals as part of routine inspections.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Discharges to the marine environment shall be reported as required.</li> </ul>	

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<b>EMP - 12</b> Surface Water	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the quality and quantity of surface water so that existing and potential environmental values, including ecosystem maintenance, are protected.</li> <li>To maintain the integrity, ecological functions and environmental values of wetlands and drainage systems.</li> <li>To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.</li> </ul>	
<p><b>Regulatory Permits/Approvals</b></p> <ul style="list-style-type: none"> <li>Bed and Banks Permits for disturbance to beds and banks of waterways</li> <li>Licence 5C to harvest surface water</li> </ul>	
<p><b>Management</b></p> <p><i>Design</i></p> <ul style="list-style-type: none"> <li>An investigation to determine storm / surface water management requirements shall be completed as part of project design.</li> <li>Drainage structures shall be designed and constructed to ensure minimal alteration to existing surface drainage patterns.</li> <li>Bridges and culverts shall be designed to accommodate design floods without undue backwater and scour.</li> <li>Appropriate design standards will be applied to allow for the provision of scour protection measures.</li> <li>Haul roads and access tracks shall be designed to minimise interference to natural drainage.</li> <li>The pipeline route will be designed so that it crosses major creeks as close to right angles as practicable to minimise the extent of damage to riverine vegetation.</li> <li>Drainage areas and settling basins will be suitably designed to minimise contamination of surface water.</li> </ul> <p><i>Watercourses and Water Quantity</i></p> <ul style="list-style-type: none"> <li>Culverts will be placed under roads, embankments and formations to allow free flow of drainage water and to assist in water shedding from the site. Culverts will also be placed where existing natural drainage lines are crossed.</li> <li>Where practicable, construction of watercourse crossings will be scheduled during dry periods.</li> </ul>	

- Where practicable, clearing of slopes leading to watercourses will be delayed until construction of the crossing is imminent thus minimising erosion and sedimentation risk. Bank stabilisation will be undertaken at these locations.
- Cleared vegetation and topsoil will be stockpiled away from watercourses and in discrete stockpiles to avoid any interference to surface flows.

#### *Water Quality*

- Contaminated water from construction and operational activities shall be kept separate from clean storm water.
- Water interfacing with construction work areas and activities, at the mine and the port, shall be directed to treatment plants or sediment ponds. Oily materials and sediments will be removed prior to reuse of the water.
- Saline water and water interfacing with potentially acid forming material will be contained and managed separately from general storm water.

#### *Mosquito Control*

- Water retention structures shall be designed to reduce the risk of mosquito breeding.
- Active mosquito control measures will be undertaken as and when required

#### **Performance Targets**

- No significant erosion or sedimentation due to project activities.
- No significant disruption to natural drainage flows.
- No evidence of impacts from acidic or saline water.

#### **Monitoring**

- Regular inspections of drainage structures and erosion control measures will be carried out as soon as possible after periods of heavy rainfall.

#### **Reporting**

- Pollution and erosion events and ‘near-miss’ situations shall be reported by personnel and investigated by the Site Manager.

**EMP - 13** Groundwater

Mine Only

**Objectives**

- To maintain the quality and quantity of ground water so that existing and potential environmental values, including ecosystem maintenance, are protected.
- To maintain the integrity, ecological functions and environmental values of wetlands and drainage systems.
- To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

**Regulatory Permits/Approvals**

- Licence to extract ground water (dewatering).

**Management**


*Design*

- Wherever possible, the project shall review options to reduce water requirements and utilise alternative sources of water.
- An investigation to determine groundwater characteristics and management requirements shall be completed as part of project design.
- The extent of dewatering and its associated impacts to groundwater dependent ecosystems and stygofauna shall be determined.
- Impact reduction measures shall be implemented where required. This may include design of extraction bore fields and rates of extraction.
- A Groundwater Management Plan shall be developed and implemented to the satisfaction of the Department of Environment and Conservation. This plan shall include appropriate trigger values, a monitoring program, and impact management strategies.

*Groundwater Quality*

- Groundwater contamination shall be prevented by appropriate secondary containment and management of waste and hazardous materials, and management of surface water quality.
- Acid forming tailings and waste rock materials shall be vertically separated from the groundwater table.
- Trigger values for groundwater quality shall be developed. These shall reflect parameters that affect the health of ecosystems including remnant vegetation, and stygofauna.

*Groundwater Quantity*

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- Rate and volume of groundwater extraction shall be in accordance with the Department of Environment and Conservation permits.
- Trigger values for groundwater levels shall be developed to reflect conservation of the health of ecosystems including remnant vegetation, and stygofauna.

**Performance Targets**


- No exceedance of trigger values as specified in the Groundwater Management Plan.

**Monitoring**


- Groundwater extraction rates shall be recorded and documented.
- A program shall be established to monitor groundwater quality and quantity on and adjacent to the project area. This shall include a network of monitoring bores at appropriate locations to be determined in consultation with the Department of Environment and Conservation.
- The program shall include an assessment of impacts to groundwater dependent vegetation, stygofauna, and other relevant ecosystem indicators.
- The monitoring program shall be implemented to the satisfaction of the Department of Environment and Conservation.

**Reporting**


- Compliance and performance reports shall be provided to the Department of Environment and Conservation as required.

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<b>EMP - 14</b> Subterranean Fauna Management	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Prior to significant dewatering activities, a Stygofauna Sampling Program shall be implemented in consultation with the Department of Environment and Conservation.</li> <li>The extent of impact to Stygofauna species and populations shall be qualified and presented to the Department of Environment and Conservation for assessment.</li> <li>If required, a Stygofauna Management Plan shall be developed and implemented to the satisfaction of the Department of Environment and Conservation. The plan shall include trigger values for ground water levels and quality, monitoring programs to quantify project impacts to Stygofauna, and impact mitigation measures.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Management trigger values and responses of Stygofauna in accordance with the Stygofauna Management Plan.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>The Site Manager shall ensure that the requirements of the Stygofauna Management Plan are implemented.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Summary reports based on the data collected in surveys and monitoring programs shall be provided to the Department of Environment and Conservation as part of the on-going consultation on management options.</li> </ul>	

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<b>EMP - 15</b> Groundwater Dependent Vegetation	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.</li> <li>To quantify and mitigate project-induced effects on phreatophytic vegetation within the vicinity of project area.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Prior to significant dewatering activities, a bi-seasonal survey shall be conducted in areas likely to be impacted by groundwater draw down.</li> <li>The extent of impact to ground water dependent vegetation units and ecosystems shall be qualified and presented to the Department of Environment and Conservation for assessment.</li> <li>If required, a Groundwater Dependent Vegetation Management Plan shall be developed and implemented to the satisfaction of the Department of Environment and Conservation. The plan shall include trigger values for ground water levels and quality, monitoring programs to quantify project impacts to these ecosystems, and impact mitigation measures.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Management trigger values and responses of specific vegetation in accordance with the Groundwater Dependent Vegetation Management Plan.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>The Site Manager shall ensure that the requirements of the Groundwater Dependent Vegetation Management Plan are implemented.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Summary reports based on the data collected in surveys and monitoring programs shall be provided to the Department of Environment and Conservation as required.</li> </ul>	

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<b>EMP - 16 Construction Dust Management</b>	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Dust modelling shall be conducted as part of project design to determine potential impacts to sensitive receptors. This includes impacts of dust deposition on vegetation, as well as PM<sub>10</sub> levels at nearby residences.</li> <li>Information from the modelling shall be used to determine required management practices.</li> <li>Water tankers will be used to moisten areas which have the potential to generate dust, including areas that receive heavy traffic, unsealed roads and access tracks.</li> <li>Vegetation clearing and exposed surfaces will be kept to a minimum wherever practicable.</li> <li>Vehicle speeds will be restricted on site.</li> <li>The performance of dust suppression equipment will be monitored and equipment will be maintained in an efficient operating condition.</li> <li>Where unacceptable dust levels occur, further dust suppression controls will be implemented.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>No dust complaints from the community during construction.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>Periodic visual dust assessments are to be implemented by the Site Manager as part of routine site inspection.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Community complaints shall be investigated and reported to the Department of Environment and Conservation as required.</li> </ul>	

**EMP - 17 Construction Noise Management**

Project Wide

**Objectives**

- To protect the amenity of nearby residents from noise impacts resulting from construction activities associated with the proposal by ensuring noise levels meet statutory requirements and acceptable standards.

**Management**

- Noise modelling shall be conducted as part of project design to determine potential impacts to sensitive receptors.
- Information from the modelling shall be used to manage noise impacts through plant and equipment selection and appropriate construction methods.
- Design of plant and equipment (including selection criteria for mobile plant) will consider noise reduction objectives.
- Normal construction activities will only be undertaken during daylight hours in noise sensitive areas.
- Low-noise equipment will be used wherever practicable.
- Silencers, mufflers and noise barriers will be used where necessary.

**Performance Targets**


- No noise complaints from the community during construction.

**Monitoring**

- Monitoring may be undertaken to verify community complaints.

**Reporting**

- Community complaints shall be investigated and reported to the Department of Environment and Conservation as required.

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<b>EMP - 18</b> Waste and Hazardous Material Management	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To ensure that the construction wastes and hazardous materials are managed to acceptable standards and criteria.</li> </ul>	
<p><b>Management</b></p> <p><i>Stormwater catchments</i></p> <ul style="list-style-type: none"> <li>An investigation to determine storm / surface water management requirements shall be completed as part of project design.</li> <li>Stormwater interacting with the facilities and work areas described below shall be contained within an enclosed catchment through design of roads and drainage diversion channels.</li> <li>The water from these areas shall be directed to treatment plants or sediment ponds. Oily materials and sediments will be removed prior to reuse of the water.</li> </ul> <p><i>Bulk Storage Facilities</i></p> <ul style="list-style-type: none"> <li>Bulk hydrocarbons containers shall be stored and managed in accordance with <i>Australian Standard 1940 – The Storage and Handling of Flammable and Combustible Liquids (AS 1940-1993)</i>.</li> <li>Containers that are self banded (double skinned) shall be protected against collision by equipment and/or vehicles.</li> <li>Containers that are not self banded shall be secondarily contained in facilities with impervious floors and bunds, with a capacity to contain 110% of the volume of the largest tank or 25% of the total volume stored in the compound.</li> <li>Containers will be appropriately labelled as required by the relevant legislation.</li> <li>Areas adjacent to secondary storage facilities shall be graded to drain away from the facilities.</li> <li>Water or other liquids that collect in the storage facilities will be removed and treated. This is to maintain the containment capacity and integrity of the facility.</li> </ul> <p><i>Minor Storage</i></p> <ul style="list-style-type: none"> <li>Drums and small containers of hydrocarbon products shall be stored upright with lids on, in secondarily container facilities.</li> <li>Storage facilities shall have impervious floors and bunds, with a capacity to contain 110% of the volume of the largest container or 25% of the total volume stored in the compound.</li> <li>Drums and containers will be checked regularly for signs of corrosion and leaks.</li> <li>Containers shall be labelled.</li> </ul>	

### *Spills*

- Spill response equipment shall be readily accessible in each work area to enable quick response to spills. As a minimum, spill response equipment shall be located at fuel storage and transfer facilities, work areas near the marine environment or open water bodies, and at maintenance workshop areas.
- Spills shall be controlled at the source, contained and cleaned up as soon as they occur. Contaminated material shall be removed and bio-remediated (if biodegradable) or disposed at a licensed facility.
- Personnel shall be competent in spill management.

### *Waste Disposal*

- Storage of waste oil on site will be in accordance with the *Dangerous Goods Regulations 1992*.
- Waste oil shall be managed in accordance with the bulk storage and / or minor storage management requirements described above.
- Where practicable, waste materials shall be minimised by reuse and recycling.
- Oily waste materials (filters, rags, spill clean up materials) shall be segregated from general waste, contained and disposed of off site at a licensed facility.

### *Bio-remediation Facility*


- Soil and biodegradable materials contaminated by hydrocarbons shall be disposed in a designated site for bioremediation in accordance with the Environmental Protection Authority Guidelines for Oil Farming of Oily Wastes.
- The bio-remediation facility shall be vertically separated from the groundwater table.
- Materials in the facility shall be placed at depths of less than 30 cm, aerated through periodic tilling and kept moist to encourage bacterial activity.
- When remediated materials contain acceptable levels of hydrocarbons (to be determined in consultation with the Department of Environment and Conservation), the materials shall be used in rehabilitation.

### *Workshop / Servicing Areas*

- Where practicable, a dry workshop policy will be implemented. Spills will be picked up by absorbent materials.
- Vehicles and mobile equipment shall be washed down on a concrete surface that drains to a sump. Oils and sediments shall be separated from the wash down water, prior to the water being re-used on site.

### *Explosives*

- Explosives will be stored in a secondarily contained magazine remote from the mine site and process plant, and managed in compliance with Department of Consumer and Employment Protection license.

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- Spills of nitrate based explosives shall be picked up, contained and removed from site.

**Performance Targets**


- No evidence of spills on site (spills cleaned up on occurrence).
- Compliance with secondary containment and risk abatement procedures.

**Monitoring**


- The Site Manager will regularly inspect construction activities to ensure that hazardous material and waste management systems are effective and in accordance with relevant procedures.
- Annual review of existing waste management procedures will be undertaken by the Site Manager.

**Reporting**


- Spills and non-compliance with procedures shall be reported by personnel and investigated by the Site Manager.
- Performance shall be reported to the Department of Environment and Conservation as required

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<b>EMP - 19</b> Fire Management	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To prevent and minimise the risk of a bushfire as a result of construction activities.</li> </ul>	
<p><b>Internal Permits/Approvals</b></p> <ul style="list-style-type: none"> <li>Internal approval for Hot Works shall be issued by the Site Manager.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>All employees and contractors will undergo a site environmental induction that includes bushfire prevention and emergency response procedures.</li> <li>Select site personnel will undergo advanced training in fire suppression.</li> <li>Fire breaks shall be established around the site in agreement with the Fire and Emergency Services Authority (FESA) and the Department of Environment and Conservation.</li> <li>Mobile plant and light vehicles shall be equipped with appropriate fire suppression equipment that complies with relevant Australian Standards and staff will be trained in its use.</li> <li>Internal hot work permits will be required for work that has the potential to create ignition sources. Hot works shall not occur with 3 m of vegetation without a prior risk assessment and written approval from the Site Manager.</li> <li>Fire extinguishing equipment shall be available at each work area where hot works occur, and shall be maintained in accordance with Australian Standards.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>No bush fires as a direct result of construction activities.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>Routine inspections of housekeeping, fire fighting equipment and fire breaks shall be undertaken by the Site Manager.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Fires shall be investigated by the Site Manager and reported to DoIR and the Department of Environment and Conservation as required.</li> </ul>	

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<b>EMP - 20</b> Sewage Management	Project Wide
<b>Objectives</b> <ul style="list-style-type: none"> <li>To ensure that sewage is managed to acceptable standards and criteria.</li> </ul>	
<b>Management</b> <ul style="list-style-type: none"> <li>Temporary and permanent sewage facilities shall constructed and maintained in accordance with Department of Health and Local Council requirements.</li> </ul>	
<b>Performance Targets</b> <ul style="list-style-type: none"> <li>Compliance with design and maintenance requirements.</li> </ul>	
<b>Monitoring</b> <ul style="list-style-type: none"> <li>As required by the Department of Environment and Conservation and Shire Health Inspector.</li> </ul>	
<b>Reporting</b> <ul style="list-style-type: none"> <li>As required by the conditions of the Department of Environment and Conservation Pollution Prevention Licence and the Shire Health Inspector.</li> </ul>	

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<b>EMP - 21</b> Housekeeping and General Waste Management	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To ensure that the construction general wastes are managed to acceptable standards and criteria.</li> </ul>	
<p><b>Management</b></p> <ul style="list-style-type: none"> <li>Waste generation, where practicable, will be minimised through the adoption of efficient designs, reduction of materials required, and reuse and recycling where practicable.</li> <li>As a minimum batteries and scrap metal shall be recycled.</li> <li>Waste shall be segregated into general waste, recyclable wastes and hazardous waste.</li> <li>General waste shall either be buried in a license landfill on site (in accordance with the Department of Environment and Conservation requirements) or removed to the municipal tip by a contractor.</li> <li>If possible recyclable waste shall be removed by a contractor to a recycling facility.</li> <li>Waste receptacles shall be available at the appropriate locations to enable waste segregation and containment.</li> <li>Waste shall be secured against wind blown litter and animal foraging.</li> <li>Littering shall be prohibited.</li> <li>Work areas shall be kept neat and tidy.</li> <li>On decommissioning of a work area, non-permanent structures and facilities will be removed and disposed of appropriately in accordance with <b>Rehabilitation EMP</b>.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>High standard of general house keeping on site.</li> <li>Wastes are segregated and recycling opportunities have been maximised.</li> </ul>	
<p><b>Monitoring</b></p> <ul style="list-style-type: none"> <li>The Site Manager shall conduct routine inspections of construction areas and enforce this procedure.</li> </ul>	
<p><b>Reporting</b></p> <ul style="list-style-type: none"> <li>Non-compliance with this procedure shall be reported to the Site Manager.</li> </ul>	

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<b>EMP - 22</b> Greenhouse Gas Emissions	Project Wide
<b>Objective</b> <ul style="list-style-type: none"> <li>To minimise greenhouse gas emissions to levels as low as practicable from construction activities.</li> </ul>	
<b>Management</b> <ul style="list-style-type: none"> <li>Materials shall be re-used and recycled where ever practicable.</li> <li>Energy-efficient designs shall be a consideration in plant and equipment selection.</li> <li>The efficient use of energy will be actively promoted in mobile equipment use, driving habits, fuel selection, and maintenance regimes.</li> </ul>	
<b>Performance Targets</b> <ul style="list-style-type: none"> <li>N/A.</li> </ul>	
<b>Monitoring</b> <ul style="list-style-type: none"> <li>N/A.</li> </ul>	
<b>Reporting</b> <ul style="list-style-type: none"> <li>N/A.</li> </ul>	

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<b>EMP - 23</b> Rehabilitation	Project Wide
<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>To ensure, as far as practicable, that post-construction rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.</li> </ul>	
<p><b>Management</b></p> <p><i>Removal of Infrastructure and Landscaping</i></p> <ul style="list-style-type: none"> <li>Temporary infrastructure shall be removed, divested or otherwise disposed appropriately.</li> <li>Soil contaminated with hydrocarbons shall be removed and bioremediated.</li> <li>Borrow pits and other excavations shall be backfilled and surfaces battered to an angle of 20° or less. The maximum final depth of these structures shall be 2 metres.</li> <li>Disturbed areas shall be land formed to achieve free draining status and blend in with the surrounding environment.</li> <li>Pre-existing drainage networks will be re-established, where appropriate, to minimise erosion.</li> <li>Erosion and sedimentation will be minimised by the construction of erosion control berms.</li> <li>Windrows shall be broken as a minimum, and completely removed if possible.</li> <li>Compacted surfaces no longer required for construction and not required for operation shall be contour ripped to promote water penetration and the catchment of seeds.</li> </ul> <p><i>Revegetation</i></p> <ul style="list-style-type: none"> <li>Disturbed areas will be progressively rehabilitated wherever practicable.</li> <li>Topsoil (100 mm if available) and vegetation shall be spread over the area.</li> <li>If required, native provenance seeds shall be used to enhance revegetation.</li> <li>Dieback and weed boundaries and hygiene requirements shall be maintained during rehabilitation.</li> <li>Rehabilitated areas shall be sign-posted and protected from disturbance where possible.</li> <li>Areas where revegetation is not successful shall receive remedial attention where practicable.</li> </ul>	
<p><b>Performance Targets</b></p> <ul style="list-style-type: none"> <li>Progressive rehabilitation opportunities have been maximised.</li> <li>Successful re-establishment of pre-disturbance state to as close as practicable.</li> </ul>	


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### Monitoring

- Site inspections will be undertaken to ensure progressive rehabilitation is practiced where feasible.
- Decommissioning of temporary construction facilities will be monitored for compliance with this procedure.
- Success of rehabilitation shall be monitored and remedial actions provided where necessary.

### Reporting

- Compliance with this procedure shall be reported to the Department of Environment and Conservation at the end of construction as required.

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<b>EMP - 24</b> Continuous Improvement	Project Wide
<b>Objective</b> <ul style="list-style-type: none"> <li>To continually seek improvements in performance.</li> </ul>	
<b>Management</b> <ul style="list-style-type: none"> <li>Personnel shall be encouraged to continually improve their performance through incentive and recognition schemes.</li> <li>Improvement ideas shall be actively shared with the project construction team.</li> <li>Work practices and procedures shall be revised as a result of ideas or corrective actions. These changes shall be communicated to relevant personnel.</li> </ul>	
<b>Performance Targets</b> <ul style="list-style-type: none"> <li>Demonstrable improved performance.</li> </ul>	