roy hill iron ore pty ltd | june 2009








roy hill 1 iron ore mining project

stage 1 public environmental review
construction environmental management plan

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Table of Contents

List of Tables

1 Introduction

1.1 Project overview

The Roy Hill 1 Project has a total operating life of approximately 20 years; however the operation will be divided into two stages. The scope of the two stages is described below:

- Stage 1: construction of all infrastructure to meet the full 20 year life of mine, plus mining and processing ore from the Stage 1 Mining Area. Dewatering to provide 'dry' mining conditions in the Stage 1 area and advanced dewatering from future mining areas in Stage 2 in the southeast of the project area will supply the majority of water for operations. Additional water from opportunistic capture of rainfall will also be used to make up any shortfall. This will mean that all water requirements for Stage 1 would be sourced entirely from within the Project area and an external water supply would not be required. Saline water produced from dewatering will be disposed in an evaporation pond.
- Stage 2: mining and processing ore from the Stage 2 Mining Area and an external water supply.

1.2 Purpose of this document

This document is the Construction Environmental Management Plan (CEMP) designed for the constructional phase only of the Project. The CEMP provides the framework for managing environmental impacts from Stage 1 construction activities.

1.3 Objective

The objective of the CEMP is to minimise and, where possible, eliminate any adverse environmental impacts associated with construction of the Project. Each management plan within the CEMP describes the objectives for managing an individual environmental aspect.

1.4 Implementation

The CEMP will be implemented prior to the commencement of detailed mine design through to completion of mine construction. On completion of the construction phase the CEMP will be superseded by the Operation Environmental Management Plan (OEMP).

In the event that mine construction and operation activities occur concurrently within the Project area the CEMP will govern all construction activities and the OEMP will govern all operation activities.

1.5 Relevant legal and other requirements

The legal requirements of the OEMP are provided within Table 1-1 below, with non-legislative requirements provided in Table1–2.

Table 1–1: Commonwealth and Western Australian requirements applicable to the CEMP.

LEGISLATION
Commonwealth
Aboriginal and Torres Strait Islander Heritage Protection Act, 1984
Aboriginal and Torres Strait Islander Heritage Protection Regulations, 1984
Energy Efficiency Opportunities Act, 2006 and Regulations, 2006
Environment Protection and Biodiversity Conservation (EPBC) Act, 1999
Environment Protection and Biodiversity Conservation Regulations, 2000
National Greenhouse and Energy Reporting Act, 2007
Native Title Act, 1993
Western Australia
Aboriginal Heritage Act, 1972
Aboriginal Heritage Regulations, 1974
Agricultural and Related Resources Protection Act, 1976
Biosecurity and Agricultural Management Act, 2007
Bush Fire Regulations, 1954
Bush Fires Act, 1954
Conservation and Land Management Regulations, 2002
Conservation and Land Management, Act 1984
Contaminated Sites Act, 2003
Contaminated Sites Regulations, 2006
Dangerous Goods Safety (Explosives) Regulations, 2007
Dangerous Goods Safety (General) Regulations, 2007
Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations, 2007
Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations, 2007
Dangerous Goods Safety Act, 2004
Environment Protection and Biodiversity (EPBC) Act, 1999
Environment Protection and Biodiversity Conservation Regulations, 2000
Environmental Protection (Clearing of Native Vegetation) Regulations, 2004
Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations, 1998
Environmental Protection (Rural Landfill) Regulations, 2002
Environmental Protection (Unauthorised Discharges) Regulations, 2004
Environmental Protection Act, 1986
Health Act, 1911
Litter Act, 1979
Local Government Act, 1960
Mines Safety and Inspection Regulations, 1995
Mining Act, 1978
Pollution of Waters by Oil and Noxious Substances Act, 1987
Rights in Water and Irrigation Act, 1914
Rights in Water and Irrigation Regulations, 2000
Soil and Land Conservation Act, 1945
Soil and Land Conservation Regulations, 1992
Waterways Conservation Act, 1976
Waterways Conservation Regulations, 1981
Wildlife Conservation Act, 1950
Wildlife Conservation Regulations, 1970

Table 1–2: Non-legislative requirements applicable to the CEMP.

OTHER REQUIREMENTS
A Guide to the Application of the ANZECC/ARMCANZ Water Quality Guidelines in the Minerals Industry. Australian Centre for Mining Environmental Research, 2003
AS 5667.1:1998 Water Quality Sampling Part 1: Guidance on the Design and Sampling Techniques and the Preservation and Handling of Samples
AS/NZS 1158: Lighting for roads and public spaces
AS/NZS 1680: Interior lighting
AS/NZS 1798-1992: Lighting poles and bracket arms – Preferred dimensions
AS/NZS 3580.1.1:2007: Methods for sampling and analysis of ambient air, Part 1.1: Guide to siting air monitoring equipment.
AS/NZS 3580.1.1:2007: Methods for sampling and analysis of ambient air, Part 1.1: Guide to siting air monitoring equipment
AS/NZS 3580.10.1:2003: Methods for sampling and analysis of ambient air, Method 10.1: Determination of particulate matter – Deposited Matter – Gravimetric method.
AS/NZS 3580.9.8: 2001: Methods for sampling and analysis of ambient air, Method 9.8: Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.
AS/NZS 4065:2000: Concrete utility services poles
AS/NZS 4282-1997: Control of the obtrusive effects of outdoor lighting
AS/NZS 4676:2000: Structural design requirements for utility services poles
AS/NZS 4677:2000: Steel utility services poles
AS/NZS 4782 Double-capped fluorescent lamps
AS/NZS 60598: Luminaires
Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000
Australian Code for the Transport of Dangerous Goods by Road and Rail (Seventh Edition) (ADG Code), 2007
Australian Standard AS 1940-2004 - Storage and Handling of Flammable and Combustible Liquids
Building Code of Australia: Mandatory energy efficiency measures for Class 2, 3 and 4 buildings
Department of Environment and Conservation (DEC) Contaminated Sites Guidelines
Enduring Value – the Australian Minerals Industry Framework for Sustainable Development
Environmental Notes on Firebreaks, March 2001
Environmental Notes on Waste Rock Dumps, January 2001
Environmental Protection Authority Guidance Statement No. 18 - Prevention of Air Quality Impacts from Land Development Sites, March 2000
Environmental Protection Authority Guidance Statement No. 18 - Prevention of Air Quality Impacts from Land Development Sites, March 2000
Environmental Protection Authority Guidance Statement No. 48 - Draft Guidance on Groundwater Environmental Management Areas
Environmental Protection Authority Guidance Statement No. 12 - Minimising Greenhouse Gas Emissions, October 2002
Environmental Protection Authority Position Statement No. 2 - Environmental Protection of Native Vegetation in Western Australia, December 2000
Environmental Protection Authority Position Statement No. 3 - Terrestrial Biological Surveys as an Element of Biodiversity Protection, March 2002
Environmental Protection Authority Position Statement No. 4 - Environmental Protection of Wetlands, November 2004
Environmental Protection Authority Position Statement No. 5 - Environmental Protection and Ecological Sustainability of the Rangelands in Western Australia, November 2004
Environmental Protection Authority Position Statement No. 6 - Towards Sustainability, August 2004
Environmental Protection Authority Position Statement No. 7 - Principles of Environmental Protection, August 2004
Environmental Protection Authority Position Statement No. 7 - Principles of Environmental Protection, August 2004
Environmental Protection Authority Position Statement No. 7 - Principles of Environmental Protection, August 2004
Environmental Protection Authority Position Statement No. 8 - Environmental Protection in Natural Resource Management, June 2004
Environmental Protection Authority Position Statement No. 9 - Environmental Offsets, January 2006
Environmental Protection Authority Water Quality Guidelines for Fresh and Marine Waters, 1993
EPA Position Statement No. 7 - Principles of Environmental Protection, August 2004
Framework for Responsible Mining
Guidelines for Mining in Arid Environments, June 1996
Guidelines for Mining in Arid Environments, June 1996

OTHER REQUIREMENTS
Guidelines for Mining in Arid Environments, June 1996
Guidelines for the Protection of Surface and Groundwater Resources During Exploration Drilling, November 2002
HB 69.12-2004: Guide to traffic engineering practice – Roadway Lighting
Mining Below the Water Table in the Pilbara, August 1999;
National Environmental Protection Measure for Ambient Air Quality.
National Environmental Protection Measure for Ambient Air Quality
Pollution of Waters by Oil and Noxious Substances Act, 1987

2 Construction flora management plan

The objectives, targets and strategies for flora management at the Project have been given in Table 2-1. Flora monitoring is outlined in Table 2-2, with reporting requirements in Table 2-3.

Table 2–1: Construction flora management plan.

CONSTRUCTION FLORA MANAGEMENT PLAN	
Objectives	Minimise adverse impacts on the abundance, species diversity, geographic distribution and productivity of vegetation communities. Avoid the disturbance of any protected or listed flora species or ecological communities identified within the Project Area.
Targets	No clearing to occur outside approved clearing areas. No Declared Rare Flora (DRF), Priority flora or Threatened Ecological Communities (TEC's) are removed.
Potential Flora Impacts	Construction of the Project has the potential to result in the following impacts on flora species and vegetation communities within and surrounding the Project Area: • habitat fragmentation and reduced connectivity; • direct loss of threatened flora or ecological communities; • direct loss of native pasture rangelands currently used for cattle grazing; • impacts on vegetation communities (mulga woodlands) and flora due to changes in surface hydrology (eg sheetflow), erosion or sedimentation; • loss of groundwater-dependent flora/vegetation as a result of hydrogeological changes, eg drawdown; - loss of flora as a result of dust or dust suppression activities; and - decline or loss in native vegetation resulting from the application of saline dust suppressants or "dust smothering" leading to decreased photosynthetic capacity.
Management Strategies	Minimise clearing of vegetation. Use markers or flagging tape to delineate areas of vegetation to be cleared. Use GPS software in earthmoving machinery navigation to identify clearing boundaries. Approval required from Environmental Site Manager prior to clearing. Develop and implement weed control/eradication measures including Weed Management Measures. Develop and implement Equipment Hygiene Procedures. Mine disturbance areas designed to avoid, minimise and/or mitigate impacts on pre-mining surface water flows, in particular sheetflow. Roads designed to avoid, minimise and/or mitigate impacts on pre-construction surface water flows, in particular sheetflow Discharge locations have minimal potential impacts on native vegetation. Surface water diversions will be located, where possible, to minimise impacts on native vegetation. Minimise discharge of mine water to the surface. Implement the Flora Monitoring Program to ensure mine impacts on vegetation communities (mulga woodlands) does not exceed those predicted prior to development. Conduct progressive rehabilitation at the earliest opportunity. Implement the Flora Monitoring Program to ensure mine impacts on Groundwater Dependant Flora do not exceed those predicted prior to development.

Table 2–2: Construction flora monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Site inspection to determine that all clearing is approved and in accordance with the Vegetation Clearing Procedure.	Weekly.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman
		Clearing outside of approved areas to be reported to the DEC and Department of Minerals and Petroleum (DMP) (formerly Department of Industry and Resources (DoIR)).	As required.	Site Environmental Manager.
Monitoring of vegetation to identify any decline or loss of flora.	Prior to construction.	Report any significant decline or loss of flora reported using the Incident Report Form.	Annually.	Site Environmental Manager.
Monitor spread of weeds and implement eradication measures to minimise impacts.	Prior to construction.	Identification of weeds to be reported to environmental personnel using the Environmental Daybook.	As required.	All personnel.
Mine and road design reviewed prior to final construction approval to determine any potential effects on vegetation as a result of surface hydrology, erosion and/or sedimentation	Prior to the construction approval of mine and road disturbance areas.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas is reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Monitoring of susceptible vegetation to identify any decline or loss of flora.	In accordance with the Flora Monitoring Program	Report any significant decline or loss of flora using the Incident Report Form.	As required.	Site Environmental Manager.
Mine design reviewed prior to final construction approval to determine any potential effects on vegetation as a result of surface hydrology, erosion and/or sedimentation.	Prior to the construction approval of mine disturbance areas.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Site Environmental Manager.
Monitoring of the condition of groundwater dependant vegetation to identify any stressed or dead vegetation inside and outside the predicted cone of depression.	In accordance with the Flora Monitoring Program.	Quarterly Condition Report of Groundwater Dependent Vegetation.	Quarterly.	Site Environmental Manager.
		Report any significant deaths of flora outside the predicted cone of depression to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.

Table 2–3: Construction flora reporting requirements and documents.

REPORTING REQUIREMENTS	
Procedures	Ground Disturbance Permit Procedure. Vegetation Clearing Procedure. Equipment Hygiene Procedure.
Programs	Flora Monitoring Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form. Quarterly Condition Report of Groundwater Dependent Vegetation.

3 Construction weed management plan

The objectives, targets and strategies for weed management at the Project have been given in Table 3–1. Monitoring is outlined in Table 3-2, with reporting requirements in Table 3-3.

Table 3–1: Construction weed management plan.

CONSTRUCTION WEED MANAGEMENT PLAN	
Objectives	Ensure construction activities do not result in the introduction of new weed species or spread of existing weed species within the Project Area. To reduce and where possible eradicate weeds within the Project Area.
Targets	No new weed species are introduced into the Project Area. Existing weed infestations are reduced or eliminated where possible within the Project Area.
Potential Weed Impacts	The construction activities associated with the Project have the potential to: • introduce new weed species, or spread existing weed species, within the Project Area; and • cause a loss in biodiversity resulting in ecosystem simplification.
Management Strategies	Prepare and display weed identification posters and include weed identification in site inductions, including the need to inform the Environmental team of new weed infestations. Weed identification and mapping. Weeds to be removed or controlled. No driving outside of designated roads and tracks. Implement Equipment Hygiene Procedure, including the use of vehicle washdown bays.

Table 3–2: Construction weed monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspection of known weed locations and to identify any new outbreaks.	Monthly.	Effectiveness of weed control/eradication measures to be reviewed and included in the Project Annual Report.	Annually.	Site Environmental Manager.
Site inspection to determine that posters are still on display and contain relevant information.	Monthly.	Not applicable.	Not applicable.	Area Superintendent.
Inspections to ensure compliance with the Equipment Hygiene Procedure.	Monthly.	Any non-compliance with the Equipment Hygiene Procedure reported using the Environmental Daybook.	As required.	Area Superintendent.
Inspection of topsoil stockpiles to ensure all efforts are made to retain soil properties.	Monthly.	Non-compliance with the Topsoil Management Procedure reported using the Environmental Daybook.	As required.	Area Superintendent.
Inspections conducted of known weed locations and to identify any new outbreaks.	Monthly.	Effectiveness of weed control/eradication measures to be reviewed annually and included in the Project Annual Report.	Annually.	Site Environmental Manager.

Table 3–3: Construction weed reporting requirements and documents.

REPORTING REQUIREMENTS	
Procedures	Equipment Hygiene Procedure. Weed Management Procedure.
Programs	Weed Management Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form.

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4 Construction fauna management plan

The objectives, targets and strategies for fauna management at the Project have been given in Table 4-1. Monitoring is outlined in 4-2, with reporting requirements in Table 4-3.

Table 4–1: Construction fauna management plan.

CONSTRUCTION FAUNA MANAGEMENT PLAN	
Objectives	Minimise the adverse impacts on terrestrial fauna abundance, diversity, geographic distribution and productivity at a species and ecosystem level. Avoid the disturbance of any protected or listed fauna which use or are present within the Project area and infrastructure corridors, eg realignment of the Marble Bar Road.
Targets	No clearing to occur outside approved clearing areas. No net loss of rare or priority fauna habitat.
Potential Fauna Impacts	Construction of the Project has the potential to result in the following impacts on fauna species within and surrounding the Project area: • loss of fauna due to habitat fragmentation and reduced connectivity; • direct loss of native fauna and/or stock from Project-related traffic (vehicle/train strike) and excavations; • loss of groundwater dependent fauna (stygofauna) as a result of hydrogeological changes, eg drawdown; • disturbance of native fauna and/or stock from Project related noise, dust and uncontrolled fires; • reduction in stock carrying capacity and access to watering points; • increased feral animal presence; and • adverse behavioural changes to migratory birds and other nocturnal fauna as a result of Project lighting.
Management Strategies	Implement relevant management plans and programs (Artificial Light Management Plan, Feral Animal Management Program, Subterranean Fauna Management Program) Minimise disturbance to native fauna habitat. Salvage native fauna habitat features during clearing for later placement on rehabilitated areas. Relocate fauna, if warranted. Progressively revegetate disturbance areas using local species that provide habitat that suits local native fauna. Trench open time to be minimised and trenches to contain adequate egress ramps. All drilling holes covered to prevent injury or death to fauna. Set and enforce vehicle speed limits on Project roads. Any injuries or fatalities to native fauna reported to the Environmental Team. No native fauna is to be captured or intentionally killed onsite. Avoid the use of barbed wire on site to protect native fauna. Evaporation pond to be fenced to protect native fauna and stock. Egress matting to be installed at intervals in all water storage areas, eg turkey's nests. Groundwater abstraction to be minimised consistent with dewatering requirements. Minimise area affected by groundwater drawdown, eg staged pits. Provide alternative watering points for stock. Monthly inspection to identify signs of feral animals on site and staff to report sightings of feral animals. All wastes disposed in containers with secure lids and seals.

Table 4–2: Construction fauna monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Site inspection to determine if all clearing is in accordance with the Vegetation Clearing Procedure.	Weekly.	Clearing outside of approved areas is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas is reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Mine design reviewed to ensure it avoids the disturbance of significant habitat features, where possible.	Prior to the approval of mine disturbance areas.	Clearing outside of approved areas is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Species Specific Fauna Relocation Program to be developed and implemented as required.	According to Species Specific Fauna Relocation Program.	Information of any species relocation included in the Project Annual Report.	Annually.	Site Environmental Manager.
Significant species monitored according to the Species Specific Fauna Monitoring Program.	According to Species Specific Fauna Monitoring Program.	Information of fauna monitoring programs included in the Project Annual Report.	Annually.	Site Environmental Manager.
Surveys/sampling to determine trends in species diversity and population status of terrestrial fauna.	Annually.	Effectiveness of fauna management measures to be reviewed annually and included in the Project Annual Report.	Annually.	Site Environmental Manager.
Trenches inspected to ensure adequate egress ramps are provided.	Daily.	Any fauna deaths associated with water storage areas to be reported using the Environmental Daybook.	As required.	Area Superintendent.
Inspection of random drill holes to assess if they are correctly covered.	Quarterly.	Inadequately covered holes reported to the Drilling Superintendent using the Environmental Daybook.	As required.	Drilling Superintendent.
Speed “traps” set up at random times to catch speeding vehicles.	Randomly selected (approximately twice per year).	Speeding drivers reported, fined/disciplined.	As required.	Site Safety Manager.
Inspect site periodically to assess compliance.	Monthly.	Report any use of barbed wire to Site Environmental Manager.	As required.	All personnel.
Inspection of fences to determine their integrity.	Quarterly.	Fence repair requirements to be reported using the Environmental Daybook.	As required.	Area Superintendent
Inspection of water storage areas for fauna deaths and condition of egress matting.	Daily.	Any fauna deaths associated with trenches to be reported using the Environmental Daybook.	As required.	Area Superintendent.
Recording of groundwater levels in accordance with Groundwater Monitoring Program.	In accordance with Groundwater Monitoring Program.	Monthly groundwater abstraction recorded in the sites groundwater register.	Monthly.	Site Environmental Manager.
		Immediately contact Department of water (DoW) if drawdown exceeds acceptable levels.	As required.	Site Environmental Manager.
In accordance with the Subterranean Fauna Management Program.	Biannually.	Effectiveness of Subterranean Fauna Management Program to be reviewed annually and included in the Project Annual Report.	Annually.	Site Environmental Manager.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Significant species monitored according to the Species Specific Fauna Monitoring Program.	According to Species Specific Fauna Monitoring Program.	Effectiveness of fauna fire management measures to be reviewed annually and included in the Project Annual Report.	Annually.	Site Environmental Manager.
Water quality at alternative stock water points is monitored in accordance with the Surface Water Monitoring Program to ensure it is safe for stock.	In accordance with the Surface Water Monitoring Program.	Exceedance of stock water quality guidelines reported to the stock owner.	As required.	Site Environmental Manager.
		Exceedance of stock water quality guidelines reported to the DoW.	As required.	Site Environmental Manager.
Inspection of mine site, camp site(s) and rehabilitation areas in accordance with the Feral Animal Management Program to identify any feral animals.	In accordance with the Feral Animal Management Program.	Not applicable.	Not applicable.	Area Superintendent
In accordance with the Feral Animal Management Program.	In accordance with the Feral Animal Management Program.	Outcomes of the Feral Animal Management Program included in the Project Annual Report.	Annually.	Site Environmental Manager.
In accordance with the Waste Management Plan.	In accordance with the Waste Management Plan.	Not applicable.	Not applicable.	Not applicable.
Inspections in accordance with the Light Monitoring Program.	In accordance with the Light Monitoring Program.	Outcomes of the Light Monitoring Program included in the Project Annual Report.	Annually.	Site Environmental Manager.
Inspections in accordance with the Light Monitoring Program.	In accordance with the Light Monitoring Program.	Replaced luminaries will be recorded in the Site Waste Register and disposed of in accordance with the Construction Waste Management Plan.	As required.	Area Superintendent.

Table 4–3: Construction fauna reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Construction Dust Management Plan. Construction Fire Management Plan. Construction Artificial Lighting Management Plan. Construction Noise Management Plan.
Procedures	Groundwater Monitoring Procedure. Subterranean Fauna Monitoring Procedure. Vegetation Clearing Procedure.
Programs	Feral Animal Management Program. Groundwater Monitoring Program. Light Monitoring Program. Species Specific Fauna Monitoring Program. Species Specific Fauna Relocation Program. Subterranean Fauna Management Program. Surface Water Monitoring Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form.

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5 Construction soil and landscape management plan

The objectives, targets and strategies for soil and landscape management at the Project have been given in Table 5–1. Monitoring is outlined in Table 5–2, with reporting requirements in Table 5-3.

Table 5–1: Construction soil and landscape management plan.

CONSTRUCTION SOIL AND LANDSCAPE MANAGEMENT PLAN	
Objectives	Maintain ecological integrity of the soil and maximise seed bank viability to contribute to regeneration of flora diversity. Stabilise the landscape to prevent erosion and mitigate potential for weed establishment. Final mine landforms are stable, revegetated and compatible with the surrounding natural topography.
Targets	No clearing to occur outside approved clearing areas. No significant erosion from soil stockpiles.
Potential Soil and Landscape Impacts	Construction of the Project has the potential to result in the following impacts associated with management of soil and landform within and surrounding the Project Area: • introduction and/or spread weeds; • increased sediment load in surface runoff; • increased dust emissions; • increased erosion and sediment movement from soil exposure (mine construction and vegetation clearance); • loss of soil resources through failure to strip and/or re-use soil from disturbance areas; • changes to soil structure beneath mine processing and infrastructure areas; and • contamination of soil by hydrocarbons, explosives, chemicals and acid mine drainage (AMD).
Management Strategies	Refer to the Construction Weed Management Plan. Refer to the Construction Surface Water Management Plan. Refer to the Construction Dust Management Plan. Refer to the Construction Chemical Management Plan and Construction Hydrocarbon Management Plan. Areas requiring topsoil stripping will be clearly demarcated in site plans prior to the clearing of any vegetation. Minimise clearing of vegetation. All vehicles will remain within designated roads and park only in allocated areas. If required, application of binding materials (ie dust suppressants) to topsoil stockpiles to prevent erosion. Regular inspections of topsoil stockpiles for evidence of water erosion. Topsoil stockpiles should be paddock-dumped to heights not greater than three metres. Approval from the Site Environment Manager must be sought prior to the commencement of any clearing activities. Salvage native fauna habitat features during clearing for later placement in rehabilitated areas.

Table 5–2: Construction soil and landscape monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspection of rehabilitation areas to identify any weed outbreaks.	Monthly.	Effectiveness of weed control/eradication measures to be reviewed annually and included in the Project Annual Report.	Annually.	Site Environmental Manager.
Inspect erosion and sediment control structures to ensure that they are functioning correctly.	Monthly.	Any damage diversion systems reported to the Area Superintendent.	As required.	Area Superintendent.
Monitoring of dust levels at selected Project roads, office buildings, Project campsites and sensitive residences in accordance with the Dust Monitoring Program.	In accordance with the Dust Monitoring Program.	Dust reported in accordance with the National Environment Protection Measure for Ambient Air Quality (Air NEPM).	In accordance with the Air NEPM.	Site Environmental Manager.
Prior to clearing mine design is reviewed to ensure it clearly demarcates areas where topsoil is to be stripped.	Prior to clearing approval.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Site inspection to determine that all clearing is approved and in accordance with the Vegetation Clearing Procedure.	Weekly.	Clearing outside of approved areas is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas is reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Inspection of vehicle parking areas to ensure all vehicles are parked within designated areas.	Weekly.	Not applicable.	Not applicable.	Area Superintendent.
Topsoil stockpiles inspected for evidence of wind erosion.	Monthly.	Not applicable.	Not applicable.	Area Superintendent.
Topsoil stockpiles inspected to ensure they are established correctly.	On establishment of a new stockpile.	Evidence of incorrect stockpiling reported to the Area Superintendent using the Environmental Daybook.	As required.	All personnel.
Inspection of active construction areas to ensure all chemical spills are dealt with according to the Chemical Spill Procedure and Hydrocarbon Spill Procedure.	Monthly.	Spills/leaks of hydrocarbons or chemicals (including explosives and AMD) are to be recorded using the Incident Report Form.	As required.	Area Superintendent.
		Reportable spills/leaks are reported to the DoW within 24 hours.	Within 24 hours of a reportable incident.	Site Environmental Manager.
		Incident report sent to the DoW within seven days.	Within seven days of a reportable incident.	Site Environmental Manager.
Inspection of site to determine if all clearing is approved and in accordance with the Vegetation Clearing Procedure.	Weekly.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Site inspected prior to clearing to identify habitat components for relocation to rehabilitation areas in	Prior to clearing.	Clearing outside of approved areas is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
accordance with the Vegetation Clearing Procedure.		Clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.

Table 5–3: Construction soil and landscape reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Construction Weed Management Plan. Construction Surface Water Management Plan. Construction Dust Management Plan. Construction Chemical Management Plan. Construction Hydrocarbon Management Plan.
Procedures	Vegetation Clearing Procedure.
Programs	Dust Monitoring Program.
Reports	Environmental Daybook. Incident Report Form.

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6 Construction surface water management plan

The objectives, targets and strategies for surface water management at the Project have been given in Table 6–1. Monitoring is outlined in Table 6-2, with reporting requirements in Table 6-3.

Table 6–1: Construction surface water management plan.

CONSTRUCTION SURFACE WATER MANAGEMENT PLAN	
Objectives	Maintain the quantity of water to protect the environmental values of the existing environment. Maintain the integrity, ecological functions and environmental values of the Fortescue Marsh (the Marsh). Manage surface water resources so that their beneficial uses are not compromised. Location of infrastructure to avoid, where possible, changes to hydrology. Treat potentially contaminated surface water before it leaves the Project boundary.
Targets	No significant change in surface water quality. No change in ecological functions and environmental values of the Marsh as a result of the mining operations.
Potential Surface Water Impacts	Construction of the Project has the potential to result in the following impacts to surface water within and surrounding the Project Area: • changes to surface water flow paths, velocities, water quality and mechanisms near mine landforms and infrastructure (including temporary diversion of creeks that cross mineralised areas, dewatering, realignment of Marble Bar Road and longer term post-closure landforms); • degradation (including changes in water balance) of downslope watercourses and the Marsh due to an increase in water erosion and sedimentation as a result of to land clearing and creek diversions; and • contamination of surface water by hydrocarbons, explosives, chemicals and AMD.
Management Strategies	Implement measures to reduce alterations in sheet flow and downstream sedimentation regimes from pits and infrastructure (levee banks and culverts). Develop and implement the Surface Water Monitoring Program and Surface Water Sampling Procedure consistent with the DoW guideline for mine site water quality monitoring. Design, install and manage surface water diversion structures that enable non-contaminated water to be directed around disturbance areas. Design, install and manage surface water diversion structures that enable potentially contaminated water to be treated. Potentially contaminated stormwater within the Project area to be harvested and used for construction activities, where appropriate. Install erosion and sediment control structures downstream of disturbance areas and design final mine landforms to be stable. Where surface water is present, vegetation removal on adjacent areas of relief will be delayed as long as is practicably possible to avoid erosion and sedimentation. Minimise discharge of mine water to the surface. Refer to the Construction Chemical Management Plan and Construction Hydrocarbon Management Plan.

Table 6–2: Construction surface water monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Mine design reviewed prior to final construction approval to determine potential impacts on surface hydrology.	Prior to the approval of mine disturbance areas.	Clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Design infrastructure to minimise impacts to on sheetflow.	Prior to construction.	Documented in annual Project report.	As required.	Project Manager.
Water quality sampling will be undertaken to determine compliance with the DoW guidelines.	In accordance with the Surface Water Monitoring Program.	Exceedances of the DoW guidelines will be reported to the DoW.	Within one week.	Site Environmental Manager.
		A summary of the results from the water monitoring program are included in the Project Annual Report.	Annually.	Site Environmental Manager.
All diversion systems to be inspected following heavy rainfall events to identify damage to the system.	Following significant rainfall events.	Damage to diversion systems are reported to the Area Superintendent.	As required.	All Personnel
Inspect erosion and sediment control structures to ensure that they are functioning correctly.	Monthly.	Damage to diversion systems reported to the Area Superintendent.	As required.	All Personnel
In accordance with Integrated Water Management.	As required.	Report non- compliance using the Environmental Daybook.	As required.	Area Superintendent
Inspection of operational areas to ensure any chemical spills have been dealt with according to the Chemical Spill Procedure and Hydrocarbon Spill Procedure.	Monthly.	Reportable spills/leaks are reported to the DoW within 24 hours.	Within 24 hours of a reportable incident.	Site Environmental Manager.
		Incident report sent to the DoW within seven days.	Within seven days of a reportable incident.	Site Environmental Manager.
Inspection to be conducted periodically to ensure compliance.	Monthly.	Non-compliance to be documented and reported to Site Environmental Manager.	Within 24 hours of reportable incident.	Area Superintendent.

Table 6–3: Construction surface water reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Conceptual Flood Management Plan. Construction Chemical Management Plan. Construction Hydrocarbon Management Plan.
Procedures	Chemical Spill Procedure. Surface Water Sampling Procedure.
Programs	Surface Water Monitoring Program.
Reports	Annual Report. DoW Incident Report. Environmental Daybook. Incident Report Form.

7 Construction groundwater management plan

The objectives, targets and strategies for groundwater management at the Project have been given in Table 7–1. Monitoring is outlined in Table 7–2, with reporting requirements in Table 7–3.

Table 7–1: Construction groundwater management plan.

CONSTRUCTION GROUNDWATER MANAGEMENT PLAN	
Objectives	The beneficial use of groundwater resources are not compromised during construction, operation and post-closure. Compliance with DoW Groundwater Licences. Minimise impact of groundwater abstraction on dependant flora, fauna and stock watering bores. Ensure changes to groundwater quality and flows (hydrogeology) do not adversely impact on the Marsh.
Targets	Compliance with all DoW groundwater licences.
Potential Groundwater Impacts	Construction of the Project has the potential to result in the following impacts to groundwater within and surrounding the Project Area: • localised drawdown near active pits and Project water supply extends below the pre-mining water table, impacting on groundwater dependant vegetation, subterranean fauna and stock watering bores; and • contamination of groundwater with hydrocarbons, explosives, chemicals and AMD.
Management Strategies	Implement the Dewatering Strategy to intercept the movement of saline water from the Marsh and deeper parts of the aquifer. Implement Integrated Water Management Plan. Limit any dewatering to the minimum required to safely mine mineralised areas below the pre-mining water table. Maximise water use efficiency at the Project and use water obtained from mine dewatering and surface water diversion structures. Maintain groundwater abstraction activities to ensure compliance with DoW licences. All drill holes covered to prevent contamination. Consider options for the disposal of groundwater to minimise the movement of highly saline water from the Marsh and the deeper parts of the aquifer. Refer to the Construction Chemical Management Plan and Construction Hydrocarbon Management Plan.

Table 7–2: Construction groundwater monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Monitoring of groundwater levels at strategically located bores in accordance with the Groundwater Monitoring Program and Groundwater Sampling Procedure.	In accordance with the Groundwater Monitoring Program.	All groundwater sampling recorded in the Groundwater Monitoring Register.	In accordance with the Groundwater Monitoring Program.	Site Environmental Manager.
		Reporting in accordance with groundwater licence conditions.	As required.	Site Environmental Manager.
		Annual Aquifer Review.	Annually.	Site Environmental Manager.
Mine design reviewed prior to final construction approval to ensure water efficiency measures have been incorporated.	Prior to the construction approval of mine disturbance areas.	Not applicable.	Not applicable.	Site Environmental Manager.
Monitoring of groundwater salinity at strategically located bores in accordance with the Groundwater Monitoring Program and Groundwater Sampling Procedure.	In accordance with the Groundwater Monitoring Program.	Reporting to the DoW in accordance with groundwater licence conditions.	In accordance with groundwater licence conditions.	Site Environmental Manager.
		Annual Aquifer Review.	Annually.	Site Environmental Manager.
Inspections of chemical storage areas, waste storage in accordance with the Construction Chemical Management Plan and Construction Hydrocarbon Management Plan.	In accordance with the Construction Chemical Management Plan and Construction Hydrocarbon Management Plan.	Spills/leaks of hydrocarbons, explosives, chemicals and AMD are to be recorded using the Incident Report Form.	As required.	Area Superintendent
		Reportable spills/leaks are reported to the DoW within 24 hours.	Within 24 hours of a reportable incident.	Site Environmental Manager.
		Incident report sent to the DEC within seven days.	Within seven days of a reportable incident.	Site Environmental Manager.
Inspection of random drill holes to assess if they are correctly covered.	Quarterly.	Inadequately covered holes reported to the Drilling Superintendent.	As required.	Drilling Superintendent.
Monitoring of treated groundwater to determine if remediation is successful.	In accordance with the Groundwater Monitoring Program.	Groundwater Monitoring Register.	As required.	Site Environmental Manager.
Review of monitoring program to occur annually.	In accordance with Integrated Water Management Plan.	In accordance with Integrated Water Management Plan.	Annually.	Site Environmental Manager.
Inspection to be conducted periodically.	Monthly.	In accordance with Integrated Water Management Plan.	Annually.	Site Environmental Manager.

Table 7–3: Construction groundwater reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Dewatering Strategy. Integrated Water Management Plan. Construction Chemical Management Plan. Construction Hydrocarbon Management Plan.
Procedures	Groundwater Sampling Procedure.
Programs	Groundwater Monitoring Program.
Reports	Annual Aquifer Review. Annual Report. Environmental Daybook. Groundwater Monitoring Register. Incident Report Form.

8 Construction general waste management plan

The objectives, targets and strategies for waste management at the Project have been given in Table 8–1. Monitoring is outlined in Table 8–2, with reporting requirements in Table 8-3.

Table 8–1: Construction waste management plan.

CONSTRUCTION WASTE MANAGEMENT PLAN	
Objectives	Ensure general waste (industrial, inert, recyclable and putrescible waste) is effectively contained and does not interact with the surrounding environment. Apply principles of waste minimisation through careful product selection, reuse and recycling. Waste management practices and procedures meet industry standards and satisfy statutory requirements.
Targets	All waste is either recycled or removed off site to the Shire of East Pilbara waste disposal facility.
Potential Waste Impacts	Construction of the Project has the potential to result in the following impacts associated with waste management within and surrounding the Project Area: • contamination of the surrounding environment from ineffective waste management; • detrimental impacts on human health; • pest species attracted to the Project Area; • decline in air quality (odours); and • decline in visual amenity.
Management Strategies	Apply the waste management hierarchy (ie elimination, reduction, reuse, recycling, treatment and disposal) into Project design. Where waste cannot be reused or recycled it will be removed offsite to the Shire of East Pilbara waste disposal facility. Chemical, hydrocarbon and other hazardous material will be transported off site to an appropriate waste disposal facility. Inform staff and contractors of waste management strategies and commitments (training and induction). Bins will have secure lids to prevent fauna access and wind-blown litter. No littering permitted.

Table 8–2: Construction waste monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspection of waste disposal facilities (bins).	Monthly.	Record waste generation statistics in the Site Waste Register.	Monthly.	Area Superintendent.
Inspection of recycling facilities to determine that no waste is inappropriately disposed.	Monthly.	Record waste generation statistics in the Site Waste Register.	Monthly.	Area Superintendent.
All staff completed the environmental induction.	Prior to commencing site work.	Not applicable.	Not applicable.	Site Environmental Manager.
Inspection of waste disposal facilities to determine that no waste is inappropriately disposed.	Monthly.	All DEC Controlled Waste Disposal Records are filed and stored for three years.	As required.	Area Superintendent.
Inspection of active construction and mining areas to identify any litter.	Weekly.	Not applicable.	Not applicable.	Area Superintendent.

Table 8–3: Construction waste reporting requirements and documents.

REPORTING REQUIREMENTS	
Reports	DEC Controlled Waste Disposal Records. Environmental Daybook. Incident Report Form. Site Waste Register.

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9 Construction chemical management plan

The objectives, targets and strategies for chemical management at the Project have been given in Table 9–1. Monitoring is outlined in Table 9-2, with reporting requirements in Table 9–3.

Table 9–1: Construction chemical management plan.

CONSTRUCTION CHEMICAL MANAGEMENT PLAN	
Objectives	Prevent the transport, storage and use of chemicals at the Project from contaminating soil, groundwater and/or surface water. Prevent the storage and use of chemicals at the Project from damaging flora and fauna on or surrounding the Project area. Ensure chemical leaks or spills are cleaned up and any necessary site remediation is undertaken.
Targets	All chemicals are stored, used and disposed of correctly. No chemicals contamination of soil, groundwater and/or surface water.
Potential Chemical Impacts	Construction of the Project has the potential to result in the following impacts associated with chemical management within and surrounding the Project Area: • contamination of soil, surface water and groundwater; and • loss of habitat, native flora and fauna (including subterranean fauna) and/or stock from exposure to chemicals, explosives and AMD.
Management Strategies	All chemicals to be correctly stored according to Australian Standards. All spills/leaks to be cleaned up in accordance with the Chemical Spill Procedure. Groundwater tested in accordance with the Groundwater Monitoring Program to identify any evidence of contamination. All chemically contaminated material is disposed of in accordance with the Chemical Spill Procedure. Ongoing monitoring of flora in accordance with the Flora Monitoring Program to identify any impacts of chemical leaks or spills. Ongoing monitoring of fauna in accordance with the Species Specific Fauna Monitoring Program to identify any impacts of chemical leaks or spills. Ongoing monitoring of alternative stock watering points in accordance with the Surface Water Monitoring Program.

Table 9–2: Construction chemical monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspection of active construction areas to ensure all chemicals are correctly stored.	Monthly.	Any incorrectly stored chemicals reported using the Environmental Daybook.	Ongoing.	Area Superintendent.
Inspection of active construction areas to ensure any chemical spills have been dealt with according to the Chemical Spill Procedure.	Monthly.	Spills/leaks of chemicals (including explosives and AMD) are to be recorded using the Incident Report Form.	As required.	Area Superintendent.
		Reportable spills/leaks are reported to the DoW within 24 hours.	Within 24 hours of a reportable incident.	Site Environmental Manager.
		Incident report sent to the DoW within seven days	Within seven days of a reportable incident.	Site Environmental Manager.
Sampling in accordance with the Groundwater Monitoring Program and Groundwater Sampling Procedure.	In accordance with the Groundwater Monitoring Program.	Contamination of groundwater reported using the Incident Report Form.	In accordance with the Groundwater Sampling Procedure.	Site Environmental Manager.
		Report describing any groundwater contamination sent to the DoW.	In accordance with the Groundwater Licence.	Site Environmental Manager.
In accordance with the Flora Monitoring Program.	In accordance with the Flora Monitoring Program.	Loss of habitat or flora as a result of chemical contamination is reported using the Incident Report Form.	As required.	Area Superintendent.
In accordance with the Species Specific Fauna Monitoring Program.	In accordance with the Species Specific Fauna Monitoring Program.	Loss of fauna as a result of chemical contamination is reported using the Incident Report Form.	As required.	Area Superintendent.
Water quality at alternative stock water points is monitored Surface Water Monitoring Program to ensure it is safe for stock.	In accordance with the Surface Water Monitoring Program.	Exceedance of stock water quality guidelines reported to the stock owner and DoW.	As required.	Site Environmental Manager.

Table 9–3: Construction chemical reporting requirements and documents.

REPORTING REQUIREMENTS	
Procedures	Chemical Spill Procedure. Groundwater Sampling Procedure.
Programs	Flora Monitoring Program. Groundwater Monitoring Program. Species Specific Fauna Monitoring Program. Surface Water Monitoring Program.
Reports	Annual Report. DEC Controlled Waste Disposal Records. DoW Incident Report. Environmental Daybook. Incident Report Form.

10 Construction artificial light management plan

The objectives, targets and strategies for artificial light management at the Project have been given in Table 10–1. Monitoring is outlined in Table 10–2, with reporting requirements in Table 10-3.

Table 10–1: Construction artificial light management plan.

CONSTRUCTION LIGHT MANAGEMENT PLAN	
Objectives	Adopt lighting practices to maximise energy efficiency, reduce greenhouse gas emissions and reduce the Project ecological footprint. Provide the minimum required lighting to satisfy Occupational Health and Safety (OHS) requirements and relevant Australian Standards. Minimise the disturbance of migratory avifauna associated with the Marsh. Minimise any reduction in amenity for the residents of Roy Hill Pastoral Station.
Targets	Minimise impacts associated with light. Where possible, usage of energy efficient lighting.
Potential Light Impacts	Construction of the Project has the potential to result in the following impacts associated with light management within and surrounding the Project Area: • unnecessary luminaires increase energy consumption and GHG emissions; • project lamps fail to satisfy OHS and Australian Standards; • adverse behavioural changes to nocturnal fauna and habitat fragmentation and reduced connectivity; and • reduction of staff or residential amenity.
Management Strategies	When not in use, lighting deemed not essential to personnel safety is to be switched off. Photo-electric cell sensors to be installed on all outdoor lighting. Ensure lamps maintain light output to Australian Standard and Building Code of Australia maintenance levels. Energy consumption of Project luminaires to be recorded. Position luminaries to directly focus on intended target. Select lighting with beam characteristics applicable to the task. Design, install and maintain a light monitoring program to ensure the objectives and initiatives of the EMP are incorporated into the Project design. Installation of electronic lighting control gear to manage voltage, reduce energy consumption and increase lamp life. Decrease luminance to minimum safe operating levels. Minimise light spill from Project luminaires. Luminary observations to be recorded at sensitive receptors. Appropriate, site specific trigger values will be established in the Light Monitoring Program. Expired luminaires will be appropriately disposed to prevent contamination to the environment.

Table 10–2: Construction artificial light monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
The site environmental manager will undertake regular site inspections to ensure all unnecessary Project lighting is switched off Inspections to be conducted in accordance with the Light Monitoring Program to be prepared.	Ongoing.	Project luminaire use to be annually reviewed as a component of the Light Monitoring Program.	Annually.	Site Electrician.
Monitoring program to be reviewed periodically.	Annually.	Performance to be recorded in Annual Project Report.	Annually.	Site Environmental Manager.
The site environmental manager will ensure replacement luminaires are correctly installed and operating within the required guidelines.	As required.	Replaced lamps will be recorded in the waste disposal register and disposed of in accordance with the Waste Environmental Management Plan.	Ongoing.	Site Electrician.
Inspections undertaken in accordance with the Light Monitoring Program to be prepared.	Implemented during operation.	Outcomes of the Light Monitoring Program included in the Project Annual Report.	Annually.	Site Manager.
Site specific monitoring procedure to be conducted in accordance with the Light Monitoring Program to be prepared.	Monthly.	If trigger values exceeded.	As required.	Site Environmental Manager.

Table 10–3: Construction artificial light reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Construction General Waste Management Plan. Construction Gaseous Air Emissions Management Plan.
Programs	Light Monitoring Program. Species Specific Fauna Monitoring Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form.

11 Construction hydrocarbon management plan

The objectives, targets and strategies for hydrocarbon management at the Project have been given in Table 11–1. Monitoring is outlined in Table 11-2, with reporting requirements in Table 11-3.

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Table 11–1: Construction hydrocarbon management plan.

CONSTRUCTION HYDROCARBON MANAGEMENT PLAN	
Objectives	Prevent the transport, storage and use of hydrocarbons at the Project from contaminating soil, groundwater and/or surface water. Prevent the storage and use of hydrocarbons at the Project from damaging flora and fauna on or surrounding the Project area. Ensure hydrocarbons leaks or spills are cleaned up and any necessary site remediation is undertaken.
Targets	All hydrocarbons are stored, used and disposed of correctly. No hydrocarbon contamination of soil, groundwater and/or surface water.
Potential Hydrocarbon Impacts	Construction of the Project has the potential to result in the following impacts associated with hydrocarbon management within and surrounding the Project Area: • hydrocarbon contamination of soil, surface water and groundwater; and • loss of habitat, native flora and fauna (including subterranean fauna) and/or stock from exposure to hydrocarbons.
Management Strategies	All hydrocarbons to be stored according to Australian Standard AS1940-2004. All spills/leaks to be cleaned up in accordance with the Hydrocarbon Spill Procedure. Groundwater tested in accordance with the Groundwater Monitoring Program to identify any evidence of contamination. Monitoring of surface water, groundwater and stock watering points. Remediation/disposal of any contaminated soil to remediation farm. Soil remediation farm to be aerated, fertilised and kept moist to encourage bioremediation. Ongoing monitoring of flora in accordance with the Flora Monitoring Program to identify any impacts of hydrocarbon leaks or spills. Ongoing monitoring of fauna in accordance with the Species Specific Fauna Monitoring Program to identify any impacts of hydrocarbon leaks or spills. Ongoing monitoring of alternative stock watering points in accordance with the Surface Water Monitoring Program.

Table 11–2: Construction hydrocarbon monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspect active construction areas to ensure all hydrocarbons are correctly stored.	Monthly.	Incorrectly stored hydrocarbons reported using the Environmental Daybook.	Ongoing.	Area Superintendant.
Inspect active construction areas to ensure any hydrocarbon spills have been addressed using to the Hydrocarbon Spill Procedure.	Monthly.	Spills/leaks of hydrocarbons are to be recorded using the Incident Report Form.	As required.	Area Superintendant.
Provide an oil storage tank at the vehicle washdown facility of 1,500L capacity.		Reportable spills/leaks are reported to the DoW within 24 hours.	Within 24 hours of a reportable incident.	Site Environmental Manager.
Provide an oil/contaminate tank of 5,000L at the refueling facility with offsite removal by road tanker.		Incident report sent to the DoW within seven days	Within seven days of a reportable incident.	Site Environmental Manager.
Sampling in accordance with the Groundwater Monitoring Program and Groundwater Sampling Procedure.	In accordance with the Groundwater Monitoring Program.	Contamination of groundwater reported using the Incident Report Form.	In accordance with the Groundwater Sampling Procedure.	Site Environmental Manager.
		Report describing any groundwater contamination sent to the DoW.	In accordance with the Groundwater Licence.	Site Environmental Manager.
Sampling of surface water, groundwater and stock watering points.	In accordance with Integrated Water Management Plan.	Monitoring results to be documented in Integrated Water Management Plan.	Annually.	Site Environmental Manager.
Inspection of the Soil Remediation Farm to ensure only soil contaminated with hydrocarbon is placed at the farm.	In accordance with the Soil Farm Remediation Procedure.	Incorrectly disposed soil at the Soil Land Farm is reported using the Environmental Daybook.	Ongoing.	Area Superintendant.
Soil to be sampled and laboratory tested for total recoverable hydrocarbon (TRH) and benzene, toluene, ethylbenzene and xylene (BTEX) to measure rates of bioremediation.	Quarterly.	Laboratory results and bioremediation volumes to be described in the Project Annual Report.	Annually.	Site Environmental Manager.
In accordance with the Flora Monitoring Program.	In accordance with the Flora Monitoring Program.	Loss of habitat or flora as a result of hydrocarbon contamination is reported using the Incident Report Form.	As required.	Area Superintendant.
In accordance with the Species Specific Fauna Monitoring Program.	In accordance with the Species Specific Fauna Monitoring Program.	Loss of fauna as a result of hydrocarbon contamination is reported using the Incident Report Form.	As required.	Area Superintendant.
Water quality at alternative stock water points is monitored Surface Water Monitoring Program to ensure it is safe for stock.	In accordance with the Surface Water Monitoring Program.	Exceedance of stock water quality guidelines reported to the stock owner and DoW.	As required.	Site Environmental Manager.

Table 11–3: Construction hydrocarbon reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Integrated Water Management Plan.
Procedures	Hydrocarbon Spill Procedure. Groundwater Sampling Procedure. Soil Farm Remediation Procedure.
Programs	Flora Monitoring Program. Groundwater Monitoring Program. Species Specific Fauna Monitoring Program. Surface Water Monitoring Program.
Reports	Annual Report. DoW Incident Report. Environmental Daybook. Incident Report Form.

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12 Construction dust management plan

The objectives, targets and strategies for dust management at the Project have been given in Table 12–1. Monitoring is outlined in Table 12–2, with reporting requirements in Table 12–3.

Table 12–1: Construction dust management plan.

CONSTRUCTION DUST MANAGEMENT PLAN	
Objectives	Minimise dust mobilisation into the atmosphere. Maintain air quality consistent with NEPM Ambient Air Quality Standards.
Targets	Air quality complies with the NEPM Ambient Air Quality Standards.
Potential Dust Impacts	Construction of the Project has the potential to result in the following impacts associated with dust within and surrounding the Project Area: • increase in dust due to vehicle movements, blasting, ore crushing/processing/loading activities and from disturbed areas that are cleared of native vegetation; • decline and/or loss of vegetation as a result of dust smothering; and • damage to the health of site personnel due to dust exposure.
Management Strategies	All vehicles will remain within designated roads and park only in allocated areas. Application of dust suppression techniques (eg water trucks with dribble nozzles) along roads and at locations of high dust risk, eg stockpiles. Trucks and construction plant should be well maintained, in accordance with manufacturer's specifications. Trips and trip distances should be reduced where possible. Limit the height and number of stockpiles. Revegetate any stockpiles not being used for long time periods. Modify working practices by limiting scrapers daily working hours and during times of high wind. Limit the laying of ballast during periods of high winds. Application of dust suppression techniques (eg water trucks with dribble nozzles) along roads and at locations of high dust risk, eg borrow pits. Management of saline dust suppressants. Monitor dust emission levels at high risk locations and sensitive receptors. Application of dust suppression techniques (eg water trucks with dribble nozzles) along roads, at locations of high dust risk, eg stockpiles. Minimise clearing of native vegetation.

Table 12–2: Construction dust monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Monitoring of susceptible vegetation in accordance with the Flora Monitoring Program to identify any decline or loss of flora	In accordance with the Flora Monitoring Program	Significant decline or loss of flora reported using the Incident Report Form.	As required.	Area Superintendant.
Monitor material stockpiling.	In accordance with Dust Monitoring Program.	Dust reported in accordance with the Air NEPM.	In accordance with the Air NEPM.	Site Environmental Manager
Road design reviewed prior to final construction approval to ensure that all roads are designed with spoon drains, windrows and sumps so that no saline water used in dust suppression leaves the site.	Prior to the construction approval of road.	Not applicable.	Not applicable.	Site Manager.
Drains and sumps are inspected to identify any damage.	Monthly.	Damage to drains, windrows or sumps is reported using the Environmental Daybook.	As required.	Area Superintendant.
Monitoring of dust levels at selected Project roads, office buildings, Project campsites and sensitive residences in accordance with the Dust Monitoring Program.	In accordance with the Dust Monitoring Program.	Dust reported in accordance with the Air NEPM.	In accordance with the Air NEPM.	Site Environmental Manager.
Site inspection to determine that all clearing is approved and in accordance with the Vegetation Clearing Procedure.	Weekly.	Clearing outside of approved areas is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Any clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Road and infrastructure design reviewed prior to final construction approval to ensure dust management measures have been incorporated.	Prior to the construction approval of road and infrastructure.	Not applicable.	Not applicable.	Site Manager.

Table 12–3: Construction dust reporting requirements and documents.

REPORTING REQUIREMENTS	
Procedures	Vegetation Clearing Procedure.
Programs	Dust Monitoring Program. Flora Monitoring Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form.

13 Construction gaseous air emissions management plan

The objectives, targets and strategies for air emission management at the Project have been given in Table 13–1. Monitoring is outlined in Table 13-2, with reporting requirements in Table 13-3.

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Table 13–1: Construction gaseous air emission management plan.

CONSTRUCTION GASEOUS AIR EMISSIONS MANAGEMENT PLAN	
Objectives	Maintain air quality consistent with NEPM Ambient Air Quality Standards. Minimise Green House Gas emissions during operation of the Project.
Targets	Air quality complies with the NEPM Ambient Air Quality Standards.
Potential Gaseous Air Emissions Impacts	Construction of the Project has the potential to result in the following impacts associated with gaseous air emissions at a local, regional and global level: • greenhouse gas emissions from the generation of electricity, burning of hydrocarbon transport fuel, fumes from blasting activities, disposal and treatment of waste and wastewater, and the decay of cleared native vegetation.
Management Strategies	Consider options for the fuel used for on-site electricity generation and efficiency of generators. Maximise energy efficiency of stationary equipment using electricity on-site. Maximise fuel efficiency of mobile equipment and fuel type used and minimise haulage distances. Regularly inspect, maintain and replace mobile equipment so that efficiency is maximised during the life of the item. Maximise the efficiency of blasting operations. Minimise production of waste materials and maximise efficiency of waste disposal and wastewater treatment. Minimise the area of native vegetation that is cleared and where possible avoid more heavily vegetated areas. Investigate carbon sequestration options to offset Project generated GHG emissions. Monitor, report and manage energy consumption. Quantify energy production, energy consumption, GHG emissions and efficiencies.

Table 13–2: Construction gaseous air emission monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Fuel efficiency of generating plant and energy efficiency of stationary equipment is reviewed prior to purchase or lease approval according to the Greenhouse Gas Accounting and Reporting Program.	Prior to purchase/lease approval of generating plant and stationary equipment.	Sustainability Report. National Greenhouse and Energy Reporting. Energy Efficiency Opportunities Reporting. Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.
Fuel efficiency and emissions profile of mobile equipment is reviewed prior to purchase/lease approval according to the Greenhouse Gas Accounting and Reporting Program.	Prior to purchase/lease approval of mobile equipment.	Sustainability Report. National Greenhouse and Energy Reporting. Energy Efficiency Opportunities Reporting. Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.
Mobile equipment inspections and maintenance will be recorded on the Site Mobile Equipment Service Certificate.	According to equipment operating manual.	Site Mobile Equipment Service Certificate.	According to equipment operating manual.	Site Maintenance Manager.
Explosive types will be selected to achieve minimal greenhouse gas emissions. Blasting procedures will be developed prior to blasting works and reviewed in stages in accordance with the Greenhouse Gas Accounting and Reporting Program.	Prior to blasting works/stages.	Sustainability Report National Greenhouse and Energy Reporting Energy Efficiency Opportunities Reporting Greenhouse Challenge Plus Reporting.	Annually.	Explosives Manager Site Environmental Manager.
In accordance with the Waste Disposal Procedure and the Wastewater Treatment Procedures.	During Project design phase then ongoing annually for life of Project.	Sustainability Report. National Greenhouse and Energy Reporting. Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.
Site inspection to determine that all clearing is approved and in accordance with the Vegetation Clearing Procedure.	Weekly.	Sustainability Report. Greenhouse Challenge Plus Reporting.	Annually.	Clearing Foreman Site Environmental Manager.
		Any clearing outside of approved areas to be recorded using the Incident Report Form.	As required.	Clearing Foreman
		Any clearing outside of approved areas to be reported to the DEC and DMP (formerly DoIR).		Site Environmental Manager.
In accordance with established Federal and State policies.	Monthly.	Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.
Consider on site and off site carbon sequestration options.	Annually.	Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.
Not applicable.	Prior to construction.	Greenhouse Challenge Plus Reporting.	Annually.	Site Environmental Manager.

Table 13–3: Construction gaseous air emission reporting requirements and documents.

REPORTING REQUIREMENTS	
Procedures	Greenhouse Gas Management Procedures. Waste Disposal Procedure. Wastewater Treatment Procedures. Vegetation Clearing Procedure.
Programs	Greenhouse Gas Accounting and Reporting Program.
Reports	Annual Report. Energy Efficiency Opportunities Reporting. Environmental Daybook. Greenhouse Challenge Plus Reporting. Incident Report Form. National Greenhouse and Reporting. Site Mobile Equipment Service Certificate. Sustainability Report.

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14 Construction noise and vibration management plan

The objectives, targets and strategies for noise management at the Project have been given in Table 14–1. Monitoring is outlined in Table 14–2, with reporting requirements in Table 14-3.

Table 14–1: Construction noise and vibration management plan.

CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN	
Objectives	Minimise noise generation. Minimise impacts on sensitive fauna. Avoid impacts of noise pollution on RHIO staff and sub-contractors. Avoid impacts to the amenity of nearby residents.
Targets	No adverse health impacts of from noise pollution on Project staff and contractors. No complaints from nearby residents.
Potential Noise and Vibration Impacts	Construction of the Project has the potential to result in the following noise related impacts within and surrounding the Project area: • restriction of available fauna habitat; • loss of amenity of nearby residence (Roy Hill homestead and construction accommodation camp) due to noise from: - vehicle movements within the Project area, the realigned Marble Bar Road; - blasting activities; - construction activities; and • noise related injuries to Project staff and contractors.
Management Strategies	Consider the operating noise, vibration and potential mitigation measures (eg sound absorption devices) of mobile equipment when selecting makes and models to purchase or lease. Regularly inspect, maintain and replace mobile equipment so that noise levels are minimised during the equipment life. Any blasting will be restricted to daylight hours and conducted to set schedules. Any noise complaints lodged are promptly responded to by the Site Environmental Manager. Blasting operation would comply with the most stringent airblast limit of 115dB Linear at the nearest noise sensitive dwellings.

Table 14–2: Construction noise and vibration monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspections to ensure that no clearing has occurred outside the approved time-period.	Weekly.	Clearing outside of approved times is to be recorded using the Incident Report Form.	As required.	Clearing Foreman.
		Clearing outside of approved areas is reported to the DEC and DMP (formerly DoIR).	As required.	Site Environmental Manager.
Road and infrastructure design reviewed prior to final approval to ensure noise management measures have been incorporated.	Prior to the approval of road and infrastructure construction.	Not applicable.	Not applicable.	Senior Project Engineer.
Noise specifications of mobile and fixed plant are reviewed prior to purchase or lease approval.	Prior to purchase/lease approval of mobile and fixed plant.	Not applicable.	Not applicable.	Site Procurement Manager.
Ongoing monitoring of construction noise to quantify impacts at nearby residences in accordance with the Noise Monitoring Program.	In accordance with the Noise Monitoring Program.	Exceedance of the *Environmental Protection (Noise) Regulations, 1997* is reported to the DEC.	As required.	Site Environmental Manager.
		Exceedances and complaints are summarised in the Project Annual Report.	Annually.	Site Environmental Manager.
Monitoring conducted according to the Noise Monitoring Program	In accordance with the Noise Monitoring Program.	Exceedance of the *Environmental Protection (Noise) Regulations, 1997* is reported to the DEC.	As required.	Site Environmental Manager.
		Exceedances and complaints are summarised in the Project Annual Report.	Annually.	Site Environmental Manager.
Complaints register reviewed to determine that all complaints have been closed out within a period of one month.	Monthly.	Acknowledgement of complaint issues to instigator describing how complaint will be addressed.	Within seven days.	Site Environmental Manager.
		Complaint response issued to the instigator describing any investigations, outcomes and management measures.	Within one month.	Site Environmental Manager.
		Exceedances and complaints are summarised in the Project Annual Report.	Annually.	Site Environmental Manager.

Table 14–3: Construction noise and vibration reporting requirements and documents.

REPORTING REQUIREMENTS	
Programs	Noise Monitoring Program.
Reports	Annual Report. Environmental Daybook. Incident Report Form.

15 Construction fire management plan

The objectives, targets and strategies for fire management at the Project have been given in Table 15–1. Monitoring is outlined in Table 15–2, with reporting requirements in Table 15-3.

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Table 15–1: Construction fire management plan.

CONSTRUCTION FIRE MANAGEMENT PLAN	
Objectives	To ensure Project activities do not result in the deliberate or accidental ignition of bushfire.
Targets	No bushfires started as a result of mining operation activities.
Potential Fire Impacts	Construction of the Project has the potential to result in the following impacts associated with fires within and surrounding the Project Area: • damage to infrastructure and facilities; and • damage, injury or death of people, flora and fauna.
Management Strategies	All vehicles run on diesel. Fire extinguishers fitted in all buildings, mining fleet, light vehicles and drill rigs. Structures that divert surface water flow (eg windrows and spoon drains and roads) will act as fire breaks. Field maintenance to be conducted on a fire break, eg cleared ground. All staff and sub-contractors will undertake fire safety training (OHS induction). No open fires permitted within the Project area. Regular liaisons with the Shire regarding current fire danger status, bushfires and fire bans Fire management coordinated by the Project Chief Fire Warden. A dust suppression vehicle capable of use as a fire response vehicle.

Table 15–2: Construction fire monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Inspections in accordance with the Safety Management Plan to ensure all fire fighting devices are in good working order.	Monthly.	Records of inspections and maintenance recorded in the Site Safety Register.	Monthly.	Chief Fire Warden.
Inspections to ensure fire breaks have been established.	Annually.	Firebreak status to be updated in the Site Safety Register.	Annually.	Chief Fire Warden.
Inspections to identify any field maintenance conducted in an inappropriate location.	Monthly.	Unsuitable field maintenance reported to the Workshop/Mechanical Manager using the Environmental Daybook.	As required	Site Maintenance Manager.
All staff completed the OHS induction.	Prior to commencing site work.	Not applicable.	Not applicable.	Site Safety Manager.
Site inspection to identify evidence of any open fires.	Monthly.	All fire events to be reported using the Incident Report Form.	As required.	Chief Fire Warden.
Contact with Shire Environment, Health and Safety Officer regarding fire risks in the area.	Monthly.	Not applicable.	Not applicable.	Chief Fire Warden.

Table 15–3: Construction fire reporting requirements and documents.

REPORTING REQUIREMENTS	
Plans	Safety Management Plan.
Reports	Environmental Daybook. Incident Report Form. Site Safety Register.

16 Construction Aboriginal heritage management plan

The objectives, targets and strategies for Aboriginal heritage management at the Project are given in Table 16–1. Monitoring is outlined in Table 16–2, with reporting requirements in Table 16-3.

Table 16–1: Construction Aboriginal heritage management plan.

CONSTRUCTION ABORIGINAL HERITAGE MANAGEMENT PLAN	
Objectives	Manage activities in a manner that complies with the *Aboriginal Heritage Act, 1972*. Protecting places and objects of Aboriginal heritage value that exist within the Project area.
Targets	No impact on Aboriginal heritage sites without approval from the Minister for Indigenous Affairs.
Potential Aboriginal Heritage Impacts	Construction of the Project has the potential to result in the following impact to Aboriginal heritage within and surrounding the Project Area: • damage to aboriginal heritage sites and/or ethnographical values located within or immediately adjacent to planned disturbance areas.
Management Strategies	Where possible avoid disturbance to known cultural heritage sites and places with recognised ethnographical values. Where disturbance of known cultural heritage sites and places with recognised ethnographical values cannot be avoided, obtain Ministerial consent under Section 18 (*Aboriginal Heritage Act, 1972*). Implement control measures to protect undisturbed cultural heritage sites adjacent to Project areas (eg signposts, fencing, awareness programs for personnel) in conjunction with the Nyiyaparli People. Any newly identified or unauthorised disturbances to culturally sensitive sites will be reported to the Department of Indigenous Affairs and representatives of the Nyiyaparli people. Staff and contractor site inductions will include cultural awareness.

Table 16–2: Construction Aboriginal heritage monitoring.

MONITORING	TIMING	REPORTING	TIMING	RESPONSIBILITIES
Conduct heritage surveys on any proposed new disturbance areas according to the Aboriginal Heritage Procedure.	Prior to work commencing in new disturbance areas.	Culturally sensitive sites will be immediately reported to the Department of Indigenous Affairs.	As required.	Archaeologists and/or Anthropological Consultant.
Site inspections to ensure compliance with any conditions of the Ministerial consent under Section 18.	In accordance with any conditions of the Ministerial consent under Section 18.	In accordance with any conditions of the Ministerial consent under Section 18.	In accordance with any conditions of the Ministerial consent under Section 18.	Indigenous Relations Coordinator.
Inspect implemented control measures in accordance with the Aboriginal Heritage Monitoring Program.	Biannually.	Report any disturbance of known cultural heritage sites to the Department of Indigenous Affairs and representatives of the Nyiyaparli people.	As required.	Indigenous Relations Coordinator.
Inspect known cultural heritage sites in accordance with the Aboriginal Heritage Monitoring Program to ensure unauthorised disturbances have not occurred.	Regular intervals as set out in the Aboriginal Heritage Management Procedure.	Report any disturbance of known cultural heritage sites to the Department of Indigenous Affairs and representatives of the Nyiyaparli people.	As required.	Indigenous Relations Coordinator.
Records to be kept of all site personnel and contractor inductions	Not applicable.	Report any suspected new heritage sites or artefacts.	As required.	All personnel.
		Report any damage to heritage sites using the Incident Report Form.	As required.	All personnel.

Table 16–3: Construction Aboriginal heritage reporting requirements and documents.

REPORTING REQUIREMENTS	
Programs	Aboriginal Heritage Monitoring Program. Aboriginal Heritage Management Plan.
Procedures	Aboriginal Heritage Management Procedure. Ground Disturbance Procedure.
Reports	DIA Section 18 Approvals. Environmental Daybook. Incident Report Form.

17 Training

Training will be provided to ensure all staff and contractors are aware of commitments and procedures pertinent to this CEMP. The training program will ensure staff are aware of the potential environmental impacts associated with the Project. The training program shall be inclusive of the following topics:

- An overview of the Project area's environmental value and the potential environmental impacts of Project activities; and
- The need to notify the Environmental Team of:
  - weed infestations;
  - fauna injuries/fatalities;
  - feral animal sightings;
  - any erosion of topsoil stockpiles;
  - any clearing outside of approved areas;
  - any water leaks;
  - any suspected new aboriginal heritage sites or artefacts; and
  - any damage to Aboriginal heritage sites.

Specific environmental training will be provided to staff and contractors to ensure they are provided with the skills to carry out specific responsibilities identified in the CEMP. These specific training requirements are described in the relevant monitoring programs.

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