

Iron Ore (WA)

Brockman 2 Operation Environmental Management Plan

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1 Introduction

1.1 Purpose

Hamersley Iron Pty Ltd (Hamersley Iron; a subsidiary of Rio Tinto Limited) owns and operates the Brockman 2 Operation.

Rio Tinto recognises that environmental management is an integral component of its operations and this is reflected within the Rio Tinto Iron Ore (RTIO) Health, Safety, Environment and Quality (HSEQ) Policy. To ensure that the objectives of this Policy are met, each operation is required to develop and implement an Environmental Management Program appropriate to their activities. This Environmental Management Plan (EMP) has been prepared to address these requirements and in addition, outlines how conditions and commitments of Ministerial Statement 131 (*Brockman No. 2 Detrital Iron Ore Mine*; issued 18 April 1991) are to be met. In addition, this plan has been amended to encompass key environmental factors associated with:

- Mining of pyritic black shale for the proposed Brockman 2 Phase 2B development, as this was not considered as part of the original assessment by Hamersley Iron; and
- Closure of the Brockman 2 Operations specific to the Phase 2B development.

1.2 Structure of EMP

The EMP is a management tool that details the methods and procedures that are applied in order to achieve the operations' environmental commitments and objectives.

The specific aims of this EMP are to:

- Summarise the relevant environmental factors potentially affected by the operation;
- Detail prevention, minimisation and mitigation measures for any environmental impacts of the operation;
- Detail site accountabilities and responsibilities for these measures; and
- Detail the monitoring and reporting process.

The EMP is a continually evolving document and process and shall be revised when substantial changes to the operation occur.

1.3 Environmental Management System

The EMP is an integral part of the RTIO Environmental Management System (IEMS) that is used to manage known and potential environmental impacts of the project and associated activities. The IEMS system is subject to internal system-audit by RTIO, external system-audit by ISO14001 accreditation bodies and other external audits (as required) by relevant regulatory agencies including, but not limited to, the Department of Water (DoW), Department of Mines and Petroleum (DMP), the Office of the Environmental Protection Authority (EPA) and Department of Environment and Conservation (DEC).

All personnel working on the Brockman 2 Operation are required adhere to IEMS, including this EMP, to ensure any impacts on the environment are managed in accordance with legal requirements and other commitments.

1.4 Scope of the EMP

Key environmental issues identified for Brockman 2 and covered in this EMP are:

- Flora;
- Fauna;
- Weeds;
- Topsoil;
- Fire;
- Dust;
- Noise;
- Non mineral waste;
- Hydrocarbons;
- Groundwater;
- Surface water;
- Mineral waste;
- Acid rock drainage (ARD);
- Greenhouse gases;
- Ground disturbance;
- Closure and rehabilitation; and
- Aboriginal heritage.

2 Definitions

AER	Annual Environmental Report
ARD	Acid Rock Drainage
AWT	Above water table
DEC	Department of Environment and Conservation
DoW	Department of Water
DMP	Department of Mines and Petroleum
EMP	Environmental Management Plan
EPA	Office of the Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986</i>
HSEQ	Health, Safety, Environmental and Quality
IEMS	Iron Environmental Management System
OWS	Oil Water Separator
RIWI Act	<i>Rights in Waters and Irrigation Act 1914</i>
RTIO	Rio Tinto Iron Ore
RTIOEP	Rio Tinto Iron Ore Expansion Project
SRE	Short Range Endemic

3 General Description

3.1 Location

The Brockman 2 Operation is located approximately 55km north-west of Tom Price. The Brockman deposits are located within a valley at the foot of the northern face of the Mount Brockman massif. Brockman 2 initially commenced as a contract operated mine and was transferred to Hamersley Iron in September 1998. The Nammuldi (stage 1) Operation is located adjacent to the Brockman 2 Operation and the two share a common mining fleet and some service infrastructure.

It should be noted that the two operations are regulated by the same DEC Operating Licence issued under Part V of the *Environmental Protection Act 1986* (EP Act) (L5258/1991/10: amended to include the Nammuldi-iron ore mine in May 2005). The Nammuldi Operation which was referred to the EPA in 1998 and subsequently assessed as a separate project, has a discrete management plan to meet the commitments outlined in the ministerial statement (approved on 28th Nov 2000, *Nammuldi-Silvergrass Iron Ore Project*, Statement 558) issued under Part IV of the EP Act.

3.2 Operation

The Brockman 2 Operation is a conventional open cut iron ore mine (Figure 1). The material is blasted before it is loaded into haul trucks and transported to the Run of Mine (ROM) hopper. Processing of the ore is a two stage crushing and screening operation. The resulting product is divided into lump and fines prior to being stockpiled. Product from the stockpiles is loaded into train wagons by front-end loader and transported along a 43km rail spur to the Rosella siding. It is then railed to the Port of Dampier where it is blended and stockpiled with products from the other Rio Tinto iron ore mines prior to shipping. A low-grade fines stockpile is retained on site for further processing. At the time of writing, approximately six Mt of this material was being screened at Brockman 2 for sale into the iron ore market.

The Brockman 2 Operation consists of the following facilities (Figure 2):

- Crushing plant;
- Stackers and conveyors;
- Light vehicle and heavy vehicle workshops;
- Plant workshop;
- Administration buildings;
- Fuel farm;
- Rail spur from the Rio Tinto mainline at Rosella siding;
- Laboratory;
- ANFO storage facility;
- Explosive magazines;
- Wellfield and distribution network
- Service and access roads;
- Haul roads and mine drainage structures;
- Waste dumps and low grade stockpiles;

- Powerline and distribution network
- Airstrip;
- Accommodation village and recreation facilities; and
- Waste management and sewage treatment facilities.

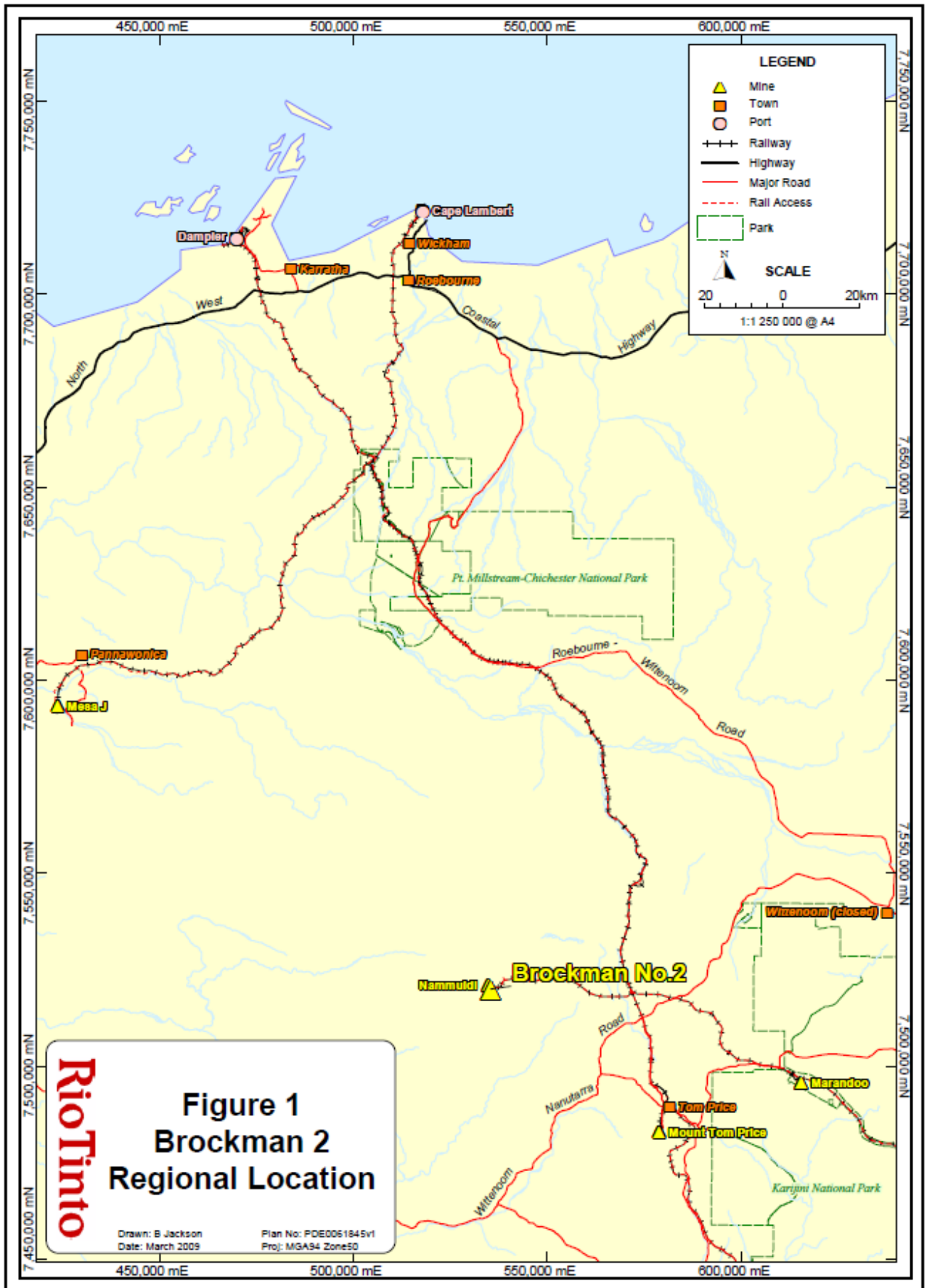


Figure 1 Location - Brockman 2 Operation

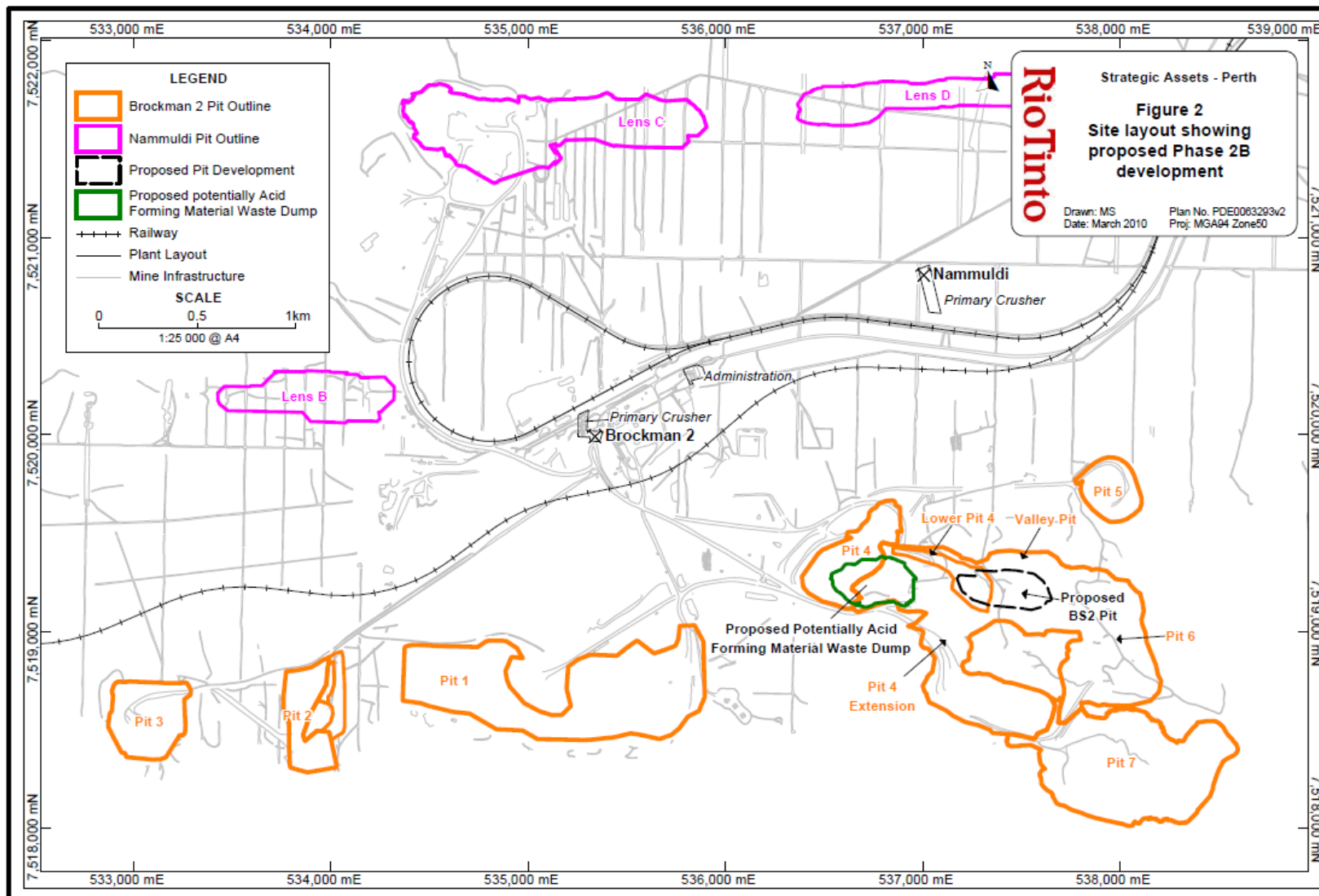


Figure 2 Brockman 2 site layout

4 Environmental Setting

4.1 Physical Environment

4.1.1 Climate

The Pilbara region experiences an arid - tropical climate with two distinct seasons, summer and winter (Gentili, 1972). Temperatures range from maximums of up to 47°C (39°C January mean daily maxima) in summer whilst winter temperatures are cooler (24°C July mean daily maxima). Annual rainfall is highly variable and occurs primarily in the summer months from localised thunderstorms and tropical cyclones. Data collected from the Brockman 2 weather station over the past 10 years indicates an average rainfall of 492 mm.

4.1.2 Local Geology

The Brockman Syncline lies within the Hamersley Province of the Pilbara Craton in the northwest of WA, it consists of mineralised Brockman Iron Formation which includes Dales Gorge Member and some mineralised lower Whaleback Shale. The smaller range to the north, comprises Marra Mamba Iron Formation, which forms the Nammuldi mineralisation, and includes Mount Newman Member with some mineralised upper West Angelas Shale. Separating the two iron formations is McRae Shale, the Mount Sylvia and the Wittenoom Formations. These are comprised of shale or dolomite and have preferentially weathered to form a valley between the two ranges. Soils on the slopes are generally shallow and stony while those on the plains are deep and generally well developed.

4.1.3 Geomorphology and Pedology

Landforms in the Brockman area comprise of footslopes of the massif and gently sloping plains. Soils on the slopes are generally shallow and stony, while those on the plains are deep and generally well developed.

4.1.4 Hydrology

There are no major river systems or permanent water bodies within the Brockman 2 mining area and surface drainage is dominated by a number of small ephemeral drainage lines that flow only during significant rainfall events. The Operation is located in the Duck Creek Catchment, a relatively small catchment, which contains some semi-permanent waterholes such as Donkey Pool and Donkey Hole (Liquid Earth, 2004). All surface water flowing through the project area drains towards the north-west, where it joins Duck Creek and eventually flows into Caves Creek on the southern flank of the Mt McRae Massif.

4.2 Biological Environment

Brockman 2 is located within the Hamersley subregion of the Pilbara Bioregion, which is characterised by Mulga woodland (*Acacia aneura*), Spinifex grasslands (*Triodia* spp.), and *Eucalyptus* spp. within the creeklines (Beard, 1975).

The area contains approximately one quarter of the known flora of the Fortescue Botanical District, which reflects the wide range of habitats present. The vegetation communities are all well represented elsewhere in the Pilbara.

There are no known Priority Ecological Communities (PEC) or Threatened Ecological Communities (TEC) within the Project area (Biota, 2009).

A total of 367 taxa of native vascular flora from 149 genera, belonging to 52 families have been recorded from the Brockman 2 Project area. No Declared Rare Flora have been recorded however nine Priority Flora species have been documented. These priority flora are:

- *Hibiscus brachysiphonius* (P3);
- *Ischaemum albobillosum* (P2);
- *Sida* sp. Wittenoom (W.R. Barker 1962) (P3);
- *Rostellularia adscendens* subsp. *adscendens* var. *latifolia* (P3);
- *Goodenia pascua* (P3);
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (P3);
- *Sida* sp. Hamersley Range (K. Newbey 10692)(P1);
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3);
- *Eremophila magnifica* subsp. *Magnifica* (P4);
- *Acacia bromilowiana* (P3); and
- *Dampiera anonyma* (P3).

4.3 Social Environment

4.3.1 Aboriginal Heritage

The Project area lies within a native title claim, by the Eastern Guruma group.

The main Aboriginal communities within the region are located at:

- Karratha - Aboriginal population of about 300 people of mixed language groups;
- Roebourne - about 900 Aboriginal people of mixed language groups;
- Wakathuni (20 km south of Tom Price) - 100 Aboriginal people of mixed language groups;
- Bellary (between Tom Price and Paraburdoo); and
- Onslow.

In addition, there is a camp to the south of Brockman 2, located along White Quartz Road, which is used intermittently by the Eastern Guruma people during law times and for educational activities.

4.3.2 Adjacent Land Use and Tenure

The Brockman 2 Operation is situated within the Mt Brockman Pastoral Lease, which is located next to Hamersley Station to the east and Rocklea Station to the south. Hamersley Station homestead, which is approximately 35 km from the mine, is the closest residential premise (other than Brockman 4 Mine Operations camp, which is managed by RTIO).

5 Legal and Other Requirements

5.1 Statutory Requirements

The project shall comply with all relevant Federal, State and Local Government legal requirements. A summary of the most significant state legislation applying to this project is given in Table 1.

Significant Federal legislation for the project includes:

- *Energy Efficiency Opportunities Act 2006*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *National Greenhouse and Energy Reporting Act 2007*

*Table 1 Relevant Legislation**

Reference	Requirement
Aboriginal heritage	
<i>Aboriginal Heritage Act 1972</i>	If an Aboriginal site (or a site that is potentially an Aboriginal heritage site) is found, it shall be reported and not disturbed unless approval to disturb has already been obtained. Any potential or protected Aboriginal site shall not be disturbed without prior approval.
Protection of water	
<i>Rights in Water Irrigation Act 1914</i>	Licensed groundwater bores should not be altered (or water used from the well) other than as allowed for by the current licence.
Pollution prevention	
<i>Contaminated Sites Act 2003</i>	Provides for the identification, recording, management and remediation of contaminated sites.
Contaminated Sites Regulations 2006	Contaminated sites are required to be reported.
<i>Dangerous Goods Safety Act 2004</i> and Associated Regulations <i>Dangerous Goods (Transport) Act 1998</i> Dangerous Goods (Transport) (General) Regulations 1999 Dangerous Goods (Transport) (Road and Rail) Regulations 1999 Dangerous Goods (Transport) (Explosives by Road and Rail) Regulations 1999	All reasonably practicable measures relating to the storage, use and transport of dangerous goods shall be taken to minimise risk. The regulations put focus on risk management in reporting and licensing and give scope for regulation extending to the environment. Reporting and licensing requirements shall be met.

Reference	Requirement
<p><i>Environmental Protection Act 1986</i> Environmental Protection Regulations 1987</p>	<p>Discharges of any wastes that may result in pollution (or allow pollution to occur) is not permitted without an appropriate licence from the Department of Environment (DEC).</p> <p>Only those activities and actions permitted on the DEC licences (and Works Approvals) are allowed to be undertaken.</p> <p>All reasonable precaution shall be taken to ensure that waste is not placed in any position from where it could reasonably be expected to cause, or be allowed to cause, it to enter the environment and result in pollution.</p>
<p>Environmental Protection (Controlled Waste) Regulations 2004</p>	<p>All waste substances that are considered to be a controlled waste as listed in the Controlled Waste Regulation shall not be transported on a public road without a DEC licensed vehicle or driver and a controlled waste tracking form.</p>
<p>Environmental Protection (Rural Landfill) Regulations 2002</p>	<p>The Regulations control category 89 premises registered under the <i>Environmental Protection Regulations 1987</i>. Category 89 premises are putrescible landfill sites accepting 20 – 5000 tonnes of waste annually.</p>
<p>Environmental Protection (Unauthorised Discharges) Regulations 2004</p>	<p>Prohibits the discharge of certain materials into the environment and burning of certain materials.</p>
<p><i>Health Act 1911</i> Health (Treatment of Sewerage and Disposal of Effluent and Liquid Waste) Regulations 1974</p>	<p>The Regulations control category 89 premises registered under the <i>Environmental Protection Regulations 1987</i>. Category 89 premises are putrescible landfill sites accepting 20 – 5000 tonnes of waste annually.</p>
<p>Approvals, permits & compliance</p>	
<p><i>Environmental Protection Act 1986 (see "Pollution Prevention")</i></p>	<p>All conditions and procedures imposed by the Minister for the Environment when the operation was approved (and subsequent to that time) shall be met. These include the Ministerial Conditions and Rio Tinto's environmental commitments. If alterations are proposed that may cause changes to the waste discharge or alter the nature of waste discharged, then a DEC Works Approval shall be obtained. If any details in the Works Approval application change, these shall be notified to the DEC. Any breach of a licence condition by any personnel (including Contractors) is an offence for which Rio Tinto is liable.</p>
<p><i>Iron Ore (Hamersley Range) Agreement Act 1963</i></p>	<p>Governing legislation that the Project operates under. Requires compliance with State laws and submission of detailed Proposals to the Minister.</p>
<p><i>Mining Act 1978</i> Mining Regulations 1981</p>	<p>Regulates onshore mining for minerals and the environmental obligations of tenement holders.</p>
<p>Protection of Flora & Fauna</p>	
<p><i>Wildlife Conservation Act 1950</i></p>	<p>Fauna cannot be harmed or killed. A licence is required to harm any flora (declared under the Act to be protected) from any crown land located outside the boundaries of the site. Plants that have been declared by the Minister as being rare flora, shall not be harmed unless prior written consent has been provided by the Minister for the Environment.</p>

*This is not a comprehensive list of all legislation applying to the Project, only those most applicable. All project personnel and contractors should consider all other legislation applicable to their activities.

The Freehills Legal Manual (RTIO-HSE-0010864) provides an overview of all legislative environmental requirements relevant to RTIO's operations. This legislative review provides summaries of the specific provisions within relevant Commonwealth, State and Local legislation.

5.2 Key Project Approvals

Copies of all site specific Licences/Approvals/Permits are held in the Rio Tinto Foundation Document Management System (FDMS) and are available on the IEMS intranet.

5.2.1 Ministerial Approvals (Part IV-EP Act)

In 1990, Hamersley Iron referred a proposal to the Environmental Protection Authority (EPA) for the development of an iron ore mine at Hamersley's Brockman No. 2 Detrital (Brockman 2) Deposit and an extension of the existing Central Pilbara Railway (CPR) and Part IV of the EPA Act.

The EPA set the level of assessment of the project as Consultative Environmental Review (CER). Hamersley prepared and submitted a CER following guidelines provided by the Department of Environmental Protection (DEP), now Department of Environment and Conservation (DEC), on behalf of the EPA. The project was subsequently approved by the Minister for the Environment on 18 May 1991 (Ministerial Statement 131). Operations at the Brockman 2 mine site commenced in June 1992.

To date, the amendments that have been made to the Brockman operation are:

- Extension of Pit 4 (approved in 1996);
- Development of Lens C East (Pit 5) (approved by Minister for the Environment on 20th August 1997);
- Railway retention plan (approved by DEP on 30th June 1998);
- Extension of Pit 4 and development of Pit 6 (approved by the DEP in June 1998 and Pit 4 proposal amendment approved on 29th July 1999);
- Development of a golf course (approved by the DEP on 22nd October 1999)
- Construction of a land bridge between Pit 4 Extension and Pit 6 (approved by the DEP on 13th December 1999, WRC on 13th December 1999 and DME on 16th December 1999)
- Section 45C to construct a Rail Siding, Fibre Optic Cable installation and Haul road (2007)
- EPA notified of intention to conduct Lens C Continuous Surface Mining Trial (October 2008);
- DEC notified of intention to Trial a Particle Sorting Plant (2008); and
- Section 45C Phase II a Development- to develop Pit 4, Pit 4 Extension, Valley Pit and Pit 6 to 580 metres and increase dewatering from Pit 4-6 from 700 to not more than 950 megalitres per year (2009).

This EMP has been reviewed as part of submission to the EPA for the BS2 Phase 2B Proposal, incorporating the mining of Potentially Acid Forming (PAF) material at Brockman 2 Operations.

5.2.2 Operating Licences

The following licences under Part V of the EP Act and the *Rights in Water and Irrigation Act 1914* (RIWI Act) are valid¹ for the Brockman 2 Operation:

- Category 05 - Processing or beneficiation of metallic or non metallic ore;
- Category 06 - Mine Dewatering;
- Category 52 - Electric Power Generation;
- Category 64 - Class II or III Putrescible landfill site;
- Category 85 – Sewage Facility; and
- Licence To Take Water (Ground Water Licence GWL 107421 (14); issued under section 5c of the RIWI Act).

5.2.3 State Agreement

The Brockman 2 Operation is approved under the *Iron Ore (Hamersley Range) Agreement Act 1963*.

Under section 10I(2)(k), it is a requirement for the Brockman 2 project that an environmental management programme be undertaken for rehabilitation and the protection and management of the environment.

5.2.4 Native Vegetation Clearing Permits

The following NVCP's are currently in place for Brockman 2

- NVCP permits; Pit 6 extension drilling (CPS2446/1);
- Pit 6 extension drilling - further drilling (CPS2446/1); and
- Pit 6 Deeps Mine Lease Drilling (CPS 3233/1).

5.3 Stakeholders

Rio Tinto consults extensively with its stakeholders. Consultation with stakeholders regarding the Brockman 2 Operation will continue throughout operations.

Key stakeholders for the operation include:

- Office of the Environmental Protection Authority;
- Department of Environment and Conservation;
- Department of Mines and Petroleum;
- Department of Indigenous Affairs;
- Eastern Guruma people;
- Hamersley Station; and
- Shire of Ashburton.

5.4 Corporate/Business Requirements

The Brockman 2 Operation shall comply with the following Rio Tinto corporate requirements:

5.4.1 Policies

- The Way We Work; and
- Rio Tinto Iron Ore HSEQ Policy.

5.4.2 Standards

- Rio Tinto Health Safety Environment and Quality Management System Standard;
- Rio Tinto Closure Standard;
- Rio Tinto Community Standard; and
- Rio Tinto HSE Performance Standards – Environment; including:
 - E2 Air Quality Control Standard;
 - E3 Acid Rock Drainage Prediction and Control Standard;
 - E4 Greenhouse Gas Emissions Standard;
 - E5 Hazardous Materials and Contamination Control Standard;
 - E6 Noise and Vibration Control Standard;
 - E7 Non-Mineral Waste Management Standard;
 - E8 Mineral Waste Management Standard;
 - E9 Land-Use Stewardship Standard; and
 - E10 Water Use and Quality Control Standard.

Both regulatory agencies and industry bodies have established guidelines to assist mining companies achieve acceptable environmental management standards. While adherence to these guidelines is not a statutory requirement, Rio Tinto subscribes to the intent and advice of these guidelines.

The Brockman 2 Operation was initially certified to ISO14001 in 2003 and was re-certified in 2007 and 2009. The current Iron Environmental Management System (IEMS) is currently in the process of being incorporated into the Iron Ore (WA) Health, Safety, Environment and Quality Management System.

6 Responsibility and Accountability

During operations, the overall environmental accountabilities are as follows:

- General Manager Greater Brockman Operations - Overall responsibility for the environmental performance of the operation.
- Mine Manager, Brockman 2 Operation - responsible for overall environmental performance and implementation of this EMP.
- Production Superintendent, Technical Services Superintendent and Fixed Plant and Infrastructure Superintendent- Responsibility for management procedures within their respective areas of accountability.
- Environmental Superintendent, Greater Brockman-Robe Valley Operations – responsible for achieving consistency in the development and implementation of EMP's across sites.
- Site Environmental Advisor – responsible for day to day verification that the environmental performance of the site complies with the intent of the EMP.

However, all personnel working at Brockman 2 are responsible for environmental management with respect to their day to day activities with their respective work areas.

7 Management Procedures

The environmental management procedures detailed in this EMP form the basis of the operational control procedures during the mining operation.

The procedures detail the objectives, management actions, performance indicators, monitoring and reporting requirements for each relevant environmental aspect associated with operations at Brockman 2.

7.1 Flora

The potential impacts of the operation on flora include clearing of vegetation, alteration of drainage patterns, introduction of weeds, diseases and exotic species, changes to existing fire regimes and the effects of dust.

The vegetation of the Brockman 2 project area and transport corridor was assessed prior to project commissioning (Mattiske and Associates, 1990). Since this time several field surveys of the Brockman 2 area have been undertaken.

Condition 3 of the Ministerial Statement 131 (131:M3; issued by the EPA on 18 May 1991) requires Hamersley Iron to commission and report on further surveys of the flora of the Mt Brockman area within 12 months of commencing the operation. A survey of the area was undertaken and approved by the EPA in December 1994.

EMP – 01	FLORA
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives	
<ul style="list-style-type: none"> To minimise the impact on native vegetation and flora habitats. To protect Declared Rare and Priority Flora consistent with the provisions of the <i>Wildlife Conservation Act 1950</i> and flora listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> that occur within the operating area. 	
Management	
<ul style="list-style-type: none"> Any areas to be cleared shall be approved internally by the RTIOEP Approvals and Risk Management department via the Approvals Coordination Process. The area to be cleared will be defined prior to the commencement of ground disturbing activities to ensure that equipment operators are aware of the limits of clearing under the Approvals Coordination Permit. Vehicles and machinery shall only use designated roadways and tracks and will be parked in designated parking areas only. Vehicles and machinery used for ground disturbing activities (clearing and grubbing) will be cleaned before mobilisation to site and prior to demobilisation from site. Any seed and vegetative materials used for rehabilitation purposes will be native to the Pilbara area. Areas shall be rehabilitated progressively following disturbance to re-establish native vegetation. Open ground fires are banned except in the designated fire training ground. Dust control measures will be implemented to minimise impacts on vegetation adjacent to the mine area and roads. 	
Performance Indicators	
<ul style="list-style-type: none"> No unauthorised vegetation clearing and/or ground disturbance. 	

EMP – 01	FLORA
Monitoring <ul style="list-style-type: none">• The Approvals Permit holder is responsible for ensuring that clearing is undertaken within the confines of the permit. Permits are subject to internal audit.• Annual mapping of clearing areas.	
Reporting <ul style="list-style-type: none">• Breaches of the RTIO Approvals Request Procedure shall be reported as an incident as per the IEMS Procedure RTIO-HSE-0019321 Environment Incident Reporting (RTIO-HSE-0019321).• All significant incidents of flora impact shall be reported via the Rio Tinto S&E Survey and the Annual Environment Report.	

7.2 Fauna

The potential impacts on the existing fauna of the area include loss and fragmentation of habitat and impacts associated with the establishment of plant and infrastructure. All wildlife in Western Australia is protected under the *Wildlife Conservation Act 1950*.

Several fauna surveys have been undertaken in the project area since approval was granted to commence operations. Under 131:M3; Hamersley Iron is required to commission and report on further surveys of the fauna of the Mt Brockman area within 12 months of commencing operation. This condition was approved and cleared by the EPA in December 1994.

It has been estimated that a total of 220 vertebrate species including 103 bird species, 18 mammals, 11 bats, three amphibians and 81 reptiles may occur in the Brockman 2 area. Targeted fauna surveys for Federal and State listed species and Short Range Endemic (SRE) invertebrates identified one species of conservation significance. The Western Pebble-mound Mouse *Pseudomys chapmani* is a Priority 4 species and has been recorded on two occasions within the project area (Anstee, 1995; Ecologia, 1994). This species is common within suitable habitat within the Hamersley Ranges and it is unlikely that the conservation status of this species will be affected by the Brockman 2 project.

Stygofauna have been identified through Rio Tinto's monitoring and research program in aquifers and alluvium deposits across the Pilbara. Dewatering at Brockman 2 has the potential to lower the water tables and affect the habitat of stygofauna.

Sampling for stygofauna at Brockman 2 and Nammuldi was conducted over a three year period between 1998 and 2001, with a total of 65 samples taken (Biota, 2003). The sampling found no evidence of stygofauna in the majority of sample sites (seven species in total recorded from the area), indicating that the Brockman2- Nammuldi area is unlikely to have stygal communities of any significance. Acknowledgement by the Department of Environmental Protection (DEP) was received in 2003 which agreed there would be relatively low risk of regionally significant stygal communities being affected by dewatering at Brockman 2.

EMP – 02	FAUNA
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Site Environmental Advisor
Objectives	
<ul style="list-style-type: none"> • To minimise the impact on native fauna species. • To protect native fauna consistent with the provisions of the <i>Wildlife Conservation Act 1950</i> and fauna listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> that occur within the operating area. • To minimise the impact of groundwater extraction on subterranean fauna. 	

EMP – 02	FAUNA
<p>Management</p> <ul style="list-style-type: none"> • Pets and off-road recreational vehicles are not permitted on site. • Firearms are only permitted on site under extenuating circumstances with prior written approval from the Mine Manager. • Feeding and / or capture of native fauna or feral animals is not permitted on site. • Killing of snakes is prohibited on site. Only trained snake handlers (licensed by DEC) are authorised to capture and relocate snakes as required. • Use of barbed wire fencing shall be avoided where possible to minimise the risk of injury to bats. • All foundation holes, drill holes and trenches shall be covered, fenced or bunded to prevent injury or capture of stock or fauna as per DMP requirements for exploration management and rehabilitation. • Any HDPE lined ponds or dams shall have fauna egress matting installed and maintained to assist the escape of wildlife. Fencing will be installed depending on the risk of fauna capture within the site ponds / dams. • Control of feral animals on site shall be undertaken where practicable (including trapping for feral cats). • A protocol for handling sick and injured fauna shall be developed for the site. This shall include 24 hr assistance available on the DEC Wildlife Helpline. 	
<p>Performance Indicators</p> <ul style="list-style-type: none"> • Observations of feral animals shall be reported to the SEA and actioned as appropriate. 	
<p>Monitoring</p> <ul style="list-style-type: none"> • Site shall be checked periodically to assess effectiveness of feral animal control. • Check facilities where potential entrapment of fauna can occur on a regular basis. 	
<p>Reporting</p> <ul style="list-style-type: none"> • All fauna deaths on site, including deaths on roads, shall be reported to the SEA. • Fauna deaths resulting directly from operating activities shall be reported as an incident as per IEMS Procedure- Environment Incident Reporting (RTIO-HSE-0019321). • All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.3 Weed Management

The effects of weed invasion on natural ecosystems can include the alteration of fire regimes, nutrient cycling and hydrology, and displacement of native flora. Eighteen weed species have been recorded in the Brockman 2 project area, most of which are widespread throughout the area and typically occur as scattered individual plants. None of the weed species comprise Declared Plants under the *Agriculture and Related Resources Protection Act 1976* (WA), however *Cenchrus ciliaris* (Buffel grass) and *Acetosa vesicaria* (Ruby Dock) are considered to be serious environmental weeds.

EMP – 03	WEED MANAGEMENT
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Production Superintendent Site Environmental Advisor
Objectives <ul style="list-style-type: none"> To prevent the introduction and spread of weeds with in the Mine area. 	
Management <ul style="list-style-type: none"> Training and education with regard to the identification of weeds on site shall be made available to all personnel involved in or managing clearing activities. All earthmoving and ground engaging equipment shall be inspected and cleaned of vegetation, mud and soil prior to entry and exit from site, in accordance with the IEMS Procedure- Equipment Hygiene Procedure (RTIO-HSE-0036005). A weed control program shall be conducted on a regular basis. Spot spraying where appropriate shall be done in consultation with the Rio Tinto preferred service provider. Quarantine areas encompassing known high risk infestations shall be established and demarcated by the SEA to prohibit vehicular access thereby reducing the potential for vegetative and seed dispersal. Any quarantine areas shall be clearly demarcated and signed. Any equipment or vehicle considered to have been working in a weed high risk area shall be cleaned down before being remobilised to other parts of the mine site. 	
Performance Indicators <ul style="list-style-type: none"> All earthmoving and ground engaging equipment shall be clean prior to entry to site. Any new weed species introduced to site as a result of mining operations at Brockman 2 shall be controlled or eradicated. 	
Monitoring <ul style="list-style-type: none"> Weed infestation inspections shall be carried out by or at the direction of the SEA as part of topsoil stockpile and work area environmental inspections. 	
Reporting <ul style="list-style-type: none"> New infestations of weeds and failures in the equipment hygiene procedure shall be reported as an environmental incident as per the IEMS Procedure RTIO-HSE-0019321 Environment Incident Reporting (RTIO-HSE-0019321). All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.4 Topsoil

Topsoil is a critical component of successful rehabilitation. Soils of the Pilbara, although often poor in quality and containing little organic matter, contain the seeds, micro-organisms and nutrients essential for rehabilitation.

EMP – 04	TOPSOIL
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives <ul style="list-style-type: none"> • To conserve and reuse topsoil for rehabilitation. • To conserve and reuse material from the subsoil zone as a source of bulk material for the rehabilitation process. 	
Management The IEMS Procedure Soil Resource Management (RTIO-HSE-0011596) shall be implemented. Key actions include: <ul style="list-style-type: none"> • A baseline soil assessment must be undertaken to identify soil availability and characteristics within areas identified for mining or mining related infrastructure. • Where practicable topsoil and subsoil should not be mixed. • A topsoil data sheet must be filled out whenever topsoil is recovered, stockpiled, relocated or dispersed. 	
Performance Indicators <ul style="list-style-type: none"> • All available topsoil and vegetation directly returned or stockpiled appropriately for later use. 	
Monitoring <ul style="list-style-type: none"> • A register of topsoil stockpiles shall be maintained on-site and shall record the stockpile number, the date placed, the source location, the type (topsoil/subsoil) and comments (including rehandling/relocation, seeding etc). • Active topsoil stockpiles shall be inspected regularly for erosion and weed control. 	
Reporting <ul style="list-style-type: none"> • Information on the volume of topsoil stripped and stockpiled shall be recorded and reported in the Annual Rio Tinto S&E Survey and AER. • Status of topsoil stockpiles is to be included in the AER. 	

7.5 Fire

Wildfires or bushfires have the potential to cause major damage to the environment, threaten lives and property and destroy grazing area. Therefore it is important that the outbreak of fires caused by the operations is prevented and that any wildfires close to the operation are controlled where practicable.

EMP – 05	FIRE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Health, Safety and Emergency Services Superintendent
Objectives <ul style="list-style-type: none"> • To prevent the outbreak of fires caused by the operation. • To ensure that any fires from the operation or bushfires are contained and controlled so that any damage to the environment, facilities, property is minimised. 	
Management <ul style="list-style-type: none"> • Lighting of fires is prohibited, except for the purposes of authorised fire training in appropriately controlled areas. • Burning of rubbish or vegetation is prohibited. • Vehicles to use designated roads, tracks and park-up areas. • Establish firebreaks around key facilities. • Appropriate fire fighting equipment is available to control localised bushfires. 	
Performance Indicators <ul style="list-style-type: none"> • Number of breaches of the fire prohibition policy 	
Monitoring <ul style="list-style-type: none"> • No specific monitoring is conducted 	
Reporting <ul style="list-style-type: none"> • All fires on site shall be reported to the SEA. 	

7.6 Dust

Dust is generated during mining and is generated primarily through blasting, earthmoving and road traffic on unsealed surfaces. In dry, windy conditions, particles can be lifted from open or disturbed areas resulting in visible dust emissions. A preliminary modelling assessment of environmental impacts from dust emissions from the Brockman 2 Operation has been established. A continuous dust monitor was installed near the Brockman camp in November 2008 and data from this sampler will be used to verify the model.

EMP – 06	DUST
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Fixed Plant and Infrastructure Superintendent Production Superintendent
Objectives <ul style="list-style-type: none"> • To minimise dust emissions generated by the operation. • To minimise the effect of dust on the social and natural environment. 	
Management <ul style="list-style-type: none"> • Vehicle speeds on haul roads, work sites and around accommodation villages shall be restricted. • Water trucks shall be used in areas which have the potential to generate dust, including areas that receive heavy traffic, unsealed roads and haul roads. • Vegetation clearing and exposed surfaces shall be kept to a minimum wherever practicable. • Progressive rehabilitation of disturbed areas shall be undertaken, which minimises dust through the reduction of exposed soil. • Plant crushing, conveying and stockpiling equipment shall maintain dust extraction and suppression systems. 	
Performance Indicators <ul style="list-style-type: none"> • There are no dust related complaints. • There are no dust related non compliances. 	
Monitoring <ul style="list-style-type: none"> • Dust monitoring will be undertaken on an ongoing basis, both from fixed location and personnel dust monitors. 	
Reporting <ul style="list-style-type: none"> • Significant dust emissions shall be reported as an incident as per IEMS Procedure Environment Incident Reporting (RTIO-HSE-0019321). • All incidents shall be reported via the Rio Tinto S&E Survey and the Annual Environment Report. 	

7.7 Noise

The primary sources of noise at Brockman 2 include operation of the crushing plant, mobile equipment and blasting activities. The nearest premises to Brockman 2 is the Hamersley Homestead which is approximately 35 km away and the Brockman camp, which is approximately 7 km away and the only noise sensitive premise in the vicinity of the operation. Results from the Noise Verification Study undertaken in 2009 indicated that there are no noise impacts associated with mining operations at Brockman 2 (SVT, 2009).

EMP – 07	NOISE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Health and Safety Superintendent
Objectives <ul style="list-style-type: none"> • To minimise noise generated by the operation. • To minimise the effect of noise on the social and natural environment. 	
Management <ul style="list-style-type: none"> • Stationary items of equipment with potential to generate significant noise levels shall be screened, enclosed or otherwise located such that acceptable noise levels are achieved. • Mobile and stationary equipment shall be fitted with effective exhaust mufflers to suppress noise emissions. • Construction work during operations shall be carried out in accordance with Section 6 of Australian Standard 2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites” and any relevant legislation. 	
Performance Indicators <ul style="list-style-type: none"> • There are no noise related complaints. • There are no noise related non compliances. 	
Monitoring <ul style="list-style-type: none"> • Noise emissions are monitored by the Health Advisor where applicable. 	
Reporting <ul style="list-style-type: none"> • Significant Noise emissions shall be reported as an incident as per IEMS Procedure Environment Incident Reporting (RTIO-HSE-001932). • All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.8 Non Mineral Waste Management

Waste, if inappropriately managed, has the potential to contaminate soils, groundwater and surface water and to attract feral animals. Waste at Brockman 2 is managed through the IEMS Non-Mineral Waste Management Plan (RTIO-HSE-0010849). The Management Plan establishes a framework for waste segregation, waste collection and disposal, and regular auditing of all aspects of waste management. Brockman 2 operates a Class II Putrescible Landfill Facility in accordance with the conditions of the site's DEC Operating Licence L5258/1991/10 and the Brockman 2 Landfill Management Plan (RTIO-HSE-0047300).

The waste materials that are typically generated from Brockman 2 include:

- Domestic waste;
- General office waste
- Scrap metal/drums;
- Rubber products (conveyor belt, tyres);
- Batteries;
- Sewage; and
- Hydrocarbon waste (discussed in section 11).

All recyclable waste is segregated and disposed of in accordance with the Non-Mineral Waste Management Plan. Major recycling streams include;

- Paper and cardboard;
- Scrap steel;
- Batteries;
- Printer Cartridges;
- Cans and bottles; and
- Cooking oil.

Two package sewage treatment plants service the mine operations buildings, plant and the camp. Treated water from the sewage plants is piped to fenced areas where it is spray irrigated onto native vegetation. Sludge material from the sewage treatment plant is periodically removed and trucked to Tom Price for disposal by a licensed contractor.

EMP – 08	NON MINERAL WASTE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Production Superintendent
Objectives <ul style="list-style-type: none"> • To minimise the generation of waste by the operation. • To dispose of waste in a manner compliant with legislative requirements. 	

EMP – 08	NON MINERAL WASTE
<p>Management</p> <ul style="list-style-type: none"> • Waste shall be managed in accordance with the IEMS Procedure Non-mineral Waste Management (RTIO-HSE-0010849) and the Brockman 2 Landfill Management Plan (RTIO-HSE-0047300). • Recyclable materials, including cardboard, paper, glass, batteries and scrap metal shall be recycled wherever practicable. • Littering on site is prohibited and office and works sites are to be kept clean and tidy. • Hazardous materials and controlled waste are covered in EMP10. 	
<p>Performance Indicators</p> <ul style="list-style-type: none"> • There are no non-compliances with the landfill licence or other legislative requirements. 	
<p>Monitoring</p> <ul style="list-style-type: none"> • Weekly landfill inspections shall be conducted. • Relevant monitoring will be conducted as per the Brockman Operation IEMS monitoring schedule (RTIO-HSE-0047187). 	
<p>Reporting</p> <ul style="list-style-type: none"> • Volumes of waste material and recycled material shall be reported in the Rio Tinto S&E Survey and the AER. 	

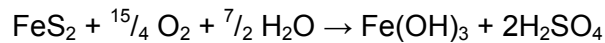
7.9 Mineral Waste Management

Mineral waste is managed through the RTIO (WA) Mineral Waste Management Plan (RTIO-HSE-0040347), the purpose of which is to plan for management, and monitor, mineral waste risks. If a risk is identified, a separate plan is utilised to manage the risk, i.e. the Spontaneous Combustion and ARD (SCARD) Management Plan for Operations, site specific process waste/tailings operating plans and site specific asbestiform management plans. Brockman 2 utilises the RTIO (WA) SCARD Management Plan (RTIO-HSE-0010872).

EMP – 09	MINERAL WASTE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives	
<ul style="list-style-type: none"> To create stable, safe, free draining and non polluting landforms that have a self sustaining cover of locally native vegetation. 	
Management	
<ul style="list-style-type: none"> The planning, management and monitoring of mineral waste shall be in accordance with the RTIO (WA) Mineral Waste Management Plan (RTIO-HSE-0040347). The design of mineral waste dumps shall be in accordance with the Pilbara Iron Landform Design Guideline (RTIO-HSE-0015708). The Rio Tinto Iron Ore Spontaneous Combustion and Acid Rock Drainage (SCARD) Management Plan (RTIO-HSE-0010872) shall be applied to manage the potential impacts of black shale material (see section 7.10). Waste dump areas shall be in locations as approved under Part IV of the EP Act and managed under the Approvals Coordination process. 	
Performance Indicators	
<ul style="list-style-type: none"> Compliance with the RTIO Approvals Request process. 	
Monitoring	
<ul style="list-style-type: none"> The Technical Services Superintendent shall inspect and arrange maintenance for erosion and sedimentation control structures during the wet season. 	
Reporting	
<ul style="list-style-type: none"> Significant erosion events shall be reported as an incident as per the IEMS Procedure - Environment Incident Reporting (RTIO-HSE-0019321). Volumes of material dumped shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.10 Acid Rock Drainage

Acid rock drainage (ARD) is the process where sulphide minerals (predominantly pyrite; FeS₂), in the presence of oxygen and water, oxidise to form insoluble ferric hydroxide and sulfuric acid. This involves a number of reactions and is summarised by in the following equation:



It can be seen that the reaction needs a continuing supply of oxygen and water and generates acid and heat. Potentially acid forming (PAF) material refers to sulfur bearing lithologies which have been identified as having the potential to generate acidity if exposed to an aerobic environment. In the case of Brockman 2, PAF lithologies (specifically waste rock – overburden) will be exposed by mining below the water table. Acid rock drainage can also induce weathering of clay minerals in the host material releasing other metals through dissolution such as aluminium, manganese, zinc and/or copper. This process can have a significant adverse effect on surface water quality, groundwater resources, revegetation programs and water management infrastructure. In addition to posing an ARD risk, an elevated sulfur content combined with organic carbon can also pose a self-heating risk potentially resulting in spontaneous combustion. Finally, the weathering products of ARD can promote low pH conditions post-oxidation, in particular through the formation of minerals such as alunite (KAl₃(SO₄)₂(OH)₆) and jarosite (KFe₃(SO₄)₂(OH)₆).

In the Brockman 2 Project area ARD management is required for:

- Potentially acid forming material exposed in the pit wall;
- Potentially acid forming waste rock material that that will be excavated and stored in a PAF material waste dump to access ore ; and
- Acid water produced from PAF material.

Brockman 2 Operations have developed management measures to mitigate the potential risks associated with ARD during mining and following mine closure in accordance with the Rio Tinto Iron Ore *Spontaneous Combustion and Acid Rock Drainage Management Plan for Operation* (SCARD Management Plan). The measures contained in **Section 3.3.2** cover the key elements of managing PAF material during operations (and are aligned with those measures contained in the SCARD Management Plan). The SCARD Management Plan should be referred to for more detailed description of management measures.

Brockman 2 Operations management of PAF material is broadly based upon the following principles:

- Identification of PAF material distribution and character, specifically:
 - Collection of representative samples from each mineral waste type (including process wastes) reflecting the spatial, physical and volumetric variation for solid and liquid extract geochemical analysis every two years. The samples are required to represent the spatial and volumetric variability of the lithology in the deposit and not just be collected from a single location in one batch;
 - Geochemical analysis involving detailed analysis of the solids and comparison of the concentrations to the crustal abundance. Liquid extracts (1 part solid to 2 part liquid) are also undertaken to assess the likely solubility of any contaminants;
 - Results are compared to nominated trigger concentrations based on crustal abundance for solids and ANZECC (2000) guidelines for liquid extracts;
 - Annual acid base accounting for PAF material to confirm adequate management strategies have been adopted if acidity load should change as the pit deepens;
- Minimising the exposure and mining of PAF as far as practicable;

- Identification and special handling of PAF material that must be mined;
- Encapsulation of PAF material inside inert waste rock dumps to limit water contact and allow the dumps to be revegetated;
- Monitoring groundwater and surface water quality and interpreting trends to determine if there are early signs for ARD (ie. monitoring sulfate concentration trends);
- Regular meetings by the mineral waste team on site to ensure ongoing improvement and implementation of the SCARD plan; and
- Audit compliance and investigate necessary improvements to the management plan every 2 years.

The PAF material waste dump will be located in Pit 4/Pit 4 Extension mine void and designed in accordance with criteria for PAF waste dumps above the regional water table in partially backfilled pits. The design of the PAF waste dump is shown in Figure 3 and location of the pit is indicated in Figure 2.

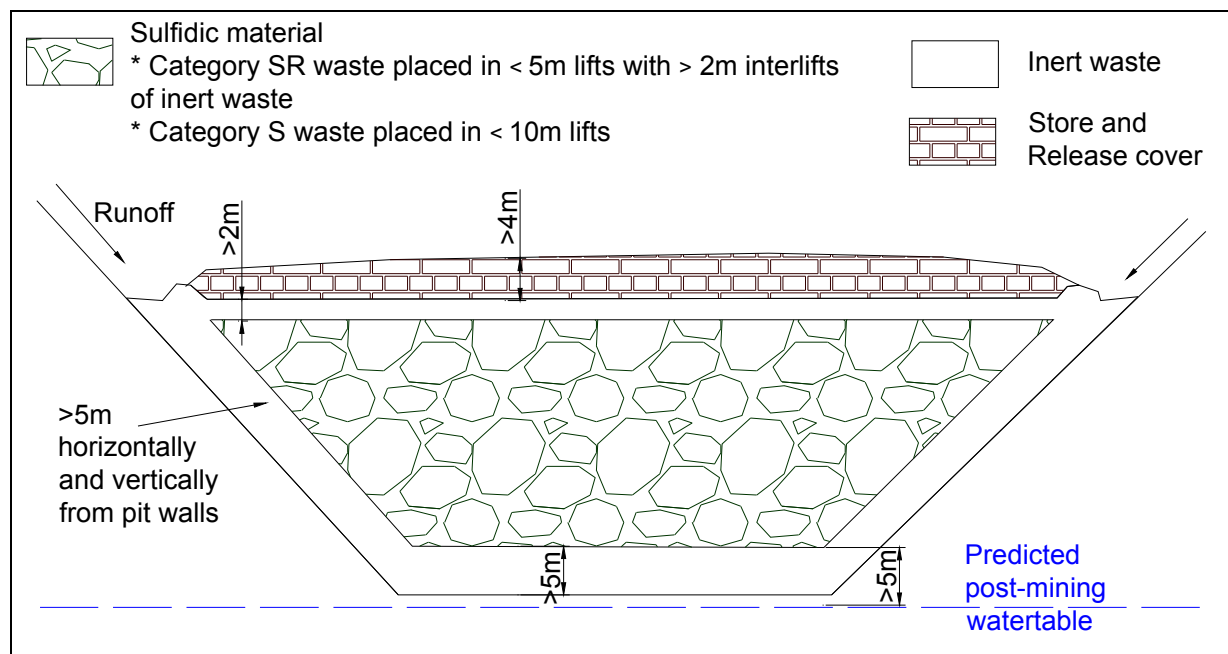


Figure 3 Design of PAF material waste dump

EMP – 10	Acid Rock Drainage
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives	
<ul style="list-style-type: none"> To minimise the environmental impacts associated with exposed PAF material in the pit wall. To ensure that all excavated PAF material is disposed and encapsulated in a manner that does not have unacceptable impacts on the environment. To ensure that there is no significant environmental impacts from acid water 	
Management	
<ul style="list-style-type: none"> Bunding will be in place to minimise the surface runoff on to any exposed PAF material. All PAF material will be accurately identified and placed in the correct dump location. All PAF material will be covered as quickly as practicable with inert waste rock (barren material) depending on the lag time between exposure of PAF material and the onset of sulfide oxidation. During the wet season PAF material will be covered with inert material within 3 weeks and during the dry season 12 weeks. Any incidents of PAF material dumped in areas where it cannot be encapsulated (or the potential impacts of oxidation can be treated) will be registered in the site's incident management database. Water that collects in the base of the pit below exposed PAF material and down-slope to the PAF waste dump will be tested for pH following all significant rainfall events that create runoff. Results of testing will be included in the AER. Water identified as acidic (pH<5) will be treated with a neutralising agent then re-tested to ensure it is not acidic before being pumped out of the pit. No water will be discharged with a pH<5. Groundwater quality monitoring: The aquifers present in the immediate area will be monitored in accordance with the Brockman Monitoring Schedule (RTIO-HSE-0047187) to determine any potential impacts to groundwater quality. 	
Performance Indicators	
<ul style="list-style-type: none"> All exposures of PAF material on the pit wall are managed to minimise acid generation. All PAF material is identified and encapsulated. Minimise exposures on the waste rock dumps during the rainy season. All acid water is treated and no acid water is released to the environment. SCARD management procedures will be followed. Groundwater and surface water quality is similar to background concentrations prior to the exposure of PAF material. 	

EMP – 10	Acid Rock Drainage
Monitoring <ul style="list-style-type: none">• The Technical Services Superintendent shall inspect and arrange maintenance for erosion and sedimentation control structures during the wet season.• Monitor construction of the waste dump against Waste Dump Plan.• Groundwater and surface water monitoring will be conducted to confirm effectiveness of PAF management controls.• PAF samples will be analysed by standard acid base accounting techniques annually.• Compliance with the SCARD plan will be audited every 2 years.	
Reporting <ul style="list-style-type: none">• Any incidents of PAF material dumped in areas where it cannot be encapsulated (or the potential impacts of oxidation can be treated) will be recorded within the RTIO incident reporting system.• All incidents shall be reported via the Rio Tinto S&E Survey and the Annual Environment Report.• Water quality and the tonnes of black shale mined will be reported in the AER.	

7.11 Hazardous Substances Management

Potential impacts on the environment from the use and storage of hazardous substances include groundwater, surface water and soil contamination, and associated impacts on vegetation. Hazardous waste streams include hydrocarbons, chemicals and ammonium nitrate.

The storage and handling of hydrocarbons is administered by the DMP via the *Dangerous Goods Safety Act 2004*. In addition, the DEC Operating Licence for Brockman 2 contains conditions relevant to hydrocarbon and chemical storage, handling and management.

At the Brockman 2 Operations, hydrocarbon contaminated water from the service bay, heavy and light refuel facility and light and heavy vehicle washdown pads is directed to an oily water separator (OWS) system located at the mobile maintenance workshop. Hydrocarbon contaminated soil is taken to the landfarm, where it is by bioremediated.

EMP – 11	HAZARDOUS MATERIALS
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder MEM Superintendent Production Superintendent Fixed Plant and Infrastructure Superintendent
Objectives <ul style="list-style-type: none"> To collect, treat, transport and dispose of wastes in an environmentally acceptable manner in accordance with relevant legislation. 	
Management <ul style="list-style-type: none"> Material Safety Data Sheets (MSDS) shall be kept on site for all hazardous materials in their area of use. Hazardous material storage and usage shall be in approved areas for approved purposes only. All chemicals shall be stored in containment bunds, or chemical cabinets as appropriate for the volume and nature of the chemicals. Explosives shall be stored in accordance with <i>the Mines Safety and Inspection Regulations (1995)</i> and <i>Dangerous Goods Safety Act (2004)</i> and Associated Regulations. Spill control equipment shall be stored in relevant locations to allow for a quick response to spills. Spills shall be contained and managed through the use of absorbent material and/or the excavation and removal of contaminated soil to the site landfarm. Where this is not possible disposal will be to an off-site licensed facility. Competency based Spill response training shall be delivered to relevant personnel. A licensed controlled waste carrier shall remove all bulk waste oils and oily products generated on site. Waste oil containers shall be clearly labelled and stored in bunded areas or purpose built skips prior to collection and shall be separated from new product drums. A list of areas identified as contaminated or which may have the potential to be contaminated shall be maintained. 	

EMP – 11	HAZARDOUS MATERIALS
<p>Performance Indicators</p> <ul style="list-style-type: none"> • Storage of bulk fuels and chemicals will be in accordance with DMP licence requirements. • Transport of Controlled Waste shall be done in accordance with <i>Environmental Protection (Controlled Waste Regulations) 2004</i> and IEMS Controlled Waste Guidelines (RTIO-HSE-0012439). • All hydrocarbon storage facilities are compliant with Australian Standard 1940:2004 <i>The storage and handling of flammable and combustible liquids</i>. 	
<p>Monitoring</p> <ul style="list-style-type: none"> • Monthly inspections of chemical and hydrocarbon storage areas. • Monthly review of controlled waste dispatch receipts retained on site and reports from controlled waste disposal and treatment site. 	
<p>Reporting</p> <ul style="list-style-type: none"> • Reporting for the Rio Tinto S&E Survey and AER shall include the volume of controlled wastes moved off site. • Any incidents, near misses and non-compliances shall be dealt with as per the IEMS Procedure - Environment Incident Reporting (RTIO-HSE-0019321). • All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.12 Groundwater Management

The Brockman 2 Operation has the potential to impact upon groundwater levels through the dewatering of mine pits and subsequent discharge of surplus water, as well as abstraction of potable and process water.

Some dewatering of the orebody aquifer is required to facilitate safe mining practices and to ensure access to identified ore reserves located below the watertable. The orebody aquifer will be dewatered to 520 mRL in the vicinity of the BS2 Pit. Dewatering water is used as far as practicable for mineral processing and dust suppression. Any excess dewatering water that is not used for operational purposes is discharged into Pit 5 for passive recharge into the regional aquifer.

The abstraction of ground water within Western Australia is regulated through RIWI Act. Brockman 2 operates under the DoW Licence To Take Water Groundwater Well Licence GWL 107421(14). The licence covers the Brockman Mine borefield (installed 1994), the Nammuldi borefield (installed 1998), the Camp borefield (installed 1994) and the dewatering borefield (installed 2006).

EMP – 12	GROUNDWATER
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent Site Hydrogeologist
Objectives <ul style="list-style-type: none"> To minimise environmental impact from the extraction of groundwater and excess water discharge to the aquifer. 	
Management <ul style="list-style-type: none"> Licences for groundwater abstraction shall be obtained and maintained during the operation. If required additional licences or permits shall be sourced in accordance with the <i>Rights in Water and Irrigation Act 1914</i>. The requirements of the Groundwater Operating Strategy shall be disseminated to key operations personnel. 	
Performance Indicators <ul style="list-style-type: none"> Compliance with DoW and DEC operating licences. 	
Monitoring <ul style="list-style-type: none"> Monitoring will be conducted in accordance with the DoW and DEC licences as well as the Groundwater Operating Strategy. 	
Reporting <ul style="list-style-type: none"> Results from groundwater monitoring shall be included in the Rio Tinto S&E Survey, the AER and Annual Aquifer Review (AAR). 	

7.13 Surface Water Management

The potential impacts of Brockman 2 Operation on surface water include contaminated surface water runoff discharging to the environment and for the alteration of natural surface water flow with, subsequent effects on vegetation, sedimentation and changes to stream morphology.

The majority of waste water generated at Brockman 2 Operation (excluding pit dewatering) is directed to oily-water separating facilities. The site's DEC operating licence regulates the discharge of hydrocarbon contaminated water to the environment.

Rainfall runoff from around the plant and workshop areas is directed via drains into a culvert where sediment control structures capture sediment from these flows.

EMP – 13	SURFACE WATER
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Fixed Plant and Infrastructure Superintendent MEM Superintendent
Objectives <ul style="list-style-type: none"> To minimise the impacts on the quality of surface waters. 	
Management <ul style="list-style-type: none"> Surface water that has been in contact with plant and process areas shall be treated in sediment control structure prior to release. Washdown water shall be treated prior to release. Oil water separators (OWS) shall be used to treat waters that are contaminated with hydrocarbons. All sedimentation basins, hydrocarbon treatment facilities and drainage structures are to be inspected and maintained on a regular basis to ensure efficient operation. Chemicals and hydrocarbon spills are to be contained and cleaned up immediately to minimise contamination of surface waters. 	
Performance Indicators <ul style="list-style-type: none"> The Total Recoverable Hydrocarbon (TRH) concentration of any water discharged is less than 30 mg/L. 	
Monitoring <ul style="list-style-type: none"> Monitoring will be conducted in accordance with the DoW and DEC licences as well as the Groundwater Operating Strategy. 	
Reporting <ul style="list-style-type: none"> All spills of contaminated water shall be reported as an incident as per IEMS Procedure - Environment Incident Reporting (RTIO-HSE-0019321). All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.14 Greenhouse Gases and Energy Use

Greenhouse gases (GHG) are gases in the atmosphere that absorb and emit radiation within the thermal infrared range. Many Greenhouse gases have both natural and human-caused sources; however, the International Panel on Climate Change has determined that anthropogenic increases in GHG emissions are implicated in observed changes in the Earth's climate.

Rio Tinto has adopted a specific set of Greenhouse Gas (GHG) principles which the Brockman 2 Operation adheres to. These include:

- Developing, documenting and maintaining knowledge of GHG sources;
- Identifying and assessing GHG related risks and opportunities for the operation; and
- Developing and achieving GHG emission reduction targets.

These targets have been incorporated into the Brockman 2 Operations Energy Management Plan, which have been developed in response to the Energy Efficiency Opportunities Act.

EMP – 14	GREENHOUSE GASES and ENERGY USE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Site Energy Champion
Objectives <ul style="list-style-type: none"> • To minimise greenhouse gas emissions where practicable for mining and operating activities. • To promote energy efficiency and ensure reporting requirements are met. 	
Management <ul style="list-style-type: none"> • Metering shall be established for the recording and reporting of greenhouse gas emissions. • Opportunities to reduce energy use shall be investigated during the operation as per <i>Energy Efficiency Opportunity Act 2006</i>. 	
Performance Indicators <ul style="list-style-type: none"> • Energy use and emission targets. 	
Monitoring <ul style="list-style-type: none"> • Monitoring of emissions sources shall be collected six monthly. 	
Reporting <ul style="list-style-type: none"> • Reporting of emissions shall be undertaken in accordance with the requirement of the <i>National Greenhouse and Energy Reporting Act 2004</i>. 	

7.15 Rehabilitation and Closure

The Brockman 2 project is required to adhere to the following requirements with regard to closure:

- EPA objectives and guidance statements;
- Government and industry guidelines; and
- Rio Tinto's corporate requirements.

The Brockman 2 & Nammuldi Closure Study Report was prepared in January 2009 (RTIO-CR-0016213) and outlines rehabilitation and closure plans for the operation. The Closure Plan is regularly reviewed and updated every five years to ensure that it continues to meet legislative and corporate requirements.

Management measures have been developed to mitigate the potential risks associated with ARD during mining and following mine closure in accordance with the SCARD Management Plan (see section 7.10). The specific measures contained in this section address the key elements of managing PAF material at closure (and are aligned with those measures contained in the SCARD Management Plan).

EMP – 15	REHABILITATION and CLOSURE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives <ul style="list-style-type: none"> • To relinquish to the State a safe, stable, non-polluting site. • To rehabilitate waste landforms such that they are stable, free draining, non-polluting and aesthetically compatible with the surrounding landscape. • To establish sustainable vegetation communities compatible with regional ecological communities and capable of preserving local biodiversity. • Establish protective bunds around pits. • Partially backfill some pits. • Prevent exposure of PAF material in final pit shell. • Management of PAF material waste dumps. 	
Management <ul style="list-style-type: none"> • Stable natural landforms will be reinstated by re-contouring to remove steep slopes and benches, backfilling pits where required. • The predicted post closure groundwater level in the pit area will be reviewed at the time of closure. • Abandonment bund will be constructed around the perimeter of the pit, outside the zone of geotechnical instability. The bund will be constructed of competent waste rock material and be at least 2 m high and 5 m wide. • Progressive rehabilitation shall occur as soon as practicable at the end of ground disturbing activities. • Waste rock dumps shall be rehabilitated according to the Pilbara Iron Landform Design Guidelines RTIO-HSE-0015708. 	

EMP – 15	REHABILITATION and CLOSURE
<ul style="list-style-type: none"> • Rehabilitation shall be conducted in accordance with the Rehabilitation Handbook RTIO-HSE-0011608. • Any seed and vegetative materials used for rehabilitation purposes will be native to the Pilbara area. • The site Closure Study-Plan shall be reviewed and revised at periods not exceeding five years. • Haul roads and accessible benches that are underlain by inert waste rock will be ripped and seeded to minimise runoff, to promote vegetation establishment and to maximise evapotranspiration. • A store and release cover system will be constructed on top of accessible PAF material exposures for those portions of the pit that will be located above the watertable and that will not be periodically flooded by cyclone events. 	
<p>Performance Indicators</p> <ul style="list-style-type: none"> • Rehabilitated areas maintain safe stable, non polluting landforms that are compatible with the surrounding environment. • Waste dumps do not cause contamination to surface water or groundwater in the long-term. • Bunding is present around all pits not completely backfilled. • A permanent pit lake does not form in the pit void. • No PAF material is exposed. 	
<p>Monitoring</p> <ul style="list-style-type: none"> • Areas that have been disturbed shall be assessed for rehabilitation potential on a regular basis. • Landscape Function Analysis or similar shall be conducted on rehabilitated area to monitor for rehabilitation success. 	
<p>Reporting</p> <ul style="list-style-type: none"> • Areas of rehabilitation shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.16 Aboriginal Heritage

Aboriginal heritage sites are protected under the *Aboriginal Heritage Act 1972*. The primary activity that has the potential to affect cultural heritage values at the Brockman 2 Operation is clearing for mining and associated infrastructure. All land that is to be disturbed is surveyed for ethnographic and archaeological sites and is managed through the internal Approvals Coordination Process.

EMP – 16	ABORIGINAL HERITAGE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives <ul style="list-style-type: none"> • To avoid unauthorised disturbance to Aboriginal heritage sites. 	
Management <ul style="list-style-type: none"> • Any areas to be cleared shall be approved internally by the Approvals and Risk Management department through the Approvals Coordination Process. • All employees and contractors shall promptly report any potential Aboriginal heritage sites to the Site Environment Advisor and the RTIO heritage team. • Where works are to be undertaken in the vicinity of a known heritage site, appropriate fencing, flagging, barricading or similar shall be undertaken in conjunction with signage and awareness to personnel working in the area. • There shall be no disturbance to any Aboriginal heritage site without the express written consent from the RTIO Heritage team and authorisation from the Department of Indigenous Affairs under section 18 of the <i>Aboriginal Heritage Act 1972</i>. 	
Performance Indicators <ul style="list-style-type: none"> • There is no unauthorised disturbance to any heritage site. 	
Monitoring <ul style="list-style-type: none"> • Inspections of fencing around heritage sites shall be undertaken. 	
Reporting <ul style="list-style-type: none"> • Unauthorised disturbance of a heritage site shall be reported as an incident as per the IEMS Procedure - Environment Incident Reporting (RTIO-HSE-0019321). • All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

7.17 Ground Disturbance

The potential impacts of ground disturbance within the project area include loss of habitat, fragmentation of ecological communities, increase in CO₂, mobilisation of dust, soil erosion and weed invasion. All ground disturbance is approved and managed through the Approvals Coordination Process.

EMP – 17	GROUND DISTURBANCE
Responsibilities	Owner Mine Manager, Brockman 2 Operation
	Task Holder Technical Services Superintendent
Objectives	
<ul style="list-style-type: none"> To minimise adverse effects of clearing. To prevent unauthorised clearing of land. 	
Management	
<ul style="list-style-type: none"> Any areas to be cleared shall be approved internally by the RTIOEP Approvals and Risk Management department under the Approvals Coordination Process. The area to be cleared shall be defined prior to the commencement of ground disturbing activities to ensure that equipment operators are aware of the limits of clearing under the Approvals Coordination Permit. Any areas that are planned to be disturbed shall undergo aboriginal heritage or biological surveys prior to clearing. Significant flora or fauna communities identified in biological surveys shall be recorded in GIS. Aboriginal heritage sites identified in surveys shall be recorded in GIS. Where practicable clearing of large areas shall be done in a staged approach to minimise sedimentation and dust emissions from erosion. Vehicles and machinery are to use designated roadways and tracks and must be parked in designated parking areas only. 	
Performance Indicators	
<ul style="list-style-type: none"> 100% compliance with the requirements of the Approvals Coordination Process and with the conditions specified in the permit. 	
Monitoring	
<ul style="list-style-type: none"> Cleared areas are to be inspected following the works. 	
Reporting	
<ul style="list-style-type: none"> Breaches of the RTIO Approvals Request Procedure shall be reported as an incident as per the IEMS Procedure Environment Incident Reporting (RTIO-HSE-0019321). All incidents shall be reported via the Rio Tinto S&E Survey and the AER. 	

8 Monitoring

Table 2 outlines the monitoring requirements for the Brockman 2 Operation as required in current site licences. For complete details of the Brockman 2 monitoring schedule, reference should be made to the IEMS Environment Monitoring Schedule & Monthly Plan -Brockman 2 (RTIO-HSE-0068775).

Table 2 Monitoring

Type	What	Frequency	Measurement
Borefield	Observation Bores	Monthly	Water level
	Production Bores	Monthly	pH, EC, instantaneous flow rate, water level, cumulative abstraction
		Annual	Groundwater chemistry (pH, EC, TDS, Na, K, Ca, Mg, Cl, SO ₄ , NO ₃ , HCO ₃ , CO ₃ , Fe, Mn, Cu, Zn, Pb, Cd, Cr, Al, As, Mo, TN
	Dewatering Bores	Monthly	pH, EC, temperature, flow, water level
		Annual	pH, EC, TDS, TSS, Al, Ca, Mg, Na, K, SO ₄ , Pb, Cu, Fe, Mn, Mo, Zn, As, Cd, Cr, NO ₃ , TP, Total nitrogen, HCO ₃ , CO ₃
ARD Bores	Monthly	Water level, pH, EC, TDS, TSS, COD, Total alkalinity as CaCO ₃ , Acidity as CaCO ₃ , Al, As, Ca, Cd, Cl, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Zn, Mo, SiO ₂ , SO ₄ , NO ₃ , HCO ₃ , CO ₃ , Co, Se, Total P, Total N, Ionic Balance, B, Sb,	
Water Discharge	Oily-Water Separator Unit	Monthly	TRH, MBAS, Flow, pH, ec and temp
		Quarterly	Chemistry suite
Waste Water Treatment Plant Discharge	WWTP	Monthly	Flow
		Quarterly	pH, EC, TSS, TDS, BOD, Total Nitrogen, Ammonium-Nitrogen, Nitrate+Nitrite-Nitrogen, Total P, Cu, Zn, As, Pb, Hg
Surface Water	Background streams	Quarterly	pH, EC, Surface water chemistry suite
Rehabilitation	Rehabilitated waste dumps & borrow Pits	Every 2 years	Perennial species richness, perennial species, abundance, percentage ground cover
PAF material runoff	Water at the base of mine pit below exposed PAF material	After runoff generating rainfall events	pH, EC (ARD Chemistry Suite where field pH is less than pH 5)
	Waste dump runoff		

9 Reporting

9.1 Annual and Triennial Environmental Reports

Progress on environmental management and monitoring results are reported to the State Government in Annual and Triennial Environmental Reports as required by the DEC Licence and Ministerial Statement. These reports will be submitted to the Minister for Mines and Resources, DEC, DMP, EPA and DoW for review.

Each annual report:

- Describes the status of work activities and environmental management;
- Identifies significant environmental activities occurring over the previous twelve months;
- Outlines the results of monitoring and research programs; and
- Foreshadows developments likely to occur in the next twelve months.

Each triennial report:

- Summarises the results of monitoring programs over the preceding three years, especially any emerging trends;
- Outlines the status of implementation of the EMP and the effectiveness of the environmental management measures already in place; and
- Outlines the proposed environmental management activities and monitoring programs to be undertaken by Rio Tinto over the next three years and the implementation of the EMP.

Reporting also includes the status of compliance with relevant commitments and conditions.

Table 3 Brockman 2 Reporting Schedule.

Report Title	Reporting Frequency	Date Due	Submitted To	Required By
Annual Environmental Reports	Annual	31 March	Minister for Industry and Resources, DMP, DEC, DEC, EPA and DoW.	State Agreement Act DEC Licence
Triennial Environmental Reports	Triennial	31 March	Minister for Industry and Resources, DMP, DEC, DEC, EPA and DoW..	State Agreement Act
Annual Assessment Compliance Report	Annual	31 August (every year for the previous financial year)	DEC	DEC Operating Licence
National Pollutant Inventory (NPI) Emissions Report	Annual	30 September	DEC	NPI NEPM
Annual Groundwater Reports	Annual	31 March	DoW	Groundwater Well Licence
Triennial Groundwater Report	Triennial	31 March	DoW	Groundwater Well Licence

Report Title	Reporting Frequency	Date Due	Submitted To	Required By
Social and Environment Report	Annual	After year end	Public	Rio Tinto adherence to Global Reporting Initiative (GRI)
Greenhouse and Energy Inventory	Annual	TBD	Rio Tinto (who submit it to the Department of Climate Change)	National Greenhouse and Energy Reporting Act 2007 and Energy Efficiency Opportunities Act 2006

9.2 Performance Report

Condition 6.1 of Ministerial Statement 131 (131:M6.1) requires the submission of a performance report to the DEC every year after commissioning. This report is to address the status of the project and rehabilitation program in addition to all outstanding commitments and conditions. The submission of the AER satisfies the requirement of this condition.

9.3 Auditing and Review

9.3.1 EMP Review

This EMP is subject to regular review and updating. Reviews are to be based on amendments to the operation, results of monitoring, audits, incidents, continuous improvement and changes in regulatory and corporate requirements.

Updates of the EMP are to be:

- Re-issued to relevant Rio Tinto personnel;
- Notified to Government whenever significant changes are made; and
- Reported to Government through Annual and Triennial Environmental Reports and Performance Reports.

9.3.2 Audits

Regular audits are undertaken to ensure compliance with management plans and procedures, company standards, external regulatory requirements and compliance with external certification bodies.

Types of audits conducted include:

- Government audits and inspections by DEC, DoW and DMP;
- Internal and external ISO14001 audits; and
- Internal Rio Tinto HSE Standards audits.

Findings in relation to these audits will be captured in a corrective actions database and responsibility assigned to ensure timely close out.

10 References

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