Koodaideri Iron Ore Mine and Infrastructure Project

Operations Environmental Management Program

May 2014

Prepared for Rio Tinto by Eco Logical Australia

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1. Introduction

Hamersley Iron Pty Limited (a subsidiary of Rio Tinto Pty Limited, herein "Rio Tinto") is seeking to develop a new iron ore mine centred on the Koodaideri resources in the Hamersley Ranges in the Pilbara region of Western Australia (WA). The Koodaideri Iron Ore Mine and Infrastructure Project (herein "the Proposal") will involve the construction and operation of a large-scale mining and ore processing operation, with product transported to ports through connection with Rio Tinto's heavy freight rail network. The Proposal will initially operate with a production throughput of around 35 million tonnes per annum (Mtpa), but may ultimately increase to around 70 Mtpa and is expected to have an operational mine life of over 30 years.

This Operations Environmental Management Program (OEMP) has been prepared to assist in the environmental assessment process and more specifically to support the preparation of the Public Environmental Review (PER) document for the Proposal under Section 38 of the WA *Environmental Protection Act 1986* (EP Act). It provides information on the project characteristics, existing environment, potential environmental impacts and proposed management commitments. It has been prepared in accordance with the *Environmental Impact Assessment (Part IV Division 1) Administrative Procedures 2010* of the EP Act.

The scope of the OEMP includes all operational aspects of the Proposal. This OEMP defines the overarching environmental management procedures and processes (implementation, monitoring and contingencies) relevant to the significant environmental factors identified for the Proposal.

It contains management plans for the following environmental factors:

- Flora and vegetation (Section 3)
- Terrestrial fauna and subterranean fauna (Section 4)
- Hydrological processes and inland waters environmental quality (Section 5)
- Koodaideri spring (Section 6)
- Noise and vibration (Section 7)

The OEMP also provides a framework for document control, review and improvement of all management plans and documents included herein.

1.1 Proposal location

The Proposal area is defined by a specific geographical outer boundary or "Development Envelope", and is centred approximately 110 km west-north-west of Newman and 130 km north-east of Tom Price in the Pilbara region of WA (**Figure 1**).

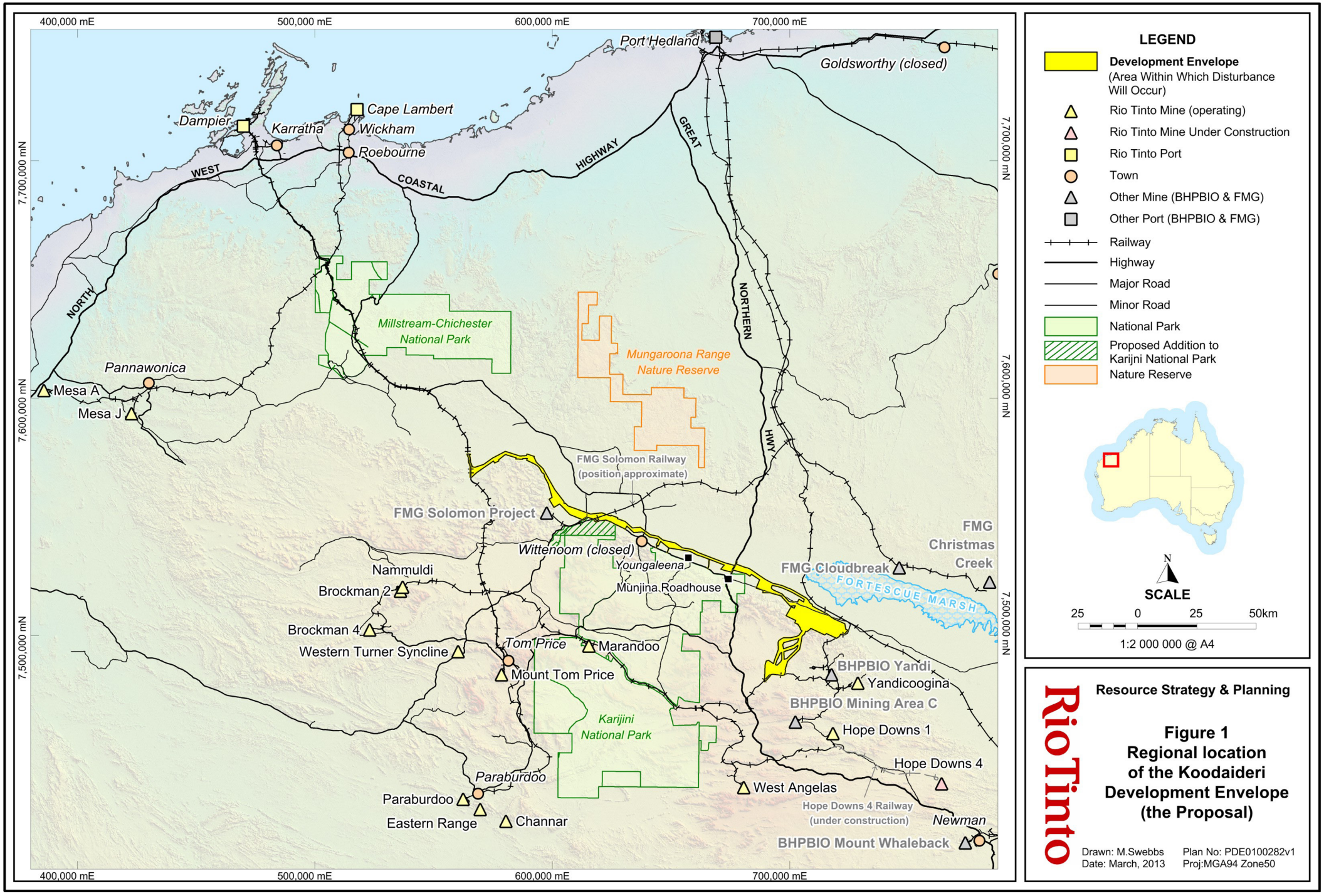
The Development Envelope covers 65,888 ha and is comprised of three main elements or components; the mine and plant area and two infrastructure corridors (**Figure 2**) that connect with existing Rio Tinto infrastructure networks. These three elements are referred to as the:

- Mine/Plant Area (herein "the MPA") ï containing the mining areas and the associated ore processing facilities (e.g. ore crushing, stockyards, administration, workshops) ï the MPA covers approximately 19,188 ha
- Western Railway Corridor (herein "the WRC") ï for ore transport by rail and for associated infrastructure (e.g. service road, communications) ï the WRC covers approximately 34,697 ha

- Southern Infrastructure Corridor (herein ðthe SICñ) with multiple potential alignments ï for power, water and road infrastructure to the MPA ï the SIC covers approximately 12,003 ha

Within the Development Envelope, the total ground disturbance footprint is restricted to a maximum of 12,171 ha including an upper limit of 7,911 ha in the MPA and 4,260 ha in the combined WRC and SIC.

The northern and central portions of the MPA intersect an area of the Marillana Station Pastoral Lease (L3114 984) proposed for conservation tenure following the partial resumption of pastoral leases in 2015 (**Figure 2**).



LEGEND

- **Development Envelope** (Area Within Which Disturbance Will Occur)
- Rio Tinto Mine (operating)
- Rio Tinto Mine Under Construction
- Rio Tinto Port
- Town
- Other Mine (BHPBIO & FMG)
- Other Port (BHPBIO & FMG)
- Railway
- Highway
- Major Road
- Minor Road
- National Park
- Proposed Addition to Karijni National Park
- Nature Reserve

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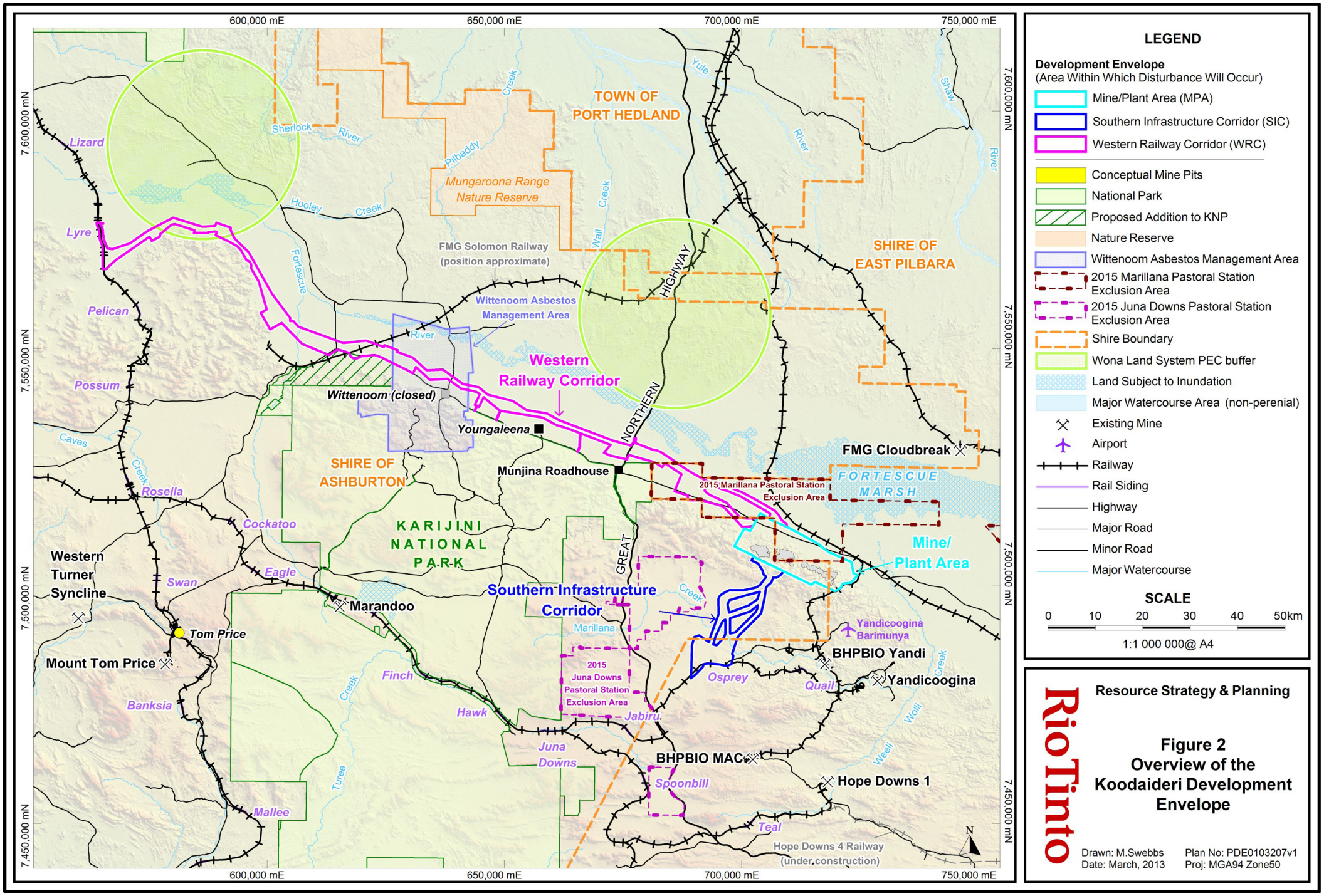
RioTinto

Resource Strategy & Planning

Figure 1
Regional location of the Koodaideri Development Envelope (the Proposal)

Drawn: M.Swebbs
Date: March, 2013

Plan No: PDE0100282v1
Proj:MGA94 Zone50



LEGEND

Development Envelope
(Area Within Which Disturbance Will Occur)

- Mine/Plant Area (MPA)
- Southern Infrastructure Corridor (SIC)
- Western Railway Corridor (WRC)

- Conceptual Mine Pits
- National Park
- Proposed Addition to KNP
- Nature Reserve
- Wittenoom Asbestos Management Area
- 2015 Marillana Pastoral Station Exclusion Area
- 2015 Juna Downs Pastoral Station Exclusion Area
- Shire Boundary
- Wona Land System PEC buffer
- Land Subject to Inundation
- Major Watercourse Area (non-perenial)
- Existing Mine
- Airport
- Railway
- Rail Siding
- Highway
- Major Road
- Minor Road
- Major Watercourse

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Resource Strategy & Planning

Figure 2
Overview of the Koodaideri Development Envelope

Drawn: M.Swebbs
Date: March, 2013

Plan No: PDE0103207v1
Proj: MGA94 Zone50

6. Koodaideri Spring Adaptive Management Plan

The Koodaideri Spring Adaptive Management Plan draws out key management commitments relevant to the management of the gorge containing Koodaideri spring from a number of the individual management plans, synthesising these into a single plan specific to the management of the gorge containing Koodaideri spring. It is intended as a stand-alone plan to allow for quick reference to the management of Koodaideri spring, removing the need to refer to information in other individual management plans. The proposal will be managed to avoid adversely impacting the Koodaideri spring and its associated vegetation and fauna habitat and to maintain the ecological value of the spring. General management measures relevant to Koodaideri spring, but also applicable to other parts of the Proposal area, are addressed in the relevant individual management plans.

6.1 Environmental aspects to be managed

A detailed description of Koodaideri spring is provided in Section 15.3.3 of the PER.

The Proposal may affect the values of Koodaideri spring in the following ways:

- Physical disturbance/clearing of vegetation and landforms during construction, mining and associated activities may affect the condition and extent of conservation significant vegetation and high conservation value fauna habitat occurring in association with Koodaideri spring. It may also result in the death or injury of fauna, including aquatic and subterranean fauna
- Mine pits, surface waste dumps, stock piles, and drainage structures will disrupt surface drainage, and mining activities may reduce water flows to Koodaideri spring, causing water pools and aquatic habitat to recede
- Project operations may result in increased risks to conservation significant vegetation and high conservation value fauna habitat occurring at the Koodaideri spring, arising from fire and the introduction and/or spread of weeds. Operations may also degrade the subterranean environment through contamination via spills of hydrocarbons, hazardous materials or wastewater discharges
- Project operations may result in the obstruction of fauna movements and disruption to nesting and roosting habitats at Koodaideri spring from dust, noise and light emissions

6.2 Performance Management

Management objectives, environmental targets, and performance indicators have been developed for the management of potential impacts to Koodaideri spring (**Table 16**).

6.3 Implementation Strategy

Management actions (**Table 17**) have been prescribed in accordance with the Koodaideri spring management objectives.

6.3.1 Monitoring

A monitoring program for Koodaideri spring (**Table 18**) has been designed to ensure that operations are consistent with the prescribed objectives and targets for management.

6.3.2 Contingencies

If monitoring indicates that environment objectives and targets for the management of Koodaideri spring are not being achieved, contingency actions (**Table 19**) will be enacted.

Table 16: Koodaideri spring management objectives, targets and performance indicators

Management objectives	Targets	Performance indicators
Protect the ecological values of the gorge containing Koodaideri spring and prevent the degradation of habitat associated with Koodaideri spring	No direct or indirect detrimental impacts to the vegetation associated with Koodaideri spring	Maps of the approved disturbance area Ground disturbance is implemented in compliance with regulatory approvals Monitoring of health and/or physiological water stress in indicator species in vegetation associated with Koodaideri spring
	Surface water flow regime stays within the historical range to support environmental values downstream of Koodaideri spring	Results of surface water monitoring against established baseline or modelled levels
	Maintain a significant proportion of the pre-development surface water flow regime to Koodaideri spring and associated surface water pools during and post-mining	Pre-disturbance hydrological modelling of Koodaideri spring catchment Post-mining disturbance hydrological modelling of Koodaideri spring catchment Koodaideri spring catchment water level monitoring program implemented Comparison of Koodaideri spring water level monitoring program results against modelling outputs
	Groundwater levels stay within range required to maintain environmental values of Koodaideri spring	Results of groundwater monitoring against established baseline levels
	Maintain surface water quality in Koodaideri spring and associated surface water pools during mining	Results of surface water monitoring indicate no statistically significant change against established baseline levels with reference to relevant ANZECC guidelines

Table 17: Koodaideri spring management actions

Factor	Action
Protection of the ecological values of Koodaideri spring (direct vegetation, habitat, and fauna protection)	The Koodaideri spring and associated vegetation unit D38 will be designated as an 'area of special protection from ground disturbance' and therefore excluded from the ground disturbance footprint; it is proposed to not mine within 50 m of the gorge that contains the Koodaideri spring (and the vegetation community D38) to retain its ecological values
	Engineered surface water diversions will be implemented in the Koodaideri spring catchment, to maintain natural surface water regimes. Environmental values will be further protected by the establishment of a natural rock façade around the Koodaideri spring that will be 50 m wide. The façade will protect the pre-mining surface water pathways and maintain the physical habitat near the spring
Trigger levels for vegetation health and/or physiological water stress	Indicator species and suitable methods for monitoring of the health of vegetation unit D38 will be determined in consultation with the DPaW. The approach will account for the potential effects of physiological water stress associated with modified hydrology.
	Management triggers based on vegetation health monitoring metrics will be determined in consultation with the DPaW. The selection of management triggers will be informed by baseline (pre-disturbance) monitoring information (refer to **Table 18**)
Trigger levels for Koodaideri spring water quality and hydrological regime	Trigger levels for the level/depth, spatial extent and/or distribution of surface water at Koodaideri spring and its associated surface water pools will be determined in consultation with the DPaW, and as informed by the range of pre-disturbance values established in baseline monitoring (refer to **Table 18**)
	Trigger levels for surface water quality at Koodaideri spring and in its associated surface water pools will be determined in consultation with the DPaW and DoW, and as informed by the range of pre-disturbance values established in baseline monitoring (refer to **Table 18**)
	Trigger levels for groundwater levels (depth to groundwater) at and around Koodaideri spring will be determined in consultation with the DPaW and DoW, and as informed by the range of pre-disturbance values established in baseline monitoring (refer to **Table 18**)
	Management and contingency actions to be implemented (including investigations into the likely cause) in the event that trigger levels are exceeded for: the level/depth, spatial extent and/or distribution of surface water, and/or; surface water quality, and/or; groundwater levels at and around Koodaideri spring (and/or in its associated pools), will be identified in consultation with the DoW, DPaW and DMP as appropriate.

Table 18: Koodaideri spring monitoring program

Parameters	Location	Frequency	Procedure	Purpose
Reconciliation of approved clearing with actual clearing	Disturbed areas	Annually	In accordance with Rio Tinto standard procedures	To ensure clearing does not occur within the designated 'area of special protection from ground disturbance' established around vegetation unit D38
Vegetation condition in accordance with appropriate condition rating scale	Mapped extent of vegetation unit D38 associated with Koodaideri spring	Annually	Vegetation condition survey of vegetation unit D38 associated with Koodaideri spring conducted by qualified botanist	To ensure no negative change in the condition of vegetation community D38
Measurement of health and/or physiological water stress as agreed with the DPaW	Indicator species within mapped extent of vegetation unit D38 associated with Koodaideri spring as agreed with the DPaW	Quarterly	Measurement of health and/or levels of physiological water stress in identified indicator species	To provide information on ecological parameters that may be affected by changes in hydrological regime To ensure vegetation unit D38 and its component flora species are not affected by project activities, with particular reference to drought or waterlogging stress
Species richness and cover of introduced flora	Mapped extent of vegetation unit D38 associated with Koodaideri spring	Annually	Measurement of weed richness and cover as part of assessment of vegetation condition	To provide information on ecological parameters that may be affected by changes in hydrological regime
Aquatic invertebrate diversity and richness	Koodaideri spring and associated surface water pools	Annually	In accordance with established protocols for monitoring aquatic ecosystem health in the Pilbara	To provide information on ecological parameters that may be affected by changes in hydrological regime To ensure Koodaideri spring and its associated surface water pools are not affected by project activities
Surface water levels	Koodaideri spring and associated surface	Monthly	Measurements of water depth and visual observations of the spatial extent/distribution of surface water	To compare to baseline water level records for Koodaideri spring to determine if within natural range and

Parameters	Location	Frequency	Procedure	Purpose
	water pools			consistent with expectations for rainfall received
Surface water quality	Koodaideri spring and associated surface water pools	Quarterly	Sampling of key water quality parameters, including but not limited to dissolved oxygen, temperature, electrical conductivity, pH, turbidity, and concentration of major ions and nutrients	To ensure no negative impacts to Koodaideri spring
Groundwater levels	General mining area, including at Koodaideri spring	Logged continuously; downloaded monthly	Measurements of depth to groundwater	To determine groundwater levels are within range required to maintain Koodaideri spring with reference to baseline groundwater level data

Table 19: Koodaideri spring adaptive management contingency actions

Trigger/criteria	Action
Marked boundary for the designated 'area of special protection from ground disturbance' established around vegetation unit D38 is not as shown in GIS layers	1. Stop work in area immediately adjacent to clearing boundary 2. Complete incident report 3. Implement corrective actions as appropriate to prevent recurrence
Disturbance to vegetation unit D38 is reported or noted through monitoring	1. Report as incident and initiate Incident Response Procedure, including: a) Stop work in the vicinity of the disturbance boundary b) Investigate cause and report to regulators as required (with notice of proposed corrective action) c) Implement corrective actions, including rehabilitation where required
Trigger level for health and/or physiological water stress is exceeded for indicator species	1. Complete incident report 2. Investigate cause of exceedance, including review of surface water and groundwater monitoring data (refer to **Table 18**) 3. Implement corrective actions as required, which may include rehabilitation of the affected area
Apparent decline in aquatic ecosystem health is observed from results of monitoring of aquatic invertebrate diversity and richness	1. Complete incident report 2. Investigate cause of exceedance, including review of surface water and groundwater monitoring data (refer to **Table 18**) 3. Implement corrective actions as required, which may include rehabilitation of the affected area
Trigger level is exceeded for: the level/depth, spatial extent and/or distribution of surface water, and/or; surface water quality, and/or; groundwater levels at and around Koodaideri spring (and/or in its associated pools)	1. Complete incident report 2. Investigate cause of exceedance 3. Implement corrective actions as required and as identified in consultation with the DoW, DPaW and DMP (as appropriate; refer to **Table 17**), which may include consideration of supplementation of Koodaideri spring via surface discharge and/or groundwater reinjection as appropriate 4. Provide to the relevant regulatory authorities (DoW, DPaW and DMP) details of corrective actions implemented and the findings of the investigation within 21 days of identification of triggers levels having been exceeded