

# **Western Turner Syncline - Section 10 Iron Ore Mine**

---

**Rio Tinto Pty Ltd**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
Report 1325  
May, 2009**

### **Environmental Impact Assessment Process Timelines**

<b>Date</b>	<b>Progress stages</b>	<b>Time (weeks)</b>
<b>4.2.2008</b>	<b>Referral received</b>	
<b>25.3.2008</b>	<b>Intention to set EPS Level of Assessment advertised (no appeals)</b>	<b>7</b>
<b>N/A</b>	<b>EPA accepts scoping document (if one provided)</b>	
<b>6.5.2009</b>	<b>Proponent's Final EPS document received by EPA</b>	<b>65</b>
<b>7.5.2009</b>	<b>EPA report to the Minister for the Environment</b>	<b>65</b>

Released: 11/5/09  
Appeals Close: 25/5/09

ISSN 1836-0483 (Print)  
ISSN 1836-0491 (Online)

Assessment No. 1786

# Contents

	<b>Page</b>
<b>1. Introduction and background</b> .....	<b>1</b>
<b>2. The proposal</b> .....	<b>1</b>
<b>3. Consultation</b> .....	<b>4</b>
<b>4. Key environmental factors</b> .....	<b>5</b>
4.1 Vegetation and flora .....	5
4.2 Terrestrial and subterranean fauna .....	8
4.3 Surface water flows .....	12
4.4 Rehabilitation and closure .....	14
<b>5. Conditions</b> .....	<b>15</b>
<b>6. Other Advice</b> .....	<b>15</b>
<b>7. Conclusions</b> .....	<b>15</b>
<b>8. Recommendations</b> .....	<b>16</b>

## Table

1. Summary of key proposal characteristics .....	4
--	---

## Figures

1. Project location
2. Conceptual mine layout

## Appendices

1. References
2. Recommended Environmental Conditions

# 1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal to open-cut iron ore at Section 10 in the Western Turner Syncline.

The proponent is Rio Tinto Pty Ltd (Rio Tinto).

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject. The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA was advised of the proposal in February 2008. Based on the information provided, the EPA considered that while having the potential to have an effect on the environment, the proposal, as described, could be managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 25 March 2008 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set the level of assessment at EPS.

The proponent has prepared the EPS document (Strategen, 2008) which accompanies this report. The EPS sets out the details of the proposal, potential environmental impacts and appropriate strategies to manage those impacts. The EPA notes that the proponent has consulted with relevant stakeholders.

The EPA considers that the proposal can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA therefore has determined, under Section 40 of the EP Act, that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 of the EP Act.

## 2. The proposal

The proposal involves the development of a satellite iron ore mine at Section 10, 20km northwest of the Tom Price minesite, to supplement falling production from the Tom Price mine as it nears the end of its life (Figure 1). The orebody occupies the lower slopes of the main range of hills in the Western Turner Syncline. The eastern and western portions of the proposed pit, where the ore is shallowest, would be mined first and subsequently backfilled, but the central portion would remain open.

A crusher and ancillary facilities, heavy vehicle workshop and offices are required. An infrastructure corridor approximately 20km long containing heavy and light vehicle access roads, power and communications lines, an ore conveyor system and water pipes, would link the mine to existing Tom Price ore processing facilities.

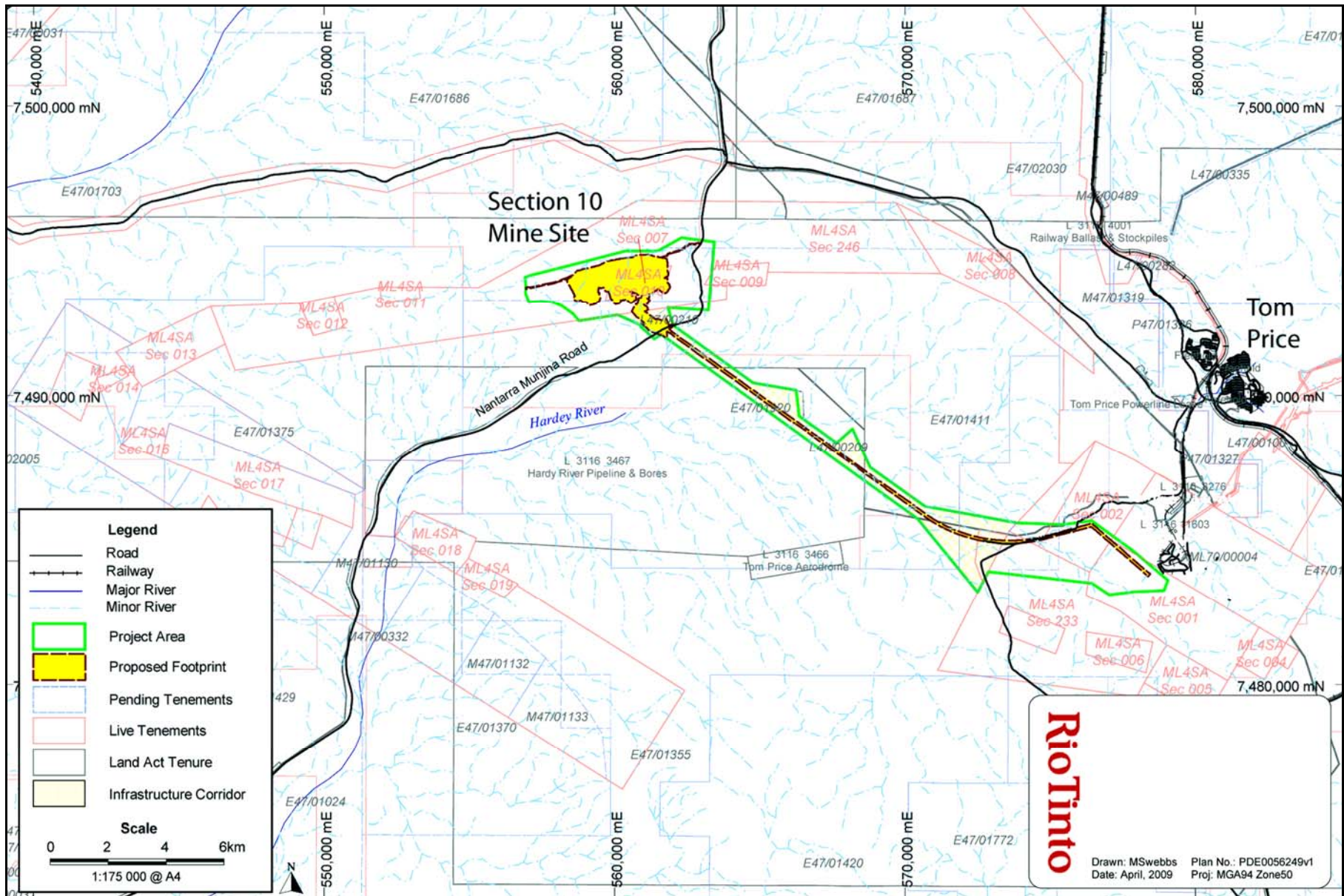


Figure 1: Project location

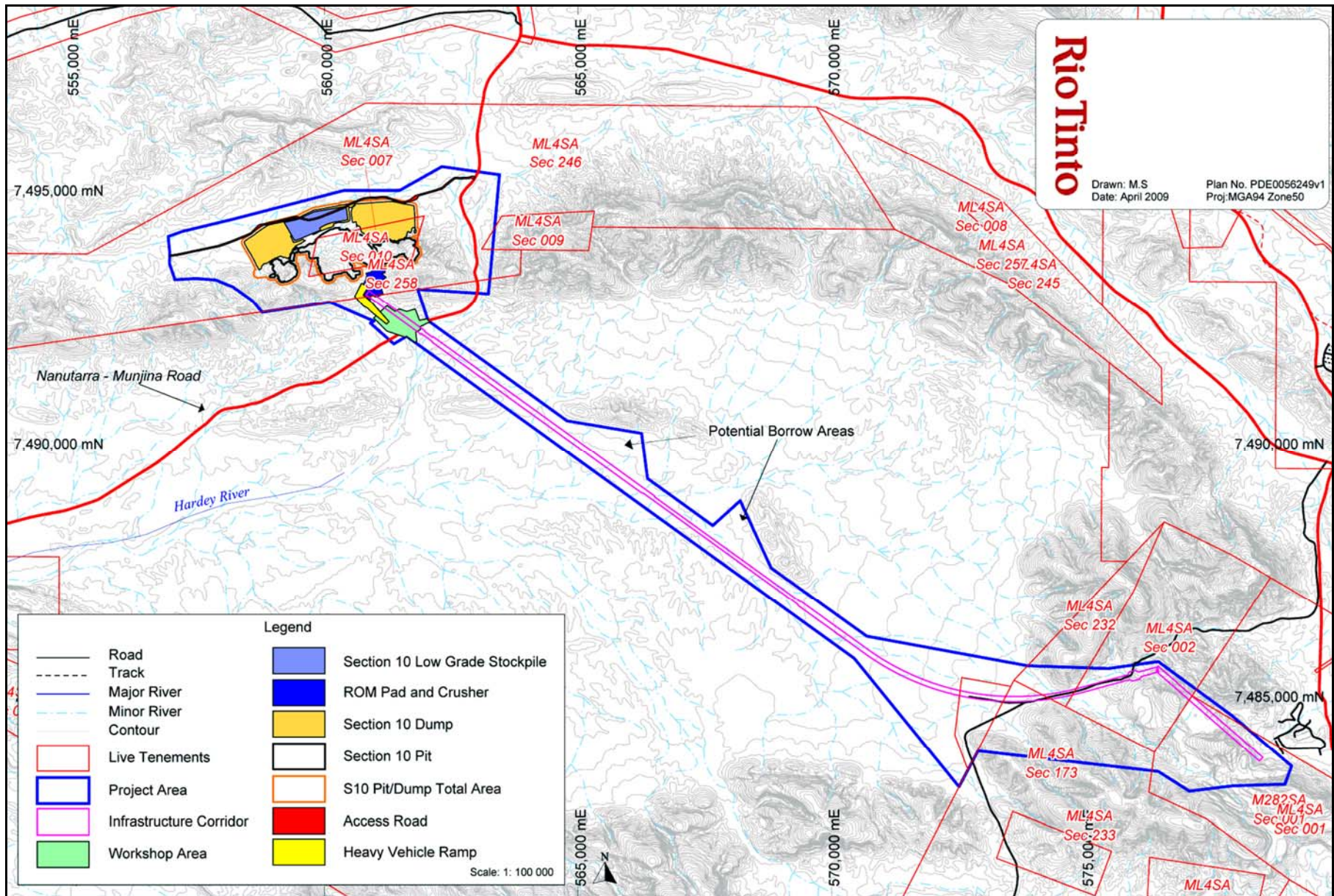


Figure 2: Conceptual mine layout

Initially the ore would be transported from Section 10 to Tom Price by truck. The ore conveyor would be built and operated when production from the mine reaches 6Mtpa (roughly half of the nominal full production rate of 11Mtpa). Whilst the mine would operate above the water table, bores within the orebody footprint would initially provide water for the operation.

**Table 1: Summary of key proposal characteristics**

<b>Element</b>	<b>Description</b>
iron ore mine, within Brockman Iron Formation	mining above water table duration up to 10 years production rate between 11 million tonnes per annum and 25 million tonnes per annum footprint up to 530 hectares
linked infrastructure corridor containing: <ul style="list-style-type: none"> <li>• light and heavy vehicle access/haul roads;</li> <li>• covered ore conveyer;</li> <li>• power and communications lines;</li> <li>• borrow pits; and</li> <li>• water pipes</li> </ul>	length approximately 20 kilometres, from minesite to Mt Tom Price ore processing facilities  maximum footprint of 220 hectares, includes borrow pits
water supply	from bores within the Western Turner Syncline Section 10 orebody footprint.

The proposal is described more fully in the proponent’s EPS document. Figure 2 shows the main components of the development proposal. The potential impacts of the proposal are discussed in the EPS document (Strategen, 2008).

### **3. Consultation**

During the preparation of the EPS, Rio Tinto undertook consultation with government agencies and key stakeholders. The agencies, groups and organisations consulted, the comments received and the proponent’s response are detailed in the EPS (Strategen, 2008).

The main topics raised by stakeholders related to vegetation and flora, fauna, hydrology/hydrology and mine closure. The specific issues raised included the need to provide more information on:

- the extent of vegetation types and proposed disturbance to each type;
- regional significance of vegetation disturbance;
- detail on distribution of short range endemic invertebrates;
- to ensure that culverts and borrow pits are well sited through the transport corridor for effective drainage management; and
- mine closure and rehabilitation.

For the complete list please refer to Table 5 in the EPS.

The EPA considers that the consultation process has been appropriate and that reasonable steps were taken to inform the community and stakeholders of the proposed development.

## 4. Key environmental factors

It is the EPA's opinion that the following key environmental factors relevant to the proposal require evaluation in this report:

- (a) vegetation and flora;
- (b) terrestrial and subterranean fauna;
- (c) surface water flows;
- (d) rehabilitation and closure.

The key environmental factors are discussed in Sections 4.1–4.4. The description of each factor shows why it is relevant to, and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

### 4.1 Vegetation and flora

#### Description

The main issue to affect vegetation within the proposal footprint is the clearing required for the mine development and the infrastructure corridor.

In the proposal area four broad topographic features control vegetation types (EPS Table 6), these being:

- stony plains and low rises;
- hills and gullies;
- drainage areas, creek lines; and
- third order creek lines.

Because of their association with major drainage systems and the likelihood of supporting species which are restricted to these habitats, two of the 31 listed vegetation types are considered to have high conservation significance and to be ecosystems at risk. These are associated with major drainage channels and listed in Table 6 of the EPS as C3 and C4. These two vegetation types are characterised by an overstorey of *Eucalyptus victrix* and/or *E camaldulensis* over *Cenchrus ciliaris* grasses. Type C3 also contains *Acacia citrinoviridis* low woodland over *Melaleuca glomerata*, and *Acacia coriacea* subsp *pendens* tall open shrubs. A total of 3.4ha of these vegetation types would be cleared.

Three vegetation types (H12, H13, H14) classed as open woodlands and shrubland are moderately significant because they act as refugia for species which are either fire-sensitive or which prefer rocky, mesic habitats. Seven others (P1, P2, P6, H2, H6, C1, C2) also have moderate conservation significance because they support Mulga trees, which are fire-sensitive, over highly flammable Spinifex grasses.

The minesite is dominated by two main vegetation types (C1 and H5-EPS Figs 13, 15). Type C1, which occupies much of the northern portion of the orebody in a broad drainage area, consists of fine-leaved and bushy forms of Mulga over Acacia and Eremophila open shrubland overlying scattered low shrubs and Spinifex. About 80% of this unit within the proposal area was burnt, leaving unaffected numerous small pockets. Type H5 has no



particular conservation values and consists of low open Eucalyptus woodland above Acacia and Grevillea shrubs overlying Spinifex grassland.

The proposed infrastructure corridor intersects several vegetation types along its 20km length (EPS Figs 14, 15). The corridor comprises approximately 30% of the area of the entire proposal, ie 220ha of the footprint of 750ha.

Plants may be affected directly by clearing activities; less directly by vehicle and earth movements (spreading seed and dust); and the potential disruption of surface water flow from land disturbance. The proposal has the potential to impact on (Priority 2) *Indigophera ixocarpa* plants, recorded at six locations associated with the proposed corridor and the Tom Price mine. Similarly, the Priority 4 species *Eremophila magnifica* subsp. *magnifica*, which is mapped from six locations (four of which are close to the proposed pit), is expected to be partially impacted, with up to 43 out of 476 individual plants being lost in the worst case scenario.

Rio Tinto has provided both the expected and the worst case disturbance scenarios for threatened flora species (Table 7 in the EPS). 1100 individual Hamersley *Lepidium* plants, which are classed as 'declared rare flora' (DRF) under State legislation and 'vulnerable' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, have been found at Mt Nameless, approximately 2.7km east of the proposed corridor. These plants are distant from areas to be disturbed and not at risk from the proposal. Twenty *Lepidium* specimens are also recorded from a valley located adjacent to the Tom Price mine through which the infrastructure corridor is designed to pass. These are considered to be at low risk of disturbance, but if cutting into the hillside is necessary to install the corridor, they may be destroyed.

Eight priority species (EPS Table 7: two Priority 1, four Priority 2, one each of Priority 3 and 4) were recorded from the study area. The Priority 1 species *Ptilotus* sp. Brockman, located 8.5km south west of the proposal area, would not be affected by the proposal. However, the other Priority 1 species, *Goodenia* sp. Pilbara calcrete, has been mapped close to the infrastructure corridor and workshop area (EPS Table 7).

Nine weed species were mapped within the vicinity of the proposal area, many of which are concentrated along drainage lines. Buffel Grass, Ruby Dock and Whorled Pigeon Grass are recorded as 'scattered' to 'abundant' along the route of the proposed corridor.

### **Assessment**

The EPA's environmental objectives are to:

- maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities, at species and ecosystem levels; and
- protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*.

The proponent has observed principles, objectives and actions from EPA Position Statement 3 and Guidance Statement 51 on the clearing of native vegetation and the methodologies of biological surveys where such actions could have an effect on biodiversity values. These include:

- consideration of the protection of biodiversity at species and ecosystems levels;
- no risk of a species, community or association of native plants becoming extinct as a result of the development;

- adequate and secure representation of scarce or endangered habitats of similar types elsewhere;
- identifying and managing both on and off-site impacts associated with the proposal;
- guidance on standards and protocols for flora and vegetation surveys for EIA; and
- the need to develop and implement best practice in biological surveys.

A multi-purpose corridor between the proposed mine and the Tom Price ore processing facility will contain separate roads for heavy and light vehicles, an ore conveyor, water, power and communications links.

Table 8 in the EPS provides the areas of each vegetation type to be cleared and compares those of moderate and high conservation significance with the regional areal extent of the same vegetation type in the wider Western Turner Syncline.

Neither vegetation type assigned high conservation significance (C3 and C4) will have more than 0.8% of its total mapped area affected by the proposal.

Three vegetation types of moderate conservation significance will have relatively high proportions cleared (EPS Table 8):

- type C1 (fine-leaved and bushy forms of Mulga over Acacia and Eremophila open shrubland overlying scattered low shrubs and Spinifex) much of which has been burnt out, would have approximately 42% cleared for the pit. Rio Tinto was asked whether there was more of this unit beyond the mapped area. Using aerial photography, landform mapping, soil descriptions and topography, and supported by previous Biota survey data it estimates that, within a radius of 50km outside of the project area, there is potentially about 90ha;
- type H6 (tall Acacias in open shrubland over Spinifex hummock grassland) would have 43% of its mapped area cleared. It grows where the south east of the pit is proposed, as well as further to the east of the proposal area; and
- type H2 (varieties of tall, closed Acacia scrub over *Scaveola acacioides*, *Dodonaea pachyneura* scattered shrubs over open Spinifex grassland and *Eriachne mucronata* very open tussock grassland), which occurs along the eastern portion of the access corridor near Tom Price mine, would have 25% of the mapped area affected.

Vegetation types H2 and H6 occur in the Newman Land System, both of which are widespread throughout the Hamersley Ranges.

A fourth type (H14-tall Acacia shrubs and open heath over tussock and hummock grasslands) occurs in discrete patches on the southern boundary of the orebody and to the southeast. Fourteen percent of its area would be cleared. The remaining mapped vegetation types of moderate conservation value will have less than 5% of their areas affected.

Twenty *Lepidium* specimens (listed as DRF) may be destroyed if cutting into the hillside is necessary to install the infrastructure corridor. This is less than 2% of those which have been surveyed for this proposal; 1100 other mapped specimens of the species will not be affected by the proposal.

None of the two recorded Priority 1 species is close enough to be directly impacted by clearing for the proposal. However, some of the *Goodenia* sp. Pilbara calcrete plants could be affected by vehicle dust as they are close to the access corridor and downwind under easterly conditions. As the proponent does not intend to seal the road good dust management would

be essential. The EPA considers that ore transport by truck could create more environmental impacts on the *Goodenia* sp than a conveyor system and encourages the proponent to make the transition to transport ore to Tom Price via a conveyor system as soon as practicable.

An expected 17% (up to 43% under a worst case scenario) of Priority 2 *Indigophera ixocarpa* plants associated with the proposal are likely to be affected to some degree. As less than 10% of the total mapped Priority 4 species *Eremophila magnifica* subsp. *magnifica* in the proposal area would be cleared, the risk to the species is considered to be low.

### **Summary**

Clearing of 750ha of vegetation will result in less than 1% of high conservation value vegetation units (coded C3 and C4) being directly affected. Some vegetation units with moderate conservation values (C1, H2, H6) are expected to lose between 25% and 43% of their areas within the mapped envelope, but substantial areas of these units are interpreted to exist within a 50km radius of the project area. These would not be affected by the project.

Natural fire regimes are also expected to be modified because grass fires that might otherwise be left unchecked would be quickly extinguished to prevent damage to mine property and minimise risks to personnel. Changes to fire regimes could lead to alterations to the proportions of native vegetation versus weeds. Given the sensitivity of Mulga species to fire, the management of fire is considered to be important, both around the minesite and along the infrastructure corridor.

The EPA considers the issue of vegetation and flora has been adequately addressed and the proposal can meet the EPA's objectives for this factor provided that the proponent implements the recommended condition 6.

## **4.2 Terrestrial and subterranean fauna**

### **Description**

Terrestrial fauna surveys for the site (mine and infrastructure corridor) were first carried out during the winter and spring of 2007. They included collecting at locations likely to support short range endemic (SRE) invertebrates. This survey work, including pitfall trapping and targeted searching for potential SRE, was repeated in August 2008. Trapping and recordings were also done for birds and bats respectively.

Four separate terrestrial habitat types were identified within the proposal area: hummock grasslands; woodlands; breakaways; and Acacia shrubland over tussock grassland on stony alluvial clay/rocky substrate.

#### *Terrestrial fauna*

Species of higher conservation significance that were recorded or are likely to be found in the area are shown in the EPS Table 9. They include an Olive Python (listed as 'rare and likely to become extinct'), six Rainbow Bee Eaters (listed as 'migratory' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) and three Western Pebble-mound Mice (Priority 4).

Five potential SRE invertebrate species were also recorded (EPS section 7.1.3). Four of these species found within the survey area were recorded at more than one site. They are not restricted to the proposed area of disturbance and the proposal is unlikely to put the species at

risk. The fifth, a trapdoor spider (*Nemesiidae* sp.) was found in vegetation type C1. It was found in a single location (Biota Environmental Sciences, January 2008) in Mulga over Spinifex hummock grassland (type C1 vegetation). This is a broad drainage area running parallel to, contiguous with, and north of the orebody. Approximately 56% (156ha) of the mapped area of this vegetation type would be cleared for the development.

#### *Stygofauna*

Surveying for subterranean fauna was undertaken to be consistent with EPA Guidance Statements 54 and 54a and consisted of field studies and a habitat-based desktop assessment. This survey focused mainly on the confined aquifer beneath the central portion of the orebody, from which water would be pumped for the mining operation. The first stygofauna sampling survey of eight bores in November 2007 revealed one stygofauna sample, from production bore ML06 (located about 3km from the proposed pit-see EPS Figure 24). Sampling during March for the second survey (15 bores successfully sampled out of 18, including ML06) found none (Table 2-3, Biota 2008). No stygofauna were collected either from the aquifer in the section 10 orebody or the surrounding Mt Lionel or Hardey River borefields in this second survey.

One invertebrate of the order *Palpigradi* was collected during stygofauna sampling. This specimen is considered to be a terrestrial rather than a subterranean dweller.

#### *Troglofauna*

Forty traps for troglofauna were placed in 15 boreholes in November 2007 (EPS Figure 26). Thirty four traps were successfully retrieved in January 2008 from eleven holes (Table 2-2, Biota 2008). Over 5700 specimens were collected from the traps. Around 97% of them came from two orders (*Acarina* and *Collembola*), both of which are considered to be terrestrial and not short range endemics. Five bores hosted Pincushion Millipedes (order *Polyxenida*) with characteristics (lack of pigmentation, no visible eyes) suggestive of subsurface dwellers. However, these features are also common in soil-dwellers (Biota 2008b) and advice from the WA Museum indicates that Pincushion Millipedes cannot be definitively assigned exclusively to either habitat.

Also collected from the traps were flies, silverfish, cockroaches, termites, ants, and springtails, none of which is considered to be troglobitic. Therefore no holes sampled within the project impact area revealed any confirmed troglobytes.

A downhole video camera was used in thirteen drillholes (EPS Figures 25, 26). The holes afforded a representative view across the ore deposit and, according to the proponent, targeted areas most likely to contain cavities and fractures that could support troglofauna and stygofauna. Rio Tinto and its consultant (Biota, 2008) studied downhole video footage and drill cores. They advise that the strata comprising the pit area have not to date been recognised as core habitat for subterranean fauna, but that the geology of the deposit at Section 10 is such that it is possible for voids and mesocaverns to occur that could be inhabited by subterranean fauna.

The project could affect fauna and their habitats through vegetation clearing, vehicle movements, by alterations to surface hydrology, and from the physical presence of the conveyor acting as a cross-country barrier to the movements of larger species. Lights, noise, and vibration from blasting could also be disruptive.

## Assessment

The EPA's environmental objectives for this factor are:

- to maintain the abundance, species diversity and geographical distribution of terrestrial fauna, including subterranean fauna; and
- to improve understanding of subterranean fauna through appropriate research, including sampling, identification and documentation.

The 2008 fauna survey was carried out to comply with the EPA's Position Statement 3 and Guidance Statement 56. Key elements are:

- that all reasonable measures are undertaken to avoid impacts on biodiversity, and where impacts cannot be avoided, to demonstrate that they will not result in unacceptable loss;
- the quality of information and scope of field surveys meets the standards, requirements and protocols as determined and published by the EPA and all relevant agreements, legislation and policies in regard to biodiversity conservation;
- for proponents to ensure that terrestrial biological surveys provide sufficient information to address both biodiversity conservation and ecological function values and the relevant EPA objectives for protection of the environment; and
- that in the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Most of the 750ha of potential habitat that would be cleared for this project consists of vegetation types which are widely distributed and well represented in the locality. Over 99% of the riverine woodland which occurs in association with the major drainage channels in the proposal area, and any associated fauna habitats, would not be disturbed by the proposal.

Three habitat types (H12, H13 and H14) offer moderate conservation values as refugia for fire-sensitive species and others preferring rocky, mesic habitats. Types H12 and H13 would not be disturbed. Type H14 would have 14% of its area (5.6ha) within the Western Turner Syncline affected. Regionally, faunal diversity is unlikely to be significantly affected as the habitats are well distributed.

### *Terrestrial fauna*

The Northern Quoll (schedule 1/ endangered) prefers to live in rocky habitat and breakaway country. It was not found in the surveys. The positioning of the mine pit would largely avoid breakaways and the proposed infrastructure corridor does not offer suitable habitat for this species. The EPA notes that the Northern Quoll is characterised as highly adaptable and mobile, with large home ranges (in the order of 35-100ha). These characteristics would help to minimise trauma to this species if any inhabit the surrounding area.

The proponent's proposed use of trucks to transport ore to Tom Price as an alternative to a conveyor system would be expected to significantly increase fauna kills in the vicinity of the infrastructure corridor. The longer this mode of ore transport is used the higher the mortality count is expected to be.

A Pilbara Olive Python (schedule 1/ vulnerable) was found in a gorge about 500m from the proposed corridor. The corridor avoids the snake's preferred habitat and no impact from the proposal is expected.

The Orange Leaf-nosed Bat (schedule 1/ vulnerable) roosts in caves, but none was detected after setting an Anabat recorder in the only known cave in the vicinity of the project area. Two other (more common) bat species were recorded in this cave, which is located immediately adjacent to the Tom Price mine.

An EPA Service Unit site visit revealed that approximately 80% (proponent's calculation at the EPASU's request) of the C1 vegetation type was affected by fire within the last year. This vegetation type was where the Trapdoor Spider was found during the fauna survey. Because Mulga is fire-sensitive the EPA was concerned that much of the C1 unit could have been permanently affected, with potentially adverse consequences for Trapdoor Spiders. However, a recent photographic survey of the burnt trees shows that many are re-sprouting vigorously from their bases, indicating that the fire was not overly hot. Also, as noted above in section 4.1, at least another 90ha of this vegetation unit has been identified within 50km of the project area).

Biota's follow-up survey in August failed to find more Trapdoor Spiders. Biota stated in its report that surveying for these species is difficult because of their cryptic nature and habits. Typically only the males leave their burrows, to mate, after which they die. These events take place under a restricted range of ambient conditions, usually on wet or humid nights.

The proponent states that, compared to the size of the fauna species, the remaining area of 123ha of vegetation type C1 represents a large area of habitat for Trapdoor Spider populations. Based on the expected loss of just over half of the relevant vegetation type where the Trapdoor Spider was recorded from, the proponent considers that the risk of species extinction resulting from the mine development is low. The EPA notes that considerably more of this vegetation type exists outside of the proposed development area than has been mapped. The remaining area is large compared to the size of the animal and its territory. Using a risk-based strategy, and keeping in mind the remaining area of unburnt and uncleared vegetation type C1, the EPA considers that sufficient habitat remains to protect the species.

#### *Stygofauna*

While sampling for stygofauna, a carcass belonging to the order *Palpigradi* was collected from a drill hole. According to Barranco and Harvey (2008) and Harvey and Yen (1997), this invertebrate is known to live variously in soil, leaf litter, under rocks, in caves and semi-aquatic interstitial environments. As such, it has a greater range of habitat options and is therefore less locally restricted than troglobytes. The proposal would disturb only a small portion of potentially suitable habitat for the palpigrade. Given that leaf litter was quite extensive around the drillhole where the specimen was found, the EPA considers that the likelihood of it being a soil or litter-dweller is quite high and that therefore its habitat may be quite widespread.

#### *Troglofauna*

Systematic sampling of the area for troglofauna revealed several thousand individual specimens, none of which can be unequivocally classed as troglobytes. However, the size of the population reduces the likelihood of them being troglobitic as troglobytes are usually found in low densities. Reviews of geological records of rock types, fracture densities and down-hole camera images suggest that the mine pit area does not appear to be a core habitat for subterranean fauna. The EPA considers that the evidence for troglofauna is inconclusive, that Biota's advice, which is consistent with advice from the WA Museum (pers. comm. Mark Harvey), reflects the current state of knowledge and that on this basis the likely impact is considered environmentally acceptable.

The EPA notes that Rio Tinto has proposed several management measures to help minimise impacts to fauna. These include:

- all clearing and ground disturbance to be consistent with Rio Tinto's Approvals Request System which aims to control vegetation clearing and ground disturbance;
- ensuring clearing of potential fauna habitat is as approved;
- progressively rehabilitating to re-establish fauna habitat;
- implementing vehicle speed limits;
- preventing ponding of water and ensuring natural drainage flows are maintained where possible;
- undertaking feral animal trapping as required;
- installing metallic reflectors on all barbed wire to minimise the potential for entanglement of bats.

Noting also that only 3.4ha of vegetation with high conservation values for fauna habitat (types C3 and C4) are likely to be disturbed, the EPA considers that the regional impacts to fauna of conservation significance are minimal.

### **Summary**

The EPA considers the issues of terrestrial and subterranean fauna have been adequately addressed and that, on balance, the risk of there being unique short range endemic species within the mine footprint is low and environmentally acceptable. Accordingly the proposal can meet the EPA's objectives for this factor provided that the proponent implements the recommended condition 7 to manage and report on potential impacts to short range endemic fauna.

## **4.3 Surface water flows**

### **Description**

The proposed mine is located in the upper catchment of the Hardey River. Drainage patterns in this area are young and typically only carry running water during and immediately after rains. A sizeable ephemeral tributary of the Hardey River passes 2km east of the proposed mine, flowing generally southwards and eastwards (Figure 2). The access corridor would have to cross this tributary and many of the numerous small drainage lines which feed it. The conveyor system would be raised above ground so should not have a significant effect on the movement of surface water.

Mining has the potential to cause significant adverse changes to soil and water chemistry. The proposed pit contains a small amount of pyritic shales (0.05% of the total volume of rock to be mined) which are potentially acid-forming if exposed to air and wetted. If acid is generated it could mobilise metallic leachates (of iron, manganese, aluminium) which are potentially harmful to wildlife and aquatic organisms. This proposal, however, is to mine only above the water table, where rocks have already been largely exposed to oxidation over millennia.

## Assessment

The EPA's environmental objectives for this factor are:

- to maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance, are protected; and
- to maintain the integrity, functions and environmental values of any Mulga communities.

The Section 10 orebody is adjacent to and occupies part of the north flank of a range of hills, with the minesite topography ranging from flat to moderately sloping. Surface waters would need to be diverted to avoid the pit, and mine components and water quality could be affected.

Waste dumps would be designed to minimise sediment-laden runoff. Sediment traps would be installed to deal with increased sediment levels expected from localised increases in flow velocity and soil erosion.

Mining below the water table is not proposed, so there would be no final pit lake. Oily water from hardstand areas would be treated first before being used or released. Rainwater that collects in the pit may be pumped to an out-of-pit settling pond, from where it could be recovered and used to suppress dust. Any excess water would be discharged from the settling pond to ephemeral drainage lines. All discharged waters would be consistent with ANZECC Water Quality Guidelines.

Many (culverted and at-grade) crossings of small creeks would be required along the infrastructure corridor. Ponding of surface runoff could potentially lead to loss of habitat and drowning of less mobile fauna. Rio Tinto's *Pilbara Iron Sediment and Drainage Control Design Criteria* would be used to minimise ponding and drainage shadow effects of the infrastructure corridor by establishing correct levels for culverts at floodways and ephemeral stream crossings.

A field inspection has shown that Mulga groves, that could be expected to be dependent on sheet flow, are not known in or close to the proposal area.

Rio Tinto has a *Spontaneous Combustion and Acid Rock Drainage Management Plan* (SCARD) for pyritic shales, which it uses at all of its mines with the potential to form acid rock drainage. The plan lists several strategies to prevent or minimise ARD, including:

- identifying areas of ARD-forming material;
- covering such material in the mine pit, where practicable, to minimise oxidation and wetting;
- prioritising in-pit disposal of pyritic shales over construction of above-ground dumps;
- directing surface water away from pyritic shale dumps;
- segregating any acid runoff to prevent contamination of cleaner water. Any acid runoff would be contained in evaporation ponds; and
- ensuring the plan is updated regularly and links into other company procedures.

The proponent has advised that the residence time of material in run-of-mine (ROM) stockpiles varies from hours to a few days, at most. There is little potential to generate leachates from the ore on the ROM pad in such a short time, particularly as most strata above the water table have already been subjected to in-situ weathering, and alumina minerals are very stable under the present conditions. This applies also to any long term, low grade ore



stockpiles with characteristically higher silica and alumina content. The EPA concurs with this assessment and considers that the abovementioned SCARD management strategies are adequate to manage potential acid drainage.

### **Summary**

The EPA considers the issue of surface water flow has been adequately addressed and the proposal can meet the EPA's objectives for this factor provided that the proponent implements the recommended condition 8.

## **4.4 Rehabilitation and closure**

### **Description**

The proposed backfilling strategy aims to fill the eastern and western ends of the pit void with mining waste to at least the lower lip of the pit. The ends would be mined first and are relatively shallow excavations. It is not proposed to backfill the central part of the pit, which would be mined last.

Using experience gained from its other mines in the region, Rio Tinto has developed a preliminary *Closure and Rehabilitation Management Plan* for the site based on ANZMEC and MCA (2000) principles. The EPS (Table 12) shows a list of targets and rehabilitation objectives that would be used to achieve and demonstrate successful rehabilitation and closure. The list would be reviewed and updated during mining operations to ensure its continuing relevance.

Rehabilitation would aim to re-establish safe, stable landforms that blend with surrounding areas. Mine closure strategies plan to prevent adverse environmental impacts and to create sustainable natural ecosystems, either as close as practicable to what preceded the development, or a suitable end land use as determined in consultation with relevant stakeholders and the community.

The EPA's objectives are to ensure that:

- rehabilitation and closure achieve stable, non-polluting and functioning landforms which are consistent with the surrounding landscape and other environmental values;
- self-sustaining native vegetation communities are returned after mining, which, in species composition and ecological function are as close as possible to naturally occurring analogue sites.

### **Assessment**

Rio Tinto's preliminary *Closure and Rehabilitation Management Plan* would be regularly reviewed during the mine life to ensure it remains accurate and incorporates relevant updates. It contains objectives for stable, aesthetically compatible, free-draining landforms, compatible, sustainable vegetation communities, similar weed densities as existed prior to mining, and no adverse impacts as a result of acid rock drainage.

Information on appropriate rehabilitation strategies should be available from the established Tom Price mine nearby and the EPA expects that these would be used to update and validate the *Closure and Rehabilitation Management Plan* for the Section 10 Mine.

The EPA considers the issues of rehabilitation and closure have been adequately addressed and the proposal can meet the EPA's objectives for this factor provided that the proponent implements the recommended condition 9.

## **5. Conditions**

Having considered the information provided in this report, the EPA has developed a set of conditions and recommends they be imposed if the proposal by Rio Tinto Pty Ltd to mine iron ore at Section 10, and connect the mining operation to the existing Tom Price Mine ore-processing facilities with an infrastructure corridor, is approved for implementation. These conditions are presented in Appendix 2.

## **6. Other Advice**

The EPA notes that the proponent has indicated that the proposal will produce a relatively small amount (~87,000tpy) of greenhouse gas emissions and has indicated that it intends to change over to transporting ore via conveyors when mine production reaches 6mtpa. The use of conveyors instead of trucks would reduce the greenhouse gas intensity. The EPA supports the proponent's intention to reduce greenhouse gas emissions via the use of conveyors.

## **7. Conclusions**

The EPA has considered the proposal by Rio Tinto Pty Ltd to open-cut iron ore at Section 10 and connect the mining operation to the existing Tom Price Mine ore processing facilities with an infrastructure corridor.

The EPA considers that the key environmental factors relevant to this proposal are:

- vegetation and flora;
- terrestrial and subterranean fauna;
- surface water flows; and
- rehabilitation and closure.

The EPA has examined the information provided by the proponent for each of these factors and sought the opinions of key stakeholders.

Clearing for the project would amount to 750ha. The high conservation value vegetation units would have less than 1% cleared. Some vegetation units with moderate conservation values are expected to lose from 25% to 43% of their areas within the mapped envelope, but substantial areas of these units are interpreted to exist within a 50km radius of the project area.

With regard to terrestrial and subterranean fauna the EPA considers the issues have been adequately addressed and that, on balance, the risk of there being unique short range endemic species within the mine footprint is acceptably low.

The infrastructure corridor would cross a tributary of the Hardey River and many smaller creeks. Rio Tinto's standard design criteria would be used to minimise ponding and drainage-shadow effects by establishing correct levels for culverts at floodways and ephemeral stream crossings. There are no known Mulga groves in the area which could be affected by changes to surface water flows.

The proponent has developed strategies for dealing with acid mine drainage from its other Pilbara mines and would employ these at Section 10, if found necessary. There is little potential to generate acidic leachates from the small amount of pyritic ore to be mined, particularly as most strata above the water table have already been subjected to in-situ weathering and oxidising over geological time.

Rio Tinto has stated that it proposes to initially use trucks to haul ore to Tom Price and would change to a conveyor system later when market demand increases sufficiently. Trucking ore to Tom Price has many environmental disadvantages, such as extra dust and the need for extra water to reduce it, increased fauna road kills, and the potential for increased vehicular accidents, especially at road crossings, which makes it less environmentally acceptable. The EPA considers that the transition to a conveyor system to transport ore should take place as soon as practicably possible.

Information on appropriate rehabilitation strategies from Rio Tinto's established mines nearby would be used to update and validate the *Closure and Rehabilitation Management Plan* for the Section 10 Mine and the EPA considers that the issues of rehabilitation and closure have been adequately addressed.

The EPA concludes that the proposal could be managed to meet its environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2.

## **8. Recommendations**

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for an open-cut mine iron ore at Section 10 in the Western Turner Syncline, connected to the existing Tom Price Mine ore processing facilities by an infrastructure corridor;
2. That the Minister considers the report on the key environmental factors as set out in Section 4;
3. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

## **Appendix 1**

### **References**

(ANZMEC) Australian and New Zealand Minerals and Energy Council and (MCA) Minerals Council of Australia (2000) *Strategic Framework for Mine Closure*, National Library of Australia Catalogue.

Barranco, P and Harvey, M S. 2008. "The first indigenous paligrade from Australia: a new species of Eukoeniena (Palpigradi: Eukoeneniidae)". *Invertebrate Systematics*, 2008, 22: 227-233.

Biota Environmental Sciences. *West Turner Syncline Section 10 Subterranean Fauna Assessment*. August 2008.

Harvey, M S and Yen, L Y. 1997. *Worms to Wasps: An Illustrated Guide to Australia's Terrestrial Invertebrates*. Oxford Press.

Strategen. April 2009. *Western Turner Syncline Section 10 Iron Ore Project. Environment Protection Statement*.

## **Appendix 2**

### **Recommended Environmental Conditions**

## RECOMMENDED ENVIRONMENTAL CONDITIONS

Statement No.

### **STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)**

#### WESTERN TURNER SYNCLINE, SECTION 10 IRON ORE PROJECT, SHIRE OF ASHBURTON

**Proposal:** to open-cut mine iron ore and link the mining operation to the existing Tom Price Mine process facilities with an infrastructure corridor. This corridor would contain an ore conveyor system, access roads, power, water and communications lines.

The proposal is further documented in schedule 1 of this statement.

**Proponent:** Rio Tinto Pty Ltd.

**Proponent Address:** 152-158 St George's Terrace, Perth WA 6000

**Assessment Number:** 1786

**Report of the Environmental Protection Authority:** Bulletin 1325

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

#### **1 Proposal Implementation**

1-1 The proponent shall implement the proposal as assessed by the Environmental Protection Authority and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

#### **2 Proponent Nomination and Contact Details**

2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3-1 The proponent shall substantially commence implementation of the proposal by 30 June 2011.

3-2 The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before 30 June 2011.

#### **4 Compliance Reporting**

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO of the Department of Environment and Conservation.

4-2 The proponent shall submit to the CEO of the Department of Environment and Conservation, the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance assessment report required by condition 4-6.

The compliance assessment plan shall indicate:

- 1 the frequency of compliance reporting;
- 2 the approach and timing of compliance assessments;
- 3 the retention of compliance assessments;
- 4 reporting of potential non-compliances and corrective actions taken;
- 5 the table of contents of compliance assessment reports; and
- 6 public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the CEO of the Department of Environment and Conservation.

4-5 The proponent shall advise the CEO of the Department of Environment and Conservation of any potential non-compliance as soon as practicable.

4-6 The proponent shall submit a compliance assessment report annually from the date of issue of this Implementation Statement addressing the previous twelve-month period or other period as agreed by the CEO of the Department of Environment and Conservation.

The compliance assessment report shall:

- 1 be endorsed by the proponent's Vice-President or a person, approved in writing by the CEO of the Department of Environment and Conservation, delegated to sign on the Vice-President's behalf;
- 2 include a statement as to whether the proponent has complied with the conditions;



- 3 identify all potential non-compliances and describe corrective and preventative actions taken;
- 4 be made publicly available in accordance with the approved compliance assessment plan; and
- 5 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

## **5 Performance Review and Reporting**

5-1 The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the second and fourth years after the commencement of operation, and then at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which address:

- 1 the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to the management of the major risks and impacts;
- 2 the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and
- 3 significant improvements gained in environmental management which could be applied to this and other similar projects.

## **6 Flora and Vegetation**

6-1 The proponent shall monitor the health and abundance of native flora including *Goodenia* sp. Pilbara calcrete, the listed Priority 1 flora species adjacent to areas to be cleared, to ensure that there is no decline in their health or abundance through the implementation of the proposal, in particular from the effects of dust and water application for dust control. This monitoring is to be carried out to the satisfaction of the CEO of the Department of Environment and Conservation.

6-2 The proponent shall submit annually the results of monitoring required by condition 6-1 to the CEO of the Department of Environment and Conservation.

6-3 In the event that monitoring required by condition 6-1 indicates a decline in the health or abundance of native flora outside the areas to be cleared and which is attributable to the development proposal, the proponent shall report such findings to the CEO within 21 days of the decline being identified, and shall state the actions the proponent shall take to remediate the decline.

6-5 The proponent shall not take any Declared Rare Flora or Priority Flora species when clearing vegetation for borrow pits, and avoid Declared Rare Flora and Priority flora outside the areas to be cleared.

6-6 The proponent shall make the monitoring reports required by condition 6-2 publicly available in a manner approved by the CEO of the Department of Environment and Conservation.

## **7 Terrestrial Fauna**

7-1 The proponent shall implement reasonable and practicable management measures, to be agreed in consultation with the Department of Environment and Conservation, that may be required to facilitate protection of the conservation status of any short range endemics, including the Trapdoor Spider (*Nemesiidae* sp.) located in the proposal area.

7-2 The proponent shall submit annually the outcomes from any measures required by condition 7-1 to the CEO of the Department of Environment and Conservation.

## **8 Surface water flows**

8-1 The proponent shall ensure that the run-off or seepage from mine components does not cause the quality of water in or leaving the proposal area to exceed ANZECC\* requirements, taking into consideration natural background water quality, so that existing and potential uses, including ecosystem maintenance, are protected.

\* - *Australian Water Quality Guidelines for Fresh and Marine Waters*, ANZECC (November 1992, and its updates).

8-2 The proponent shall monitor the quality of any run-off or seepage from mine components on and in proximity to the project area shown in the figure in Schedule 1 to the Minister's Statement with particular regard to acid mine drainage. This monitoring is to be done to the satisfaction of the CEO of the Department of Environment and Conservation.

8-3 The proponent shall submit the results of the monitoring to the CEO of the Department of Environment and Conservation.

8-4 In the event that monitoring shows that the quality of water in or leaving the proposal area exceeds ANZECC requirements the proponent shall, in consultation with the Department of Environment and Conservation, undertake measures to improve the water quality to conform with ANZECC requirements.

## **9 Closure and Rehabilitation**

9-1 Prior to commencement of mining the proponent shall have conducted surveys of the proposal area to collect baseline information on the following:

1. soil profiles;
2. groundwater levels;
3. surface water flows;
4. plant communities and flora; and
5. landscape and landforms.

- 9-2 Waste dumps and other artificial landforms shall be constructed so that their shape, size, stability, soil profiles, ability to support native vegetation and response to surface water flows are comparable to natural landforms in the area.
- 9-3 Waste dumps, artificial landforms and other disturbed areas outside the pit, shall be rehabilitated with native plant species of local provenance (defined as plant material or seeds collected within 10km of the project).
- 9-4 Within five years of mine closure, the percentage cover of native vegetation shall be comparable with that of natural landforms in the area.
- 9-5 No new noxious or environmental weed species shall be introduced into the area as a result of the implementation of the proposal.
- 9-6 Within five years of mine closure the distribution and abundance of weeds shall be no greater than the distribution and abundance of weeds prior to the implementation of the proposal.
- 9-7 Within five years of mine closure the proponent shall submit a report of rehabilitation performance monitoring to the CEO of the Department of Environment and Conservation and shall address in the report the following:
- 1 progress towards meeting the criteria required by conditions 9-2 to 9-6 inclusive; and
  - 2 contingency management measures in the event that criteria are unlikely to be met.

### **Procedures**

1. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.
2. The Minister for Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.
3. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

The Proposal (Assessment No. 1710)

The proposal is for the construction and operation of an open-cut iron ore mine at Section 10 in the Western Turner Syncline and an infrastructure corridor connecting the mining operation to the existing Tom Price Mine ore-processing facilities. Supporting facilities include a crusher and ancillary facilities, heavy vehicle workshop, offices and a borefield.

**Table 1: Summary of key proposal characteristics**

<b>Element</b>	<b>Description</b>
iron ore mine, within Brockman Iron Formation	mining above water table duration up to 10 years production rate between 11 million tonnes per annum and 25 million tonnes per annum footprint up to 530 hectares
linked infrastructure corridor containing: <ul style="list-style-type: none"> <li>• light and heavy vehicle access/haul roads;</li> <li>• covered ore conveyer;</li> <li>• power and communications lines;</li> <li>• borrow pits; and</li> <li>• water pipes</li> </ul>	length approximately 20 kilometres, from minesite to Mt Tom Price ore processing facilities  maximum footprint of 220 hectares, includes borrow pits
water supply	from bores within the Western Turner Syncline Section 10 orebody footprint.

Figures

Figure 1 – Project location. (See Page 2 above).

Figure 2 – Conceptual mine layout. (See Page 3 above)