



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2283/5
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Hamersley Iron Pty Ltd**

1.3. Property details

Property: *Iron Ore (Rhodes Ridge) Agreement Authorisation Act 1972, Temporary Reserve 70/4193*
Iron Ore (Rhodes Ridge) Agreement Authorisation Act 1972, Temporary Reserve 70/4882
Iron Ore (Rhodes Ridge) Agreement Authorisation Act 1972, Temporary Reserve 70/4883
Iron Ore (Rhodes Ridge) Agreement Authorisation Act 1972, Temporary Reserve 70/4884

Local Government Area: Shire of East Pilbara

Colloquial name: Bakers South Exploration Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
342		Mechanical Removal	Mineral Exploration

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 21 December 2017

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped for the whole of Western Australia. Four Beard vegetation associations have been mapped within the application area (GIS Database).

18: Low woodland; mulga (*Acacia aneura*).

29: Sparse low woodland; mulga, discontinuous in scattered groups.

82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*.

175: Short bunch grassland - savanna/grass plain (Pilbara).

The amendment area (excluding areas covered by CPS 4149/3) was surveyed in June and July 2016 (Rio Tinto, 2017). The following vegetation units were recorded during the flora survey (Rio Tinto, 2017):

Vegetation of Hills and Hillslopes

H1: *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* low open woodland over mixed *Acacia* species open shrubland over *Triodia* species (\pm *Triodia basedowii*, *Triodia epactia*, *Triodia wiseana*) hummock grassland.

H2: Scattered *Eucalyptus leucophloia* subsp. *leucophloia* low trees over *Triodia wiseana* hummock grassland.

H3: Scattered *Corymbia hamersleyana* low trees over *Acacia inaequilatera* and *Hakea chordophylla* tall open shrubland over *Triodia wiseana* open hummock grassland.

H4: *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* low open woodland over mixed *Acacia* species open shrubland over *Triodia* species (\pm *Triodia basedowii*, *Triodia epactia*, *Triodia wiseana*) hummock grassland.

H5: *Acacia pruinocarpa*, *Acacia aptaneura* and *Acacia aneura* tall shrubland over *Triodia epactia* open hummock grassland.

Vegetation of Gullies and Broad Drainage

D1: *Corymbia hamersleyana* low open woodland over *Acacia monticola* and/or *Gossypium robinsonii* open shrubland over *Triodia epactia* open hummock grassland with *Themeda triandra* open tussock grassland.

D2: *Eucalyptus xerothermica* (\pm *Corymbia deserticola*, *Corymbia hamersleyana*, *Corymbia candida* subsp. *dipsodes*) low open woodland over *Eremophila longifolia*, *Senna artemisioides* subsp. *artemisioides* and *Acacia aptaneura* tall open shrubland over *Chrysopogon fallax* open tussock grassland.

D3: *Eucalyptus victrix* and *Eucalyptus camaldulensis* (\pm *Corymbia hamersleyana*) low open woodland over *Scaevola spinescens* open shrubland over *Eragrostis dielsii*, *Digitaria ammophila* and *Themeda triandra* open tussock grassland.

D4: Scattered *Eucalyptus xerothermica* trees over *Themeda triandra* closed tussock grassland.

Vegetation of Plains

P1: Scattered *Eucalyptus gamophylla* low trees over *Acacia ancistrocarpa* (\pm *Acacia arida* and *Acacia bivenosa*) open shrubland over *Triodia basedowii* hummock grassland.

P2: Scattered *Eucalyptus gamophylla* low trees over *Triodia wiseana* hummock grassland over *Aristida holathera*, *Enneapogon polyphyllus* scattered tussock grasses on stony plains.

P3: *Corymbia candida* subsp. *dipsodes* and *Acacia aptaneura* low open woodland over *Acacia pruinocarpa* scattered tall shrubs over mixed tussock grassland.

P4: *Acacia aptaneura* low open woodland over *Eremophila lanceolata*, *Ptilotus schwartzii* and *Solanum lasiophyllum* scattered low shrubs over *Eriachne flaccida*, *Aristida contorta* and *Fimbristylis depauperata* open tussock grassland.

P5: *Aristida contorta* open tussock grassland over *Lepidium echinatum* open forbland.

P6: *Acacia aptaneura* low open woodland over *Acacia catenulata* subsp. *occidentalis* and *Acacia pruinocarpa* tall open shrubland over *Eremophila forrestii* subsp. *forrestii* scattered shrubs over *Triodia melvillei* scattered hummock grassland and scattered tussock grasses.

P7: Scattered *Acacia aptaneura* low trees over *Aristida contorta*, *Aristida latifolia* and *Themeda triandra* open tussock grassland over *Sclerolaena cornishiana* and *Maireana* sp. low chenopod shrubland.

P8: Scattered *Acacia aptaneura* tall shrubs over *Eremophila caespitosa* scattered low shrubs over *Fimbristylis depauperata* very open tussock grassland.

P9: *Acacia aptaneura* and *Acacia aneura* low woodland over *Ptilotus obovatus* low scattered shrubs over very open tussock grassland and scattered *Triodia melvillei* and *Triodia epactia* hummock grasses.

P10: Scattered *Acacia aptaneura* and *Grevillea berryana* low trees over *Hakea chordophylla*, *Acacia catenulata* subsp. *occidentalis* and *Acacia pruinocarpa* scattered tall shrubs over *Aristida latifolia* and *Themeda triandra* open tussock grassland with *Triodia melvillei* and *Triodia epactia* open hummock grassland.

P11: *Eucalyptus gamophylla* and *Corymbia deserticola* low open woodland over *Hakea chordophylla* and *Acacia ancistrocarpa* open shrubland over *Triodia basedowii* hummock grassland.

P12: *Acacia aptaneura* low open woodland over *Aristida contorta*, *Aristida latifolia* and *Fimbristylis depauperata* open tussock grassland and *Triodia melvillei* scattered hummock grassland.

P13: *Acacia ayersiana*, *Acacia aptaneura* and *Acacia catenulata* subsp. *occidentalis* tall open shrubland over *Eremophila forrestii* and *Eremophila latrobei* low open shrubland over *Triodia melvillei* and *Triodia epactia* hummock grassland plains.

P14: *Acacia catenulata* subsp. *occidentalis* tall open shrubland over *Enchylaena tomentosa* scattered low shrubland over *Aristida contorta* tussock grassland on light clay plains.

P15: *Aristida latifolia*, *Chrysopogon fallax* and *Ischaemum albavillosum* closed tussock grassland.

P16: *Acacia aptaneura* (\pm *Acacia aneura*) low woodland over *Themeda triandra* tussock grassland.

P17: Scattered *Acacia aptaneura* (\pm *Eucalyptus xerothermica*) low trees over *Themeda* sp. Hamersley Station (M.E. Trudgen 11431), *Aristida contorta* and *Chrysopogon fallax* tussock grassland.

In addition to these vegetation units there were areas mapped as previously cleared and previously rehabilitated.

The amendment area also includes areas that were approved under CPS 4149/3. The following vegetation units have been identified in this area (Rio Tinto, 2016):

Vegetation of hills and hill slopes

H1: *Acacia incurvaneura*, *Acacia catenulata* subsp. *occidentalis* and *Grevillea berryana* tall open shrubland over scattered *Eremophila petrophila* subsp. *petrophila* shrubs over *Eriachne mucronata* and *Paspalidium basicladum* very open tussock grassland over scattered mixed herbs;

H2: Scattered *Eucalyptus leucophloia* subsp. *leucophloia* low trees over scattered mixed low shrubs over very open *Triodia epactia* hummock grassland;

H3: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia deserticola* and *Corymbia hamersleyana* low open woodland over scattered *Dampiera candidans* low shrubs over scattered *Stackhousia* sp. swollen gynophore (W.R. Barker 2041) and *Trachymene oleracea* herbs over scattered *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grasses;

H4: Scattered *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia deserticola* low trees over *Hakea lorea* subsp. *lorea* and *Acacia inaequilatera* open shrubland over *Acacia ancistrocarpa* and *Senna* spp. low open shrubland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) open hummock grassland over *Amphipogon sericeus* scattered tussock grasses.

Vegetation of drainage lines

D1: Scattered *Corymbia hamersleyana* low trees over *Scaevola* sp. and *Androcalva luteiflora* low open shrubland over scattered *Ptilotus nobilis* and *Trachymene oleracea* herbs over *Themeda triandra*, *Enneapogon lindleyanus* and *Eriachne mucronata* very open tussock grassland;

D2: *Eucalyptus xerothermica* and *Corymbia candida* low open woodland over *Acacia ayersiana* open shrubland over scattered *Ptilotus obovatus* low shrubs over *Aristida inaequiglumis*, *Enneapogon lindleyanus* and *Themeda triandra* tussock grassland.

Vegetation of plains

P1: Scattered *Corymbia deserticola* low trees over scattered *Eucalyptus gamophylla* mallees over scattered low shrubs over very open *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland;

P2: *Acacia ayersiana* low open woodland over *Sida ectogama*, *Maireana tomentosa* subsp. *tomentosa* and *Eremophila forrestii* subsp. *forrestii* low open shrubland over scattered *Triodia melvillei* hummock grasses over *Aristida nitidula* and *Aristida contorta* very open tussock grassland;

P3: *Acacia aneura*, *Acacia pruinocarpa* and *Eucalyptus xerothermica* low open woodland over *Ptilotus obovatus*, *Ptilotus polystachyus*, *Ptilotus macrocephalus* low open shrubland over scattered *Chrysopogon fallax* tussock grasses over scattered **Bidens bipinnata* and other herbs;

P4: Scattered *Acacia pteraneura* and *Acacia pruinocarpa* tall shrubs over scattered *Ptilotus obovatus* low shrubs over *Aristida contorta* and *Eragrostis dielsii* very open tussock grassland over scattered mixed herbs;

P5: *Acacia incurvaneura* and *Acacia pruinocarpa* high open shrubland over scattered *Ptilotus obovatus* low shrubs over *Aristida contorta* and *Eragrostis dielsii* open tussock grassland over *Goodenia prostrata* and *Lepidium echinatum* very open herbs;

P6: *Acacia aneura* low woodland over scattered *Acacia pruinocarpa* shrubs over *Ptilotus obovatus* and *Solanum lasiophyllum* low open shrubland over *Chrysopogon fallax*, *Panicum effusum* and *Aristida nitidula* very open tussock grassland over *Roebuckiella ciliocarpa*, *Haloragis odontocarpa*, **Bidens bipinnata*, *Stenopetalum anfractum* and *Ptilotus polystachyus* very open herbland;

P7: Scattered *Acacia aneura* and *Acacia pruinocarpa* tall shrubs over *Eremophila caespitosa*, *Ptilotus schwartzii* and *Sclerolaena tetragona* scattered low shrubs over *Aristida contorta* and *Eragrostis dielsii* very open tussock grassland over scattered mixed herbs;

P8: Scattered *Acacia aptaneura* and *Acacia aneura* shrubs over *Eriachne flaccida*, *Eragrostis dielsii* and *Eragrostis lanipes* tussock grassland over scattered mixed herbs;

P9: *Acacia aneura* low open woodland over scattered *Acacia pruinocarpa* tall shrubs over *Ptilotus obovatus*, *Ptilotus polystachyus*, *Ptilotus macrocephalus* and *Maireana tomentosa* subsp. *tomentosa* low open shrubland over *Aristida nitidula*, *Chrysopogon fallax*, *Aristida obscura* open tussock grassland over scattered mixed herbs;

P10: *Eucalyptus xerothermica* and *Acacia aneura* low woodland over *Ptilotus obovatus* and *Eremophila lanceolata* scattered low shrubs over *Aristida inaequiglumis*, *Chrysopogon fallax* and *Enneapogon lindleyanus* tussock grassland;

P11: Scattered *Acacia aptaneura*, *Acacia ayersiana* and *Acacia pruinocarpa* over *Triodia melvillei* hummock grassland;

P12: *Acacia aptaneura* low open woodland over *Ptilotus obovatus*, *Sida* sp. spiciform panicles (E. Leyland s.n. 14/8/90) and *Rhagodia* sp. Hamersley (M. Trudgen 17794) very open shrubland over scattered *Maireana villosa* low shrubs over *Aristida inaequiglumis* and *Themeda triandra* open tussock grassland.

Additional flora surveys have been undertaken over the application area. Additional vegetation units from these surveys are described in decision report CPS 2283/4.

Clearing Description	Bakers South Exploration Project. Hamersley Iron Pty Ltd proposes to clear up to 342 hectares of native vegetation within a total boundary of approximately 4,849 hectares, for the purpose of mineral exploration. The project is located approximately 42 kilometres north-west of Newman, in the Shire of East Pilbara.
Vegetation Condition	Pristine: No obvious signs of disturbance (Keighery, 1994); to Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).
Comment	The vegetation condition was described using a scale based on Trudgen (1988) and has been converted to the corresponding Keighery (1994) condition. Clearing permit CPS 2283/1 was granted by the Department of Industry and Resources (now Department of Mines, Industry Regulation and Safety) on 23 April 2008, authorising the clearing of up to 200 hectares of native vegetation within a boundary of approximately 949 hectares, for the purpose of mineral exploration. CPS 2283/1 was amended on 12 May 2011 to change the reporting date from 31 March to 31 July each year. The area approved to clear and the permit boundary remained unchanged. On 16 February 2012 CPS 2283/2 was subsequently amended to extend the period in which clearing is authorised by five years and the duration of the permit by five years. CPS 2283/3 was amended on 30 March 2017 to extend the period in which clearing is authorised by five years, extend the duration of the permit by five years, and change the permit reporting date from 31 July for the previous financial year to 30 June for the previous calendar year. Hamersley Iron Pty Ltd has applied to increase the amount of clearing authorised to 342 hectares and increase the clearing permit boundary to approximately 4,859 hectares. The proposed amendment boundary increase includes the area approved by CPS 4149/3. This permit will be surrendered following this amendment.

3. Assessment of application against Clearing Principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments **Proposal may be at variance to this Principle**

The application area occurs within the Hamersley (PIL3) Interim Biogeographic Regionalisation for Australia (IBRA) sub-bioregion (GIS Database). This sub-bioregion is characterised by Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

Flora and vegetation surveys have been undertaken over the application area. None of the vegetation communities has been identified as being a Threatened or Priority Ecological Community (Rio Tinto, 2016; 2017). A vegetation unit within the application area was previously identified as needing protection due to the presence of Priority flora and potential for it to be representative of the 'West Angelas Cracking-Clays' Priority Ecological Community. A condition was imposed on CPS 2283/4 excluding the clearing of this vegetation association.

The majority of the vegetation within the application area is in pristine condition however, there are some areas within the application area that have been previously disturbed from exploration activities, fire and grazing (Rio Tinto, 2017). Several vegetation units should be considered of moderate significance as they could be representative of 'valley floor mulga' which has been identified as an 'ecosystem at risk', and support a number of range extensions and Priority flora (CALM, 2002). Vegetation units P7 and P8 from the additional area covered by CPS 4149/3 are also considered to be of moderate significance as they support a number of range extensions and are relatively uncommon in the Pilbara (Rio Tinto, 2016). In addition, vegetation association P17 could also hold evaluated significance due the presence of *Themeda* sp. Hamersley Range as a dominant understorey species (Rio Tinto, 2017).

The flora survey covering the majority of the additional amendment area recorded a total of 299 flora taxa from 122 genera and 43 families (Rio Tinto, 2017). The flora survey of the amendment area covering CPS 4149/3 recorded a total of 286 flora taxa from 119 genera and 44 families (Rio Tinto, 2016). None of the species recorded were identified as Threatened flora species (Rio Tinto, 2016; 2017). Several Priority flora species have been recorded within the application area; *Euphorbia inappendiculata* var. *queenslandica* (Priority 1), *Isotropis parviflora* (Priority 2), *Oxalis* sp. Pilbara (M.E. Trudgen 12725) (Priority 2), *Goodenia* sp. East Pilbara (Priority 3), *Indigofera gilesii* (Priority 3), *Rhagodia* sp. Hamersley (M. Trudgen 17794) (Priority 3), *Solanum kentrocaule* (Priority 3), *Themeda* sp. Hamersley Station (Priority 3), *Triodia* sp. Mt Ella (M.E. Trudgen 11431) (Priority 3), *Acacia bromilowiana* (Priority 4) and *Goodenia nuda* (Priority 4).

The flora species *Euphorbia inappendiculata* var. *queenslandica* has only been recorded from a single location within the application area (Rio Tinto, 2016). This species is more commonly recorded outside of Western Australia and has been recorded by the Western Australian Herbarium (2017) from seven locations and within the Rio Tinto database from six locations representing 37 individuals within a range of 150 kilometres (Rio Tinto, 2016).

Isotropis parviflora has been recorded during both flora surveys covering the amendment area (Rio Tinto, 2016; 2017). This species is known from valley slopes of ironstone plateaux in the Pilbara and several records in the Tanami Desert (Western Australian Herbarium, 2017). A total of 1,379 individuals from 134 locations have been recorded from within the application area (Rio Tinto, 2017). Rio Tinto (2016; 2017) has more restricted records of this species with a further 330 individuals recorded from 87 locations within a range of approximately 80 kilometres. Records of this species were recorded within areas that were burnt within the last five years (Rio Tinto, 2017).

Oxalis sp. Pilbara (M.E. Trudgen 12725) was recorded at two locations within the application area totalling 21 individuals (Rio Tinto, 2016; 2017). This species is known from 10 records within the Pilbara bioregion (Western Australian Herbarium, 2017). A flora management condition to minimise Impacts to *Euphorbia inappendiculata* var. *queenslandica*, *Isotropis parviflora* and *Oxalis* sp. Pilbara (M.E. Trudgen 12725) was placed on CPS 4149/3. Potential impacts within the additional amendment area may also be minimised by the implementation of the same condition.

The proposed clearing of 342 hectares within the application area is not likely to have a significant impact on the other Priority flora species recorded within the application area.

There has been 13 broad fauna habitats mapped within the amendment areas (Rio Tinto, 2016; 2017). The habitats identified are common in the region and are not expected to support higher levels of faunal diversity than surrounding areas.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology CALM (2002)
Rio Tinto (2016)
Rio Tinto (2017)
Western Australian Herbarium (2017)

GIS Database:
- IBRA Australia
- Threatened and Priority Flora
- Threatened Ecological Sites Buffered

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments Proposal is not likely to be at variance to this Principle

The following broad fauna habitats have been recorded within the application area (Rio Tinto, 2016; 2017):

- Stony hills and hillslopes
- Gullies and broad drainage
- Mulga woodland on plains and lower slopes
- Acacia shrubland on stony plains and lower slopes
- Tussock grassland on heavy clay plains
- Themeda grasslands on plains
- Mosaic of Themeda grassland and mulga woodland on plains
- Mosaic of Acacia shrubland and mulga woodland on plains
- Rocky mid slopes
- Lower slopes and low hills
- Undulating plains
- Mulga plains
- Minor drainage lines

These habitats are all considered common and widespread within the region (Rio Tinto, 2016; 2017). No significant habitat features such as caves, permanent water holes and rocky breakaways were recorded within the application area (Rio Tinto, 2016; 2017). The minor drainage lines habitat may be of elevated significance as it potentially contains small pools following rainfall events and is likely to contain a greater range of microhabitats such as logs, leaf litter and tree hollows (Rio Tinto, 2016).

The Western Pebble-mound Mouse (*Pseudomys chapmani* - Priority 4) has been recorded from over 50 locations within the application area (Rio Tinto, 2016; 2017). Suitable habitat for this species is common the local region and the proposed clearing is not likely to have a significant impact on this species.

The Ghost Bat (*Marcoderma gigas* - Vulnerable) and Rainbow Bee-eater (*Merops ornatus* - Migratory) are both considered likely to utilise the application area (Rio Tinto, 2016; 2017). The Ghost Bat is likely to utilise the application area for foraging as part of a larger range (Rio Tinto, 2016; 2017). No roosting caves have been recorded within the application area (Rio Tinto, 2016; 2017). Suitable habitat exists for the Rainbow Bee-eater however, this species is highly mobile and is not likely to solely rely on habitat within the application area. The

proposed clearing of 342 hectares within the larger permit boundary is not likely to have a significant impact on these species.

The fauna habitat within the application area is well represented throughout the region and is not likely to represent significant habitat for native fauna species.

Based on the above, the proposed clearing is not likely at variance to this Principle.

Methodology Rio Tinto (2016)
Rio Tinto (2017)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments Proposal is not likely to be at variance to this Principle

There are no known records of Threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of Threatened flora (Rio Tinto, 2016; 2017).

Based on the vegetation units present, the proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora (Rio Tinto 2016; 2017).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Rio Tinto (2016)
Rio Tinto (2017)

GIS Database:
- Threatened and Priority Flora

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments Proposal is not likely to be at variance to this Principle

There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database).

A flora and vegetation survey of the application area did not identify any TECs (Rio Tinto, 2016; 2017).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Rio Tinto (2016)
Rio Tinto (2017)

GIS Database:
- Threatened and Priority Ecological Communities boundaries
- Threatened and Priority Ecological Communities buffered

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The application area lies within the Pilbara Interim Biogeographical Regionalisation of Australia (IBRA) bioregion in which approximately 99.58% of the pre-European vegetation remains (Government of Western Australia, 2016; GIS Database).

The vegetation of the application area has been broadly mapped as Beard vegetation associations 18, 29, 82 and 175 (GIS Database). These vegetation associations have not been extensively cleared as over 99% remains for all associations at both a state and bioregional level (Government of Western Australia, 2016). The application area is not a remnant nor does it form part of any remnants within the local area (GIS Database).

Based on the above, the proposed clearing is not at variance to this Principle.

Methodology Government of Western Australia (2016)

GIS Database:
- IBRA Australia
- Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). There are numerous ephemeral drainage lines that pass through the application area (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall (CALM, 2002). Several of the vegetation units were associated with drainage lines within the application area (Rio Tinto, 2016; 2017).

Riparian vegetation within the minor drainage lines may provide important habitat for fauna, as the vegetation can provide faunal habitat of a moderate range of microhabitats with logs, leaf litter and tree hollows (GIS Database). Provided disturbance to riparian habitats is avoided or minimised where possible, and strict weed hygiene procedures are followed, the proposed works are not expected to substantially impact this vegetation association. Potential impacts to riparian vegetation may be minimised through the implementation of a watercourse management condition.

Based on the above, the proposed clearing is at variance to this Principle.

Methodology CALM (2002)
Rio Tinto (2016)
Rio Tinto (2016)

GIS Database:
- Hydrography, Lakes
- Hydrography, linear

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposal is not likely to be at variance to this Principle

The application area lies within the Boolgeeda, Newman, Rocklea, Spearhole and Wannamunna land systems (GIS Database). These land systems have been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development).

The Boolgeeda Land System is described as stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). The vegetation within the system is not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al, 2004). Analysis of aerial photography reveals the application area is comprised of stony lower slope and upper plain; and stony lower plain land units within this system. These are not susceptible to erosion due to the presence of stony mantles.

The Newman land system is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). This system is not prone to erosion (Van Vreeswyk et al., 2004).

The Rocklea land system is described as basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004).

The Spearhole land system is described as gently undulating hardpan plains supporting groved mulga shrublands and hard spinifex (Van Vreeswyk et al., 2004). This system is not prone to erosion (Van Vreeswyk et al., 2004).

The Wannamunna Land System is described as hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasional Eucalypt woodlands) (Van Vreeswyk et al., 2004). Generally, the system has a low susceptibility to erosion (Van Vreeswyk et al., 2004). Analysis of aerial photography reveals the application area is comprised of hardpan plain, grove and internal drainage plain land units within this system. These are not susceptible to erosion, although disturbances to surface flow can have adverse effects on vegetation (Van Vreeswyk et al, 2004).

The application area is relatively flat so the proposed clearing is not likely to cause an increase in accelerated runoff (GIS Database). The proposed clearing of up to 342 hectares of native vegetation within a boundary of approximately 4,859 hectares, for the purpose of mineral exploration is unlikely to cause appreciable land degradation.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Van Vreeswyk et al. (2004)

GIS Database:

- Contours
- Landsystem Rangelands

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments Proposal is not likely to be at variance to this Principle

There are no conservation areas in the vicinity of the application area. The nearest DBCA (formerly DPaW) managed land is Karijini National Park which is located approximately 53 kilometres west of the application area (GIS Database). The proposed clearing is unlikely to impact on the environmental values of any conservation area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology GIS Database:
- DPaW Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments Proposal is not likely to be at variance to this Principle

There are no permanent waterbodies or watercourses within, or in association with the application area (GIS Database). There are several minor ephemeral drainage lines that pass through the application area (GIS Database). Rainfall in this area is mainly restricted to a wet summer season, where precipitation can be variable. Rain can be either intense falls associated with cyclonic events, or scattered falls associated with local thunderstorms. The application area receives average annual rainfall of 327.7 millimetres (BoM, 2017), and experiences a pan evaporation rate of approximately 3,400 millimetres/year (BoM, 2017). Therefore, during normal rainfall events, surface water within the application area is likely to evaporate or be utilised by vegetation quickly. However, substantial rainfall events create surface sheet flow which is likely to be high in sediments.

There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). Generally, groundwater in the area is marginal with salinity levels between 500 - 1,000 milligrams per litre of total dissolved solids (GIS Database). It is not likely that the proposed clearing of 342 hectares within a larger boundary of approximately 4,859 hectares will have an impact on the local and regional groundwater quality.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology BoM (2017)

GIS Database:
- Groundwater Salinity, Statewide
- Hydrography, Linear
- Public Drinking Water Source Areas

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments Proposal is not likely to be at variance to this Principle

The climate of the region is semi-arid, with a low average rainfall of approximately 327.7 millimetres per year (BoM, 2017). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall (Van Vreeswyk et al., 2004).

There are no permanent watercourses or waterbodies within the application area (GIS Database). Seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events. However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology BoM (2017)
Van Vreeswyk et al. (2004)

GIS Database:
- Hydrography, linear

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 25 September 2017 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There are two native title claims over the area under application (Department of Planning, Lands and Heritage, 2017). However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are 11 registered Aboriginal Sites of Significance within the application area (Department of Planning, Lands and Heritage, 2017). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

Methodology Department of Planning, Lands and Heritage (2017)

4. References

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DBCA	Department of Biodiversity Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)
DEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DEE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DEE)
DWER	Department of Water and Environmental Regulation, Western Australia

EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DPaW (2017) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T	<p>Threatened species: Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <p>Threatened fauna is that subset of ‘Specially Protected Fauna’ declared to be ‘likely to become extinct’ pursuant to section 14(4) of the <i>Wildlife Conservation Act 1950</i>.</p> <p>Threatened flora is flora that has been declared to be ‘likely to become extinct or is rare, or otherwise in need of special protection’, pursuant to section 23F(2) of the <i>Wildlife Conservation Act 1950</i>.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p>
CR	<p>Critically endangered species Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EN	<p>Endangered species Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
VU	<p>Vulnerable species Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EX	<p>Presumed extinct species Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.</p>
IA	<p>Migratory birds protected under an international agreement Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
CD	<p>Conservation dependent fauna Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
OS	<p>Other specially protected fauna Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>

P

Priority species

Species which are poorly known; or

Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1

Priority One - Poorly-known species:

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2

Priority Two - Poorly-known species:

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3

Priority Three - Poorly-known species:

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4

Priority Four - Rare, Near Threatened and other species in need of monitoring:

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.