



1. Application details

1.1. Permit application details

Permit application No.: 2524/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: Miscellaneous Licence 47/206
Local Government Area: Shire of Ashburton
Colloquial name: Karijini Airport.

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
260		Mechanical Removal	Airport Construction

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 at a 1:250,000 scale for the whole of Western Australia and are useful to look at vegetation extent in a regional context. Three Beard vegetation associations are located within the application area (GIS Database):

29: Sparse low woodland; mulga, discontinuous in scattered groups (Shepherd et al, 2006). According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 29 is a shrubland dominated by *Acacia aneura*, over *Eremophila fraseri*, *Acacia pruinocarpa*, *Acacia sp. aff ligulata*, *Eremophila forrestii* and *Ptilotus drummondii*, over *Eremophila lanceolata*, *Brachyscome sp.*, *Calocephalus francisii*, *Rhodanthe floribunda*, *Pimelea holroydii* and *Ptilotus gaudichaudii*.

157: Hummock grasslands, grass steppe; hard spinifex *Triodia wiseana* (Shepherd et al, 2006). According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 157 is a grassland dominated by *Triodia wiseana*.

567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *T. basedowii* (Shepherd et al, 2006). According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 567 is a shrubland dominated by *Acacia aneura*, with sub-dominants of *Senna sp.*, *A. pruinocarpa*, *A. xiphophylla* and *Eremophila sp.*

The application area was surveyed by Keith Lindbeck and Associates in 2006 (Keith Lindbeck and Associates, 2007). The following vegetation types were identified within the application area:

Low Rises:

R1: *Acacia aneura*, *A. inaequilatera* and *A. pruinocarpa* low open woodland over *Triodia epactia* hummock grassland.

Cracking Clays:

L1: Scattered *Acacia xiphophylla* and *A. aneura* shrubs over tussock grassland.

Calcrete Platforms:

C1-1: *Corymbia hamersleyana*, *Hakea lorea* open low woodland over *Acacia* shrubland over *Triodia wiseana-T. epactia* mid-dense hummock grassland with occasional tussock grasses.

C1-2: *Codonocarpus continifolius*, *Acacia bivenosa* and *A. inaequilatera* scattered shrubs over *Triodia wiseana* hummock grassland.

Stony Flat Plains:

P1-1: *Acacia xiphophylla* and *A. aneura* open - mid-dense low trees over *Triodia epactia* hummock grassland and open tussock grassland.

P1-2: *Acacia xiphophylla* low woodland with scattered *A. aneura var. pilbarana* shrubs over *Triodia wiseana* hummock grassland.

P1-3: *Acacia aneura var pilbarana* over *Triodia epactia* hummock grassland and scattered tussock

grasses.

P1-4: Low open *Acacia* woodland over *Triodia epactia* hummock grassland.

P1-5: Scattered *Corymbia hamersleyana* low trees with scattered *Acacia aneura*, *A. pyrifolia*, *A. pruinocarpa* tall shrubs over *Triodia epactia* hummock grassland and *Aristida contorta*/*Eriachne helmsii* tussock grassland.

Colluvial Plains Mulga Grove:

P2: Low *Acacia aneura* var *pilbarana* woodland over *Themeda triandra* tussock grassland and *Triodia epactia*.

Watercourses:

W1: *Acacia ancistrocarpa* and *A. inaequilatera* scattered shrubs over *Themeda triandra*.

W2: *Acacia aneura* and *A. xiphophylla* closed scrub over closed *Triodia pungens* hummock grassland.

W3: *Eucalyptus camaldulensis* var *obtusa*, *E. vitrix* and *E. xerothermica* open woodland over *Acacia* open shrubland over *Themeda triandra* tussock grassland.

W4: *Acacia citrinoviridis*, *A. sclerosperma*, *A. bivenosa*, *A. farnesiana* closed shrubland over *Themeda triandra* and *Cenchrus ciliaris* tussock grassland.

Disturbed Areas:

D1: Borrow pits - species recorded include *Acacia bivenosa*, *A. victoriae*, *Pterocaulon sphacelatum*, *Senna notabilis*, *Malvastrum americanum* (a weed), *Themeda triandra*, *Senna artemisioides* ssp. *oligophylla*, *Ptilotus exaltatus* var *exaltatus*, *Solanum lasiophyllum*, *Corchorus crozophorifolius*, *Corchorus lasiocarpus* ssp. *parvus*, *Gossypium australe*, *Hibiscus struttii* var *campyohlamys*, *Rulingia luteiflora*, *Waltheria indica*, *Eucalyptus leucophloia* ssp. *leucophloia*, *Flaveria australasica*, *Streptoglossa decurrens* and *Vittadina obovata*.

Clearing Description

Hamersley Iron Pty Ltd have applied to clear up to 260 hectares within an application area of approximately 1356 hectares for the purpose of constructing an airstrip and associated infrastructure to be known as Karijini Airport. The airport will be located approximately 5 kilometres west of Tom Price. Vegetation will be cleared with bulldozer, blade down within the application area.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

Comment

Vegetation condition based on assessment made by Keith Lindbeck and Associates (2007). It was noted in the survey report that vegetation condition was excellent due to heavy seasonal rainfall and responsible stocking rates (the application area occurs within Hamersley Station). Degraded vegetation occurs in pre-existing borrow pit areas.

2.1.2.

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 is at variance to this Principle

The application area occurs within the Hamersley (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) sub-region (GIS Database). This sub-region 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). The vegetation described within the application area (Keith Lindbeck and Associates, 2007) is typical of the bioregion.

A vegetation survey of the application area and adjacent vegetation identified 277 flora species from 45 families (Keith Lindbeck and Associates, 2007). This is considered to be biologically diverse. It was noted during the flora survey that the vegetation was in excellent condition due to heavy seasonal rainfall. Poaceae, Malvaceae, Mimosaceae, Asteraceae, Papilionaceae, Amaranthaceae, and Myoporaceae families display high levels of speciation within the application area (Keith Lindbeck and Associates, 2007). This is typical of the floristics of the Pilbara IBRA Region.

An area search of the Western Australian Museum's Faunabase conducted by the assessing officer suggests that the application area is diverse in reptile and avian fauna species (Western Australian Museum, 2008). The database search found 89 reptile species from 9 Families as potentially occurring within 50 kilometres of the application area, being particularly diverse in Skinks (26) and Geckos (17). A total of 77 avian fauna species from 31 Families have also been recorded within 50 kilometres of the application area, reflecting the diverse range of habitats available. The application area is likely to be habitat for several significant fauna species.

Ten alien weed species were recorded within the vegetation survey area, including *Acetosa vesicaria* (Ruby Dock) (Keith Lindbeck and Associates, 2007). Most weeds were located in previously disturbed borrow pit areas. Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and

further loss of biodiversity if the area is subject to repeated fires. No major infestations were observed. It is not expected that the clearing of vegetation will lead to an infestation of weeds within the application area or surrounding vegetation if adequate soil hygiene measures are implemented.

An incised ephemeral creek occurs within the application area and during the flora survey contained pools of water (Keith Lindbeck and Associates, 2007). The presence of *Eucalyptus camaldulensis* is an indication that the creek is host to riparian vegetation.

Based on the above, the proposed clearing is at variance to this Principle. It is recommended that should a permit be granted, conditions be imposed on the permit with regards to weed management.

Methodology CALM (2002)
Keith Lindbeck and Associates (2007)
Western Australian Museum (2008)
GIS Databases:
- Interim Biogeographic Regionalisation of Australia (subregions)

(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 assessing officer has conducted a search of the Western Australian Museum's online fauna database between the coordinates 117.25°E, 22.16°S and 118.25°E, 23.16°S, representing a 50 kilometre radius around the application areas.

This search identified 8 Amphibian, 77 Avian, 30 Mammalian and 89 Reptilian species that may occur within the application areas (Western Australian Museum, 2008). Of these, the following species of conservation significance have previously been recorded within the search area: Striated Grasswren (*Amytornis striatus striatus*), Night Parrot (*Pezoporus occidentalis*), Star Finch (*Neochmia ruficauda clarescens*), Partridge Pigeon (eastern sub-species) (*Geophaps smithii smithii*), Northern Quoll (*Dasyurus hallucatus*), Long-tailed Dunnart (*Sminthopsis longicaudata*), Orange Leaf-nosed Bat (*Rhinochiropterus aurantius*), Lakeland Downs Mouse (*Leggadina lakedownensis*), Pebble-mound Mouse (*Pseudomys chapmani*), a skink (*Notoscincus butleri*) and Pilbara Olive Python (*Liasis olivaceus barroni*).

Keith Lindbeck and Associates (2007) requested a search of the Department of Environment and Conservation's Threatened and Priority Flora database using similar co-ordinates used by the assessing officer above. This database search identified two species of conservation significance in addition to those species listed above, that had previously been recorded in the search area: Peregrine Falcon (*Falco peregrinus*) and Australian Bustard (*Ardeotis australis*).

Of those species listed above, based on preferred habitat type the following species are likely to occur within the application area:

The Night Parrot (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is a very seldom seen bird that occupies dense, low vegetation, which provides them shelter during the day (Australian Museum Online, 2007a). Most records come from hummock grasslands with spinifex (porcupine grass, *Triodia sp.*), or from areas dominated by samphire. It has been suggested that birds move into the grasslands when *Triodia* is seeding. They have also been reported in low chenopod shrublands comprising saltbush and bluebush, and from areas of Mitchell grass, *Astrelba sp.* with scattered chenopods. Many records have come from waterholes, and almost all reports from areas of *Triodia* have noted the presence of nearby water. As this species is very rare, and little is known of its distribution, it is difficult for the assessing officer to determine what impact, if any, the proposed clearing will have on this species. However, given the lack of permanent water in the application areas, it is unlikely that the vegetation to be cleared represents significant habitat for this species.

The Peregrine Falcon (Schedule 4 - Other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is known to inhabit most areas in Australia and utilise cliffs, tall trees and granite outcrops for nesting (Australian Museum Online, 2007b). The Peregrine Falcon is likely to occur sporadically within the application areas, but is not known to nest in the area. Given the vast amounts of available habitat within the Pilbara region that this species can utilise, it is unlikely that the vegetation within the application areas is significant habitat for this species.

The Long-tailed Dunnart (DEC - Priority 4) occurs in rugged rocky landscapes that support low open woodland or shrubland of Acacia's (especially Mulga) with an understorey of spinifex hummocks, and (occasionally) also perennial grasses and Cassia's from the Pilbara and upper Gascoyne region (DNREA, 2007). They have also more recently been recorded from plateaus near breakaways and scree and rugged boulder strewn scree in the Goldfields region. The habitat types found within the application area may support populations of Long-tailed Dunnart. However, it is unlikely that the vegetation to be cleared represents significant habitat for this species, given its widespread distribution.

The Lakeland Downs Mouse (DEC - Priority 4) is known to occur on sandy soils and cracking clays that support

native grasses (DEC, 2006). It is known that this species experiences great fluctuations in population size depending on seasonal factors, reaching plague proportions in good years (DEC, 2006). Cracking clay soils and suitable vegetation habitat occurs within the application area. Furthermore, given heavy seasonal rains and excellent vegetation growth and condition, it is likely that the species was present in the application area during the 2006 flora survey. However, given the widespread distribution and abundance of suitable habitat within the Pilbara region, it is unlikely that the vegetation to be cleared is significant habitat for this species.

The Western Pebble-mound Mouse (DEC - Priority 4) is described as constructing pebble mounds on slopes composed of stony soils, near sharply incised drainage lines (Start et al, 2000). Mounds are built in vegetation dominated by hard spinifex (*Triodia basedowii*) or *T. wiseana*. Several mounds were recorded within the application area (Keith Lindbeck and Associates, 2007). Suitable habitat occurs outside of the application area and the species is widely distributed throughout the Hamersley Ranges (Keith Lindbeck and Associates, 2007). Given the species occurs widely across the Hamersley Ranges and elsewhere within the Pilbara Region in suitable habitat, the clearing is not likely to significantly impact the conservation of this species and the vegetation within the application area is not likely to be significant habitat for this species.

The Star Finch (DEC - Priority 4) has a patchy distribution within the Pilbara and at low densities where it occurs (Garnett et al, 2000). There are occasional concentrations at Exmouth and Millstream (Garnett et al, 2000). Star Finch inhabits grasslands and eucalypt woodland close to water, where they feed on seeds (Hall, 1974, Immelmann, 1982, M. Todd as cited in Garnett et al, 2000). Birds tend to be resident in large flocks during the dry season, and disperse to breed during the wet season (Garnett et al, 2000). The Star Finch is likely to be present within the application area following heavy rain when water is likely to pool within creeks. However, this vegetation type is widespread throughout the Pilbara region and it is unlikely that the vegetation to be cleared represents significant habitat for this species.

Notoscincus butleri (DEC - Priority 4) is a small skink that is considered endemic to the Pilbara (Morton et al, 1995). It has a restricted range along the coastal area of the Pilbara, commonly occurring in spinifex dominated areas adjacent to riparian habitats. The vegetation within the application area may be suitable habitat for this species. However, given the large amounts of suitable habitat within the Pilbara region, the vegetation within the application area is not likely to be significant habitat for this species.

The Australian Bustard (DEC - Priority 4) prefers tussock grassland, *Triodia* hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). This species may occur within the application area. However, given the widespread distribution of this species, the habitat within the application area is not likely to be significant habitat for this species.

Striated Grasswrens (DEC - Priority 4) live on sandplains dominated by mature *Triodia* hummock grassland with an over-storey of shrubs, usually mallee eucalypts (Garnett et al, 2000). Currently the major threat throughout the subspecies range is fire, especially extensive fires that destroy mature hummock grassland over large areas. There are vast amounts of *Triodia* hummock grassland within the Pilbara IBRA region that this species can utilise. It is not likely that the vegetation within the application areas is significant habitat for this species.

There are no unique, restricted or fauna specific habitat types within the application area. The habitat types (stony plains, low rises, calcrete platforms, cracking clays, mulga groves, ephemeral watercourses) are common throughout the Pilbara region.

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

Methodology Australian Museum Online (2007a)
Australian Museum Online (2007b)
DEC (2006)
DNREA (2007)
Keith Lindbeck and Associates (2007)
Garnett et al (2000)
Morton et al (1995)
Start et al (2000)
Western Australian Museum (2008)

(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

According to available databases, no Declared Rare or Priority flora species occur within the application area (GIS Database).

A flora survey was conducted over the application area and adjacent vegetation (the survey area) by Keith Lindbeck and Associates (2007). This survey involved interpretation of aerial photography of the survey area to produce a preliminary vegetation map, a database search of the Department of Environment and Conservation's Threatened Flora Database to determine what conservation significant flora species may occur within the survey area, and a field based survey to provide a description of vegetation within the survey area

and to search for conservation significant flora. This survey and subsequent report adequately meets the requirement of EPA Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004).

As a result of this survey the following four species of conservation significant flora were identified within the application area:

Goodenia sp. East Pilbara (Priority 1)
Themeda sp. Hamersley Station (Priority 3)
Goodenia pascua (Priority 3)
Hibiscus brachysiphonious (Priority 3)

Goodenia sp. East Pilbara was identified in two locations within the application area (Keith Lindbeck and Associates, 2007). There are seven records in the WA Herbarium for this species (Western Australian Herbarium, 1998-2008). According to Florabase, the species prefers cracking clays, clay plains and swamp areas in grassland vegetation (Western Australian Herbarium, 1998-2008). The assessing officer requested further information from Hamersley Iron as to how many populations of this species have been recorded in their Pilbara Iron database. In response, Hamersley Iron have provided data that suggests this species has been recorded from 506 locations within its tenements (Hamersley Iron, 2008). The species has been identified from the Ophthalmia Ranges, Yandi, Hope Downs, Paraburdoo, Tom Price, Brockman and South of West Angeles. Population numbers range from a few plants to more than 1000 plants. Whilst some of these 506 locations are likely to be sub-populations and some may have been cleared since being recorded, the information provided suggests this species is likely to occur in suitable habitat throughout the Hamersley IBRA sub-region. Based on this information, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Goodenia pascua was identified from 22 locations within the application area (Keith Lindbeck and Associates, 2007). There are 11 records in the WA Herbarium for this species (Western Australian Herbarium, 1998-2008) and it has been widely recorded by Pilbara Iron threatened flora database, from locations as disparate as Paraburdoo, Brockman, Mesa A, and various locations within Hamersley Station (Keith Lindbeck and Associates, 2007). According to Florabase, this species has been found mostly on cracking clays and basaltic plains (Western Australian Herbarium 1998-2008). Given that this species has been found over a widespread area and occurs commonly where it is found, the application area is not likely to be necessary for the continued existence of this species.

Themeda sp. Hamersley Station was located from one location within the application area totalling 70 individual plants (Keith Lindbeck and Associates, 2007). There are 11 records in the WA Herbarium for this species (Western Australian Herbarium, 1998-2008) and it has been widely recorded during other botanical surveys from locations as disparate as Karratha, Nullagine, Millstream, Hamersley Station, West Angeles, Hope Downs, and Coondewanna Flats. (Keith Lindbeck and Associates, 2007). According to Florabase, this species has been found mostly in drainage lines as individual plants or in dense grasslands on cracking clays (Western Australian Herbarium, 1998-2008). By far the largest population is found within the *Themeda* grasslands Threatened Ecological Community where the species occurs at densities of approximately 4 plants per square metre, within an area of 30,000 hectares (Keith Lindbeck and Associates, 2007). The *Themeda* grassland TEC is located approximately 20 km north of the application area. Advice has been received from the Department of Environment and Conservation (2008) that the presence of 70 *Themeda* sp. Hamersley Station plants is not indicative of the presence to the *Themeda* grasslands TEC. To be considered as a representative of the TEC, *Themeda* sp. Hamersley Station needs to be the dominant species and there should be a conspicuous lack of over-storey. Where *Themeda* sp. Hamersley Station was located during the survey, it occurs as part of the grass layer, with an over-storey of *Eucalyptus camaldulensis* var. *obtusa*, *E. vitrix* and *E. xerothermica*. *Themeda triandra* was recorded as the dominant grass. Given the species widespread distribution and its relative abundance at other sites, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Hibiscus brachysiphonious was located from two locations within the application area by Pilbara Iron staff in 2006 (Keith Lindbeck and Associates, 2007). A search for these two populations failed to find any trace of the species. The failure to find the populations is most likely due to grazing. There are 15 records in the WA Herbarium for this species (Western Australian Herbarium, 1998-2008) and it has been widely recorded during other botanical surveys from locations as disparate as Turee Creek, Rhodes Ridge, Cape Lambert, Barrabiddy Creek, Christmas Creek and Balgo Mission. Populations can be numerous where found (Keith Lindbeck and Associates, 2007). According to Florabase, this species has been found mostly in cracking clay soils (Western Australian Herbarium, 1998-2008). Given the species widespread distribution and relative abundance when found, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

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

Methodology DEC (2008)
EPA (2004)
Hamersley Iron (2008)
Keith Lindbeck and Associates (2007)

Western Australian Herbarium (1998-2008)
 GIS Database:
 - Declared Rare and Priority Flora List

(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

According to available databases, no Threatened Ecological Communities (TEC) occur within the application area (GIS Database). The nearest TEC occurs approximately 20 kilometres north of the application area (*Themeda* grasslands). The northern part of the application area occurs within a buffer zone surrounding the TEC (Keith Lindbeck and Associates, 2007). However, at this remote distance it is unlikely that the vegetation within the application area is necessary for the maintenance of the TEC.

Advice has been received from the Department of Environment and Conservation (2008) that the presence of 70 *Themeda sp.* Hamersley Station plants is not indicative of the presence to the *Themeda* grasslands TEC. To be considered as a representative of the TEC, *Themeda sp.* Hamersley Station needs to be the dominant species and there should be a conspicuous lack of over-storey. Where *Themeda sp.* Hamersley Station was located during the survey, it occurs as part of the grass layer, with an over-storey of *Eucalyptus camaldulensis var. obtusa*, *E. vitrix* and *E. xerothermica*. *Themeda triandra* was recorded as the dominant grass.

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

Methodology DEC (2008)
 Keith Lindbeck and Associates (2007)
 GIS Database:
 - Threatened Ecological Communities

(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

According to available databases, the application area falls within the Pilbara IBRA Bioregion (GIS Database). This bioregion's vegetation extent remains at approximately 100% of its Pre-European extent (see table). Beard vegetation association's 29, 157 and 567 occur within the application area (GIS Database). These vegetation associations remain at approximately 100% of their Pre-European extent (see table). Vegetation associations 157 and 567 are well represented in conservation estate within the Pilbara bioregion (see table). Whilst vegetation association 29 is not well represented in conservation estate, its conservation status is under no threat given it remains virtually uncleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves*
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~100	Least Concern	6.3
Beard veg assoc. – State					
29	7,904,064	7,904,064	~100	Least Concern	0.3
157	502,737	501,522	~99.8	Least Concern	17.2
567	777,517	777,517	~100	Least Concern	22.3
Beard veg assoc. - bioregion					
29	1,133,228	1,133,228	~100	Least Concern	1.9
157	198,636	198,522	~99.9	Least Concern	5.7
567	776,833	776,833	~100	Least Concern	22.3

* Shepherd et al. (2006)

** Department of Natural Resources and Environment (2002)

Therefore, the application area is not part of a remnant of native vegetation in an area that has been extensively cleared.

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd et al. (2006)
GIS Databases:
- Interim Biogeographic Regionalisation of 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**

According to available databases, many minor non-perennial drainage lines occur within the application area. These drainage lines flow into Barnett Creek, which is described by Keith Lindbeck and Associates (2007) as a minor creek.

Barnett Creek begins east of the application area, turning north within the application area and continuing north upon leaving the application area. Barnett Creek is a tributary of the Ashburton River. During the flora survey period, Barnett Creek contained water pools, resulting from heavy seasonal rains (Keith Lindbeck and Associates, 2007). Drainage lines leading to Barnett Creek did not contain permanent water.

The vegetation within Barnett Creek was described as *Eucalyptus camaldulensis var obtusa*, *E. victrix* & *E. xerothermica* open woodland over *Acacia* open shrubland over *Themeda triandra* tussock grassland. The vegetation within Barnett Creek could be considered riparian vegetation and would experience water flows following seasonal rains. The vegetation within the application area is not likely to be groundwater dependant.

DoW (2008) have advised that that Hamersley Iron Pty Ltd are likely to require permission under the *Rights in Water Irrigation Act, 1914* to disturb Barnett Creek and other drainage lines within the application area.

It is likely that as a result of clearing and subsequent land use, surface flows within the application area will be altered and if not adequately controlled may cause sedimentation of Barnett Creek. The impact of this sedimentation, if allowed to occur, would be localised and is not likely to affect vegetation downstream.

Advice has been received from Hamersley Iron Pty Ltd to the effect that no clearing is anticipated within Barnett Creek, although some taller trees may need to be trimmed to meet Civil Aviation Safety Authority (CASA) safety requirements. Hamersley also advised that run-off from tarmac areas will be captured as per CASA engineering requirements.

Based on the above, the proposed clearing is at variance to this Principle. The assessing officer recommends that a condition be placed on any permit granted requiring the permit holder to manage surface water run-off from cleared areas.

Methodology DoW (2008)
Keith Lindbeck and Associates (2007)
GIS Database:
- Hydrography, Linear (Heirarchy)

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

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

The application area has been surveyed by the Department of Agriculture and Food (Van Vreeswyk et al 2004). The application area is composed of the following land systems (GIS Database):

- Paraburdoo
- Wona
- Rocklea
- McKay

The Paraburdoo Land System is described as basalt derived stony gilgai plains and stony plains supporting snakewood and mulga shrublands with spinifex and tussock grasses (Van Vreeswyk et al, 2004). An analysis of aerial photography suggests the application area is most likely to fall within the 'Low basalt hill and ridge', 'Upper interfluvium and slope', 'Grove', 'Gilgai plain', 'Drainage zone', 'Braided creekline and channel' and 'calcrete platform' land units. Drainage zones are moderately susceptible to erosion (Van Vreeswyk et al, 2004). The vegetation described by Van Vreeswyk et al (2004) accurately reflects the vegetation types described in vegetation surveys conducted over the area (Keith Lindbeck and Associates, 2007).

The Wona Land System is described as Basalt upland gilgai plains supporting tussock grasslands and minor hard spinifex grasslands (Van Vreeswyk et al, 2004). An analysis of aerial photography suggests the application area is most likely to fall within the 'Low basalt hill', 'stony gilgai upland plain' and 'stony plain' land

units. These land units are not susceptible to erosion except if the stony mantle is removed. Whilst it is likely that the stony mantle will be removed to create the Karijini Airport, the soil is likely to be covered by tarmac or infrastructure. The vegetation described by Van Vreeswyk et al (2004) accurately reflects the vegetation types described in vegetation surveys conducted over the area (Keith Lindbeck and Associates, 2007).

The Rocklea Land System is described as basalt hills and restricted stony plains with hard spinifex (Van Vreeswyk et al, 2004). An analysis of aerial photography suggests the application area is most likely to fall within the 'Hill, ridge, plateau, and upper slope', 'Lower slope', 'Upper drainage Line', 'Stony Plain and interfluve', 'Upper drainage line' and 'Drainage floor and channel' land units. These land units have a very low erosion hazard due to presence of surface mantles of rocks, pebbles and shale. The vegetation described by Van Vreeswyk et al (2004) accurately reflects the vegetation types described in vegetation surveys conducted over the area (Keith Lindbeck and Associates, 2007).

The McKay Land System is described as hills, ridges, plateau remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands (Van Vreeswyk et at, 2004). An analysis of aerial photography suggests the application area is most likely to fall within the 'Hill, ridge and plateau remnant', 'Breakaway', 'Lower footslope', 'Stony plain' and 'Drainage floor' land units. These land units are not susceptible to soil erosion. The vegetation described by Van Vreeswyk et al (2004) accurately reflects the vegetation types described in vegetation surveys conducted over the area (Keith Lindbeck and Associates, 2007).

Most land units are not susceptible to soil erosion due to the presence of a stony mantle. In some instances, removal of this stony mantle can lead to soil erosion. Alteration to surface water flows can also accelerate soil erosion.

During a flora survey of the application area, it was noted that severe gully erosion was present on old access roads and tracks where surface water run-off is now concentrated, and the bare areas of the track had the protective topsoil removed, exposing the more erosive subsoil (Keith Lindbeck and Associates, 2007). Sedimentation was clearly evident downslope of disturbed areas. It has been identified within this assessment that the clearing and subsequent land use is likely to add to the surface water run-off in the area and alter surface water flows. Hamersley Iron have advised that surface water run-off will be captured and managed according to Civil Aviation Safety Authority engineering standards.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that should a permit be granted, a condition be placed on the permit requiring the permit holder to manage surface water run-off from cleared areas.

Methodology Keith Lindbeck and Associates (2007)
Hamersley Iron (2008)
Van Vreeswyk et al (2004)
GIS Database:
- Rangeland Land System Mapping - DA

(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

At its closest point, the application area is approximately 14 kilometres west of Karijini National Park (GIS Database). At this distance it is not likely that the vegetation within the application area provides a buffer to a conservation area, or is important as an ecological link to a conservation area, particularly given the vegetation in the Pilbara region remains substantially uncleared. The vegetation types within the application areas are well replicated in other land systems within the Pilbara region. Consequently, their conservation status is under no threat.

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

Methodology GIS Database:
- CALM Managed Lands and Waters

(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 may be at variance to this Principle

According to available databases, the application area does not occur within a Public Drinking Water Source Area (GIS Database).

The application area occurs within a proclaimed surface water management area as proclaimed under the *Rights in Water Irrigation Act, 1914* (RIWI Act) (DoW, 2008). The DoW advises that any taking or diversion of surface water in this proclaimed area for purposes other than domestic and/or stock watering is subject to licence issued by the Department of Water. Part of the application area is intersected by Barnett Creek. Any interference with the bed and banks of a watercourse in this proclaimed area will require a permit from the Department of Water. The impact of clearing riparian vegetation upon the quality of surface water is assessed

during the bed and banks application process on a case by case basis (DoW, 2008). The assessing officer considers that the proposed clearing will alter surface run-off flows and may increase sediment flow in the area. This increased sediment flow may alter the quality of water in Barnett Creek if not controlled. Hamersley Iron (2008) have stated that they will capture surface run-off as per Civil Aviation Safety Authority engineering requirements.

DoW (2008) have stated that the application area occurs within the Pilbara Groundwater Area as proclaimed under the RIWI Act. Any groundwater abstraction in this proclaimed area is subject to licensing by the Department of Water. The groundwater salinity within the application area is approximately 500 - 1000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be potable water. Given the size of the area to be cleared (260 hectares) compared to the size of the Hamersley groundwater province (101,668 square kilometres) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that should a permit be granted, conditions be placed on the permit with regards to surface water management.

Methodology DoW (2008)
Hamersley Iron (2008)
GIS Database:
- Public Drinking Water Source Areas - (PDWSA's)

(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 application area experiences an arid, tropical climate with a wet summer season and a dry winter season (BoM, 2008). Most rainfall is received during the wet season, but falls can be variable (BoM, 2008). Rain can either be sporadic (local thunderstorms) or heavy and intense (cyclonic events). It is likely that during times of intense rainfall there may be some localised flooding in adjacent areas. However, the small area to be cleared (260 hectares) in relation to the size of the Ashburton River catchment area (78,777 square kilometres; GIS Database) is not likely to lead to an increase in flood height or duration.

Methodology BoM (2008)
GIS Database:
- Hydrographic Catchments - Catchments

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

There is a native title claim over the area under application: WC97/89 (GIS Database). The claim has been registered with the National Native Title Tribunal. However, the mining tenement 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*.

The application area is located within a *Rights in Water Irrigation Act, 1914* (RIWI Act) Surface Water Management Area (GIS Database). The proponent is required to obtain a Beds and Banks Permit in order to disturb any water course (DoW, 2008). The application area is located in a RIWI Act Groundwater area (GIS Database). The proponent is required to obtain permits to extract groundwater in this area (DoW, 2008).

No public submissions were received during the advertised period.

Two submissions were received by direct interest parties during the submissions period. One submission raised no objections to the proposed clearing.

The other submission raised concerns regarding Aboriginal sites of significance, bush tucker and medicinal plants and the extent of native vegetation in the local area.

Hamersley Iron have stated that the application area has been surveyed for aboriginal sites of significance and 15 sites have been located. Hamersley Iron have advised that a buffer zone has been placed around each site and these sites will be avoided. It is the proponent's responsibility to comply with the *Aboriginal Heritage Act, 1972* and ensure that no sites of Aboriginal significance are damaged through the clearing process.

It is considered that the extent of remaining vegetation both within the local area and regionally is such that access to bush tucker and medicinal plants by native title claimants will not be significantly impacted by the proposed clearing.

It is not considered that the removal of 260 hectares of native vegetation will significantly impact the extent of

native vegetation within the area both locally and regionally. Whilst a number of applications have been granted within the region, the extent of remaining vegetation on a regional scale is such that there is likely to be no significant impact to the extent of vegetation within the Pilbara region. It should be noted that many of these granted permits require the permit holder to rehabilitate the areas cleared such that there will be no net loss of vegetation in these areas, in the longer term.

Methodology DoW (2008)
Hamersley Iron (2008)
GIS Database:
- Native Title Claims
- Aboriginal Sites of Significance

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles and has been found to be at variance to Principles (a) and (f), may be at variance to Principles (g) and (i), is not likely to be at variance to Principles (b), (c), (d), (h), and (j) and is not at variance to Principle (e).

It is recommended that should a permit be granted, conditions be endorsed on the permit with regard to weed management, management of surface water, recording and reporting areas cleared.

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6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005. Department of Conservation and Land Management, Como, Western Australia*} :-

P1	Priority One - Poorly Known taxa: taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two - Poorly Known taxa: taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3	Priority Three - Poorly Known taxa: taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
P4	Priority Four – Rare taxa: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
R	Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable): taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
X	Declared Rare Flora - Presumed Extinct taxa: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

Schedule 1	Schedule 1 – Fauna that is rare or likely to become extinct: being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
Schedule 2	Schedule 2 – Fauna that is presumed to be extinct: being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
Schedule 3	Schedule 3 – Birds protected under an international agreement: being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
Schedule 4	Schedule 4 – Other specially protected fauna: being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna. Department of Conservation and Land Management, Como, Western Australia*} :-

- P1 Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2 Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3 Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4 Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5 Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999*)

- EX Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W) Extinct in the wild:** A native species which:
- (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
 - (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN Endangered:** A native species which:
- (a) is not critically endangered; and
 - (b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU Vulnerable:** A native species which:
- (a) is not critically endangered or endangered; and
 - (b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.