



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2283/1  
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 Act 1972 Temporary Reserve TR70/4882  
Iron Ore (Rhodes Ridge) Agreement Act 1972 Temporary Reserve TR70/4883  
Iron Ore (Rhodes Ridge) Agreement Act 1972 Temporary Reserve TR70/4193  
Local Government Area: Shire Of East Pilbara  
Colloquial name: Bakers Hill South Exploration Project

### 1.4. Application

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

## 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. Four Beard vegetation associations are located within the application area (GIS Database):

175: Short bunch grassland - savanna/grass plain (Pilbara). According to the Shared Land Information Platform (SLIP, 2007), Beard vegetation association 175 is a grassland dominated by *Astelba pectinata*, *Aristida latifolia*, *Chrysopogon fallax* and *Eragrostis setifolia*, with sub-dominants *Angianthus sp.*, *Calotis multicaulis*, *Rhodanthe floribunda*, *Ptilotus astrolasius* and *Ptilotus gomphrenoides*.

18: Low woodland; mulga (*Acacia aneura*). According to the Shared Land Information Platform (SLIP, 2007), Beard vegetation association 18 is a shrubland dominated by *Acacia aneura*, over *Ptilotus drummondia*, *Eremophila fraseri*, *Acacia pruinocarpa*, *Acacia sp. aff. ligulata*, *Eremophila forrestii* over *Eremophila lanceolata*, *Brachyscome sp.*, *Calocephalus francisii*, *Rhodanthe floribunda*, *Pimelea holroydii* and *Ptilotus gaudichaudii*.

29: Sparse low woodland; mulga, discontinuous in scattered groups. According to the Shared Land Information Platform (SLIP, 2007), 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*.

82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*. According to the Shared Land Information Platform (SLIP, 2007), Beard vegetation association 82 is a shrubland dominated by *Eucalyptus kingsmillii*, *E. gamophylla*, *E. leucophloia* over *Senna artemisioides ssp. x sturtii*, *Dodonaea viscosa*, *Grevillea wickhamii*, *Hakea lorea* and *Senna pleurocarpa var. pleurocarpa*, over *Triodia wiseana*.

A vegetation survey conducted over the application area by Pilbara Iron staff in March 2007 identified 16 vegetation types (Hamersley Iron, 2007). These were:

1. Clay Flats: *Acacia ayersiana*, *Acacia aneura* low open woodland over *Eremophila caespitosa* low open shrubland over *Aristida latifolia*, *Chrysopogon fallax* scattered tussock grass over *Aristida contorta* scattered bunch grass.

2. Clay Flats/Shallow Drainage Line: *Corymbia candida ssp. dipsodes* low open woodland over *Acacia catenulata*, *Acacia pruinocarpa* high open shrubland over *Acaica pachyacra* open shrubland over *Senna pleurocarpa* low open shrubland over *Aristida latifolia*, *Themeda triandra*, *Chrysopogon fallax* open tussock grassland over *Aristida contorta* very open bunch grass. (Burnt <1 year).

3. Clay Flat Open Woodland: *Corymbia candida ssp. dipsodes*, *Eucalyptus xerothermica*, *Grevillea berryana* low open woodland over *Acacia aneura* high shrubland over *Ptilotus obovatus* low scattered shrubs over *Eriachne*

flaccida, *Themeda triandra* open tussock grassland over *Aristida contorta*, *Enneapogon polyphyllus* very open bunch grass.

4. Stony mid-slope: *Eucalyptus leucophloia*, *Corymbia hamersleyensis* low open woodland over *Acacia aneura*, *A. pruinocarpa* high open shrubland over *Eremophila fraseri*, *Keraudrenia velutina* open shrubland over *Triodia basedowii*, *T. wiseana* hummock grassland over *Aristida latifolia*, *A. holathera* scattered tussock grassland over *A. contorta* scattered bunch grass.

5. Lower slope run-off: *Acacia aneura*, *Acacia pruinocarpa* low woodland over *Keraudrina velutina*, *Eremophila forrestii* scattered shrubs over *Triodia melvillei*, *T. basedowii*, *T. wiseana* hummock grassland over *Themeda triandra* scattered tussock grasses.

6. Stony Clay Flats/Open Woodland: *Corymbia candida ssp. dipsodes* scattered low trees over *Acacia aneura* tall shrubland over *Triodia melvillei* very open hummock grassland over *Chrysopogon fallax*, *Aristida latifolia* scattered tussock grasses over *Aristida contorta*

7. Lower Clay Flat/Valley Floor: *Acacia aneura* tall open shrubland over *Themeda triandra* tussock grassland.

8. Open Mulga Clay Flat: *Acacia paraneura*, *Acacia aneura* low woodland over *Ptilotus obovatus* scattered low shrubs over *Aristida contorta* open bunch grass.

9. Clay Flat Drainage Line: *Eucalyptus xerothermica*, *Hakea lorea*, *Grevillea berryana* low open woodland over *Acacia aneura* high open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* open shrubland over *Themeda sp.*, *Aristida latifolia* open tussock grasses.

10. Cracking Clay Flat: *Astrebla pectinata*, *Aristida latifolia*, *Ischaemum albobillosum* (P2) tussock grassland.

11. Cracking Clay Plain: *Dichanthium sericeum*, *Aristida latifolia*, *Themeda triandra* closed tussock grassland.

12. Calcrete/Gentle Rise: *Eucalyptus xerothermica* scattered trees over *Eucalyptus socialis* low open woodland over *Acacia pruinocarpa*, *Acacia aneura* high open shrubland over *Triodia wiseana* open hummock grassland.

13. Mulga woodland/Grass plain: *Acacia aneura* high open shrubland over *Eriachne flaccida* scattered tussock grasses over *Aristida contorta* open bunch grass.

14. Cracking Clay Pan: *Acacia aneura* high open shrubland over *Dichanthium sericeum*, *Ischaemum albobillosum* (P2), *Aristida longifolia*, *Chrysopogon fallax* closed tussock grassland.

15. Stony Drainage Line: *Acacia citrinoviridis*, *A. aneura*, *Acacia rhodophloia* high shrubland, *Eremophila fraseri* open shrubland over *Triodia pungens* very open hummock grassland over *Chrysopogon fallax*, *Eriachne flaccida* scattered tussock grass over *Aristida contorta* scattered bunch grass.

16. *Eucalyptus* & *Acacia* woodland: *Eucalyptus xerothermica* low woodland over *Acacia citrinoviridis*, *A. aneura*, *A. ayersiana* tall open scrub over *Eremophila fraseri*, *Rhagodia eremaea* open shrubland over *Ptilotus obovatus* low scattered shrub over *Triodia pungens* very open hummock grassland over *Enneapogon polysepalous* very open bunch grass.

<b>Clearing Description</b>	Hamersley Iron have applied to clear 200 hectares of native vegetation within an application area of 949 hectares for the purpose of mineral exploration. This involves the maintaining and establishing of tracks, clearing of approximately 225 kilometres of 3 metre wide tracks and clearing of approximately 2,614 drill pads (10 metres x 15 metres).
<b>Vegetation Condition</b>	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)  To  Pristine: No obvious signs of disturbance (Keighery 1994)
<b>Comment</b>	Vegetation condition was described as very good to good by Pilbara Iron staff using a vegetation condition scale developed by Trudgen ME (1998). Analysis of photographs by the assessing officer suggests that the vegetation within the application area is in very good to excellent condition according to Keighery (1994).

### 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) 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). The vegetation described within the application area (Hamersley Iron, 2007) is typical of the bioregion.

Vegetation surveys of the application area identified 334 flora species from 41 Families (Hamersley Iron, 2007). This is considered to be very high in biological diversity. Poaceae (63), Malvaceae (21), Mimosaceae (33), Asteraceae (21) and Amaranthaceae (21) families are particularly diverse within the application area (Hamersley Iron, 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 species, particularly Skinks and Geckos (Western Australian Museum, 2008). The search found 63 species from 9 Families as potentially occurring within the application area.

Four alien weed species were recorded within the vegetation survey area (Hamersley Iron, 2007). 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 through 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. None of the weeds identified are declared weeds.

Based on the above, the proposed clearing is at variance to this Principle. Should a permit be granted, the assessing officer recommends that conditions be imposed on the permit with regard to weed control and rehabilitation.

##### Methodology

CALM (2002)

Hamersley Iron (2007)

Western Australian Museum (2008)

GIS Database:

- Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00

#### (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 may be at variance to this Principle**

The assessing officer has conducted an area search of the application area and a 50 kilometre radius using the Western Australian Museum's Faunabase (Western Australian Museum, 2008). This search listed one conservation significant species as having been recorded within the search area; the (Pilbara Olive Python, *Liasis olivaceus barroni*).

Hamersley Iron conducted an area search of the application area and a 50 kilometre radius using the Department of Environment and Conservation's (DEC) 'Threatened Fauna Database'. The search used similar coordinates to that used by the assessing officer. This search listed six species of conservation significance as having been recorded within the search area: Black Flanked Rock Wallaby (*Petrogale lateralis lateralis*), Pilbara Olive Python, *Ramphotyphlops ganei* (a blind snake), Ghost Bat (*Macroderma gigas*), Western Pebble Mound Mouse (*Pseudomys chapmani*) and Grey Falcon (*Falco hypoleucos*).

The Pilbara Olive Python (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) prefers deep gorges and water holes in the ranges of the Pilbara region (Pearson, 1993 as cited in DEWR, 2007). Radio-telemetry has shown that individuals are usually in close proximity to water and rock outcrops. The application area does not provide 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*. Two pebble mounds were observed at two locations (Hamersley Iron, 2007). The vegetation within the application area may be significant habitat for this species, although the species is found in many locations within the Hamersley Iron ranges, including Karijini National Park.

The Grey Falcon (DEC - Priority 4) is a wide ranging bird known to nest along watercourses in tall *Eucalyptus camaldulensis* (Garnett et al, 2000). Due to the non perennial nature of the local watercourses, and the lack of *E. camaldulensis*, the vegetation within the application is not likely to be significant habitat for this species.

The Blind snake *Ramphotyphlops ganei* (DEC - Priority 1) has been collected at opposite ends of the Pilbara uplands, hence the species may occur over a substantial geographic range (Aplin, 1998). Four specimens have

been recorded from Newman, not far from the application area. However, the fact that it has not previously been collected implies either a general scarcity or a very discontinuous distribution. Aplin suggests that the new species is associated with the moist microhabitats which exist in many of the deeper, better shaded gorges throughout the region. Suitable habitat for this species occurs within the application area. Given the lack of information regarding the habitat preference and range of this species, it is possible that the vegetation within the application area may be significant habitat for this species.

The Ghost Bat (DEC - Priority 4) roosts in caves, old mine shafts and deep cracks in rocks (Australian Museum Online, 2008). The application area does not support suitable habitat for the ghost bat. Therefore, the vegetation within the application area is not likely to be significant habitat for this species.

The habitat of the Black-Flanked Rock Wallaby (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) varies in detail from colony to colony but always involves proximity to some form of cliff, rock-pile, talus or escarpment for refuge to a source of food (DEWR, 2008). Existing populations of this subspecies are scattered across much of western WA, with mainland populations occurring east of the Fortescue River Roadhouse, in Cape Range, Ningaloo Station, Calvert Range, Kalbarri National Park (DEWR, 2008). There are also six populations in the wheatbelt, at Nangeen Hill, Mount Caroline, Mount Stirling, Sales Rock, Querkin Rocks and Tutakin Rock (DEWR, 2008). Two isolated populations occur on Barrow Island and on Salisbury Island (DEWR, 2008). The terrain within the application area is unlikely to contain the complexity of rocks, cliffs or escarpment necessary to sustain a population of this species. A lack of predator control is also a limiting factor in whether the species remains in the area. Therefore, the vegetation within the application area is not likely to be significant habitat for this species.

Based on the above, the proposed clearing may be at variance to this Principle as the vegetation may support habitat for the Western Pebble-mound mouse and *Ramphotyphlops ganei*. The assessing officer recommends that conditions be placed on any permit granted to protect existing pebble mounds and limit blade down clearing to drill pads and sumps.

**Methodology** Aplin (1998)  
Australian Museum Online (2008)  
DEWR (2007)  
DEWR (2008)  
Garnett et al (2000)  
Hamersley Iron (2007)  
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 may be at variance to this Principle**

According to available databases, no Declared Rare or Priority Flora species have been recorded within the application area (GIS Database).

Flora surveys conducted by Pilbara Iron botanists over the application area in March 2007 and September 2007 have identified no Declared Rare flora species, but have identified four Priority flora species within the application area (Hamersley Iron, 2007). These are: *Goodenia sp.* East Pilbara (P1), *Ischaemum albobillosum* (P2), *Eremophila caespitosa* (P3) and *Triumfetta leptacantha* (P4).

*Goodenia sp.* East Pilbara occurs on low undulating plains or swampy plains in red-brown clay soil (Western Australian Herbarium, 1998-). Florabase has five recorded populations for this species (Western Australian Herbarium, 1998-). A single population of 20 plants was identified within the survey area (Hamersley Iron, 2007). Hamersley Iron have committed to avoiding this species when conducting exploration activities. Given its limited distribution and small population the vegetation within the application area may be significant habitat for this species.

*Ischaemum albobillosum* occurs on plateaus in crabhole country (cracking clays) (Western Australian Herbarium, 1998-). Two separate populations were identified within the survey area, with population numbers in the hundreds (Hamersley Iron, 2007). Hamersley Iron have committed to avoiding this species when conducting exploration activities (Hamersley Iron, 2007). There are 19 records of this species on Florabase over a wide range within the Pilbara region (Western Australian Herbarium, 1998-). It is likely that this species occurs where suitable soil types are present.

*Eremophila caespitosa* occurs on stony open flats (red soil with stony mantle) (Western Australian Herbarium, 1998-). Hamersley Iron identified many populations on existing drill lines with numbers in their hundreds. Florabase has 22 records for this species, which has a wide distribution from southern Pilbara to central Gascoyne (Western Australian Herbarium, 1998-). The species is likely to be common in areas recently disturbed anywhere within this range. The vegetation within the application area is not likely to be significant habitat for this species.

*Triumfetta leptacantha* occurs on stony hillsides within the Hamersley Ranges, often found after fire (Western Australian Herbarium, 1998-). Hamersley Iron (2007) have not quantified the populations found within the survey area but have described it as extensively distributed. Florabase has 36 records for this species (Western Australian Herbarium, 1998-). The vegetation within the application area is not likely to be significant habitat for this species.

An un-named *Acacia* species was also collected from within the application area (Hamersley Iron, 2007). Hamersley Iron have committed to avoiding this species when conducting exploration activities. Given that there is no information regarding the status of this *Acacia* species the vegetation within the application area is significant habitat for this species.

Based on the above, the proposed clearing may be at variance to this Principle. It is recommended that conditions be placed on any permit granted to protect populations of *Goodenia sp.* East Pilbara, *Ischaemum albobilosum* and the un-named *Acacia* species.

**Methodology** Hamersley Iron (2007)  
Western Australian Herbarium (1998-)  
GIS Database:  
- Declared Rare and Priority Flora List - CALM 01/07/05

**(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 may be at variance to this Principle**

There are no known Threatened Ecological Communities (TEC) located within the application area (GIS Database). One TEC and two Priority Ecological Communities (PEC) are located within approximately 45 kilometres of the application area. At this remote distance there is little likelihood of any impact to any known TEC or PEC from the proposed clearing.

Hamersley Iron have identified Vegetation type 10 (Cracking Clay Flat) as needing protection due to the presence of two Priority flora species and the possible presence of several other Priority Flora species. A full species list of this vegetation type is not available due to poor rainfall prior to survey, such that the survey could not identify the full range of grasses and herbs that may occur within the vegetation type. On the basis of species currently identified within this vegetation type, this area may be representative of the "West Angeles cracking clay community" which is listed by the DEC as a Priority 1 Ecological Community (PEC). The DEC have listed mining as a threatening process to this PEC. Hamersley Iron have committed to avoiding this area from their exploration program and intend to re-survey the area following good seasonal rains. The results of that survey will be forwarded to the DEC in Karratha to be considered.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that a condition be imposed on any clearing permit granted to avoid clearing within vegetation type 10 "Cracking Clay Flat".

**Methodology** Hamersley Iron (2007)  
GIS Database:  
- Threatened Ecological Communities - CALM

**(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). Four Beard Vegetation Association occur within the application area; 18, 29, 82 and 175 (GIS Database). These vegetation associations all remain at approximately 100% of their Pre-European extent (see table). The Beard vegetation associations 18 and 82 are well represented in conservation estate (see table).

	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					
18	19,890,795	19,890,029	~100	Least Concern	2.1
29	7,904,064	7,904,064	~100	Least Concern	0.3
82	2,565,929	2,565,929	~100	Least Concern	10.2
175	525,128	524,028	~100	Least Concern	4.2
Beard veg assoc. - bioregion					
18	676,561	676,561	~100	Least Concern	16.8
29	1,133,227	1,133,227	~100	Least Concern	1.9
82	2,563,609	2,563,609	~100	Least Concern	10.2
175	507,037	507,008	~100	Least Concern	4.4

\* Shepherd et al. (2001) updated 2005

\*\* Department of Natural Resources and Environment (2002)

Given that the vegetation extents both in the Pilbara and statewide remain uncleared the vegetation within the application area is not an example of remnant vegetation in an area that has been otherwise 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 (2001)  
GIS Database:  
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00  
- Pre-European Vegetation - DA 01/01

**(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, a few minor non-perennial drainage lines occur within the application area (GIS Database). Analysis of aerial photography reveals that the application area occurs mainly on the top, upper and lower slopes of a small ridge running east/west. There are some minor areas of proposed clearing on the valley floors. There are many small drainage lines running downslope from the ridge that are merely focal points for surface run-off. Water would only run in these shallow drainage lines during times of extreme rainfall, where-upon they discharge into the valley floor. During extreme rainfall events, the valley floors surrounding the ridge are likely to be inundated.

No vegetation types described by Hamersley Iron (2007) are representative of riparian vegetation.

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

**Methodology** Hamersley Iron (2007)  
GIS Database:  
- Hydrography, Linear - DoE 1/2/04

**(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 has been surveyed by the Department of Agriculture and Food (Van Vreeswyk et al 2004) and is comprised of the following land systems (GIS Database):

- Newman;

- Wannamulla;
- Boolgeeda; and
- Spearhole

A very small fraction of the application area occurs within the Spearhole land system and is comprised mainly of mulga groves which are not susceptible to erosion.

The majority of the proposed clearing occurs on the Newman land system. This system is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al, 2004). Analysis of aerial photography reveals the application area is comprised mainly of plateau, ridge, mountain or hill; lower slope and stony plain land units within this system. These are not susceptible to erosion due to the stony nature of the soils.

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 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).

Therefore the proposed clearing for exploration purposes is not likely to lead to significant land degradation. Several exploration gridlines and tracks already exist within the application area and do not appear to have contributed to erosion or water starvation of adjacent vegetation.

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:  
- 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 at variance to this Principle**

According to available databases, the application area occurs approximately 65 kilometres east of Karijini National Park. At such a remote distance, there will be no impacts to this conservation area. The vegetation and landforms within the application area are well represented within Karijini National Park.

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

**Methodology** GIS Database:  
- CALM Managed Lands and Waters - CALM 1/7/05

**(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**

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

The application area falls within a surface water and groundwater management area under the *Rights in Water Irrigation Act, 1914* (DoW, 2008). Extraction of groundwater, obstruction or interference of the beds and banks of a watercourse or wetland is subject to licensing by the Department of Water (DoW). DoW (2008) have advised that the clearing of 228 hectares of native vegetation that is not in association with a watercourse or wetland would not have an adverse impact on surface or groundwater quality in the area.

There are no permanent waterbodies or watercourses within, or in association with 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 311 millimetres (BoM, 2008), and experiences a pan evaporation rate of approximately 3400 millimetres/year (Luke et al, 1987). 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.

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

**Methodology** BoM (2008)  
DoW (2008)  
Luke et al (1987)  
GIS Database:  
- Public Drinking Water Supply Areas (PDWSA) - DoW

**(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 method of clearing and the small area to be cleared are not likely to lead to an increase in flood height or duration. Flooding is not expected within the application area as it is located higher in the landscape.

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

**Methodology** BoM (2008)

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

**Comments**

There is one native title claim over the area under application (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*.

Several Aboriginal sites of significance occur in close proximity to the application area (GIS Database). Hamersley Iron has identified several Aboriginal sites of significance within the application area and have excised those areas from the application area. 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.

The application area falls within a surface water and groundwater management area under the *Rights in Water Irrigation Act, 1914* (DoW, 2008). Extraction of groundwater, obstruction or interference of the beds and banks of a watercourse or wetland is subject to licensing by the Department of Water (DoW). DoW (2008) have advised that the clearing of 200 hectares of native vegetation that is not in association with a watercourse or wetland would not have an adverse impact on surface or groundwater quality in the area.

A submission was received from an interested party during the public submissions period. The submission requested the assessment take into account aboriginal heritage sites within the application area, bush tucker and medicinal plants and the extent of native vegetation within the region. Aboriginal sites of significance are not considered as part of the 10 clearing Principles, but may be a trigger for referral to the Environmental Protection Authority (EPA). The assessing officer does not consider it necessary to refer the application to the EPA due to Hamersley's commitment to avoid such sites. Bush tucker and medicinal plants if present, should return post-clearing provided adequate rehabilitation is undertaken by the proponent. Native vegetation extents were considered under Principle (e).

**Methodology** DoW (2008)  
Hamersley Iron (2007)  
GIS Database:  
- Native Title Claims  
- Aboriginal Sites of Significance (STATUS)

**4. Assessor's comments**

Purpose	Method	Applied area (ha)/ trees	Comment
Mineral Exploration	Mechanical Removal	200	The proposal has been assessed against the Clearing Principles is at variance to Principles (a) and (f), may be at variance to Principles (b), (c) and (d), is not likely to be at variance to Principles (g), (i) and (j) and is not at variance to Principles (e) and (h).

It is recommended that should a permit be granted, conditions be endorsed on the permit with regards



to rehabilitation of areas cleared, avoidance of conservation significant species, avoidance of priority ecological communities, weed management, recording areas cleared and reporting against the permit conditions.

## 5. References

- Aplin, K., 1998. Three new blindsnakes (Squamata: Typhlopidae) from north western Australia. *Records of the Western Australian Museum* 19(1): 1?12.
- Australian Museum Online (2007). Bats in Australia, Orange Leaf-nosed Bat. <http://www.amonline.net.au/bats/records/bat14.htm> Accessed 8/6/07.
- BoM (2007). Climate Averages - Newman. [http://www.bom.gov.au/climate/averages/tables/cw\\_007151.shtml](http://www.bom.gov.au/climate/averages/tables/cw_007151.shtml) Accessed 28/3/08. Bureau of Meteorology.
- Department of Conservation and Land Management (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- DEWR (2007). Olive Python (Pilbara subspecies). [http://eied.deh.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=66699](http://eied.deh.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66699) Accessed 9/8/07. Department Of Environment and Water Resources.
- DEWR (2008). *Petrogale lateralis lateralis* - Black-flanked Rock-wallaby. [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=66647](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66647) Accessed 21/3/08. Department of Environment and Water Resources.
- DoW (2008). Advice for land clearing application 2283/1. Advice to Assessing Officer, Native Vegetation Assessment Branch, Department of Industry and Resources (DoIR), received 15/4/08. Department of Water, Western Australia.
- Garnett ST & Crowley GM (2000). Action Plan for Australian Birds 2000. Environment Australia, Canberra.
- Hamersley Iron (2007). Supporting documentation supplied within clearing permit application for Bakers South Exploration Project. Hamersley Iron Pty Ltd.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Luke GJ, Burke KL, O'Brien TM. (1987) Evaporation Data for Western Australia. Department of Agriculture, Western Australia
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- SLIP (2007). Shared Land Information Platform <http://spatial.agric.wa.gov.au/slip/home.htm> Accessed 18/2/08.
- Start AN, Anstee SD & Endersby M, (2000). A review of the biology and conservation status of the Ngadji, *Pseudomys chapmani* Kitchener 1980 (Rodentia: Muridae). CALMScience, Vol 2, No 2, p 125-147.
- Van Vreeswyk AME, Payne AL, Leighton KA & Hennig P, (2004). Technical Bulletin No. 92: An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture, Western Australia.
- WAM (2008). Faunabase - Western Australian Museum, Queensland Museum and Museum & Art Gallery of NT Collections Databases. <http://www.museum.wa.gov.au/faunabase/prod/index.htm> Accessed 19/3/08. Western Australian Museum.
- Western Australian Herbarium (1998-). FloraBase - The Western Australian Flora. Department of Environment and Conservation. <http://florabase.calm.wa.gov.au/> (Accessed xx/xx/xxxx).

## 6. Glossary

### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government.
<b>CALM</b>	Department of Conservation and Land Management, Western Australia.
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia.
<b>DA</b>	Department of Agriculture, Western Australia.
<b>DEC</b>	Department of Environment and Conservation
<b>DEH</b>	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
<b>DEP</b>	Department of Environment Protection (now DoE), Western Australia.
<b>DIA</b>	Department of Indigenous Affairs
<b>DLI</b>	Department of Land Information, Western Australia.
<b>DoE</b>	Department of Environment, Western Australia.
<b>DoIR</b>	Department of Industry and Resources, Western Australia.
<b>DOLA</b>	Department of Land Administration, Western Australia.
<b>DoW</b>	Department of Water
<b>EP Act</b>	Environment Protection Act 1986, Western Australia.
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
<b>GIS</b>	Geographical Information System.
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia.

<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>RIWI</b>	Rights in Water and Irrigation Act 1914, Western Australia.
<b>s.17</b>	Section 17 of the Environment Protection Act 1986, Western Australia.
<b>TECs</b>	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.