



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2446/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

### 1.3. Property details

Property: Mineral Lease 4SA (AML 70/4), Iron Ore (Hamersley Range) Agreement Act 1963  
Local Government Area: Shire Of Ashburton  
Colloquial name: Brockman 2 Pit 6 Extension Drilling Program

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
27.8		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** Vegetation within the application area has been mapped at a 1:250,000 scale as the following Beard vegetation association: (Shepherd et al., 2001; GIS Database).

- **82:** Hummock grasslands, shrub steppe; *Grevillea refracta* & hakea over soft spinifex.

The vegetation within the application area has been subject to several flora and vegetation surveys over the previous few years (Hamersley Iron, 2008). The most recent survey was conducted by a botanist from Pilbara Iron in February 2008. A total of 13 vegetation communities have been identified within the application area (Hamersley Iron, 2008).

**1) Gorge:** *Corymbia hamersleyana*, *C. ferritcola*, *Eucalyptus leucophloia* low open forest over *Acacia pruinocarpa* high open shrubland over *Acacia hamersleyensis*, *Dodoaea pachyneura*, *Senna glutinosa* open shrubland over *Triodia pungens*, *T. wiseana* hummock grassland over *Cymbopogon ambiguus*, *Eriachne mucronata* very open tussock grassland. 'Very Good' condition with no recent fire history.

**2) Upperslope:** *Eucalyptus leucophloia*, *Corymbia deserticola* low open forest over *Acacia pruinocarpa* tall open shrubland over *Acacia maitlandii*, *Senna glutinosa* open shrubland over *Triodia wiseana* hummock grassland over *Eriachne mucronata*, *Cymbopogon ambiguus* very open tussock grassland. 'Very Good' condition with no recent fire history.

**3) Cliff, Breakaway, Upper Slope:** *Eucalyptus leucophloia*, *Corymbia deserticola* low open woodland over *Astrotricha hamptonii*, *Acacia hamersleyensis* tall open shrubland over *Senna glutinosa* open shrubland over *Triodia wiseana* open hummock grassland over *Eriachne mucronata* open tussock grassland. 'Very Good' condition with no recent fire history.

**4) Very Upper Slope, Crest:** *Eucalyptus leucophloia*, *E. gamophila*, *Corymbia deserticola* low open forest over *Acacia pruinocarpa*, *A. pyrifolia* tall open shrubland over *Triodia wiseana* open hummock grassland over *Eriachne mucronata* very open tussock grassland. 'Very Good' condition with no recent fire history.

**5) Crest, Cliff, Breakaway:** *Corymbia deserticola*, *Ficus brachypoda* low open woodland over *Astrotricha hamptonii* scattered tall shrubs over *Senna glutinosa* open shrubland over *Eremophila magnifica* subsp. *magnifica* low open shrubland over *Triodia wiseana* open hummock grassland over *Eriachne mucronata* open tussock grassland. 'Very Good' condition with fire history occurring within the last four years.

**6) Steep East Slope:** *Eucalyptus leucophloia* low open woodland over *Acacia pruinocarpa* high open shrubland over *Acacia exilis*, *Senna glutinosa* open shrubland over *Triodia wiseana* closed hummock grassland over *Themeda triandra*, *Eriachne mucronata* very open tussock grassland. 'Very Good' condition with no recent fire history.

**7) Hilltop, Crest:** *Eucalyptus leucophloia*, *Corymbia deserticola* low open woodland over *Acacia pruinocarpa*, *Hakea lorea* high open shrubland over *Acacia pyrifolia*, *Senna glutinosa* open shrubland over *Triodia wiseana* hummock grassland. 'Very Good' condition with no fire history.

**8) Mid Slope:** *Eucalyptus leucophloia*, *Hakea lorea* low woodland over *Acacia pyrifolia*, *Senna glutinosa* open shrubland over *Triodia wiseana* open hummock grassland. 'Very Good' condition with no fire history.

**9) Upper Slope, Drainage Line:** *Eucalyptus leucophloia*, *E. pilbarensis* low woodland over *Acacia pruinocarpa*, *Hakea lorea* high open shrubland over *Triodia wiseana* open hummock grassland over *Eriachne*

*mucronata* open tussock grassland. 'Very Good' condition with no recent fire history.

**10) Very Steep Upper Slope:** *Eucalyptus leucophloia* low woodland over *Acacia pruinocarpa* high open shrubland over *Acacia bivenosa*, *Senna glutinosa* shrubland over *Triodia pungens*, *T. basedowii* hummock grassland over *Cymbopogon ambiguus*, *Eriachne mucronata* very open tussock grassland. 'Very Good' condition with no recent fire history.

**11) Steep Mid Slope:** *Hakea lorea* scattered low trees low woodland over *Acacia bivenosa* open heath over *Triodia basedowii* hummock grassland over *Cymbopogon ambiguus*, *Eriachne mucronata* very open tussock grassland over *Lepidium pedicellusum* very open herbs. 'Very Good' condition with no recent fire history.

**12) Lower Gully:** *Corymbia ferritcola*, *Eucalyptus leucophloia* low open woodland over *Acacia pruinocarpa* high open shrubland over *Acacia bivenosa*, *A. exilis*, *Senna glutinosa* open shrubland over *Triodia pungens* hummock grassland over *Themeda triandra*, *Cymbopogon ambiguus* open tussock grassland

**13) Mid Slope:** *Eucalyptus leucophloia*, *E. gamophylla*, *Corymbia hamersleyana* low woodland over *Acacia monticola* open scrub over *Triodia wiseana* open hummock grassland over *Eriachne mucronata*, *Cymbopogon ambiguus* open tussock grassland.

**Clearing Description**

Hamersley Iron Pty Ltd proposes to clear up to 27.8 hectares of native vegetation within an application area of 154 hectares for the purpose of infill drilling at the Brockman 2 Mine Pit 6.

Vegetation will be cleared by a bulldozer with its blade down. Clearing will be kept to a minimum, with historic tracks and gridlines being followed wherever possible. The vegetation and topsoil will be collected and stockpiled for use in future rehabilitation (Hamersley Iron, 2008).

**Vegetation Condition**

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

to

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994).

**Comment**

The condition of vegetation within the application area has been assessed as 'Excellent to 'Very Good' based on the flora and vegetation assessment by Pilbara Iron (2008). The Assessing Officer notes that no weed species were recorded within the application area, and photographs and aerial imagery supplied with the clearing permit application indicates that there has been little or no other disturbances to the vegetation within the application area (Hamersley Iron, 2008).

**3. Assessment of application against clearing principles**

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

**Comments**

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

The application area is located within the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion which encompasses an area of 17,804,164 hectares (GIS database; Shepherd et al., 2001). The Hamersley subregion is characterised by sedimentary ranges and plateaux, dissected gorges, low Mulga woodlands over bunch grasses in valley floors and Eucalyptus woodlands over *Triodia* spp. on skeletal soils of the ranges (Kendrick, 2001). The mountain tops, gorges and upper slopes throughout the subregion provide refuge from fire for a large number of restricted flora species and native fauna species and the extensive ranges comprise of a high diversity of *Acacia*, *Triodia*, *Ptilotus*, *Corymbia* and *Sida* species (Kendrick, 2001).

The vegetation within the application area consists of Beard vegetation association 82 which is common and widespread throughout the Pilbara region, with approximately 100% of the pre-European vegetation remaining (Shepherd et al., 2001; GIS Database).

Aerial imagery indicates that the application area is located immediately east and south-east of the operational Hamersley Iron Brockman 6 mine site (Hamersley Iron, 2008). Due to the proximity to the existing mine site and plans to expand the Brockman 6 open pit, the application area has been subject to several surveys by botanists from Pilbara Iron (Hamersley Iron, 2008).

Pilbara Iron (2008) have identified and described 13 vegetation communities for the application area and recorded a total of 154 species from 39 families and 75 genera (Hamersley Iron, 2008). A total of four Priority flora species, *Sida* sp. Pilbara (Priority 1), *Sida* sp. Barlee Range (Priority 3), *Acacia bromilowiana* (Priority 3) and *Triumfetta leptacantha* (Priority 3), have been recorded within the application area (Pilbara Iron, 2008). No introduced flora species or weed species were recorded during any of the surveys within the application area (Pilbara Iron, 2008). The Assessing Officer notes that the application area comprises of a high diversity of landform features that includes slopes (lower, mid and upper), hilltops, drainage lines, gullies, breakaways and gorges (Pilbara Iron, 2008).

Given the high number of vegetation communities, flora species and landform features that have been identified within the application area, as well as the lack of weed species, the vegetation condition is considered 'Excellent' to 'Very Good' (Pilbara Iron, 2008), and the biodiversity of the application area would be considered moderate to high.

Hamersley Iron has applied to clear up to 27.8 hectares of native vegetation within an application area of 154 hectares for the purpose for infill drilling for the Brockman pit 6 extension drilling program (Hamersley Iron, 2008). The proposed activities will involve clearing for up to 383 drill pads (20 metres by 30 metres in size, and 50 metres apart), 383 sumps (3 metres by 3 metres in size) and access tracks (15 kilometres in length by 3 metres in width) (Hamersley Iron, 2008). The extent of the drilling program is likely to significantly disturb and fragment the vegetation within the application area.

Information provided with the clearing permit application indicates that the proposed clearing activities have the potential to adversely impact on the populations of the Priority listed species *Sida* sp. Pilbara, *Sida* sp. Barlee Range, *Acacia bromilowiana* and *Triumfetta leptacantha*, and their respective habitats. Hamersley Iron (2008) has advised that a 10 metre exclusion zone will be placed around all of the recorded populations of *Sida* sp. Pilbara. As a result of this management strategy adopted by Hamersley Iron, *Sida* sp. Pilbara is unlikely to be impacted on by the proposed clearing activities. The Assessing Officer has reviewed the Western Australian Museum's Florabase and also additional information submitted by the applicant, and it appears evident that the Priority 3 species *Sida* sp. Barlee Range, *Acacia bromilowiana* and *Triumfetta leptacantha* have wide ranging distributions across the Hamersley Ranges of the Pilbara region (Western Australian Museum, 2008a; Hamersley Iron, 2008). As the proposed clearing is for exploration purposes and not broad scale clearing, the overall impact on these species has the potential to be minimised, however, it is most likely inevitable that some individuals will be adversely impacted by the clearing activities.

The landform features and vegetation communities that have been described for the application area are relatively common throughout the Hamersley subregion which covers an area of 6,215,092 hectares (Kendrick, 2001). However, the proposed clearing is likely to have a localised impact on an area of native vegetation that would be considered as an area of moderate to high biodiversity.

Based on the above, the proposal may be at variance to this Principle. The Assessing Officer recommends that should the permit be granted, conditions be imposed on the permit for the purpose of weed management and to protect the Priority 1 species *Sida* sp. Pilbara.

- Methodology**
- Hamersley Iron (2008)
  - Kendrick (2001)
  - Pilbara Iron (2008)
  - Shepherd et al., (2001)
  - Western Australian Museum (2008a)
  - GIS Database:
    - Interim Biogeographic Regionalisation of Australia
    - Interim Biogeographic Regionalisation of Australia (subregions)
    - Pre-European Vegetation

**(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**

Pilbara Iron (2008) has identified and described the vegetation and landform units within the application area. The Assessing Officer notes that the application area comprises of landform features that includes slopes (lower, mid and upper), hilltops, drainage lines, gullies, breakaways and gorges (Pilbara Iron, 2008). In addition, the application area comprises of a diverse range of vegetation communities that includes open forests, open woodlands, open shrublands and open tussock grasslands (Pilbara Iron, 2008). The condition of the vegetation and landforms within the application area has been described by Pilbara Iron (2008) as "Very Good" with little or no signs of disturbance.

The Assessing Officer conducted a search of the Western Australian Museum's online fauna database between the coordinates 22.27°S, 117.18°E and 22.64°S, 117.55°E, representing a 20 kilometre radius around the application area. This search identified 9 Avian, 16 Mammalian and 58 Reptilian species that may occur within the application area (Western Australian Museum, 2008a).

Hamersley Iron Pty Ltd requested the Department of Environment and Conservation to conduct a search of its Threatened Fauna Database to identify species of conservation significance that have been recorded within the coordinates specified above (Hamersley Iron, 2008). The following species of conservation significance have been recorded within the search area: Long-tailed Dunnart (*Sminthopsis longicaudata*), Lakeland Downs Mouse (*Leggadina lakedownensis*), Pebble-mound Mouse (*Pseudomys chapmani*), Ghost Bat (*Macroderma gigas*), Australian Bustard (*Ardeotis australis*), Bush Stone-curlew (*Burhinus grallarius*) and Striated Grasswren (*Amytornis striatus striatus*) and a skink (*Notoscincus butleri*).

The Long-tailed Dunnart (DEC - Priority 4) is known to inhabit rugged rocky landscapes across central parts of Western Australia 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 (Western Australian Museum, 2008b; Department of Natural Resources, Environment and the Arts, 2008). The vegetation types and landforms that are found within the application area may support populations of Long-tailed Dunnart,

however, given its widespread distribution throughout the Pilbara region it is unlikely that the vegetation proposed to be cleared represents significant habitat for this species.

The Lakeland Downs Mouse (DEC - Priority 4) is known from a broad distribution across the Pilbara and Kimberley regions of Western Australia, and its distribution includes Thevenard Island where it occurs naturally and Serrurier Island where it was introduced as a back-up population for those on Thevenard Island (Australian Museum Trust/Queensland Museum, 2008). The species is known to occur on sandy soils and cracking clays that support grasslands (Department of Environment and Conservation, 2008a), and its populations are known to fluctuate dramatically annually (Australian Museum Trust/Queensland Museum, 2008). The soil types within the application area appear to consist of stony surfaces and mantles which are unlikely to provide suitable habitat for this species (Pilbara Iron, 2008; Payne et al. 1988). The proposed clearing is unlikely to impact on significant habitat for the Lakeland Downs Mouse.

The Western Pebble-mound Mouse (DEC - Priority 4) is relatively widespread and abundant throughout much of the Pilbara 3 subregion, and parts of the Gascoyne (Kendrick, 2001; Australian Museum Trust/Queensland Museum, 2008). The species occurs on spinifex covered, gentle colluvial slopes with pebbles of size (approximately 3.5 grams) suitable for the transport and construction of pebble mounds (Australian Museum Trust/Queensland Museum, 2008). One active mound was recorded by Pilbara Iron during a flora survey of the application area (Pilbara Iron, 2008). The vegetation within the application area may be significant habitat for this species, although the species is found in many locations within the Pilbara region. The proposed clearing is unlikely to impact on significant habitat for this species.

The Ghost Bat (DEC - Priority 4) is known to show preference for large, deep caves, crevices and old underground mining workings (Australian Museum Online, 1999), and is distributed in Western Australia, throughout the western half of the Pilbara, and throughout the Kimberley including the Buccaneer Archipelago Islands (Australian Museum Trust/Queensland Museum, 2008). One of the main conservation threats to the Ghost Bat is the loss of feeding habitat by clearing (Australian Museum Online, 1999). The Ghost Bat preys on large insects, frogs, birds, lizards and small mammals including other bats. They swoop on their prey and then fly to a feeding site to eat (Australian Museum Online, 1999). The application area is located within a portion of the Hamersley Range that comprises of landform features that includes slopes (lower, mid and upper), hilltops, drainage lines, gullies, breakaways and gorges (Pilbara Iron, 2008). There is the potential that the gorge, gully and breakaway areas may comprise of suitable sized crevices that may provide habitat for the Ghost Bat. However, given its widespread distribution throughout the Pilbara and Kimberley region, the area is unlikely to represent significant habitat for this species.

The Australian Bustard (DEC - Priority 4) is known to inhabit open or lightly wooded grasslands including sandplains with *Triodia* species, and also chenopod flats and plains and low heathland environments (Johnstone and Storr, 1998). The species is known to be nomadic, with irregular widespread movements over long distances (Johnstone and Storr, 1998; Department of Environment and Climate Change NSW, 2008). This species may occur within the application area, however, given the widespread distribution and nomadic nature of this species, the vegetation and landforms within the application area is unlikely to represent significant habitat for this species.

The Bush Stone-curlew (DEC - Priority 4) is known to inhabit grassy woodlands, and also partly cleared forests and farmlands (Department of the Environment, Water, Heritage and the Arts, 2008; Johnstone and Storr, 1998). This species may occur within the application area, however, given the widespread distribution of this species, it is not likely that the Bush Stone-curlew is dependant upon the vegetation within the application area for its continued existence in the local area. The vegetation is not likely to represent significant habitat for this species.

Striated Grasswrens (DEC - Priority 4) are known to occur on sandy or loamy plains dominated by *Triodia* species, and also on sandridges and interdunes that comprise of *Acacia ligulata* and *A. aneura* with *Triodia* species (Johnstone and Storr, 1998). Vegetation mapping indicates that there are large expanses of *Triodia* hummock grassland throughout the Pilbara region which this species can utilise (GIS Database). The vegetation is not likely to represent significant habitat for this species.

*Notoscincus butleri* (DEC - Priority 4) is a small skink that is considered endemic to the Pilbara (Department of Environment and Conservation, 2008a). 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.

Based on the results from the database searches, the vegetation and landform units that have been identified within the application area may be of sufficient quality for the part maintenance of significant habitat for fauna species indigenous to Western Australia, including those conservation significant listed species described above. Land system information provided by Van Vreeswyk et al. (2004) and subregional information by Kendrick (2001) indicates that the the vegetation communities and landform features appear to be common and widespread throughout the Hamersley subregion.

The proposed infill exploration activities within the application area are likely to have an adverse impact on the

local environment, which will most likely result in a moderate to high degree of fauna habitat fragmentation within the application area. As a result, the proposed clearing activities may impact on significant fauna habitat for the local area.

Based on the above, the proposal may be at variance to this Principle. However, given the widespread sub-regional distribution of similar vegetation communities and landform features, the proposed clearing is unlikely to result in any large scale impact on native vegetation that is necessary for the maintenance of significant fauna habitat.

**Methodology** Australian Museum Online (1999)  
Australian Museum Trust/Queensland Museum (2008)  
Department of Environment and Climate Change NSW (2008)  
Department of Environment and Conservation (2008a)  
Department of the Environment, Water, Heritage and the Arts (2008)  
Department of Natural Resources, Environment and the Arts (2008)  
Hamersley Iron (2008)  
Johnstone and Storr (1998)  
Kendrick (2001)  
Payne et al. (1988)  
Pilbara Iron (2008)  
Shepherd et al. (2001)  
Van Vreeswyk et al. (2004)  
Western Australian Museum (2008a)  
GIS Database:  
- Interim Biogeographic Regionalisation of Australia  
- Interim Biogeographic Regionalisation of Australia (subregions)  
- Pre-European Vegetation

**(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 datasets there are no known records of Declared Rare Flora (DRF) or Priority flora species within the application area (GIS database).

A Declared Rare Flora and Priority flora survey was undertaken by botanists from Pilbara Iron in February 2008. No species of DRF were recorded within the survey area (Pilbara Iron, 2008). Based on the known information, the proposed clearing is unlikely to impact on any DRF species.

Four Priority flora species were recorded within the application area. These were:

- *Sida* sp. Pilbara (S. van Leeuwen 4377) (Priority 1);
- *Acacia bromilowiana* (Priority 3);
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3); and
- *Triumfetta leptacantha* (Priority 3).

*Sida* sp. Pilbara is an upright or semi-prostrate shrub that stands between 0.2 – 2 metres high, and is found in skeletal red stony soil and ironstone on cliffs and summits and in shady locations in the Pilbara (Western Australian Museum, 2008b). Pilbara Iron recorded a total number of approximately 138 individuals of *Sida* sp. Pilbara from 23 populations within the application area (Hamersley Iron, 2008). The Western Australian Museum (2008b) (through Florabase) indicates that there are 5 records for this species, and the frequency for these records is described as uncommon or infrequent, to common in shaded locations. Additional information provided by the applicant indicates that Pilbara Iron have recorded 5 populations of *Sida* sp. Pilbara totalling approximately 26 individuals at the Tom Price mine site which is situated approximately 51 kilometres south-east of the application area (Hamersley Iron, 2008; GIS Database), and 7 populations of *Sida* sp. Pilbara totalling approximately 42 individuals at the Brockman 3 mine site which is situated approximately 14 kilometres south of the application area (Hamersley Iron, 2008). Given the number of populations and individuals that have been recorded within the application area, the proposed clearing activities have the potential to impact on a significant number of individuals and populations of *Sida* sp. Pilbara. In order to minimise the impact of the proposed clearing on *Sida* sp. Pilbara, Hamersley Iron have subsequently confirmed that the species will be avoided during the exploration clearing activities and that a 10 metre exclusion buffer will be placed around all the recorded populations so they will not be disturbed (Hamersley Iron, 2008). The Department of Environment and Conservation (2008b) has advised “there are no concerns with the exploration program, provided that the commitments made by the proponent are adhered to in regard to avoiding direct impacts to *Sida* sp. Pilbara”. The Assessing Officer recommends that should the permit be granted, conditions be imposed on the permit for the purpose of flora protection.

*Acacia bromilowiana* is a tree or shrub reaching up to 12 metres high, and is found on skeletal stony loam, orange-brown pebbly, gravel loams, laterites, banded ironstone formations and basalt on rocky hills, breakaways, scree slopes, gorges and creek beds (Western Australian Museum, 2008b). Pilbara Iron

recorded approximately 20 individuals of this species during the flora survey of the application area (Hamersley Iron, 2008). Additional information provided by the applicant indicates that the species has also been recorded by Pilbara Iron at the Mount Tom Price and Hope Downs sites (Hamersley Iron, 2008). Florabase indicates that there are 21 records for this species throughout the Pilbara, and the frequency for *Acacia bromilowiana* is generally described as common where it has been recorded (Western Australian Museum, 2008b). Given the widespread distribution of the records for *Acacia bromilowiana* and taking into consideration the abundance of similar landform features and vegetation types throughout the Pilbara region, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

*Triumfetta leptacantha* is described as a spreading shrub which stands between 0.25 – 0.6 metres in height and is found on stony red loam soils amongst boulders and stony hillsides (Western Australian Museum, 2008b). Pilbara Iron recorded approximately 176 individuals of *Triumfetta leptacantha* from 25 populations during the flora survey for the application area (Hamersley Iron, 2008). Florabase indicates that there are 36 records for this species, and these records are distributed throughout the Hamersley Range system of the Pilbara region (Western Australian Museum, 2008b). Additional information submitted by the applicant indicates that Pilbara Iron have recorded in excess of 854 individuals of this species from approximately 176 populations from locations that include the Brockman locality, Tom Price, Turee Creek, Koodaideri and East Angeles (Hamersley Iron, 2008). Given the number and widespread distribution of the records for *Triumfetta leptacantha*, as well as taking into consideration the abundance of similar landform features and vegetation types throughout the Pilbara region, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

*Sida* sp. Barlee Range is a spreading shrub to 0.5 metres high and is found on skeletal red soils and on cliffs and summits or in shady locations around the Hamersley Ranges (Western Australian Museum, 2008b; Hamersley Iron, 2008). Pilbara Iron recorded approximately 137 individuals of *Sida* sp. Barlee Range from 20 populations within the application area (Hamersley Iron, 2008). Florabase indicates that there are 14 records for this species, and the frequency for the species is generally described as common where recorded (Western Australian Museum, 2008b). A distribution map for *Sida* sp. Barlee Range indicates that the species has been recorded from a wide ranging distribution across the Hamersley Ranges of the Pilbara region (Western Australian Museum, 2008b). Additional information provided by the applicant indicates that Pilbara Iron have recorded *Sida* sp. Barlee Range at locations that include Tom Price, Koodaideri and Western Turner (Hamersley Iron, 2008). Given the widespread distribution of the records for *Sida* sp. Barlee Range and taking into consideration the abundance of similar landform features and vegetation types that may provide suitable habitat for this species, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Based on the above, the proposal may be at variance to this Principle. The Assessing Officer recommends that should the permit be granted, a condition be imposed on the permit to protect the Priority 1 species *Sida* sp. Pilbara.

**Methodology** Department of Environment and Conservation (2008b)  
Hamersley Iron (2008)  
Pilbara Iron (2008)  
Western Australian Museum (2008b)  
GIS Database:  
- Declared Rare and Priority Flora List  
- Towns  
- Clearing Instruments

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

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

There are no known Threatened Ecological Communities (TEC's) within the application area (GIS database; Hamersley Iron, 2008). The nearest known TEC is located approximately 18 kilometres north-east of the application area (GIS database). Given the distance between the proposal and the nearest known TEC, the proposed clearing is not likely to impact on the conservation of that TEC.

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

**Methodology** Hamersley Iron (2008)  
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**

The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region in which approximately 99.9% of the pre-European vegetation remains (GIS database; Shepherd et al.,

2001).

The vegetation of the clearing application area has been mapped as Beard vegetation association 82: Hummock grasslands, shrub steppe; *Grevillea refracta* & *Hakea* over soft Spinifex (GIS Database, Shepherd et al., 2001). According to Shepherd et al., (2001) approximately 100% of Beard vegetation association remains at both the state and regional level.

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Pilbara Bioregion and Beard vegetation association 82 is of "Least Concern" (Department of Natural Resources and Environment, 2002).

While a small percentage of the vegetation types within the Pilbara bioregion are protected within conservation reserves, the bioregion remains largely uncleared. As a result, the conservation of the vegetation associations within the bioregion is not likely to be impacted on by this proposal.

	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	~99.9	Least Concern	6.3
Beard veg assoc. – State					
82	2,565,930	2,565,930	~100	Least Concern	10.2
Beard veg assoc. – Bioregion					
82	2,563,610	2,563,610	~100	Least Concern	10.2

\* Shepherd et al. (2001)

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

The vegetation under application is not a remnant of vegetation in an area that has been extensively cleared.

Based on the above, the proposal 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 (subregions) - 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**  
There are no permanent wetlands or watercourses within the areas applied to clear (GIS database). The proponent has advised that the vegetation to be cleared is not associated with any major watercourses, wetlands or wetland dependent vegetation (Hamersley Iron, 2008). Several ephemeral creek systems and an upper slope drainage line have been recorded within the application area (GIS database). These creek systems largely act as minor drainage lines and are widespread across the Pilbara region.

As there are watercourses within the application area, the proposed clearing is at variance to this Principle. These watercourses are minor, natural drainage channels that are widespread across the Pilbara landscape (GIS database), and are responsible for quickly dispersing floodwaters after significant rainfall events. The vegetation communities growing in association with the watercourses are not unique and are considered common and widespread in the Pilbara bioregion (Shepherd et al., 2001; GIS Database). The proposed clearing is unlikely to significantly impact on vegetation communities growing in association with these minor ephemeral creek systems.

**Methodology** Hamersley Iron (2008)  
Shepherd et al. (2001)  
GIS Database:  
- Hydrography, linear\_1  
- Hydrography, linear (hierarchy)

**(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**

According to the Department of Agriculture's Technical Bulletin No. 92 "An inventory and condition survey of the rangelands of the Pilbara Region, Western Australia", the application area is comprised of the Newman Land System (Van Vreeswyk et al., 2004).

The Newman Land System consists of rugged jaspilitic ranges, plateaux, ridges and mountains that characterise and typify much of the Pilbara (Van Vreeswyk et al., 2004). The majority of the vegetation appears to occur on the landform unit ridges, mountains and hills, slopes (low, mid and upper) and stony plains (Hamersley Iron, 2008; Van Vreeswyk et al., 2004). The soils consist of rocky outcrops and dense stony mantles, with little soil development, and dark reddish brown stony silt loams (Payne et al., 1988). The Newman Land System has stony surface materials which are likely to show high resistance to erosion (Van Vreeswyk et al., 2004). The proposed clearing may expose surface mantles which may cause an increase in surface water runoff, however, given the stony nature of the surface materials water and/or wind erosion is unlikely to occur.

Groundwater salinities within the application area have been recorded in the range of 500 – 1,000 milligrams/Litre Total Dissolved Solids (GIS Database). The application area experiences average annual rainfall of approximately 400 millimetres, with the majority of rainfall received between December and March. Localised flooding can be expected to occur seasonally in the Pilbara region as a result of heavy rainfall triggered by cyclonic activity and sporadic thunderstorms. Hamersley Iron has applied to clear up to 27.8 hectares within an application area of 154 hectares (Hamersley Iron, 2008). The proposed clearing activities will occur predominantly on the ridges, mountains and hills, slopes (low, mid and upper) and stony plains of a range system within the Hamersley subregion (Hamersley Iron, 2008). The application area is not associated with any permanent wetlands or watercourses (GIS database). The proposed clearing is not likely to increase land salinisation either on or off-site.

As a result, water logging is unlikely to be increased either on or off site.

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

**Methodology** Hamersley Iron (2008)  
Payne et al. (1988)  
Van Vreeswyk et al. (2004)  
GIS Database:  
- Groundwater Salinity, Statewide  
- Rainfall, Mean Annual  
- Evaporation Isopleths

**(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**

The application area is not located within a Department of Environment and Conservation managed conservation area (GIS Database; Hamersley Iron, 2008). The nearest conservation area is Karijini National Park which is situated approximately 57 kilometres south-east of the application area (GIS database). Based on the distance between the proposal and the nearest conservation area, the proposed clearing is not likely to impact on the conservation values of Karijini National Park.

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

**Methodology** Hamersley Iron (2008)  
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 is not likely to be at variance to this Principle**

There are no permanent watercourses, drainage systems or wetlands within the application area (GIS Database). The land system associated with the application area has high resistance to erosion (Van Vreeswyk et al., 2004; Payne et al., 1998), thereby reducing the risk of sediment export which may result in sedimentation and turbidity in any nearby watercourses. The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Millstream Water Reserve which is located approximately 17 kilometres north of the application area (GIS Database). The proposed clearing activities will involve clearing 27.8 hectares of native



vegetation for access tracks and drill pads across an application area of 154 hectares. Given the distance separating the application area and the nearest water supply area, the proposed clearing is unlikely to impact on the quality of the Millstream Water Reserve.

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

**Methodology** Payne et al. (1998)  
Van Vreeswyk et al. (2004)  
GIS Database:  
- Public Drinking Water Source Areas (PDWSAs)

**(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 is not associated with any permanent wetlands or watercourses (GIS database). The application area experiences average annual rainfall of approximately 400 millimetres, with the majority of rainfall received between December and March. Local flooding can be expected to occur seasonally in the Pilbara region as a result of heavy rainfall triggered by cyclonic activity and sporadic thunderstorms.

Numerous ephemeral watercourses are distributed across the landscape, and these are responsible for quickly dispersing floodwaters after significant rainfall events, thereby reducing peak flood heights (GIS database). It is unlikely that the proposed clearing for the drill pads and access tracks will impact on the drainage patterns in the local area. The proposed clearing of native vegetation is unlikely to cause or increase the incidence of flooding or result in an increase in peak flood height.

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

**Methodology** GIS Database:  
- Hydrography, linear (hierarchy)  
- Hydrography, linear\_1

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

**Comments**

There is one native title claim over the area under application; (WC97/089) (GIS Database). The claim has been registered with the National Native Title Tribunal on behalf of the claimant group (GIS Database). However, the 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*.

There are 16 registered Sites of Aboriginal Significance (Site ID: 15882, 16916, 16921, 16922, 16923, 16924, 16925, 16926, 20127, 20129, 22349, 22333, 22334, 22335, 22316 and 22068) that occur within the area applied to clear (GIS Database). 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. Hamersley Iron Pty Ltd has confirmed that the application area has been subject to a heritage survey, and that any Sites of Aboriginal Significance will be avoided during the clearing activities (Hamersley Iron, 2008).

One direct interest submission was received in relation to the protection of Sites of Aboriginal Significance and consideration towards the cumulative impact of clearing. The issues raised within the submission have been addressed under Principle (e) and under the section titled 'Planning instrument, Native Title, Previous EPA decision or other matter'.

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

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

## 4. Assessor's comments

### Comment

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

It is recommended that should a permit be granted, conditions be endorsed on the permit with regards to weed management, flora protection, rehabilitation, recording areas cleared and rehabilitated and reporting against the permit conditions.

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## 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.