



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2073/2  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: BHP Billiton Iron Ore Pty Ltd

### 1.3. Property details

Property: State Agreement Act, Mining Lease 244SA (AML 70/244)  
Local Government Area: Shire of East Pilbara  
Colloquial name: Jinayri Exploration Project

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
150		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	Clearing Description	Vegetation Condition	Comment
<p>The area applied to clear has been broadly mapped at a scale of 1:250000 as: Beard Vegetation Association 18: Low woodland; Mulga (<i>Acacia aneura</i>) and Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i> (GIS Database).</p> <p>ecologia Environment Pty Ltd (2006a) conducted a dual season vegetation and flora survey of the proposed clearing area in Spring 2005 and Summer 2006. The following 10 vegetation types were described from the survey area:</p> <p>1. Minor drainage channels: Isolated <i>Corymbia hamersleyana</i> over dense to moderately dense <i>Acacia tumida</i> var. <i>pilbarensis</i> / <i>A. monticola</i> / <i>Petalostylis labicheioides</i> / <i>Gossypium robinsonii</i> over <i>Triodia pungens</i> and/or <i>Themeda triandra</i>.</p> <p>2. Steep gully faces: Sparse <i>Eucalyptus ferriticola</i> subsp. <i>ferriticola</i> and <i>Ficus brachypoda</i> over sparse low shrubs over sparse <i>Eriachne mucronata</i>, <i>Triodia pungens</i> and <i>Themeda triandra</i>.</p> <p>3. Major creekline banks: Sparse <i>Eucalyptus camaldulensis</i> over open <i>Acacia citrinoviridis</i> / <i>A. pyrifolia</i> over mixed shrubs over open <i>Triodia pungens</i> and <i>Themeda triandra</i>.</p> <p>4. Major creekline outwash plains: Open <i>Corymbia hamersleyana</i> / <i>Eucalyptus leucophloia</i> / <i>E. xerothermica</i> over open to moderately dense tall shrubs <i>Petalostylis labicheioides</i> / <i>Gossypium robinsonii</i> / <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> / <i>Acacia tumida</i> var. <i>pilbarensis</i> over dense mixed grassland.</p> <p>5. Dense <i>Acacia aneura</i> / <i>Acacia catenula</i> forest over sparse shrubs and open to moderately</p>	<p>This clearing permit application is for a Purpose Permit to clear up to 150 hectares of native vegetation within a Purpose Permit boundary of approximately 5,555 hectares. The proposed clearing will allow the proponent to intensify mineral exploration activities in the Jinayri Project area, located approximately 60 kilometres north west of Newman (BHP, 2007a).</p> <p>Vegetation clearing is necessary to establish access tracks and drill pads for the exploration program which will consist of reverse circulation and diamond drilling (BHP, 2007a). Several hundred drill holes are planned, some of which will be placed on existing drill pads (BHP, 2007a).</p>	<p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)</p> <p>to</p> <p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)</p>	<p>The proposed clearing area has previously been disturbed by mineral exploration activities (BHP Billiton, 2007a). Mt Newman Mining Company drilled 35 percussion drill holes in the project area between 1970 and 1983 and BHP Billiton drilled 140 reverse circulation percussion holes in a 2006 exploration campaign (BHP Billiton, 2007a). Approximately 35 kilometres of track have been previously cleared in the project area to service these two exploration programs (BHP Billiton, 2007a). Based on these disturbances, it is estimated that approximately 17.4 hectares of land has previously been cleared in the project area (BHP Billiton, 2007a).</p> <p>Four introduced flora species were identified in the Jinayri project area by ecologia Environment Pty Ltd in 2006 (cited in BHP Billiton, 2007a). These were: Beggars Tick (<i>Bidens bipinnata</i>), Buffel Grass (<i>Cenchrus ciliaris</i>), Spiked Malvastrum (<i>Malvastrum americanum</i>) and Whorled Pigeon Grass (<i>Setaria verticillata</i>). Care must be taken to ensure that the proposed clearing (and subsequent drilling activities) do not spread or introduce the above listed weed species to non infested areas. The proponent will conduct all clearing and drilling activities in accordance with their Exploration Environmental Management Plan (BHP Billiton, 2007b). Key weed management actions outlined in this document include (BHP Billiton, 2007b):</p> <ul style="list-style-type: none"> <li>- Inspection and cleaning of all mobile machinery prior to being brought to the site, being moved from a 'weed risk' area to another site, or being removed from the site;</li> <li>- Inspections will be conducted of disturbed areas to monitor for the presence of weeds;</li> </ul>

dense *Triodia brizoides*.

6. Moderately dense to open *Acacia aneura* / *A. pruinocarpa* woodland over sparse shrubs dominated by *Eremophila forestii* subsp. *forestii* over open *Triodia pungens*.

7. Hill slopes and crests: Sparse *Eucalyptus leucophloia* / *Corymbia hamersleyana* over open *E. gamophylla* over sparse *Hakea chordophylla* / *Acacia arida* over open to moderately dense *Triodia basedowii*.

8. Hill crests: Sparse *Eucalyptus leucophloia* / *Corymbia deserticola* over open *Eucalyptus kingsmillii* over sparse shrubs over open to moderately dense *Triodia wiseana* / *T. basedowii*.

9. Hill slopes and crests: Scattered *Eucalyptus leucophloia* / *E. deserticola* over scattered *Hakea chordophylla* over sparse to open low shrubs dominated by *Gompholobium karijini*, *Dampiera candidans* and *Goodenia stobbsiana* over open to moderately dense *Triodia basedowii* / *Amphipogon sericeus*.

10. Lower Slopes: Scattered *Eucalyptus leucophloia* over sparse low shrubs *Sida pilbarensis* / *Dampiera candidans* / *Corchorus lasiocarpus* subsp. *lasiocarpus* over open *Triodia wiseana*.

- Should any potential weed species be identified, the BHP Billiton geologist shall record the location using GPS and photographs if possible and report immediately to the Environmental Section;

- Weed treatment will be undertaken where necessary. This will include herbicide spraying programs, follow up inspections and respraying if necessary.

Clearing Permit 2073/1 (granted on 25 October 2007) contains an administrative error that requires correcting. Condition 1 incorrectly states that "the Permit Holder must not clear more than 150 hectares of native vegetation within the area cross hatched yellow on attached Plan 2073/1". This condition needs to be altered to read "the Permit Holder must not clear more than 150 hectares of native vegetation. All clearing must be within the areas cross-hatched yellow or shaded red on attached Plan 2073/2". No further assessment against the 10 Clearing Principles is required to undertake this amendment.

### 3. Assessment of application against clearing principles

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

##### Comments

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

The proposed clearing area is located approximately 60 kilometres north west of Newman in the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Hamersley subregion is characterised by sedimentary ranges and plateaux, dissected by gorges (CALM, 2001). The climate is semi-desert tropical, with an average annual rainfall of approximately 300 millimetres (CALM, 2001). This is largely associated with summer cyclonic activity and thunderstorms, although winter rainfall is not uncommon (CALM, 2001). At a broad scale, vegetation can be described as Mulga low woodlands over bunch grasses on fine textured soils in valley floors and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2001). Subregional drainage flows into one of three major rivers, these being: Fortescue (to the north), Ashburton (to the south), or Robe (to the west) (CALM, 2001). Dominant land uses in the Hamersley subregion include grazing, unallocated crown land and crown reserves, native pastures, conservation, mining and urban (CALM, 2001). Rare features of the subregion include gorges of the Hamersley Ranges (particularly those within Karijini National Park), Palm Spring, Duck Creek and Themeda grasslands (CALM, 2001). Permanent spring systems such as Weeli Wolli are also listed for their importance as refugia (CALM, 2001).

The proposed clearing area forms part of the catchment for the Weeli Wolli Creek (located approximately 4.5 kilometres to the north west), but supports no springs or permanent watercourses or wetlands (BHP Billiton, 2007a).

Vegetation mapping within the proposed clearing area described 10 major vegetation types, eight of which are well represented in the east of the Pilbara bioregion (ecologia Environment Pty Ltd, 2006a). The remaining two vegetation types are more localised (ecologia Environment Pty Ltd, 2006a). The Newman land system covers a majority of the proposed clearing area and is characterised by landforms and vegetation types that are extensive and typical of much of the Pilbara, particularly the Hamersley Ranges (ecologia Environment Pty Ltd, 2006a). The Newman land system is well represented within the Hamersley subregion's main conservation estate ( Karijini National Park), therefore the landforms and vegetation types within the proposed clearing area are well represented within the Karijini National Park (ecologia Environment Pty Ltd, 2006a).

A dual season terrestrial vertebrate fauna survey of the proposed clearing area yielded a total of 142 species comprising 22 species of mammals (including four introduced mammals), 70 species of bird, 48 species of reptile and two amphibian species (ecologia Environment Pty Ltd, 2006b). The species richness is comparable with other surveys of similar size and scope which have been undertaken surrounding the project area (ecologia Environment Pty Ltd, 2006b). The number of bird species recorded within the proposed clearing area (70) would suggest that the area is species-rich in bird fauna, however this is to be expected in the Pilbara bioregion

where fauna are generally highly mobile and have a “boom or bust” life cycle (ecologia Environment Pty Ltd, 2006b). Post-cyclonic conditions during the 2nd phase of the fauna survey can also account for some unusual bird recordings (ecologia Environment Pty Ltd, 2006b). Similarly, the number of reptile species recorded (48) would suggest that the area is species-rich in reptiles. This finding is not unexpected given that the 1st phase of the fauna survey was conducted to coincide with peak reptile activity (ecologia Environment Pty Ltd, 2006b).

Previous mineral exploration activity within the proposed clearing area has resulted in some minor ground disturbance (BHP Billiton, 2007a), whilst four introduced flora species have been recorded within the area by ecologia Environment Pty Ltd (2006a). Based on the findings of the biological surveys undertaken within the proposed clearing area by ecologia Environment Pty Ltd (2006a; 2006b), it is unlikely that the proposed clearing area contains a higher level of biological diversity than undisturbed areas of vegetation in the local or regional area.

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

**Methodology** BHP Billiton (2007a).  
CALM (2001).  
ecologia Environment Pty Ltd (2006a).  
ecologia Environment Pty Ltd (2006b).  
GIS Database:  
- Interim Biogeographic Regionalisation for 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**

ecologia Environment Pty Ltd (2006b) conducted a Level 2 fauna survey of the proposed clearing area in accordance with the Environmental Protection Authority (EPA) Position Statement No. 3: '*Terrestrial Biological Surveys as an element of biodiversity protection*' (EPA, 2002) and Position Statement No. 56: '*Guidance for the Assessment of Environmental Factors - terrestrial fauna for Environmental Impact Assessment in Western Australia*' (EPA, 2004). Prior to undertaking a field survey, ecologia Environment Pty Ltd (2006b) conducted a desktop search in order to compile a list of species expected to occur in the project area. This involved a search of available databases and literature on fauna surveys undertaken in the local area. A dual season terrestrial vertebrate fauna survey of the proposed clearing area was undertaken by ecologia Environment Pty Ltd (2006b) between 17 - 31 October 2006 and 27 March - 5 April 2007. A variety of systematic and non-systematic sampling techniques were employed during the survey. These included (ecologia Environment Pty Ltd, 2006b):

- cage trapping (216 trap nights);
- pit traps (1,080 trap nights);
- funnel traps (1,062 trap nights);
- elliot traps (2,160 trap nights);
- bird censusing (2,400 minutes);
- opportunistic searching (3,755 minutes);
- bat recording (995 minutes); and
- night searching (1,990 minutes).

Six sites were selected for the fauna survey, representing a broad cross-section of the habitat types within the proposed clearing area. These included (ecologia Environment Pty Ltd, 2006b):

- ridge top and scree slope;
- minor drainage gully;
- stony plain with mulga and eucalypts over spinifex mounds;
- alluvial plain supporting mulga woodland;
- rocky scree slope supporting mulga and spinifex; and
- mesa top supporting open snappy gum woodland over spinifex.

A total of 142 species were recorded from the fauna survey, comprising 22 species of mammals (including four introduced mammals), 70 species of bird, 48 species of reptile and two amphibian species (ecologia Environment Pty Ltd, 2006b). The total of 142 species included two bird species listed under Schedule 1 of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* as 'Migratory' and 'Marine' (ecologia Environment Pty Ltd, 2006b). These were the Rainbow-bee Eater (*Merops ornatus*) and the Fork-tailed Swift (*Apus pacificus*). No species listed as rare or endangered under the *Wildlife Conservation Act 1950* were recorded (ecologia Environment Pty Ltd, 2006b). Three species listed on the Department of Environment and Conservation (DEC) Priority Fauna list were also included in the total number of species recorded. These were: Australian Bustard (*Ardeotis australis*), Western Pebble-mound Mouse (*Pseudomys chapmani*) and Ghost bat (*Macroderma gigas*).

The Rainbow Bee-eater was recorded in the riverine and alluvial plains sites during the fauna survey (ecologia Environment Pty Ltd, 2006b). Soils in the proposed clearing area are likely to be stony, red shallow loams and

some red shallow sands (DAWA, 2004) which could possibly be used by the Rainbow Bee-eater for nesting. Given the broad habitat requirements of this species, and the fact that it is a migrant commonly occurring throughout the Pilbara, the proposed clearing is not likely to have a significant impact upon this species (ecologia Environment Pty Ltd, 2006b).

The Fork-tailed Swift is largely an aerial species (ecologia Environment Pty Ltd, 2006b). The proposed land clearing is not likely to have a significant impact upon the Fork-tailed Swift.

The Australian Bustard is a wide ranging, nomadic species which moves in response to the availability of food (ecologia Environment Pty Ltd, 2006b). This species is known to utilise a range of different habitats and is likely to evacuate the proposed clearing area at the onset of disturbance (ecologia Environment Pty Ltd, 2006b). Whilst the proposed clearing is likely to result in the local displacement of the Australian Bustard, individual mortality is unlikely (ecologia Environment Pty Ltd, 2006b). The proposed clearing is not expected to result in the loss of significant habitat for this species.

Thirteen mounds (burrow systems) of the Western Pebble-mound Mouse were recorded on rocky scree slopes, stony plains and ridge tops within the proposed clearing area (ecologia Environment Pty Ltd, 2006b). Based on survey intensity, it is likely that countless mounds are present throughout the proposed clearing area. Given that this species has been recorded at numerous locations throughout the Pilbara, it is unlikely that the proposed clearing will result in a loss of significant habitat at the subregional or bioregional level (ecologia Environment Pty Ltd, 2006b). However, habitat within the proposed clearing area may be considered locally significant. Care should be taken to avoid direct impact to mounds (both active and inactive) as this will reduce mortality of the Western Pebble-mound Mouse during clearing operations and will also ensure that mounds are preserved to provide possible shelter habitats at a later date (ecologia Environment Pty Ltd, 2006b). GPS locations of Western Pebble-mound Mouse burrows were recorded during the terrestrial vertebrate fauna survey of the project area, and will be used by BHP Billiton to demarcate mounds on the ground to prevent unnecessary disturbance (BHP Billiton, 2007a). Exploration activities will avoid mounds wherever possible, and a program-specific environmental induction will educate crew members of the importance of preserving these mounds (BHP Billiton, 2007a).

The Ghost Bat was recorded opportunistically in a gorge near site 6 (mesa top supporting open snappy gum woodland over spinifex) within the survey area (ecologia Environment Pty Ltd, 2006b). Survey site 6 is located approximately 200 - 300 metres from the proposed drilling program (BHP Billiton, 2007a). In the Pilbara, Ghost bats are known to roost in caves beneath bluffs of low rounded hills (Ecologia Environment Pty Ltd, 2006b). Whilst no caves suitable as roosting habitat were located within the proposed clearing area, it is likely that suitable roosting habitat is present nearby (or possibly within the proposed clearing area), as Ghost bats are thought not to venture more than two kilometres from their roost (Tidemann et al., 1985 cited in ecologia Environment Pty Ltd, 2006b). Should the proposed clearing (and subsequent drilling) operations disturb a roost site, Ghost bats may vacate the roost and face mortality if another suitable roosting site is not found (ecologia Environment Pty Ltd, 2006b). This may lead to local extinction of the Ghost Bat if there are no other roosts in the surrounding area (ecologia Environment Pty Ltd, 2006b). For these reasons, the Ghost Bat must be treated as of local and regional conservation significance until further information is known about the location of roosting sites in the proposed clearing area (ecologia Environment Pty Ltd, 2006b).

Landforms described by ecologia Environment Pty Ltd (2006b) as being compatible as roosting habitat for the Ghost Bat do not occur within two kilometres of the proposed drilling program (BHP Billiton, 2007a). BHP Billiton (2007a) are aware of the significance of the Ghost Bat and are currently conducting a genetic variation study to better understand the potential impacts of mining and associated impacts upon the Ghost Bat. At Cattle Gorge (a BHP mining operation in the Pilbara) BHP Billiton operate a mine within 500 metres of known Ghost Bat habitat. Monitoring has taken place over the last two years and is reported to the DEC as part of mine approval conditions (BHP Billiton, 2007a). To date, bat numbers have not been impacted by the mining operations. BHP Billiton (2007a) will continue to conduct specific research into the management of the Ghost Bat and seek external advice to determine the status of caves in relation to them being roost sites or otherwise. Given that the location of the roost site within the proposed clearing area or its surrounds is not known, it is not possible to quantify the impacts that the proposed clearing may have upon the Ghost Bat. However, it should be reiterated that monitoring results at BHP Billiton's Cattle Gorge mine site have suggested that mining within 500 metres of known Ghost Bat habitat has not impacted upon bat numbers to date. It is also pertinent to point out that the proposed clearing is not contiguous and low impact mineral exploration activities are proposed for the site.

An undescribed species of Planigale (*Planigale sp.*) was recorded within the proposed clearing area by ecologia Environment Pty Ltd (2006b). Whilst poorly described, this species is not necessarily rare and is in fact represented by 141 specimen records in Western Australian Museum collections (Western Australian Museum, 2003). Similarly, several individuals of a new species of varanid lizard (*Varanus sp. aff. gilleni/caudolineatus*) currently being described by the Western Australian Museum were also recorded within the proposed clearing area (ecologia Environment Pty Ltd, 2006b). Both of these undescribed species have been recorded in previous biological surveys commissioned by BHP Billiton in the Pilbara (BHP Billiton, 2007a). For instance, both species were recorded in the 'Area C: Deposits D, E and F Biological Survey' (ecologia Environment Pty Ltd, 2004). *Planigale sp.* has also been listed in the 'Jumblebar Marra Mamba Biological Survey' (ecologia Environment Pty Ltd, 2006c), whilst *Varanus sp. aff. gilleni/caudolineatus* was recorded in the 'Mining Area C Biological Survey' in 1998 (ecologia Environment Pty Ltd, 1998). Therefore whilst these two species are poorly described, they are not restricted to the proposed clearing area. Notwithstanding this, habitat within the proposed clearing area may

be considered locally significant for these two species.

A red variant of the skink species complex *Cryptoblepharus* (*C. plagiocephalus* aff. *carnabyi*) was recorded at survey site 2 within the proposed clearing area, and also opportunistically in areas that are more than one kilometre from the proposed clearing (BHP Billiton, 2007a). There is no information at hand which suggests that *Cryptoblepharus plagiocephalus* aff. *carnabyi* has been recorded in previous surveys (BHP Billiton, 2007a). The proposed clearing area may therefore be representative of significant habitat for this species. However, until further information is known about this species, the proponent has committed to establishing a 200 metre buffer around survey site 2 where no clearing or drilling activities will be undertaken (BHP Billiton, 2007a).

A number of other conservation significant fauna species have been listed by ecologia Environment Pty Ltd (2006b) as potentially occurring within the proposed clearing area based on habitat preferences and known distributions. Such species include: Orange Leaf-nosed Bat (*Rhinonictis aurantius*) and Pilbara Olive Python (*Liasis olivaceus barroni*) (both listed under Schedule 1 of the *EPBC Act 1999* as 'Vulnerable' and Schedule 1 'Fauna that is rare or likely to become extinct', *Wildlife Conservation (Specially Protected Fauna) Notice 2006*); Peregrine Falcon (*Falco peregrinus*) (listed as Schedule 4 'Other specially protected fauna' under the *Wildlife Conservation Act 1950*), Great Egret (*Ardea alba*) and Cattle Egret (*Ardea ibis*) (both listed as 'Marine' under Schedule 1 of the *EPBC Act 1999*) and the Oriental Plover (*Charadrius veredus*) (listed as 'Migratory' and 'Marine' under Schedule 1 of the *EPBC Act 1999*).

ecologia Environment Pty Ltd (2006b) note that the proposed clearing area is largely made up of the Newman land system (one of the largest land systems in the Pilbara and the most dominant of the Hamersley Ranges). Landforms, soils, vegetation and drainage patterns within the proposed clearing area are therefore well represented elsewhere in the Pilbara and across the Hamersley Ranges (ecologia Environment Pty Ltd, 2006b). However, the vegetation in the proposed clearing area may be considered locally significant for the Ghost Bat, Western Pebble-mound Mouse, *Planigale* sp., *Varanus* sp. aff. *gilleni/caudolineatus* and *Cryptoblepharus plagiocephalus* aff. *carnabyi*.

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

**Methodology** BHP Billiton (2007a).  
DAWA (2004).  
ecologia Environment Pty Ltd (1998).  
ecologia Environment Pty Ltd (2004).  
ecologia Environment Pty Ltd (2006b).  
ecologia Environment Pty Ltd (2006c).  
EPA (2002).  
EPA (2004).  
Western Australian Museum (2003).

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

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

There are no known records of Declared Rare Flora within the proposed clearing area (GIS Database). ecologia Environment Pty Ltd undertook a two-phase flora and vegetation survey of the proposed clearing area in Spring 2005 and early 2006 and did not locate any DRF species (ecologia Environment Pty Ltd, 2006a). The nearest known record of DRF to the proposed clearing area is a population of *Lepidium catapycnon*, located approximately 6.5 kilometres north west (GIS Database). It is therefore unlikely that the proposed clearing will impact upon any DRF species.

One Priority 3 species, *Abutilon trudgenii*, was recorded within the proposed clearing area by ecologia Environment Pty Ltd (2006a). *Abutilon trudgenii* is a low shrub that is known to occur in recently burnt areas and has been recorded at several sites throughout the Pilbara (BHP Billiton, 2007a). It must be stated that this Priority species was recorded outside of the proposed 150 hectare disturbance footprint for this clearing permit application (BHP Billiton, 2007a). It is therefore unlikely that any individual plants of this Priority species will be removed during the clearing operations.

A targeted survey to reconcile the survey recordings of *Abutilon trudgenii* will be conducted by BHP Billiton environmental staff, and a further search for additional *Abutilon trudgenii* plants will be conducted to determine the extent of the population (BHP Billiton, 2007a).

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

**Methodology** BHP Billiton (2007a).  
ecologia Environment Pty Ltd (2006a).  
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 is not likely to be at variance to this Principle**

There are no known Threatened Ecological Communities (TECs) within the proposed clearing area (GIS Database). The Coolibah-Lignum Flats and West-Angelas Cracking Clays TECs both occur approximately 25 kilometres west of the proposed clearing area, however given this distance it is expected that they will not be impacted by the proposed clearing (BHP Billiton, 2007a).

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

**Methodology** BHP Billiton (2007a).  
GIS Database:  
- Threatened Ecological Communities - CALM 12/04/05.

**(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 area applied to clear is within the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara bioregion (GIS Database). According to Shepherd et al (2001) there is approximately 99.9% of the pre-European vegetation remaining in the Pilbara bioregion. The vegetation of the application area is classified as Beard Vegetation Association 18: Low woodland; Mulga (*Acacia aneura*) and Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database). There is approximately 100% of the pre-European vegetation remaining of both Beard Vegetation Associations 18 and 82 in the Pilbara bioregion (Shepherd et al, 2001). Beard Vegetation Associations 18 and 82 are both represented in conservation reserves within the Pilbara bioregion (16.8 and 10.2% of the pre-European vegetation extent respectively), and the area proposed to clear does not represent a significant remnant of vegetation in the wider regional area. The proposed clearing will not reduce the extent of Beard Vegetation Associations 18 or 82 below current recognised threshold levels, below which species loss increases significantly.

	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					
18	19,892,437	19,890,348	~100	least concern	2.1
82	2,565,930	2,565,930	100	least concern	10.2
Beard veg assoc. – Bioregion					
18	676,561	676,561	100	least concern	16.8
82	2,563,610	2,563,610	100	least concern	10.2

\* Shepherd et al. (2001) updated 2005

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

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 Databases:  
- 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**

There are no permanent watercourses or wetlands within the proposed clearing area (GIS Database; BHP Billiton, 2007a). Numerous ephemeral drainage lines run off the plateau on which the clearing is proposed, feeding larger drainage systems in the valley floor (BHP Billiton, 2007a).

Of the 10 major vegetation types identified within the Jinayri survey area, three are described as being associated with watercourses:

1. Minor drainage channels: Isolated *Corymbia hamersleyana* over dense to moderately dense *Acacia tumida* var. *pilbarensis* / *A. monticola* / *Petalostylis labicheioides* / *Gossypium robinsonii* over *Triodia pungens* and/or *Themeda triandra*;

2. Major creekline banks: Sparse *Eucalyptus camaldulensis* over open *Acacia citrinoviridis* / *A. pyrifolia* over mixed shrubs over open *Triodia pungens* and *Themeda triandra*; and

3. Major creekline outwash plains: Open *Corymbia hamersleyana* / *Eucalyptus leucophloia* / *E. xerothermica* over open to moderately dense tall shrubs *Petalostylis labicheioides* / *Gossypium robinsonii* / *Grevillea wickhamii* subsp. *hispidula* / *Acacia tumida* var. *pilbarensis* over dense mixed grassland.

The proposed clearing area (and its watercourses) are part of the Weeli Wolli Creek Catchment (BHP, 2007a). Given that Weeli Wolli Creek is listed by CALM (2001) as a wetland of subregional significance and refugia for the Hamersley subregion, the watercourses in the proposed clearing area may be considered environmentally significant.

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

However, BHP Billiton will not undertake drilling activities in any major drainage channels and wherever practicable will not encroach within 10 metres of drainage lines that may be considered significant in relation to local and/or regional surface water flow (BHP Billiton, 2007a).

**Methodology** BHP Billiton (2007a).  
CALM (2001).  
GIS Database:  
- Hydrography, linear - DOE 01/02/04.

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

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

Land system mapping by the Department of Agriculture Western Australia (DAWA) shows that the proposed clearing area falls largely within the Newman land system, with smaller areas being mapped as the Platform and Boolgeeda land systems (GIS Database).

The Newman land system is comprised of four land units. These are (DAWA, 2004):

- plateau, ridge, mountain and hill;
- lower slope;
- stony plain; and
- narrow drainage floor with channel.

All of the proposed clearing activities are located on the top of a low relief plateau (BHP Billiton, 2007a). Soils in this area are likely to be stony, red shallow loams and some red shallow sands (DAWA, 2004). Following vegetation removal, soils in the proposed clearing area will be exposed to the erosive forces of intense summer rainfall events associated with cyclonic activity.

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

However, the implementation of appropriate management measures will minimise land degradation risks such as soil erosion and sedimentation. Management measures outlined by the proponent include (BHP Billiton, 2007a; 2007b):

- vegetation clearance will be kept to a necessary minimum. This includes using existing tracks wherever possible, restricting tracks to a maximum width of four metres and drill pads to a maximum size of 400 square metres;
- access tracks will be constructed using a raised blade technique wherever possible to minimise dust generation and disturbance to topsoil; and
- sediment traps/sumps will be constructed in areas assessed as high risk in relation to erosion and sedimentation release to the environment beyond disturbed areas.

**Methodology** BHP Billiton (2007a).  
DAWA (2004).  
GIS Database:  
- Rangeland Land System Mapping - DA.

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

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

There are no conservation reserves in close proximity to the proposed clearing area (GIS Database). The nearest conservation reserve is the Karijini National Park, located approximately 70 kilometres north west (BHP Billiton, 2007a).

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

**Methodology BHP Billiton (2007a).**

GIS Database:

- CALM Managed Lands and Waters - CALM 01/07/05.

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

The proposed clearing is not located within a Public Drinking Water Source Area (GIS Database). Groundwater levels or quality are not likely to be significantly altered by the proposed vegetation removal which will consist of discrete drill pads and access tracks (BHP Billiton, 2007a).

There are no perennial watercourses in the proposed clearing area (BHP Billiton, 2007a). Numerous minor drainage lines run off the plateau on which the clearing is proposed, feeding larger drainage systems in the valley floor (BHP Billiton, 2007a).

The proposed clearing area is located in the Weeli Wolli Creek catchment area (BHP Billiton, 2007a). The Weeli Wolli Creek is located approximately 4.5 kilometres to the north west of the proposed clearing area (GIS Database) and maintains surface water flows for several months following significant rainfall, and has a large flowing permanent spring (BHP Billiton, 2007a; 2007b). Care must be taken to ensure that the proposed clearing (and subsequent drilling operations) do not increase sedimentation, pollution or turbidity of minor drainage systems feeding into the Weeli Wolli Creek. Based on the above, the proposed clearing may be at variance to this Principle.

To ensure that the proposed clearing (and subsequent drilling) operations do not have a significant impact on the water quality of the Weeli Wolli Creek or its catchment, BHP (2007a) will not undertake drilling activities in any major drainage channels and wherever practicable will not encroach within 10 metres of drainage lines that may be considered significant in relation to local and/or regional surface water flow (BHP Billiton, 2007a). Furthermore, sediment traps/sumps will be constructed in areas assessed as high risk in relation to erosion and sedimentation release to the environment beyond disturbed areas (BHP Billiton, 2007a).

**Methodology BHP Billiton (2007a).**

BHP Billiton (2007b).

GIS Database:

- Hydrography, linear - DOE 01/02/04.

- Public Drinking Water Source Areas (PDWSAs) - DOE 28/04/05.

**(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 average annual rainfall of Newman is 310 millimetres (BHP Billiton, 2007a). Average annual evaporation exceeds rainfall by as much as 500 millimetres per year (BHP Billiton, 2007a). Rainfall in the Pilbara is highly erratic and variable, with intense rainfall events typically associated with thunderstorms and cyclonic activity (BHP Billiton, 2007a). Localised flooding is known to occur following intense rainfall events, however the incidence or intensity of flooding is not likely to be significantly influenced by the proposed vegetation clearing. Furthermore, the proposed clearing is planned to take place on a low relief plateau which forms part of the Hamersley Ranges (BHP Billiton, 2007a). Rainfall in the area is therefore likely to run off into the broad valleys and drainage systems lower in the landscape.

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

**Methodology BHP Billiton (2007a).**



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

### Comments

There is one native title claim over the area under application (GIS Database). This claim (WC05/006) has been registered with the National Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

The proponent is committed to the management and protection of Aboriginal heritage sites (BHP Billiton, 2005). BHP Billiton has a heritage protocol agreement with the Nyiyaparli people (traditional owners of the area), and regularly consult with the Nyiyaparli people to undertake Aboriginal heritage surveys in and around Newman (BHP Billiton, 2006a). BHP Billiton also has an internal process; the Project Environment and Aboriginal Heritage Review (PEAHR), which is designed to prevent inadvertent disturbance of Aboriginal heritage sites within BHP Billiton operations. Prior to the commencement of any land disturbance activity, a PEAHR must be completed and submitted to BHP Billiton's Aboriginal Affairs Department, for assessment. All land disturbance activities must be approved by BHP Billiton's Environment and Aboriginal Heritage staff (BHP Billiton, 2005).

There are 11 registered Sites of Aboriginal Significance (Site ID: 7358, 7315, 7306, 7307, 7308, 7309, 7310, 7311, 7312, 7313, 7314) 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. The assessing officer (DoIR) considers that the systems in place will ensure that no sites are disturbed illegally, or without consultation with local Aboriginal organisations.

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.

Clearing Permit 2073/1 (granted on 25 October 2007) contains an administrative error that requires correcting. Condition 1 incorrectly states that *"the Permit Holder must not clear more than 150 hectares of native vegetation within the area cross hatched yellow on attached Plan 2073/1"*. This condition needs to be altered to read *"the Permit Holder must not clear more than 150 hectares of native vegetation. All clearing must be within the areas cross-hatched yellow or shaded red on attached Plan 2073/2"*. No further assessment against the 10 Clearing Principles is required to undertake this amendment.

**Methodology** BHP Billiton (2005).  
GIS Databases:  
- Aboriginal Sites of Significance - DIA 04/07/02.  
- Native Title Claims - DLI 19/12/04.

## 4. Assessor's comments

Purpose	Method	Applied area (ha)/ trees	Comment
Mineral Exploration	Mechanical Removal	150	The clearing Principles have been addressed and the proposed clearing is at variance to Principle (f), may be at variance to Principle (a), (b), (g) and (i), is not likely to be at variance to Principle (a), (b), (c), (d), (h) or (j), and is not at variance to Principle (e).  It is recommended that conditions be imposed on the permit for the purposes of weed management, surface water management and erosion control, rehabilitation, protection of poorly described fauna and permit reporting.

## 5. References

- BHP Billiton (2005) Aboriginal Heritage Induction Handbook. BHP Billiton Iron Ore Pty Ltd, Western Australia.
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- BHP Billiton (2007b) Exploration Environmental Management Plan, Version 1.
- CALM (2001) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Pilbara 3(PIL 3 - Hamersley subregion).
- Department of Agriculture Western Australia (2004) Technical Bulletin No. 92: An inventory and condition survey of the Pilbara region, Western Australia. South Perth, Western Australia.
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- ecologia Environment Pty Ltd (1998) Mining Area C Biological Survey. Unpublished report commissioned by BHP Iron Ore Pty Ltd. Perth, Western Australia.
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- ecologia Environment Pty Ltd (2006b) Jirridi Terrestrial Vertebrate Fauna Survey. Unpublished report for BHP Billiton Iron Ore Pty Ltd. Perth, Western Australia.
- ecologia Environment Pty Ltd (2006c) Jimblebar Marra Mamba Exploration Biological Survey. Unpublished report for BHP Billiton Iron Ore Pty Ltd. Perth, Western Australia.
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- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
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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} :-

<b>P1</b>	<b>Priority One - Poorly Known taxa:</b> 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.
<b>P2</b>	<b>Priority Two - Poorly Known taxa:</b> 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.
<b>P3</b>	<b>Priority Three - Poorly Known taxa:</b> 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.
<b>P4</b>	<b>Priority Four – Rare taxa:</b> 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.
<b>R</b>	<b>Declared Rare Flora – Extant taxa</b> (= <i>Threatened Flora</i> = <i>Endangered</i> + <i>Vulnerable</i> ): 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.