



1. Application details

1.1. Permit application details

Permit application No.: 2230/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: Iron Ore (Hamersley Range) Agreement Act 1963
Mineral Lease 246SA
Local Government Area: Shire Of Ashburton
Colloquial name: 10 East Waste Dump Rehabilitation – Paraburdoo

1.4. Application

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

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>Vegetation within the application area has been mapped at a 1:250,000 scale as the following Beard vegetation associations.</p> <ul style="list-style-type: none"> - 181: Shrublands; mulga & snakewood scrub. - 82: Hummock grasslands, shrub steppe; <i>Grevillea refracta</i> & hakea over soft spinifex. <p>The vegetation within the application area was surveyed by botanists from Pilbara Iron on 17 September 2004. Although the flora and vegetation survey searched for the presence of Declared Rare Flora and Priority Flora species, the vegetation communities were not identified or described for the application area.</p> <p>A flora and vegetation survey of an area immediately adjacent to application area was undertaken on 2 August 2007 (Keith Lindbeck and Associates, 2007). The vegetation communities within the application area for this area permit application are likely to be similar to the vegetation communities that have been identified and described within the adjacent area.</p> <p>The Assessing Officer has taken into consideration flora species lists and site photographs submitted with the clearing permit application. The vegetation communities within the application area are likely to include:</p> <ol style="list-style-type: none"> 1) Rocky Hillside with scattered trees and shrubs (RH) - <i>Acacia aneura</i>, <i>A. marramamba</i>, <i>A. tetragonophylla</i> over <i>Triodia pungens</i>, <i>Eriachne mucronata</i>, <i>Eremophila fraseri</i>, <i>E. latrobei</i>, <i>Grevillea berryana</i> and <i>Hibiscus coatesii</i>. 2) Lower Slopes with low open woodland and spinifex grassland (LS) - <i>Acacia aneura</i>, <i>A. pruinocarpa</i>, and <i>A. tetragonophylla</i> over <i>Triodia pungens</i> and <i>Marieana melanocoma</i>. 3) Grove 1: Densely vegetated drainage line dissecting LS (G1) - <i>Acacia wanyu</i>, <i>A. aneura</i> and <i>A. pruinocarpa</i> over <i>Marieana melanocoma</i> and <i>Ptilotus obovatus</i> and <i>Tribulus suberosus</i>. 4) Mulga Plains with sparse understorey (MP) - <i>Acacia</i> 	<p>Hamersley Iron Pty Ltd has applied to clear 10.6 hectares of native vegetation for the rehabilitation of the 10 East Waste Dump at the Paraburdoo mine site. The proposed clearing will allow for the reforming of the waste dump in order to facilitate rehabilitation. Vegetation will be cleared by a bulldozer with its blade down, and vegetation and topsoil will be collected and stockpiled for future rehabilitation (Hamersley Iron, 2008).</p>	<p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).</p>	<p>The application area for this area permit application (2230/1) is located immediately adjacent to the clearing permit boundary area for clearing permit 2205/1 (issued by the Department of Industry and Resources on 21 February 2008). A flora and vegetation survey over the clearing permit boundary for clearing permit 2205/1 was undertaken on 2 August 2007. A small eastern-portion of the application area for this area permit application (2230/1) was included in the survey.</p> <p>Vascular flora species lists compiled by Pilbara Iron (2004) and site photographs of the application area indicate similarities in the vegetation types between the two areas. Due to the close proximity of the application area (for this permit - 2230/1) to the area which has been previously surveyed for clearing permit 2205/1, it is considered likely that the vegetation communities within the application area would be regarded as representative of the vegetation communities that have been identified and described within the adjacent area.</p> <p>Vegetation condition was assessed by photographs</p>

aneura and *A. tetragonophylla* over sparsely populated *Maireana villosa* and *Senna glutinosa*.

5) Stony Plains (SP) - *Acacia aneura*, *A. rhodophloia*, *A. tetragonophylla*, *A. wanyu*, *Enneapogon polyphyllus* and *Eremophila cuneifolia* over a thin scattering of *Aristida contorta*.

6) Regrowth Areas (RA) - *Acacia aneura* and *A. synchronicia* low open forest with open heath over open tussock grassland.

and survey information provided by Hamersley Iron (2008) and Keith Lindbeck and Associates (2007).

3. Assessment of application against clearing principles

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

Comments **Proposal is not likely to 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). 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 vegetation of the application area consists of two vegetation associations (Beard Vegetation Associations 82 and 181), both of which are common and widespread throughout this region, with approximately 100% of the pre-European vegetation remaining (Shepherd et al., 2001).

The application area is situated within the Paraburdoo mine site which has been significantly degraded by past and present mining activities. The application area adjoins the Paraburdoo 10 East waste dump. The flora and vegetation survey by botanists from Pilbara Iron recorded a total of 87 flora species from 30 families and 45 genera. Two weed species, Ruby Dock (*Acetosa vesicaria*) and Kapok Bush (*Aerva javanica*), were located on disturbed areas (Keith Lindbeck and Associates, 2007a).

Photographs of the application area show the vegetation condition to be good with slight impacts from mining activities impacting on vegetation growth. The vegetation communities within the application area are not likely to be considered as rare, geographically restricted or of significant conservation value (Keith Lindbeck and Associates, 2007a; Keith Lindbeck and Associates, 2007b). The vegetation communities and potential fauna habitats within the application area are likely to be considered as common within the Pilbara region, and are unlikely to be of higher biodiversity than the surrounding areas. The proposed clearing is unlikely to have a significant impact on the biological diversity of the region, or comprise of a high level of biological diversity.

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

Methodology Keith Lindbeck and Associates (2007a)
Keith Lindbeck and Associates (2007b)
Kendrick (2001)
Shepherd et al. (2001)
GIS Database:
- Interim Biogeographic Regionalisation of Australia

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

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

A rare and priority fauna search from the Department of Environment and Conservation Threatened Fauna Database was undertaken for the Tom Price region that included the application area (Keith Lindbeck and Associates, 2007a). A search was conducted using the Department of Environment and Water Resources' Protected Matters Search Tool to identify species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* which may potentially occur within the application area (Keith Lindbeck and Associates, 2007a). The review concluded that seven species of conservation significance could potentially occur within the application area (Keith Lindbeck and Associates, 2007a). These include:

- Orange Leaf-nosed Bat (*Rhinioncteris aurantius*), listed under Schedule 1 (Fauna that is rare or is likely to become extinct) of the Wildlife Conservation (Specially Protected Fauna) Notice 2006.
- Pilbara Olive Python (*Liasis olivaceus barroni*), listed under Schedule 1 (Fauna that is rare or is likely to become extinct) of the Wildlife Conservation (Specially Protected Fauna) Notice 2006.
- Peregrine Falcon (*Falco peregrinus*), listed under Schedule 4 (Other specially protected fauna) of the Wildlife Conservation (Specially Protected Fauna) Notice 2006.
- Western Pebble-mound Mouse (*Pseudomys chapmani*), Priority 4 on the Department of Environment and Conservation (DEC) Priority Fauna List.
- Lakeland Downs Mouse (*Leggadina lakedownensis*), Priority 4 on the DEC Priority Fauna List.
- Ghost Bat (*Macroderma gigas*), Priority 4 on the DEC Priority Fauna List, and;

- Australian Bustard (*Ardeotis australis*), Priority 4 on the DEC Priority Fauna List (Keith Lindbeck and Associates, 2007a).

The Orange Leaf-nosed Bat is known to prefer warm humid caves for roosting, although some have been found in tree hollows. Foraging habitats include grasslands, open woodlands, savannah woodlands and spinifex covered hills, although habitat use may be influenced by roost availability (Australian Museum Online 2007; EPA (Qld), 2006). The species is known from less than 10 localities in the Pilbara and from one locality in the Gascoyne. No natural colony sites are known from the Pilbara (Environment Australia, 1999). Known colonies in the Pilbara occupy abandoned, deep and partially flooded mines that trap pockets of warm, humid air in the mines constant temperature zone (Environment Australia, 1999). The application area appears to lack the presence of caves or hollows which provide suitable roosting habitat for this species and as a result, the species is unlikely to inhabit the area (Keith Lindbeck and Associates, 2007a). It is unlikely that the vegetation within the application area would be regarded as significant habitat for this species.

The Pilbara Olive Python is known to occur throughout the Hamersley and Chichester Ranges, parts of the East Pilbara and the Barlee Range Nature Reserve. It is known to inhabit rocky areas near waterholes with caves, overhang ledges and crevasses that provide shelter (Keith Lindbeck and Associates, 2007b). The application area is devoid of rocky shelters, caves, ledges and vegetated waterholes (GIS Database; Keith Lindbeck and Associates, 2007a). It is unlikely that the vegetation within the application area will provide suitable habitat for the Pilbara Olive Python. The proposed clearing is unlikely to impact on significant habitat for this species.

The Peregrine Falcon has a ubiquitous distribution throughout mainland Australia and inhabits a wide range of habitats including forest, woodlands, wetlands and open country (Keith Lindbeck and Associates, 2007b). Kendrick (2001) states in the biodiversity audit of the Pilbara 3 - Hamersley subregion that the Peregrine Falcon is an uncommon resident, with very little data available regarding the species apart from occasional sightings. Given the widespread habitat and distribution of the Peregrine Falcon, the proposed clearing is unlikely to impact on significant habitat for this species.

The Western Pebble-mound Mouse is relatively widespread and abundant throughout much of the Pilbara 3 subregion, and parts of the Gascoyne (Kendrick, 2001; Keith Lindbeck and Associates, 2007b). The species occurs on spinifex covered, gentle colluvial slopes with pebbles of size (approximately 70 grams) suitable for the transport and construction of pebble mounds (Keith Lindbeck and Associates, 2007b). Within the application area, there appears to be a lack of undulating spinifex covered lower slopes with a pebble mantle that would provide significant habitat for the Western Pebble-mound mouse. It is unlikely that the vegetation proposed to be cleared would be regarded as significant habitat for this species.

The Lakeland Downs Mouse is distributed across the Pilbara and Kimberley regions of Western Australia, and is known to occur on sandy soils and cracking clays that support grasslands (Keith Lindbeck and Associates, 2007b; Biota, 2004b). The soils within the application area appear to consist of stony surfaces and mantles which are unlikely to provide suitable habitat for this species (Payne et al., 1988). The proposed clearing is unlikely to impact on significant habitat for the Lakeland Down Mouse.

The Ghost Bat is known to show preference for large, deep caves, crevices and old underground mining workings (Australian Museum Online, 2008; Keith Lindbeck and Associates, 2007b). The application area lacks the presence of caves, crevices or mine shafts which may provide suitable roosting habitat for this species and as a result, the species is unlikely to inhabit the area. One of the main conservation threats to the Ghost Bat is the loss of feeding habitat by clearing. 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, 2008). The vegetation under application adjoins an operational waste dump and as a result has been impacted on by mining activities. Similar and higher quality vegetation types are widespread throughout the surrounding region. The proposed clearing is unlikely to significantly impact on habitat for the Ghost Bat.

The Australian Bustard is known to occur within open rangeland habitats such as Triodia hummock grassland, grassy woodland, sandplains with spinifex, chenopod flats and low shrublands (Johnstone and Storr, 1998). During their breeding season the species can show preference for open grassland areas which border protective shrubland or woodlands (Australian Wildlife Conservancy, 2008). 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). Descriptions of the vegetation types within the application area demonstrate that the majority of the vegetation types consist of Acacia open woodlands over Triodia and Tussock grasslands. It is possible that the application area may provide suitable habitat for the Australian Bustard. However, the vegetation type within the application is likely to be common and widespread throughout the Pilbara and not restricted to the application area (Shepherd et al., 2001; Payne et al., 1988). Given the nomadic nature of the species and its ability to cover long distances, the proposed clearing is unlikely to impact on significant habitat for the Australian Bustard.

A number of migratory bird species that are protected under the CAMBA and JAMBA treaties (China and Japan/ Australia Migratory Bird Agreements) may potentially occur within the application area. These include the Rainbow Bee-eater (*Merops ornatus*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*), Oriental Plover (*Charadrius veredus*) and Fork-tailed Swift (*Apus pacificus*). All of these species may utilise the habitat within and adjoining the application area, for nesting or foraging, at different times throughout the year. The habitat types that occur within the application area are not restricted to the application area and there is a widespread

distribution of similar, and for some species more suitable, habitat types throughout the Pilbara region. The proposed clearing is unlikely to impact on significant habitat required for the existence of these migratory species.

The vegetation applied to clear adjoins an existing waste dump. The vegetation communities within the application area are considered as being common within the Pilbara region and there are no landscape or vegetation features such as caves, ledges, hollows or waterholes that would provide significant habitat for fauna indigenous to Western Australia (Keith Lindbeck and Associates; 2007a; Shepherd et al 2001). The proposed clearing is unlikely to impact on significant habitat for fauna indigenous to Western Australia.

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

Methodology Australian Museum Online (2007)
Australian Wildlife Conservancy (2008)
Biota (2004b)
Department of Environment and Climate Change NSW (2008)
EPA (Qld) (2006)
Environment Australia (1999)
Johnstone and Storr (1998)
Keith Lindbeck and Associates (2007a)
Keith Lindbeck and Associates (2007b)
Kendrick (2001)
Payne et al. (1998)
Shepherd et al. (2001)
GIS Database:
- Hydrography, linear (hierarchy)

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

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

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

A Declared Rare Flora and Priority Flora survey was undertaken by botanists from Pilbara Iron on 17 September 2004. No DRF or Priority Flora species were recorded during the survey (Keith Lindbeck and Associates, 2007a). The proposed clearing is unlikely to impact on any DRF or Priority flora species.

Botanists from Biota Environmental Services located a population of Priority 1 species *Ptilotus trichocephalus* during a survey for the Paraburdoo Gas Pipeline in September 2003 (Keith Lindbeck and Associates, 2007b). The survey encompassed an area approximately 2 kilometres south-east of the application area and extended south and east. The closest known occurrence of *Ptilotus trichocephalus* is located approximately 3 kilometre south-east of the application area (Keith Lindbeck and Associates, 2007b). Given the distance between the application area and the nearest known population of *Ptilotus trichocephalus*, the proposed clearing is unlikely to impact on in situ existence of this species.

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

Methodology Keith Lindbeck and Associates (2007a)
Keith Lindbeck and Associates (2007b)
GIS Database:
- Declared Rare and Priority Flora List

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

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

There are no known Threatened Ecological Communities (TEC) within the application area (GIS database; Keith Lindbeck and Associates, 2007a). The nearest known TEC is located approximately 100 kilometres north 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 the TEC.

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

Methodology Keith Lindbeck and Associates (2007a)
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 181: Shrublands; mulga & snakewood scrub, and 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 these vegetation associations remain 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 associations 181 and 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					
181	1,697,329	1,697,329	~100	Least Concern	2.4
82	2,565,930	2,565,930	~100	Least Concern	10.2
Beard veg assoc. – Bioregion					
181	65,094	65,094	~100	Least Concern	4.9
82	2,563,610	2,563,610	~100	Least Concern	10.2

* Shepherd et al. (2001)

** 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 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 (Keith Lindbeck and Associates, 2007a). Several ephemeral creek systems 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 (GIS database).

The closest watercourses are Seven Mile Creek which is located approximately 1.8 kilometres north-west and Turee Creek which is located approximately 17 kilometres south-east of the application area (GIS Database). The vegetation proposed to be cleared is unlikely to be regarded as a significant buffer to the nearest watercourse.

As there are watercourses within the application area, the proposed clearing is at variance to this Principle. However, the watercourses in question 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 (Keith Lindbeck and Associates, 2007a; 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 Keith Lindbeck and Associates (2007a)
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 in Technical Bulletin No 62 "An inventory and condition survey of the rangelands in the Ashburton River catchment, Western Australia" (Payne et al., 1988), the application area consists of the Boolgeeda and Newman Land Systems.

- The Boolgeeda Land System consists of stony lower slopes and wide, low relief plains, below large range hill systems, that support spinifex grasslands and Mulga shrublands (Payne et al., 1988). Approximately 50% of the application area occurs within the Boolgeeda Land System (GIS Database). The soils of the Boolgeeda Land System consist of rocky outcrops with virtually no soil development and red loamy soils with dense stony mantles (Payne et al., 1988). The soils are likely to have high resistance to erosion due to the stony nature of the surface materials.
- The Newman Land System consists of rugged jaspilitic ranges, plateaux, ridges and mountains that characterise and typify much of the Pilbara. Approximately 50% of the application area is located within the Newman Land System, of which the majority of the vegetation appears to occur on the landform unit ridges, mountains and hills, and lower slopes. 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 soils are likely to have a high resistance to erosion due to the high occurrence of rock outcrops and stony mantles.

Both the Boolgeeda and Newman Land Systems have 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 have been measured in the range from 500 to 1,000 mg/L Total Dissolved Solids (TDS) (GIS Database). The application area is located within the Turee Creek catchment area which covers an area of approximately 675,000 hectares (Hamersley Iron, 2008). Rainwater is known to have a large impact on groundwater recharge (Keith Lindbeck and Associates, 2007a). Paraburdoo, which is situated approximately 7 kilometres north-east of the application area, has mean annual rainfall of 280.8 millimetres and mean annual evaporation of approximately 3600 millimetres (Keith Lindbeck and Associates, 2007a; GIS Database). Due to the low rainfall to high evaporation ratio, it is likely that the majority of groundwater recharge would occur following significant rainfall events. Given the size of the Turee Creek catchment system (675,300 ha) in relation to the size of the application area (10.6 ha), and considering the low rainfall to high evaporation ratio, it is unlikely that the proposed clearing will significantly increase groundwater recharge or that land salinisation will be increased either on or off-site.

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

Methodology Keith Lindbeck and Associates (2007a)
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). The nearest conservation area is Karijini National Park which is situated approximately 37 kilometres east-northeast of the application area (GIS database; Keith Lindbeck and

Associates, 2007a). 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 proposed clearing is not likely to be at variance to this Principle.

Methodology Keith Lindbeck and Associates (2007a)
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; Keith Lindbeck and Associates, 2007a). The closest watercourses are Seven Mile Creek which is located approximately 1.8 kilometres north-west and Turee Creek which is located approximately 17 kilometres south-east of the application area (GIS Database). The two land systems associated with the application area have high resistance to erosion (Van Vreeswyk et al., 2004; Payne et al., 1998; Keith Lindbeck and Associates, 2007b), thereby reducing the risk of sediment export which may result in sedimentation and turbidity in nearby watercourses. The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

The application area is located within the Turee Creek catchment system which covers an area of 675,300 hectares (Hamersley, 2008). The Turee Creek catchment is underlain by four aquifers (Keith Lindbeck and Associates, 2007b). Aquifer 1 resides in shallow alluvium and colluvial scree that lies on top of weathered basement, paleochannel clays and in some areas directly on fractured basement rock. Aquifer 2 lies below Aquifer 1 and is a thick sequence of low permeability paleochannel clays which acts as an aquiclude. These low permeability clays are an effective barrier between the shallow aquifer and the deeper paleochannel sediments and fractured rock aquifers. Aquifer 3 occurs in paleochannel sediments that consist of sand, gravel and some silt and clay. Aquifer 4 is a fractured rock aquifer that lies below the paleochannel sediments Keith Lindbeck and Associates, 2007b).

In relation to the shallow aquifer, given the size of the Turee Creek catchment system (675,300 ha) in relation to the size of the application area (10.6 ha) and considering the low rainfall to high evaporation ratio, it is unlikely that the proposed clearing will significantly increase groundwater recharge or impact on groundwater quality.

In relation to the deeper underlying aquifers, due to the lack of interconnection between the shallow and deeper aquifers caused by presence of the aquiclude, it is unlikely that the proposed clearing will have any further impact on groundwater quality of the underlying deeper aquifers.

The application is not located within a Public Drinking Water Source Area (GIS Database).

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

Methodology Keith Lindbeck and Associates (2007a)
Keith Lindbeck and Associates (2007b)
Hamersley (2008)
Payne et al. (1998)
Van Vreeswyk et al. (2004)
GIS Database:
- Hydrography, linear_1
- Hydrography, linear (hierarchy)
- Rainfall, Mean Annual
- Evaporation Isopleths
- 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; Keith Lindbeck and Associates, 2007a)). The average annual rainfall of Paraburdoo is approximately 280.8 mm/yr, with monsoonal events from tropical cyclones producing a few large rainfall events each year with rainfall in excess of 100 mm or 200 mm in a few days (Keith Lindbeck and Associates, 2007a; Keith Lindbeck and Associates, 2007b)). As a result, local flooding can often occur seasonally in the Pilbara region between December and March. Numerous non-perennial 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).

The proposed clearing of 10.6 hectares is unlikely to impact on drainage patterns within the Turee Creek catchment system, or result in an increase in peak flood heights. Furthermore, the proposed clearing of native vegetation for the rehabilitation of the 10 East Waste Dump is not likely to cause or increase the incidence of flooding.

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

Methodology Keith Lindbeck and Associates (2007a)
 Keith Lindbeck and Associates (2007b)
 GIS Database:
 - Hydrography, linear (hierarchy)
 - Hydrography, linear_1
 - Topographic Contours, Statewide

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

Comments

There are two native title claims over the area under application; (WC97/043) and (WC98/069) (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (GIS Database). However, the tenements 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 no registered Sites of Aboriginal Significance 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.

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 GIS Database:
 - Native Title Claims – DLI 7/11/05
 - Sites of Aboriginal Significance DIA

4. Assessor's comments

Purpose	Method	Applied area (ha)/ trees	Comment
Mineral Production	Mechanical Removal	10.6	The clearing principles have been addressed and the proposed clearing is at variance to Principle (f), is not likely to be at variance to Principle (a), (b), (c), (d), (g), (h), (i) or (j) and is not at variance to Principle (e). Should the permit be granted, it is recommended that conditions be imposed on the permit for the purposes of rehabilitation and reporting areas cleared.

5. References

- Australian Museum Online (1999). Bats in Australia, Orange Leaf-nosed Bat. An Australian Museum Website, Australian Museum, viewed 4 February 2008, <<http://www.amonline.net.au/bats/records/bat22.htm>>.
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6. Glossary

Acronyms:

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

Definitions:

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

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which

are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

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

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

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

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

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

CD

Conservation Dependent: A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.