



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2362/1

Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Iluka Resources Ltd

### 1.3. Property details

Property:

LOT 10 ON PLAN 18828 (Lot No. 10 BRAND ENEABBA 6518)  
 LOT 10219 ON PLAN 206715 ( ARROWSMITH EAST 6519)  
 LOT 10220 ON PLAN 206715 (Lot No. 10220 BRAND ENEABBA 6518)  
 LOT 10222 ON PLAN 206723 ( ENEABBA 6518)

Local Government Area:

Shire Of Carnamah & Shire Of Three Springs

Colloquial name:

### 1.4. Application

Clearing Area (ha)

No. Trees

Method of Clearing

For the purpose of:

39

Mechanical Removal

State Agreement

## 2. Site Information

### 2.1. Existing environment and information

#### 2.1.1. Description of the native vegetation under application

##### Vegetation Description

Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. Three Beard vegetation associations were located within the application area. These were;

49 Shrublands; mixed heath;

378 Shrublands; scrub-heath with scattered *Banksia spp*, *Eucalyptus todtiana* & *Xylomelum angustifolium* on deep sandy flats; and

379 Shrublands; scrub-heath on lateritic sandplain.

Woodman Environmental Consulting (2007) conducted vegetation mapping of the application area in November 2007. Through this survey they identified two Floristic Community Types which occur in the application area;

1) Woodland to tall shrubland dominated by *Xylomelum angustifolium* and/or *Banksia spp*. on grey sand on dune crests and upper slopes; and

2) Low shrubland of mixed species including *Mesomelaena stygia sub-sp. deflexa*, *Georgeantha hexandra*, *Hakea spathulata* and *Cassutha glabella* on white-grey sand over lateritic gravels.

##### Clearing Description

Iluka Resources Ltd (hereby known 'Iluka') have applied to clear 39 hectares of native vegetation, within a total application area of approximately 263 hectares. The Project is located 4.5 kilometres north-east of the town site of Eneabba within the *Mineral Sands (Eneabba) Agreement Act 1975* Mineral Lease 267SA (Iluka Resources Ltd, 2008), in the Geraldton Sandplains Interim Biogeographical Regionalisation for Australia (IBRA) bioregion (Desmond & Chant, 2001).

The application area is divided into a northern section referred to as the Brandy Flats application area, and a series of closely bunched areas in the south-east called the Depot Hill application area.

The proposed clearing is for mineral sands mining as a continuation of the existing mining activities at Iluka Resources Ltd's Eneabba mineral sands operation. Clearing will be conducted mechanically with a lowered blade, in accordance with methods already in practice at the mine site.

##### Vegetation Condition

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)

##### Comment

Sand mining is not a new venture in the Eneabba area. The Depot Hill/Depot Hill East and some of the Brandy flats area were originally mined by the Jennings Mining Group in the late 1970s (Iluka Resources Ltd, 2008). Once mining operations ceased there was little attempt to rehabilitate the area. This has left areas which were previously mined in a degraded state.

### 3. Assessment of application against clearing principles

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

##### Comments

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

The application area is situated 4.5 kilometres north-east of the town site of Eneabba, within the Lesueur Sandplains sub-region of the Geraldton Sandplains Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Australian Natural Resource Atlas (ANRA) (2008) describes the region as; extensive Proteaceous heath and scrub-heaths rich in endemics, often with emergent Mallees, Banksia and Actinostrobos, on an undulating lateritic sandplains. Extensive York Gums and Acacia woodlands occur on alluvial outwash plains associated with drainage and valleys in hill country. Areas of coastal Aeolian sands and limestone support Proteaceous heath and Acacia scrubs.

The Lesueur Sandplains bioregion contains a high proportion of endemic plants with over 250 plants endemic to the subregion (Desmond & Chant, 2001). The area is recognised Australia-wide and internationally as having particularly high floristic diversity, with an area of 10 square metres supporting up to 80 different species. On the continental landscape stress class assessed by the Landscape Health Report the bioregion is listed at 4, however, Desmond and Chant (2001) state it should be 3 or worse (1 is most stressed, 6 is least stressed). The level of threat faced is similar to that of the Avon Wheatbelt, but the reserve system is more representative (Desmond & Chant, 2001). The main threatening processes to the region are feral animals, grazing pressures, changing fire regimes, increasing land fragmentation, exotic weeds and changes to hydrology (ANRA, 2008).

Within the application area of 263 hectares, the majority of vegetation is dominated by farm trees (mainly Pines with some Eucalypts) and pasture with fodder crops (Tagasaste) planted as part of farming landcare practices during and after the historic mining. Areas which are earmarked for clearing are small isolated patches of remnant native vegetation occurring at Depot Hill, with a very small area of vegetation on the Brandy Flats area (combined totalling 39 hectares). These areas are surrounded and intersected by pastoral or highly disturbed land, thereby lowering their biodiversity potential. Furthermore, feral animals such as rabbits have been reported to be widespread in the region. This has culminated to reducing the biological value of this region (Woodman Environmental Consulting, 2007).

Within these isolated patches of native vegetation, Woodman Environmental Consulting (2007), identified two floristic community types. These were;

1) Woodland to tall shrubland dominated by *Xylomelum angustifolium* and/or *Banksia spp.* on grey sand on dune crests and upper slopes; and

2) Low shrubland of mixed species including *Mesomelaena stygia sub-sp. deflexa*, *Georgeantha hexandra*, *Hakea spathulata* and *Cassytha glabella* on white-grey sand over lateritic gravels.

Woodman Environmental Consulting (2007) reports that both these floristic community types are common within Iluka's lease at Eneabba. In a region traditionally recognised for its high level of biological diversity, finding two floristic community types within 39 hectares of native vegetation would suggest biological diversity is lower than surrounding areas which have not been impacted by mining and agriculture. In undisturbed regions, quadrats less than one kilometre apart may have less than half their species in common (Woodman Environmental Consulting, 2007). This would suggest it is typical in the region for floristic community types to change rapidly in small areas. Therefore, it is possible that biological diversity within the application area may be lower than surrounding areas.

Although limited floristic community types were identified within the application area, biodiversity within the two community types was considered to be high (Woodman Environmental Consulting, 2007). In November 2007, Woodman Environmental Consulting were commissioned by Iluka to conduct a Declared Rare Flora (DRF) and Priority flora search in the Depot Hill/Brandy Flats region. This survey revealed no occurrences of DRF within the clearing envelope, however 16 species of Priority flora were present. Woodman Environmental Consulting (2007) report that the high number of Priority species recorded within the Depot Hill/Brandy Flats application area reflects the presence of lateritic soils, which generally provide habitat for a greater number of restricted taxa in this region. Woodman Environmental Consulting (2007) also report that clearing of these areas will have an adverse impact on the local populations of these restricted species but will not significantly reduce the total populations known from the Eneabba area.

Although Priority flora will be impacted by this proposal, Iluka has an established track record in successfully rehabilitating land, including Priority species of flora. Approximately 2,000 hectares of land affected by mineral sand mining has been rehabilitated by Iluka at the Eneabba operations. Rehabilitated areas are the subject of an on-going biological monitoring program (Mattiske Consulting Pty Ltd, 2006).

In 2006, Bamford Consulting Ecologists conducted a literature review of previous fauna monitoring conducted in the vicinity of the application area to ascertain the faunal assemblage (Iluka Resources Ltd, 2008). This survey identified up to 30 species of conservation significant vertebrates which may occur in the application area. These included two reptiles, 27 birds and one mammal (Iluka Resources Ltd, 2008). This appears to be a relatively low number of conservation significant reptiles and mammals recorded in the application area. It is therefore thought that the fragmentation of the vegetation within the application area may have led to lower

biodiversity in ground based fauna, due to predation and reduced breeding habitats (Iluka Resources Ltd, 2008).

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

A Dieback Management Plan exists for all Iluka's operations at Eneabba to protect biodiversity in the region. A revised version of that document aiming to incorporate current best practices has been reviewed by the Department of Environment and Conservation (Iluka Resources Ltd, 2006). Should the permit be granted, it is recommended that a condition be imposed for the purpose of Dieback management.

Although the region is noted for its high level of biological diversity, this clearing proposal is mostly located on ex-pastoral lands or within areas suffering from degradation from past agriculture and mining activities. Any rehabilitation conducted by Iluka post-mining, is expected to provide a net benefit in biological diversity within the local region provided rehabilitation is successful (Iluka Resources Ltd, 2008). In addition, Iluka will rehabilitate an adjacent area of disturbed and denuded pastoral land into native vegetation. Consequently this clearing proposal is unlikely to have an adverse impact on the overall biodiversity of the Geraldton Sandplains bioregion.

**Methodology** ANRA (2008)  
Desmond & Chant (2001)  
Iluka Resources Ltd (2006)  
Iluka Resources Ltd (2008)  
Mattiske Consulting Pty Ltd (2006)  
Woodman Environmental Consulting (2007)  
GIS Database:  
-Interim Biographic Regionalisation for 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**

Iluka have conducted numerous fauna surveys throughout their Eneabba lease. In 2006 Bamford Consulting Ecologists conducted a literature review of available surveys to ascertain the faunal assemblage of the application area (Iluka Resources Ltd, 2008). As a result of this review, 30 species of conservation significant fauna were identified as potentially occurring within the vicinity of the application area. Most of the conservation significant species of fauna which have been found to have potential to occur in the Eneabba area are not expected to occur in the application area due to habitat preferences. The Depot Hill/Brandy Flats application areas are largely comprised of cleared agricultural land with introduced trees as buffers (Pines and Eucalypts) or fodder (tagasaste) which presents limited habitats for native fauna. Some areas of native vegetation do occur, however these are highly disturbed (Iluka Resources Ltd, 2008).

The following three conservation significant fauna listed under the *Wildlife Conservation Act 1950*, are the most likely of the 30 species listed to utilise habitat within the application area.

The Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950*. The cockatoo breeds in mature Eucalypt woodland such as Salmon Gum or Wandoo which have suitable hollows for nesting. Although the Carnaby's Black-Cockatoo breeds in Salmon Gum and Wandoo woodland, it requires Kwongan heath to feed. Therefore, the cockatoo requires a close association between breeding and feeding sites during the breeding season (Department of the Environment, Heritage Water and the Arts, 2008). Within the application area, the Carnaby's Black-Cockatoo has been recorded feeding on Pie Melons (*Citrullus lanatus*) in farm paddocks to the south of Depot Hill and roosting on trees along Three Springs Road. The Carnaby's Black-Cockatoo has not been recorded in the isolated patches of native vegetation that occur within the application area (Iluka Resources Ltd, 2008), notwithstanding this it is acknowledged it may feed within the native vegetation sites in the application area and on isolated Pine trees used as wind breaks. However, because the area is unlikely to be a breeding location and feeding has not been recorded in the application area it is unlikely that the vegetation is significant habitat for this species.

The Shield Back Trapdoor spider (*Idiosoma nigrum*) was historically common throughout the area, however it is now restricted to jam (*Acacia acuminata*) woodland, east of the northern part of the Darling Ranges to Murchison River, and east to Paynes Find. Preferred habitats include heavy clay soils in open York Gum (*Eucalyptus loxophleba*), Salmon Gum (*Eucalyptus salmonifolia*), Wheatbelt Wandoo (*Eucalyptus capillosa*) woodland, with Jam (*Acacia acuminata*) forming a thin understorey (Iluka Resources Ltd, 2008). A target survey of potential habitats for the spider was conducted by Bamford Consulting Ecologists in December 2006 in which none of these habitats were found (Iluka Resources Ltd, 2008). Furthermore, detailed invertebrate surveys conducted over the past 25 years in the area revealed no records of this spider (Iluka Resources Ltd, 2006). Therefore it is unlikely that the vegetation is significant habitat for this species.

The Rufous Fieldwren (*Calamanthus campestris montanellus*) is listed on the Department of Environment and Conservation (DEC) Priority fauna list as Priority 4. It is a species that inhabits very low heath and has previously been recorded at Eneabba and is therefore likely to be a permanent and widespread resident species. Although this species will disappear from the directly impacted area for 2-3 years following the clearing

and mining activities, there is a significant proportion of remaining habitat in the general area to support the displaced birds. It is therefore thought that the clearing of 39 hectares of native vegetation in the application area is not considered significant habitat for this species. Furthermore the Rufus Fieldwren has been found to recolonise rehabilitation very well (Iluka Resources Ltd, 2008). Iluka's rehabilitation programmes at Eneabba are important for this species and any long term impacts are unlikely provided rehabilitation occurs and is successful.

Previous DEC (formerly known as CALM) advice provided for the nearby Adamson A and B proposals for CPS 1662/1 has stated that if the clearing is carried out in an incremental manner and actively rehabilitated directly after the cessation of mining activities, the proposal is unlikely to have a major impact on the local fauna (CALM, 2005).

The clearing of 39 hectares of native vegetation at Depot Hill/Brandy Flats is not expected to have a significant impact on the conservation status of the 30 species of vertebrate fauna of conservation significance that are known to occur in the Eneabba area.

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

**Methodology** Bamford Consulting Ecologists (2006)  
CALM (2005)  
Department of the Environment, Heritage Water and the Arts (2008)  
Iluka Resources Ltd (2006)  
Iluka Resources Ltd (2008)

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

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

In November 2007, Woodman Environmental Consulting were commissioned by Iluka to conduct a Declared Rare Flora (DRF) and Priority flora search in the Depot Hill/Brandy Flats area (Woodman Environmental Consulting, 2007). This survey was conducted to determine the presence of significant flora, and ascertain whether the native vegetation in the application area is significant habitat for rare flora. This survey revealed no occurrences of DRF within the application area however, 16 species of Priority flora were present. These species are listed in the Table below.

Priority Flora Species	Priority Status	Total mapped on Iluka Lease **	No. in proposed disturbance area	% disturbance in Lease area
<i>Banksia Chamaephyton</i>	P4	72	1	1
<i>Comesperma acerosum</i>	P3	180	6	3
<i>Daviesia chapmanii</i>	P4	145	4	3
<i>Daviesia epiphyllum</i>	P3	641	15	2
<i>Desmocladius elongates</i>	P3	68	1	1
<i>Georgeatha hexandra</i>	P4	699	29	4
<i>Grevillea rudis</i>	P4	87	7	8
<i>Hakea polyanthema</i>	P3	105	14	13
<i>Hemiandra sp. Eneabba (H. Demarz 3687)</i>	P1	239	14	6
<i>Isopogon tridens</i>	P3	495	35	7
<i>Persoonia filiformis</i>	P2	50	1	2
<i>Stachystemon axillaris</i>	P4	51	8	16
<i>Stylidium diuroides subsp. paucifoliatum</i>	P4	34	8	24
<i>Synaphea aephyrsa</i>	P3	7	1	14
<i>Tricoryne sp. Eneabba</i>	P2	9	1	11
<i>Verticordia fragrans</i>	P3	134	1	1

\*\* Only mineral resource areas have been mapped to date, not the complete Iluka lease areas

In total, 146 individual Priority plants will be impacted by this proposal. Plant species of highest concern are *Hemiandra sp. Eneabba* (P1), *Tricoryne sp. Eneabba* (P2) and *Persoonia filiformis* (P2) (Woodman Environmental Consulting, 2007).

*Hemiandra sp. Eneabba* is listed as Priority 1 under the *Wildlife Conservation Act 1950*. It is a straggly, erect shrub, generally growing in sand and has been found to re-colonise disturbed sites (Florabase 2008). A total of 14 plants of this species occur in the application area. This represents six percent of the plants which have been surveyed on the Iluka lease. As there is still 94 percent of the local population remaining, it is unlikely the clearing of native vegetation in this clearing proposal will adversely impact on the continued existence of this species.

*Tricoryne sp. Eneabba* is listed as Priority 2 under the *Wildlife Conservation Act 1950*. It is a woody

rhizomatous, perennial, herb, which has been noted to regenerate in disturbed areas (Florabase 2008). In total one plant of this species falls within the application area. This represents 11 percent of the plants which have been surveyed on the Iluka lease. As there is still 89 percent of the local population remaining, it is unlikely the clearing of native vegetation associated with this proposal will adversely impact the conservation status of this species.

*Persoonia filliformis* is listed as Priority 2 under the *Wildlife Conservation Act 1950*. It is an erect, spreading, lignotuberous shrub, generally growing in yellow or white sand over laterite (Florabase 2008). One plant of this species falls within the application area. This represents two percent of the plants which have been surveyed on the Iluka lease. As there is still 98 percent of the local population remaining, it is unlikely the clearing of native vegetation associated with this proposal will adversely impact the conservation status of this species.

Although 146 individuals Priority plant species will be impacted by this proposal, only a small percentage of their populations in the region will be impacted. Areas which have been mapped in the Depot Hill/ Brandy Flats region correlate to regions with mineral deposits and equate to approximately 11 percent of all remnant native vegetation in the area (Woodman Environmental Consulting, 2007). It is therefore expected that much higher numbers of Priority species would be recorded within close vicinity of the application area.

Two of the Depot Hill clearing application areas come within 100 metres of an un-named species of *Leucopogon* which has high potential for listing as DRF species (currently listed as Priority 1 (P1) with Department of Environment and Conservation) (Iluka Resources Ltd, 2008). This species is confined to one block of land containing 2,188 individuals which Iluka Resources Ltd has agreed to avoid. A 50 metre buffer zone has been imposed around each plant to minimise disturbance to each individual plant. Clearing in this proposal is limited to very small areas of native vegetation to the north and north-east, and a section of highly disturbed native vegetation to the east of the northern boundary of the block. Although this species doesn't occur within the application area, its close proximity to the clearing of native vegetation may have an impact on this species. The following precautionary measures will be implemented by Iluka to ensure current mining activities will have minimal impact on this species (Iluka Resources Ltd, 2008):

- Areas cleared close to this population will be subject to extra vigilance from dust, surface water runoff and accidental hydrocarbon spills;
- Dust will be managed under Department of Environment and Conservations licence conditions and Iluka Resources Ltd Dust Management Plan, with a focus on sourcing local clay from mining operations to stabilise the up-slope areas of the population;
- No in-pit servicing of excavation equipment and any hydrocarbon spills will be removed to the hydrocarbon land farm facility 10 kilometres to the south-west of the project site; and
- Events of surface flooding will be minimised during high rainfall as all mining activities are contained within bunded areas.

Whilst the proposed clearing area provides habitat for a range of flora species, it is unlikely that the proposed clearing will result in the loss of significant habitat necessary for the continued existence of DRF or Priority flora species.

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

**Methodology** Iluka Resources Ltd (2008)  
Woodman Environmental Consulting (2007)

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

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

There are no known Threatened Ecological Communities (TEC's) within the Depot Hill/Brandy Flats application area (GIS Database). The nearest registered TEC's occur approximately 10 kilometres to the south-west and north-east of the application areas (GIS Database). It is unlikely these communities will be impacted by this proposal.

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

**Methodology** 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 likely to be at variance to this Principle**

The application area is within the Interim Biogeographic Regionalisation for Australia (IBRA) Geraldton

Sandplains bioregion (GIS Database). According to Shepherd et al (2001) there is approximately 42.2% of the pre-European vegetation remaining in the Geraldton Sandplains bioregion which places it as 'depleted' according to the Department of Natural Resources and Environment (2002).

Three Beard vegetation associations were located within the application area; 49, 378 and 379 (GIS Database). Within the bioregion, there is approximately 32.5% of the pre-European vegetation extent remaining of Beard vegetation association 49; 61.7% of Beard vegetation association 378; and 20.7% of Beard vegetation association 379. All three vegetation types are represented in IUCN Class I-IV Reserves within both the bioregion and the State (refer to Table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% of Pre-European area in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Geraldton Sandplains	3,136,277	1,324,440	~42.2	Depleted	15.3
IBRA Subregion – Lesueur Sandplains	1,171,805	478,987	~40.9	Depleted	17.7
Local Government – Carnamah	287,493	113,136	~39.4	Depleted	N/A
<b>Beard veg assoc. – State</b>					
49	52,494	23,802	~45.3	-Depleted	40.2
378	95,115	58,715	~61.7	-Least Concern	21.2
379	547,767	113,427	~20.7	-Vulnerable	22.4
<b>Beard veg assoc. – Bioregion</b>					
49	39,721	12,916	~32.5	-Depleted	7.6
378	95,115	58,715	~61.7	-Least Concern	13.3
379	546,586	113,268	~20.7	-Vulnerable	5.0
<b>Beard veg assoc. – Subregion</b>					
49	33,141	12,273	~37.0	-Depleted	9.1 (22.2)
378	90,931	58,542	~64.4	-Least Concern	13.9 (21.3)
379	370,097	98,744	~26.7	-Vulnerable	5.5 (18.7)

\* Shepherd et al. (2001) updated 2005

Whilst the sub-region has been significantly cleared, the proposed clearing of 39 hectares is unlikely to significantly reduce the extent of Beard vegetation associations 49,378 or 379 below current levels. Therefore, the vegetation within the application area is not likely to be a significant remnant in an area that has been extensively cleared. Furthermore, the vegetation within the application area is degraded and comprises a mixture of cleared land, alien species and native vegetation.

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

**Methodology** Department of Natural Resources and Environment (2002)  
Shepherd et al. (2001)  
GIS Databases:  
- the Interim Biogeographic Regionalisation for Australia  
- Pre-European Vegetation

**(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

**Comments** **Proposal is at variance to this Principle**  
The southern boundary of the Depot Hill/Depot Hill East application area is situated approximately 500 metres

north of the Eneabba Creek, with a 40 to 50 metre descent to the creekline (Iluka Resources Ltd, 2008). The application area is isolated with highly disturbed areas suffering from gully erosion and silt deposition as a result of sheet flow of water following events of high rainfall (Iluka Resources Ltd, 2008). Iluka propose to stabilise and repair the upper slopes of Depot Hill in the clearing application area and re-establish native vegetation for commercial cropping. In addition Iluka have proposed to rehabilitate native vegetation areas between the Depot Hill and Depot Hill East to establish a continuous belt of native vegetation on the lower slopes of Depot Hill (Iluka Resources Ltd, 2008). As a result of these actions, potential impact to the Eneabba Creek will be reduced through the management of surface water runoff.

The Brandy Flats application area situated seven kilometres to the north east of Depot Hill, intersects an ephemeral drainage line at its southern border (GIS Database). Vegetation along the drainage line in the application area is highly disturbed. Due to the poor condition of vegetation in this location, a net environmental gain will be achieved post-mining when the area is rehabilitated. Although this area is highly degraded, clearing will be required within this watercourse and is therefore at variance to this Principle.

Iluka has applied for a Bed and Banks Permit from the Department of Water. Under sections 11, 16 and 21A of the *Rights in Water and Irrigation Act 1914*, it is the proponent's responsibility to attain and adhere to the conditions of this permit.

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

**Methodology** Iluka Resources Ltd (2008)  
GIS Database:  
-Hydrography, linear

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

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

The application areas consist of grey sand soils, and are subject to strong sea breezes in summer (Iluka Resources Ltd, 2006). Guidelines with regard to soil erosion caused by wind (Wells and King, 1989), indicate that the area has a capability class of IV, which recommends clearing with wind protection. Wind erosion is one of the main land degradation risks associated with clearing on this land type (DAFWA, 2006). Gully erosion, silt deposition and sand blowouts are common. The Depot Hill east area contains a six hectare blowout in the centre of a 25 hectare patch of remnant vegetation (Iluka Resources Ltd, 2008). It is likely over time these areas would become further degraded due to erosional actions of wind and water.

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

Notwithstanding, Iluka have committed to rehabilitation of those areas presently degraded. Areas of land which are highly degraded at present are proposed to be rehabilitated. This rehabilitation process will include drainage and the control of surface water runoff to minimise erosion and scouring of cleared and rehabilitated areas (Iluka Resources Ltd, 2008). Provided rehabilitation is successful the potential for erosion will be mitigated. Should the permit be granted it is recommended a rehabilitation condition be imposed on the permit.

Furthermore, to minimise the potential for wind erosion, as well as the potential for dust issues to occur, the topsoil stockpiles and other open areas are routinely stabilised by Iluka, using vegetation such as Rye Grass, native mulch, and glue on gravel (Iluka Resources Ltd, 2006).

As part of their reporting requirements under section 8 of the Mineral Sands (Eneabba) Agreement Act 1975, Iluka is required to submit detailed triennial reports that specifically address the management of issues including: water quality, surface water discharge, rehabilitation plans and monitoring. Officers from the Department of Industry and Resources, the Department of Environment and Conservation and the Department of Water inspect the operations annually as part of the Mineral Sands Agreement Rehabilitation Coordinating Committee to ensure soil erosion and water management issues are adequately managed.

**Methodology** DAFWA (2006)  
Iluka Resources Ltd (2006)  
Iluka Resources Ltd (2008)  
Wells and King (1989)

**(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 divided into a northern section referred to as the Brandy Flats application area and a series of closely bunched areas in the south-east called the Depot Hill application area. The Brandy Flats application area to the north-west is situated approximately two kilometres to the west of an unnamed flora and fauna conservation reserve totalling 1,163 hectares (GIS Database). The Depot Hill area to the south west is

situated approximately four kilometres to the west from the Depot Hill Nature Reserve totalling 62.9 hectares (GIS Database).

Although the application areas are within close proximity to conservation areas, all areas have been historically used for mining and agriculture. Consequently, the application areas are degraded, providing limited protection or buffers from wind, dust or weeds to the nearby nature reserves (Iluka Resources Ltd, 2008).

The areas of native vegetation may be used as ecological linkages for birds and some larger reptiles and mammals, however, due to the degraded nature of the vegetation much of the refuge potential has been lost (Iluka Resources Ltd, 2008). Rehabilitation post-mining is likely to improve ecological linkages between conservation areas, by reducing wind blow out areas and erosion increasing vegetation cover. Furthermore Iluka plan to rehabilitate an additional area of land between the Eneabba Creek and the Depot Hill application area which is currently cleared pasture land (Iluka Resources Ltd, 2008). This will increase the native vegetation coverage in the local area providing increased ecological linkages.

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

**Methodology** Iluka Resources Ltd (2008)  
GIS Database  
-CALM Managed Lands and Waters (19/3/2008)

**(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**

The Depot Hill/Brandy Flats application areas are approximately three kilometres from the Eneabba Public Drinking Water Supply Area (GIS Database). Iluka have advised that mining in the Depot Hill/Brandy Flats area is not up stream of groundwater recharge areas and therefore will not impact the quality of groundwater in the area (Iluka Resources Ltd, 2008).

There are no adjacent surface water bodies that will be impacted by this proposal. Groundwater in the area is typically 60 - 100 metres below the surface (Iluka Resources Ltd, 2008). Given that basement levels mined for ore are typically between 20- 25 metres it is unlikely there will be an impact on groundwater (Iluka Resources Ltd, 2008).

Poor surface water quality from surrounding disturbed areas is currently impacting pockets of native vegetation (Iluka Resources Ltd, 2008). Iluka have committed to re-contour cleared areas to improve quality of surface water runoff.

Iluka's operations are subject to Licence 5645/7 under part V of the *Environmental Protection Act 1986*. This licence requires an annual report be submitted demonstrating the management of groundwater and surface water runoff, in respect to water quality, quantity and result monitoring against Australian and New Zealand Environment Conservation Council guidelines.

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

**Methodology** Iluka Resources Ltd (2008)  
GIS Database:  
- Public Drinking Water Source Areas

**(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**

Although a minor, ephemeral watercourse intersects the southern section of the Brandy Flats application area (GIS Database), it does not fall within a designated floodway or flood fringe area (GIS Database).

The application area has a long-term average annual rainfall of approximately 600 millimetres (GIS Database), with an annual evaporation rate of approximately 2,400 millimetres (GIS Database). It is therefore anticipated there would be little surface water flow during normal seasonal rainfall events.

The clearing of 39 hectares within the Indoon Logue Catchment (137,611 hectares) (GIS Database) is unlikely to result in an increase in flood intensity or frequency.

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

**Methodology** Iluka Resources Ltd (2008)  
GIS Databases:  
-DoE FMD Floodway and Floodfringe Areas 2003  
-Evaporation Isopleths



-Hydrography Catchments  
-Hydrography Linear

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

### Comments

There is one native title claim over the area under application; WC98\_057. This claim has been registered with the 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*.

There are no known Aboriginal Sites of Significance located within the clearing permit application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

A submission was received from the Yamatji Land and Sea Council raising three points which are considered below.

1) "That the clearing does not interfere with any Aboriginal Sites, and be undertaken in compliance with the *Aboriginal Heritage Act 1972*".

There are no registered Sites of Aboriginal Significance within the area applied to clear (GIS Database).

2) "Native vegetation is used by Aboriginal people for bush tucker and medicine. The effects of the proposed clearing on this use of the land by our clients should be considered on the basis that cultural and social use fall within the definition of 'environment' under section 3(2) of the *Environmental Protection Act 1986* (WA). The Environmental Protection Authority's Guidance statement 41 further provides that the *Environmental Protection Act 1986* can give attention to matters of a social nature, including traditional hunting activities, be providing for the retention of habitat for native fauna to enable such activities to continue".

It is expected that food and medicine plants will return after the completion of rehabilitation projects. The respondent should contact the applicant with respect to this issue.

3) "With respect to assessment of the proposal against the Clearing Principles outlined in Schedule 5 of the *Environmental Protection Amendment Act 2003* (WA), Clearing Principle (e) provides that native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared. To date, there have been separate applications granting the clearing of approximately 387 hectares. There is now an additional application for clearing a further 39 hectares, and we request that the cumulative impact of all applications be considered in light of the Clearing Principle (e)".

Considering that mining has been occurring in the area since the 1970's, and Iluka proposes to deliver a net environmental gain through rehabilitation associated with this proposal, it is unlikely that the proposed clearing will have long term impacts on the area (Iluka Resources Ltd, 2008). Furthermore, the nature of mineral sands operations is such that new or previously mined areas are cleared, mined and rehabilitated over a relatively short time period compared to other mineral extraction activities. The rehabilitation activities carried out by Iluka at Eneabba are of a high standard and provided that such standards are maintained the likelihood of detrimental cumulative effects resulting from the clearing of native vegetation alone are not likely to be significant in relation to the clearing principles.

Previous Clearing Permit Applications (CPS 716/1, 1549/1 and 1662/1) have been referred to the Environmental Protection Authority (EPA). The EPA set the level of assessment as: "Not assessed, public advice given, assessed under Part V, clearing regulations' for this proposed clearing". As these Permits are in close proximity to the current application referral to the EPA is not considered necessary.

The Eneabba town site, a Public Drinking Water Supply Area and a 'C' Class Nature Reserve (Unnamed) are located within five kilometres of the application area (GIS Database). Advice received from the Department of Environment and Conservation on 21 May 2007 for Clearing Permit CPS 1662, advised that a formal referral to the EPA would not be required. This decision was attributed to the degraded nature of the application area, and the extensive history of agriculture and mining in the area. The current application area occurs further from the area in question and is of a similar degraded nature.

Mining at the Iluka Eneabba operations is conducted under the *Mineral Sands (Eneabba) Agreement Act 1975*. It is the proponent's responsibility to liaise with the DEC and the DoW to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The Shire of Carnamah, in a letter dated 19 March 2008, expressed no objection to this clearing permit application.

**Methodology** GIS Database (19/3/2008)  
 -Aboriginal Sites of Significance  
 -CALM Managed Lands  
 -Native Title Claims  
 -Public Drinking Water Source Areas

#### 4. Assessor's comments

Purpose	Method	Applied area (ha)/ trees	Comment
State Agreement	Mechanical Removal	39	The clearing principles have been addressed and the proposed clearing is not likely to be at variance to Principles (b), (d), (e), (h), (i) and (j); may be at variance to Principles (a) (c) and (g); and is at variance to Principle (f).  Should the permit be granted it is recommended that conditions be imposed for the purposes of rehabilitation, dieback management and permit reporting.

#### 5. References

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#### 6. Glossary

##### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government.
<b>CALM</b>	Department of Conservation and Land Management, Western Australia.
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia.
<b>DA</b>	Department of Agriculture, Western Australia.
<b>DEC</b>	Department of Environment and Conservation
<b>DEH</b>	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
<b>DEP</b>	Department of Environment Protection (now DoE), Western Australia.
<b>DIA</b>	Department of Indigenous Affairs
<b>DLI</b>	Department of Land Information, Western Australia.
<b>DoE</b>	Department of Environment, Western Australia.

<b>DoIR</b>	Department of Industry and Resources, Western Australia.
<b>DOLA</b>	Department of Land Administration, Western Australia.
<b>DoW</b>	Department of Water
<b>EP Act</b>	Environment Protection Act 1986, Western Australia.
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
<b>GIS</b>	Geographical Information System.
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia.
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>RIWI</b>	Rights in Water and Irrigation Act 1914, Western Australia.
<b>s.17</b>	Section 17 of the Environment Protection Act 1986, Western Australia.
<b>TECs</b>	Threatened Ecological Communities.

### Definitions:

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

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

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

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

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

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4** **Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed,

or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

**P5** **Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

**EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

**EX(W)** **Extinct in the wild:** A native species which:  
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or  
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

**CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

**EN** **Endangered:** A native species which:  
(a) is not critically endangered; and  
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

**VU** **Vulnerable:** A native species which:  
(a) is not critically endangered or endangered; and  
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

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