



## 1. Application details

### 1.1. Permit application details

Permit application No.: 1576/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: JABIRU METALS LTD

### 1.3. Property details

Property: L37/134  
L37/167  
Local Government Area: Shire Of Leonora  
Colloquial name: Gas Pipeline

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
60		Mechanical Removal	Building or Structure

## 2. Site Information

### 2.1. Existing environment and information

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

Vegetation Description	Clearing Description	Vegetation Condition	Comment
<p>The vegetation has been mapped at 1:250000 as Beard Vegetation Types 18, 28, 29 &amp; 39 (GIS Database). These are described in Shepherd (2001) as:</p> <p>18 - Low Woodland; mulga (<i>Acacia aneura</i>).</p> <p>28 - Open low woodland; mulga.</p> <p>29 - Sparse low woodland; mulga, discontinuous in scattered groups.</p> <p>39 - Shrublands; mulga scrub.</p> <p>A flora survey over the application area conducted by McMillan et al (2006) between 5-7 June 2006 identified the following vegetation types.</p> <p>1. Mulga Low Woodland: Dominated by <i>Acacia aneura</i> with scattered <i>A. quadrimarginea</i> with an understorey of <i>Eremophila</i>, <i>Maireana</i> and <i>Acacia</i> shrubs.</p> <p>2. Rocky Outcrop: Dominated by <i>Acacia aneura</i> and <i>A. quadrimarginea</i>, with understorey of <i>Eremophila</i> spp.</p> <p>3. Creek Line: Dominated by <i>Eucalyptus clelandii</i> and <i>E. camaldulensis</i> spp. <i>obtusa</i>.</p>	<p>Jabiru Metals Ltd has applied to clear up to 60 hectares for the purpose of constructing a gas pipeline on Miscellaneous License L37/134 and L37/167. The application area is approximately 55km North-North West of Leonora. Vegetation to be cleared consists primarily of mulga (<i>Acacia aneura</i>) associated with flats and rocky outcrops.</p>	<p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)</p>	<p>McMillan et al (2006) described the vegetation as undisturbed but has not ranked the vegetation condition by any recognised scale. However, the application area is located within Tarmoola and Sturt Meadows Stations and as such the vegetation has been subject to grazing pressure.</p> <p>The assessing officer conducted a site visit on 21st November 2006. During the visit the assessing officer confirmed the vegetation types as described by McMillan et al (2006) and inspected the site of a proposed creek crossing. The vegetation type 'mulga low woodland' is very extensive. The 'rocky outcrop' vegetation type occurs on rocky outcrops and is essentially a subset of the mulga low woodland. The proposed pipeline route avoids most rocky outcrops. The 'creek line' vegetation type of Wilson's Creek is extensive upstream and downstream of the proposed creek crossing. Vegetation condition could be ranked from 'good' to 'very good' using the Keighery Scale (Keighery, 1994)</p>

### 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 occurs within the Murchison IBRA Bioregion (GIS Database). This Bioregion is noted for its internal drainage and extensive areas of elevated red desert sandplains with minimal dune development (CALM, 2002). Salt lake systems are associated with the occluded paleodrainage system (CALM, 2002). Vegetation is dominated by mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands (CALM, 2002). The bioregion is rich and diverse in both its flora and fauna but most species are wide ranging and usually occur in adjoining regions (CALM, 2002).

Within the bioregion, woodlands and shrublands (*Acacia*, chenopod, *Melaleuca*, *Casuarina* and *Eucalyptus*) and grasslands are generally in fair or good condition and are either declining or show a static trend (CALM, 2002). All of these communities are threatened by grazing (stock, goats and rabbits) and changed fire regimes (CALM, 2002). The vegetation types within the application area are in similar condition. The application area is within the Sturt Meadows and Tarmoola Stations (GIS database) and has therefore been subject to grazing pressures. The area is also grazed by feral goats, as was witnessed by the assessing officer during the site visit in November 2006 where goats were observed within the area under application.

More than 40 per cent of the Murchison's original mammalian fauna is now regionally extinct (CALM, 2002). This is due to competition from other herbivores and predation by foxes and wild dogs (CALM, 2002). Rare species for the subregion include, Great Desert Skink (*Egernia kintorei*), Mallee Fowl (*Leipoa ocellata*), Alexandra's Parrot (*Polytelis alexandrae*) and Mulgara (*Dasyercus cristicauda*) (CALM, 2002). Of these, only the Malleefowl could be considered to possibly occur within the application area (Shepherdson, 2006).

During an inspection of the application area, the assessing officer noted a lack of understorey species in some areas and considered the vegetation condition to range from 'good' to 'very good' on the Keighery scale (Keighery, 1994). Past mining activity was also evident.

It is not considered that the application area is an area of outstanding biodiversity in the local area, or in the bioregion.

The Biodiversity Coordination Section of the Department of Environment and Conservation (DEC) state "DEC has previously provided preliminary advice to DoIR's Native Vegetation Assessment Branch regarding the adequacy of the flora/vegetation and fauna surveys submitted by the proponent for this proposal. DEC notes that the survey practitioner has subsequently provided amendments to the original survey reports to enable a more thorough assessment of the relevant clearing principles. Following the review of these reports and taking into account the findings of the site assessment undertaken by the DoIR Assessing Officer, it appears that the vegetation under assessment is representative of typical vegetation encountered in the local area and bioregion and is not restricted in nature or of significant biodiversity value. On this basis this proposal is unlikely to be at variance to this clearing principle." (DEC, 2007).

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

##### Methodology

CALM (2002)  
DEC (2007)  
Keighery (1994)  
McMillan et al (2006)  
Shepherdson (2006)  
GIS database:  
-Pastoral Leases - DOLA 10/01  
- Interim Biogeographic Regionalisation of Australia – EA 18/10/00

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

##### Comments

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

A desktop search of the Western Australian Museum (WAM) Faunabase by the assessing officer reveals no fauna species of conservation significance within a 50 km radius of the application area (Western Australian Museum, 2006).

A search of available GIS databases reveals one record of a Bilby (*Macrotis lagotis*) (Schedule 1, Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) sighting from 1981, approximately 6 km north of the application area (GIS databases). Bilbies were formerly known to occupy habitat ranging from *Eucalyptus* and *Acacia* woodlands in the wheatbelt of Western Australia to *Triodia* grasslands in the desert regions. They require sandy or loamy soil in which to burrow. Bilbies are now only found in areas where foxes do not occur or are not abundant, including the driest and least fertile parts of their former range. The major habitats they now occupy within WA include mulga scrub and hummock grasslands on sandplains, or along drainage or salt lake systems (DEC, 2006a). The Mulga Low Woodland vegetation type identified by (McMillan et al, 2006), may provide potential Bilby habitat, although they would be subject to

predation by foxes and wild dogs, as well as grazing pressure by rabbits and stock.

A fauna survey conducted in 2005 by Biota Environmental Services on mining tenements adjoining this application area recorded the Peregrine Falcon (*Falco peregrinus*) (Schedule 4, Other Specially Protected Fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) (Biota Environmental Services, 2005). Two birds were observed hunting over the old mine pit each day of the survey. This species occurs across most of Australia in a wide variety of habitats and has a large home range typically of 20-1500 sq km. The area of disturbance associated with application area should not have an adverse effect on this species considering the large area of its home range.

Jabiru Metals Ltd commissioned Ecotec WA to conduct a Level 1 fauna survey over the application area in August 2006. The subsequent report submitted to DOIR was not adequate to enable the assessor to complete the assessment. Ecotec WA were requested by the assessor to make additions and amendments to their survey report. This updated report (Shepherdson, 2006) was received in November 2006.

The survey involved a desktop search of DEC's threatened fauna database to identify those species of conservation significance that could potentially occur within the application area, a review of known literature to compile a species list for the area and a risk assessment of the likelihood of the proposed clearing impacting on those species. A field survey was also conducted to determine if vegetation types present were potential habitat for conservation significant species.

The survey identified the following species that could potentially occur within the application area: Malleefowl (*Leipoa ocellata*), Bilby (see above), Mulgara (*Dasyercus cristicauda*), Inland Western Rosella (*Platycercus icterotis xanthogenys*), Wood Sandpiper (*Tringa glareola*), Common Sandpiper (*Tringa nebularia*), Sharp-tailed Sandpiper (*Calidris acuminata*), Red Necked Stint (*Calidris ruficollis*), Peregrin Falcon (see above), Woma (*Aspidites ramsayi*), South West Carpet Python (*Morelia spilota imbricata*), Major Mitchell Cockatoo (*Cacatua leadbeateri*), Australian Bustard (*Ardeotis australis*), Bush Stone Curlew (*Burhinus grallarius*) and Grey Falcon (*Falco hypoleucos*) (Shepherdson et al, 2006).

The Wood Sandpiper, Common Sandpiper, Sharp-tailed Sandpiper and Red Necked Stint are all Migratory species protected under international agreements (Schedule 3, Fauna protected under international agreements, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*). Shepherdson (2006) suggests that these species could visit lakes and major creeks after significant rainfall events. Should they visit the area under application, the impact to these species from the proposed clearing will be insignificant as there are many kilometres of suitable habitat upstream and downstream of the proposed creek crossing.

The Malleefowl is a Schedule 1 species (Fauna in need of special protection) in accordance with the *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*. Although no active Malleefowl mounds are known to exist within the application area, suitable Malleefowl habitat is known to occur within the application area, as identified by McMillan et al (2006). Pipeline construction should avoid active mounds if observed.

The vegetation types present within the application area would not support Mulgara populations (Schedule 1, Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) and therefore, the proposed clearing is not likely to impact on the conservation of this species.

The Woma (Schedule 4, Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) is described as favouring open myrtaceous heath on sandplains, and dunefields dominated by spinifex (DEC, 2006a). The vegetation types present within the application area (mulga low woodlands) are unlikely to provide habitat for the woma python.

The South West Carpet Python (Schedule 4, Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) is described as occurring in inland habitats, *Banksia* woodland, eucalypt woodlands, and grasslands (DEC, 2006a). The vegetation types present within the application area may support South West Carpet Python populations, however, where carpet pythons occur they do so at low densities, and there is a vast amount of suitable habitat that carpet pythons are able to utilise both in the local area and the region generally. Although this species is not particularly mobile, it is considered unlikely that the conservation of this species will be significantly impacted by the proposed clearing.

The Major Mitchell Cockatoo (Schedule 4, Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) occurs in semi-arid and arid areas where suitable nesting (large eucalypts) and food species (*Acacia*, *Callitris*) occur (Slater et al, 1994). Major Mitchell Cockatoos were observed by Shepherdson (2006) and is likely to utilise the *Eucalyptus camaldulensis* found along the major creeklines for roosting and nesting, as well as obtaining water from the remaining pools. There is extensive habitat upstream and downstream of the proposed creek crossing and the conservation of this species is not likely to be significantly impacted by the proposed clearing. Jabiru Metals have committed to avoiding the removal of large *E. camaldulensis* at creek crossings (Jabiru, 2006).

Australian Bustards (Priority 4, As listed by DEC's own Priority Fauna List) are uncommon within the Goldfields region. There are vast amounts of vegetation in the local area that Bustards can utilise and the proposed clearing will not significantly impact the conservation of this species.

The Bush Stone Curlew (Priority 4, As listed by DEC's own Priority Fauna List) prefer open vegetation with sparse understorey (Shepherdson, 2006). The vegetation within the application area may provide habitat for this species, however, there are vast amounts of vegetation that Bush Stone Curlews in the local area can utilise and the proposed clearing will not significantly impact the conservation of this species.

The Grey Falcon (Priority 4, As listed by DEC's own Priority Fauna List) is described as occurring on inland drainage systems where there is an average annual rainfall of less than 500 mm (Garnet et al, 2000). It frequents timbered lowland plains, particularly *Acacia* shrublands that are crossed by tree-lined watercourses. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) (Garnett et al, 2000). If the species occurs within the application area, there is extensive habitat upstream and downstream of the proposed creek crossing and hence the conservation of this species is not likely to be significantly impacted by the proposed clearing. Jabiru Metals have committed to avoiding the removal of large *E. camaldulensis* at creek crossings (Jabiru, 2006).

Clearly, the creekline vegetation type is significant fauna habitat due to its large Eucalypt trees, water pools and sandy substrate. However, the vegetation type is extensive upstream and downstream of the proposed creek crossing and it is not likely that the proposed clearing will significantly impact on the fauna habitat. Jabiru Metals have committed to avoiding the removal of large *E. camaldulensis* at creek crossings (Jabiru, 2006).

The Biodiversity Coordination Section of the Department of Environment and Conservation (DEC) state "Due to the temporary nature of the pipeline development and based on the provision that adequate rehabilitation is undertaken to re-establish vegetation within the disturbance area, this proposal is unlikely to have a significant impact on fauna which may persist in the application area. However special consideration should be taken by the proponent during the construction of the pipeline to avoid disturbance to riparian vegetation on the numerous creeklines which intercept the pipeline route, particularly Wilson's Creek, which is likely to be a locally important habitat for native fauna." (DEC, 2007)

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

**Methodology** Biota Environmental Services (2005)  
DEC (2006a)  
DEC (2007)  
EPA (2004a)  
Garnet et al (2000)  
Jabiru (2006)  
McMillan et al (2006)  
Shepherdson (2006)  
Slater (1994)  
Western Australian Museum (2006)  
GIS database:  
- Threatened Fauna - CALM 1/9/05

**(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**

A search of available GIS databases did not identify any rare or priority flora species within the application area (GIS Database). There are several records of *Hemigenia exilis* (P4) and *Grevillea inconspicua* (P4) occurring within a 10 km radius of the application area (GIS Database).

*H. exilis* is described as inhabiting laterite breakaways and slopes and its known distribution is confined to the Murchison IBRA Region (Western Australian Herbarium, 2006).

*G. inconspicua* is described as inhabiting drainage lines on rocky outcrops, and creeklines (Western Australian Herbarium, 2006). Its known distribution is confined to the Murchison IBRA Region (Western Australian Herbarium, 2006).

A flora survey conducted by Jims Seeds, Weeds & Trees (2004) on mining tenements adjoining this clearing permit application identified three priority species: *Phyllanthus baeckeoides* (P1), *Baeckea* sp Melita Station (P3) and *Calytrix uncinata* (P3).

*P. baeckeoides* is known from five populations within the Murchison IBRA Region (Western Australian Herbarium, 2006). Shepherdson (2005) found that *P. baeckeoides* appears to be geographically restricted to rocky slopes where it grows in association with *Acacia aneura* and *A. quadrimarginea* on suitable soil type. Whilst the exact nature of this association is not known, upon reaching maturity, plants are commonly seen growing independent of the *Acacia* species. Shepherdson (2005) also noted that the species appears to thrive in disturbed areas.

*Baeckea* sp. Melita Station is described as occurring on dark red rocky soil over ironstone within mulga

shrubland (Western Australian Herbarium, 2006). Its known distribution is confined to the Murchison IBRA Region (Western Australian Herbarium, 2006). It is known from 17 locations, across the region and it is possible that the species is located throughout this range in suitable soil types, topography and habitat (Western Australian Herbarium, 2006).

*C. uncinata* is described as occurring on white or red sand, or sandy clay soils associated with granite or sandstone breakaways and rocky rises (Western Australian Herbarium, 2006). It is known from 17 locations, mainly Eastern Murchison IBRA sub-region, but is also located in the West Murchison IBRA sub-region and Yalgoo IBRA Region (Western Australian Herbarium, 2006). It is possible that the species is located throughout this range in suitable soil types, topography and habitat.

A flora survey was conducted over the application area between 5-7<sup>th</sup> June 2006 by Ecotec WA over the application area. The subsequent report submitted to DoIR was not adequate to allow the assessing officer to complete the assessment. Ecotec WA were requested to make additions and amendments to the report. This updated report (McMillan et al, 2006) was received on 24<sup>th</sup> November 2006.

The survey involved a desktop search of the DEC Threatened Flora database within a 50 km radius of the midpoint of the application area and a field investigation that involved traversing the application area by vehicle and on foot. Nineteen transects were placed at intervals within the application area and all flora species were recorded. A search was also conducted within the application area for the presence of rare and priority flora species.

The flora survey and rare flora search did not locate any conservation significant species within the application area. The report did identify the following species in addition to those listed above as being recorded within a 50km radius from the midpoint of the application area (McMillan et al, 2006): *Baeckea* sp. Sandstone (P1), *Stenanthemum patens* (P1), *Thryptomene* sp. Leinster (P1), *Calytrix erosipetala* (P3) and *Sauropus ramosissimus* (P3).

*Baeckea* sp. Sandstone is recorded as inhabiting red sandy soils within Low Woodlands dominated by *Eucalyptus kingsmillii* and *E. gongylocarpa*, over mixed low scrub, over low heath and hummock grass (McMillan et al, 2006). This vegetation type does not occur within the application area and it is unlikely that this species occurs there.

*S. patens* is recorded as inhabiting low basalt hills and rocky hillsides in Low *Acacia* shrub. The proposed pipeline avoids most rocky outcrops within the application area and therefore the likelihood of the proposed clearing impacting on a population of *S. patens* is very low (McMillan et al, 2006).

*Thryptomene* sp. Leinster is recorded as inhabiting the flat tops of breakaways within open mulga shrublands. The proposed pipeline avoids most rocky outcrops within the application area and therefore the likelihood of the proposed clearing impacting on a population of *Thryptomene* sp. Leinster is very low (McMillan et al, 2006).

*C. erosipetala* is recorded as inhabiting red brown loam on low ridges of decomposing granite within low *Acacia* shrublands. The proposed pipeline avoids most rocky outcrops within the application area and therefore the likelihood of the proposed clearing impacting on a population of *C. erosipetala* is very low (McMillan et al, 2006).

*S. ramosissimus* is recorded as inhabiting greenstone hills and ironstones within Mulga shrublands. The proposed pipeline avoids most rocky outcrops within the application area and therefore the likelihood of the proposed clearing impacting on a population of *S. ramosissimus* is very low (McMillan et al, 2006).

The Biodiversity Coordination Section of the Department of Environment and Conservation (DEC) state "According to DEC Corporate databases, both DEFL and WAHERB, there are several records of Priority flora located from within a 50km radius of the application area, these include the following;

*Baeckea* sp. Sandstone P1  
*Philotheca tubiflora* P1  
*Stenanthemum patens* P1  
*Thryptomene* sp. Leinster P1  
*Baeckea* sp. Melita Station P1  
*Calytrix erosipetala* P3  
*Calytrix praecipua* P3  
*Calytrix uncinata* P3  
*Sauropus ramosissimus* P3  
*Grevillea inconspicua* P4  
*Hemigenia exilis* P4

The original flora report submitted by the proponent was subsequently amended to provide further information for the assessment of this proposal (McMillan et al, 2006). DEC notes that this flora survey did not identify the presence of any conservation significant flora species and as such this proposal is unlikely to be at variance to this principle." (DEC, 2007).

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

**Methodology** DEC (2007)  
EPA (2004b)  
Jims Seeds, Weeds & Trees (2004)  
McMillan et al (2006)  
Shepherdson (2005)  
Western Australian Herbarium (2006)  
GIS database:  
- Declared Rare and Priority Flora List - CALM 1/7/05

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

**Comments** **Proposal is not likely to be at variance to this Principle**  
A search of available databases reveals that there are no Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest TEC is located approximately 90 km north west of the application area (GIS database). DEC (2006b) have advised that this is the Depot Springs Stygofauna Community. This TEC contains an assemblage of stygofaunal species not known from anywhere else. The proposed clearing will not impact this community and is unlikely to have any impact on stygofaunal communities that may be present within local groundwater.

A vegetation survey over the application area by McMillan et al (2006) identified three vegetation types. None of these vegetation communities could be considered to be threatened ecological communities.

The Biodiversity Coordination Section of the Department of Environment and Conservation state 'According to DEC Corporate databases, there are no known TECs recorded from the proposed gas pipeline corridor and having regard to the vegetation communities identified from the flora and vegetation survey (McMillan et al, 2006), it is unlikely that any Threatened Ecological Communities would be present in the application area' (DEC, 2006a).

Based on the above, it is not likely that the proposal is at variance to this principle.

**Methodology** DEC (2006b)  
DEC (2007)  
McMillan et al (2006)  
GIS Database:  
- Threatened Ecological Communities - CALM 12/4/05

**(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

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

	Pre-European area (ha)	Current extent (ha)	Remaining %	Conservation Status	Pre-european % in IUCN Class I-IV Reserves
IBRA Bioregion – Murchison	28,120,558*	28,120,558*	100*	Least Concern**	1.1*
Shire of Leonora	3,191,565***	N/A	N/A	N/A	N/A
Beard vegetation associations (Murchison)					
18	12,403,248*	12,403,248*	100*	Least Concern**	0.4*
28	224,294*	224,294*	100*	Least Concern**	Nil*
29	2,956,412*	2,956,412*	100*	Least Concern**	Nil*
39	1,148,411*	1,148,411*	100*	Least Concern**	0.02*

\* Shepherd et al. (2001)

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

\*\*\* GIS database

Options to select from: Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment 2002)

Presumed extinct	Probably no longer present in the bioregion
Endangered*	<10% of pre-European extent remains
Vulnerable*	10-30% of pre-European extent exists
Depleted*	>30% and up to 50% of pre-European extent exists
Least concern	>50% pre-European extent exists and subject to little or no degradation over a majority of this area.

\* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

Explanation:

At a regional level, the Murchison IBRA Region remains at approximately 100% of its pre-european vegetation extent (Shepherd et al, 2001). According to the 'Bioregional Conservation Status of Ecological Vegetation Classes' (Department of Natural Resources and Environment, 2002), these values give the region a Conservation Status of 'Least Concern'.

The proposed clearing area falls within the Shire of Leonora (GIS Database). There is no information as to the Shire's current vegetation extent.

Within the bioregion, all four Beard vegetation associations (18, 28, 29, 39) that are identified as occurring within the application area remain at approximately 100% of their pre-european vegetation extent. According to the 'Bioregional Conservation Status of Ecological Vegetation Classes' (Department of Natural Resources and Environment, 2002), these values give the vegetation types a Conservation Status of 'Least Concern'.

Whilst very little vegetation is protected within conservation reserves within the Murchison IBRA Bioregion, as the bioregion remains largely uncleared, the conservation of these vegetation associations is not likely to be significantly affected by this proposal.

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:  
 - Local Government Authorities - DLI 8/7/04

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

According to available databases (GIS database), there are many minor non-perennial drainage lines that the pipeline must cross. However, following a site inspection by the assessing officer it is clear that the majority of these drainage lines do not normally carry water and are not host to riparian vegetation. The only significant drainage line within the application area is Wilson's Creek, which is approximately 30 m wide and has banks approximately 5 - 6 metres deep in some places. This creek is likely to flow after heavy rainfall and retains small water pools in deep shady areas for lengthy periods. The creek is host to River Red Gums (*Eucalyptus camaldulensis*) as well as some reed or sedgelike species. The vegetation is riparian in nature, and is significant fauna habitat within the local area. Riparian vegetation does not extend more than 10 m from the creek.

The proposed creek crossing for the gas pipeline involves clearing a corridor approximately 10 metres wide on each side of the creek. Following construction, the banks will be rehabilitated and erosion control measures put in place to prevent the banks from eroding. This must be done to ensure the pipeline remains underground. Exposure of the pipeline following erosion would be extremely dangerous as the leaking of gas could spark an ignition. The proponent is aware of this potentially dangerous situation and is committed to the use of engineering methods to ensure that erosion does not occur.

Under conditions imposed on this permit, the permit holder will be required to rehabilitate the areas cleared.

It is the proponents responsibility to liaise with the Department of Water to determine if a Bed and Banks Permit is required to construct the creek crossing.

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

**Methodology** GIS database:  
 - Hydrography, Linear - DoE 1/2/04

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

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

The application area falls within the following land systems: Nubev, Hamilton, Bevon, Tiger, Monitor, Monk and Wilson (DAFWA, 2007).

DAFWA (2007) have provided the following advice in relation to the potential for land degradation:

"In summary the proposed pipeline route will cross many drainage lines. On all land units, the drainage zones are generally at moderate risk of soil erosion if cleared and disturbed" (DAFWA, 2007).

"The alluvial fan and wash plains units at the western end of the proposed route are highly susceptible to soil erosion. It is likely that areas of greatest risk will already be severely degraded and eroded and great care will need to be exercised during construction to avoid exacerbating the problem" (DAFWA 2007).

"Away from the defined drainage zones, the pipeline will traverse land units that are subject to sheet flow conditions. Any alteration of the natural flow regime by the proposed works is likely to adversely affect the native vegetation down gradient through water starvation" (DAFWA, 2007).

"Therefore it is concluded that the proposed clearing is likely to be at variance to principle 'g' for soil erosion and loss of native vegetation through water starvation" (DAFWA, 2007).

A condition has been placed on the permit requiring the permit holder to implement appropriate erosion control measures.

Three weed species were identified during a flora survey over the application area (McMillan et al, 2006). A condition has been placed on the permit requiring the permit holder to remove new weed populations that may occur along the length of the pipeline, and to apply appropriate hygiene measures when clearing the vegetation.

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

**Methodology** DAFWA (2007)  
McMillan et al (2006)

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

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

There are no conservation reserves within a 10 km radius of the application area. The nearest conservation reserve is Wanjarri Nature Reserve, located approximately 85 km north of the application area (GIS database).

The vegetation to be cleared does not contribute significantly to the environmental values of a conservation area and is not a buffer to a conservation area. The clearing is of a linear nature (pipeline) which will not impact upon ecological linkages between vegetation remnants.

Whilst the vegetation types located in the application area are not well represented in conservation estate, the vegetation both locally and regionally is uncleared and therefore the conservation of those vegetation types will not be significantly impacted by the proposed clearing.

The Biodiversity Coordination Section of the Department of Environment and Conservation (DEC) state "There are no conservation areas within a 50km radius of the proposed clearing area and as such this proposal is not at variance to this clearing principle" (DEC, 2007).

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

**Methodology** DEC (2007)  
GIS database:  
- CALM managed lands and waters - CALM 1/7/05

**(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

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

The application area is subject to a semi-arid to arid climate with hot, dry summers and cool to mild winters. The average annual rainfall is 229 mm at Leonora, but this is unreliable and the area is often subjected to both drought and localised short-term floods (DoE, 2004). Rainfall is evenly distributed between the summer and winter months, although heaviest in summer, when it is associated with thunderstorm activity or rainbearing depressions formed from tropical cyclones (DoE, 2004). The likelihood of run-off causing an increase in

turbidity and sedimentation downstream is therefore low.

Average annual potential evaporation ranges from approximately 3400 mm to 3600 mm (DoE, 2004). Evaporation is greatest during the summer months of January and February and lowest during the winter months of June and July (DoE, 2004).

Groundwater recharge constitutes a very small proportion of rainfall, most of which is either directly evaporated or utilised by the native vegetation, with a small component of runoff discharging into claypans and playa lakes (DoE, 2004). Most recharge is likely to occur during heavy rainfall, when it is augmented by recharge from surface runoff and local flooding (DoE, 2004).

The application area is located within the Raeside Palaeodrainages catchment area (DoE, 2004). There are no permanent rivers; intermittent streamflow occurs only after major rainfall and the water runs into playa lakes (DoE, 2004). The Raeside catchment area is not a Public Drinking Water Source Area (GIS Database).

Depth to groundwater is dependent on topography and ranges from less than 1 m in playa-lake environments to more than 40 m in elevated areas (DoE, 2004). The application area occurs higher in the landscape and therefore, the removal of up to 60 ha of vegetation over a 30 km pipeline corridor is not likely to affect groundwater levels at such depths.

The distribution of groundwater salinity is related to topography (DoE, 2004). Groundwater tends to become more saline towards and along the drainage lines, particularly the palaeodrainages, with the lowest salinity groundwater beneath catchment divides (DoE, 2004). Groundwater salinity ranges from less than 1000 mg/L total dissolved solids (TDS) in fractured-rock aquifers along catchment divides, to more than 200 000 mg/L TDS in brines in palaeochannels, adjacent playa lake sediments, and in fractured and weathered bedrock (DoE, 2004). The removal of up to 60 ha of vegetation over a 30 km pipeline corridor is not likely to affect groundwater quality at such depths.

The pH ranges from neutral to slightly alkaline with most groundwater sampled having a pH between 7.0 and 8.1 (DoE, 2004). The removal of 60 ha vegetation is not likely to alter the pH of groundwater.

During a site visit conducted by the assessing officer, the proposed site of a creek crossing was inspected. It was noted that a 10m wide corridor would need to be cleared initially to construct the pipeline. This could cause some low levels of silt to enter the creek after rainfall until revegetation has established. The assessing officer considers that the low levels of added silt will not make a difference to water quality within the creek, which is likely to be high in silt whilst the creek is flowing after large rainfall events.

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

**Methodology** DoE (2004)  
GIS Database:  
- Public Drinking Water Source Areas (PDWSAs) - DoW

**(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

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

The application area is subject to a semi-arid to arid climate with hot, dry summers and cool to mild winters. The average annual rainfall is 229 mm at Leonora (DoE, 2004), but this is unreliable and the area is often subjected to both drought and localised short-term floods. Rainfall is evenly distributed between the summer and winter months, although heaviest in summer, when it is associated with thunderstorm activity or rainbearing depressions formed from tropical cyclones (DoE, 2004).

Average annual potential evaporation ranges from approximately 3400 mm to 3600 mm (DoE, 2004). Evaporation is greatest during the summer months of January and February and lowest during the winter months of June and July (DoE, 2004).

There is little likelihood that the area is subject to flooding during normal rainfall events due to limited rainfall and high evaporation rates. The area would be subject to flooding during extreme rainfall events such as tropical downpours. The linear nature of the proposed clearing is not likely to lead to an incremental increase in flood duration or height during extreme rainfall events.

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

**Methodology** DoE (2004)

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

**Comments**

There are two native title claims over the area under application. These claims (WC99/001) and (WC99/010) have been registered with the National Native Title Tribunal on behalf of the claimant groups (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*.

According to the Department of Indigenous Affairs website, one aboriginal heritage site is located within L37/134 (Wilson's Creek 2006/01) (DIA, 2006). 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** DIA (2006)  
 GIS Database:  
 - Native Title Claims - DLI 7/11/05

**4. Assessor's recommendations**

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Building or Structure	Mechanical Removal	60	Grant	<p>The proposal has been assessed against the clearing principles and the proposal has been found to be not at variance to principle e and h, not likely to be at variance to principles a, b, c, d, i and j, may be at variance to principles f and g.</p> <p>The assessing officer recommends the permit be granted subject to the following conditions:</p> <ol style="list-style-type: none"> <li>The Permit Holder shall record the following for each instance of clearing:                             <ol style="list-style-type: none"> <li>the location of where the clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system;</li> <li>the size of the area cleared in hectares;</li> <li>the dates on which the area was cleared; and</li> <li>the purpose for which the vegetation was cleared.</li> </ol> </li> <li>The Permit Holder shall record the following for each instance of clearing:                             <ol style="list-style-type: none"> <li>the co-ordinates of areas rehabilitated using Geocentric Datum Australia 1994;</li> <li>the size of the areas rehabilitated in hectares; and</li> <li>the dates on which the area was rehabilitated.</li> </ol> </li> <li>The Permit Holder shall provide a report to the Director, Environment, Department of Industry and Resources by 30 June each year for the life of the permit setting out the records required under condition 1 and 2 of this permit in relation to clearing carried out during the previous 12 months. This report can be as an addendum to the Annual Environmental Report submitted to the Department of Industry and Resources and must also include information as to how the Permit Holder has complied with all other conditions.</li> <li>When undertaking any clearing, revegetation and rehabilitation, or other activity pursuant to this Permit the Permit Holder must take the following steps to minimise the risk of the introduction and spread of weeds:                             <ol style="list-style-type: none"> <li>clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;</li> <li>ensure that no weed-affected road building materials, mulch, fill or other material is brought into the area to be cleared; and</li> <li>restrict the movement of machines and other vehicles to the limits of the areas to be cleared.</li> </ol> </li> <li>At least once in each 12 month period for the term of this Permit, the Permit Holder must remove or kill any weeds growing within areas cleared, revegetated and rehabilitated under this Permit.</li> <li>The Permit Holder shall stockpile the vegetative material and topsoil removed by clearing in accordance with this permit and use in rehabilitation under condition 7.</li> <li>For each instance of clearing recorded under condition 1, the Permit Holder shall, within 6 months of the burial of the pipeline, rehabilitate all cleared areas by</li> </ol>

re-shaping the surface of each cleared area, so that the shape of the surface of the rehabilitated area is consistent with the shape of the surrounding 5 metres of uncleared land, and re-spreading the topsoil and vegetative material stockpiled under condition 6 over each cleared area.

8. Condition 7 does not apply to an area required to remain open for the purpose of a vehicle access track wide enough to allow the passage of a large vehicle.

9. The Permit Holder shall implement appropriate erosion control measures to minimise potential erosion when clearing within 50 metres of Wilson's Creek

In this permit, **Annual Environmental Report** means a report produced as a requirement under the Mining Act, 1974.

## 5. References

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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.
WAM	Western Australian Museum.

### 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.

