



1. Application details

1.1. Permit application details

Permit application No.: 2424/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Western Areas NL

1.3. Property details

Property: Miscellaneous Licence 70/109
Miscellaneous Licence 70/111
Miscellaneous Licence 74/44
General Purpose Lease 70/226
General Purpose Lease 70/231
Local Government Area: Shire Of Kondinin & Shire Of Lake Grace
Colloquial name: Digger Rocks – Mossco's Farm Dewatering Pipeline and Evaporation Ponds

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia and are useful to look at vegetation extent in a regional context. Three Beard vegetation associations are located within the application area (GIS Database):

519: Shrublands; mallee scrub, *Eucalyptus eremophila*. According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 519 is a mallee shrubland of *Eucalyptus eremophila* over *Melaleuca* sp.

936: Medium woodland; salmon gum. According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 936 is a woodland dominated by *Eucalyptus salmonophloia* over *Melaleuca lateriflora*, *Santalum acuminatum*, over *Olearia muelleri*, *Grevillea huegelii* and *Gahnia ancistrophylla*.

2048: Shrublands; scrub-heath in the Mallee Region. According to the Shared Land Information Platform (SLIP, 2008), Beard vegetation association 2048 has been divided into two sub-types. Both of these sub-types occur within the application area. These sub-types are:

2048: A shrub layer including *Acacia* sp., *Allocasuarina acutivalvis*, *Adenanthos argyreus*, *Calothamnus lateralis*, *Melaleuca* sp., *Hakea* sp., *Allocasuarina campestris*, over a ground layer of *Verticordia* sp., *Dryandra* sp., *Melaleuca* sp. *Baeckea* sp., *Leucopogon* sp., *Isopogon* sp., *Petrophile* sp. and *Banksia* sp.

2048.100098: A Shrub layer including *Acacia fragilis*, *Acacia multispicata*, *Grevillea excelsior*, *Hakea falcata*, *Leptospermum erubescens*, *Allocasuarina acutivalvis*, *A. campestris*, *A. corniculata*, *A. pinaster*, *Grevillea hookeriana*, *Hakea platysperma*, *Hakea scoparia*, *Santalum acuminatum* over a lower shrub layer of *Adenanthos argyreus*, *Acacia fragilis*, *Banksia sphaerocarpa*, *B. violacea*, *Calothamnus lateralis*, *Dryandra cirsioides*, *Grevillea* sp., *Isopogon* sp. *Petrophile* sp., over a ground layer including *Baeckea* sp., *Boronia caerulea*, *Brachysema daviesioides*, *Calytrix brachyphylla*, *Conospermum* sp., *Melaleuca* sp., *Microcorys* sp., *Leucopogon* sp. and *Verticordia* sp.

Three separate flora surveys were conducted over the application area by Botanica Consulting. One flora survey covered the dewatering pipeline route, whilst the others covered the evaporation pond site.

As a result of the surveys a total of nine vegetation types were identified within the application area. These were (Botanica Consulting, 2006):

Transitional Tall *Eucalyptus* woodland: Dominated by *Eucalyptus flocktoniae* ssp. *flocktoniae* and *E. urna* over a mid-storey of *Melaleuca* sp., *Daviesia nematophylla*, *Senna artemisioides* ssp. *filifolia*, *Halgania andromedifolia* and *Dodonaea bursariifolia* over an under-storey of *Olearia muelleri*, *Wilsonia humilis*, *Atriplex stipitata*, *Astroloma serratifolium*, *Acacia intricata*, *A. deficiens* and *Microcybe albiflora*.

Cleared Farmland: Species include *Ptilotus polystachyus* ssp. *polystachyus*, *Acacia lasiocalyx*, *Daviesia benthamii* ssp. *acanthoclada*, *Urodon dasyphyllus*, *Grevillea cagiana*, *Hakea erecta* and *Drummondita hassellii*.

Sandplain regrowth: Upper-storey of *Acacia lasiocalyx* and *Eucalyptus* sp. over a mid-storey of *Melaleuca cordata*, *M. adnata*, *Daviesia nematophylla* and *Exocarpos aphyllus*, over an under-storey of *Acacia sphacelata* ssp. *sphacelata*, *Verticordia chrysantha* and *Grevillea huegellii*.

Casuarina shrubland: Upper-storey of *Allocasuarina acutivalvis*, *A. corniculata* and *Eucalyptus leptophylla* over a mid-storey of *Acacia yorkrakinensis*, *A. cracentis*, *Leptospermum erubescens*, *Melaleuca cordata*, *Banksia elderiana*, *Dryandra cirsioides*, *Grevillea eriostachya* and *Hakea scoparia*, over an under-storey of *Hibbertia pungens*, *H. gracilipes*, *Dampiera eriocephala*, *Beaufortia interstans*, *Verticordia chrysantha* and *Drummondita hassellii*.

Sandplain heath: Upper-storey of *Allocasuarina campestris* and *Callitris preissii* over a mid-storey of *Acacia multispicata*, *Calothamnus quadrifidus*, *Leptospermum erubescens*, *Melaleuca teuthidoides*, *Banksia elderiana*, *Grevillea cagiana*, *Hakea erecta* and *Santalum acuminatum*.

Fire regeneration: Upper-storey of *Grevillea cagiana*, *G. eriostachya* and *Banksia elderiana*, over a mid-storey of *Goodenia pinifolia*, *Eremophila densifolia*, *Melaleuca cordata* and *G. shuttleworthiana* ssp. *obovata*, over an under-storey of *Lepidosperma brunonianum*, *Verticordia chrysantha* and *Drummondita hassellii*.

Eucalyptus mallee woodland: Upper-storey of *Eucalyptus eremophila* ssp. *eremophila*, *E. calycogona* and *E. cylindrocarpa* over an mid-storey of *Eremophila drummondii*, *Melaleuca adnata*, *M. elliptica*, *M. hamata*, *Daviesia benthamii* ssp. *acanthoclada* and *Hakea multilineata*, over an under-storey of *Cooperhookea strophiolata*, *Westringia cephalantha*, *Acacia sphacelata* ssp. *sphacelata* and *A. intricata*.

Melaleuca thicket: Upper-storey of *Eucalyptus suggrandis* ssp. *promiscua*, *Melaleuca hamata* over a mid-storey of *Goodenia pinifolia*, *Acacia hadrophylla*, *Leptospermum erubescens* and *Grevillea huegellii* over an under-storey of *Lepidosperma brunonianum*, *Cooperhookea strophiolata*, *Westringia cephalantha*, *Grevillea acuaria* and *Dodonaea bursariifolia*.

Eucalyptus rugulata woodland: Upper-storey of *Eucalyptus flocktoniae* ssp. *flocktoniae* and *E. rugulata* over a mid-storey of *Allocasuarina campestris*, *Acacia fragilis*, *A. yorkrakinensis*, *Calothamnus quadrifidus*, *Hakea erecta*, *H. scoparia*, *Persoonia helix* and *Melaleuca cordata*, over an under-storey of *Astoloma serratifolium*, *Hibbertia pungens*, *Westringia cephalantha*, *Acacia sphacelata* ssp. *sphacelata*, *Darwinia inconspicua*, *Verticordia plumosa* var *incrassata* and *Drummondita hassellii*.

Clearing Description	Western Areas NL have applied to clear up to 55 hectares of native vegetation within an application area of approximately 823 hectares, for the purpose of constructing a dewatering pipeline and evaporation pond. The evaporation ponds are to be constructed on largely cleared farmland, whilst the pipeline will follow the existing Carstairs and Mulcahy Roads. Clearing will be via bulldozer or grader, blade down.
Vegetation Condition	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994) To Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).
Comment	Based on a site inspection by the assessing officer in November 2007, the vegetation condition has been rated as ranging from excellent within the parts of the road reserves to good within the patches of vegetation remaining within the cleared areas. The vegetation type 'Cleared Farmland' is completely degraded.

2.1.2.

3. Assessment of application against clearing principles

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

Comments	<p>Proposal is at variance to this Principle</p> <p>The application area occurs within the Western Mallee IBRA sub-Bioregion (GIS Database). This sub-region is characterised by clays and silts underlain by kankar, exposed granite, sandplains, isolated uplands of laterite pavements and salt lake systems (on a granite basement) (CALM, 2002). Mallee communities can be found on a variety of surfaces and <i>Eucalyptus</i> woodlands occur mainly on fine-textured soils, with scrub-heath on sands and laterite (CALM, 2002). Mallee over myrtaceous-proteaceous heaths on duplex (sand over clay) soils are common (CALM, 2002). <i>Melaleuca</i> shrublands characterise alluvia, and <i>Halosarcia</i> low shrublands occur on saline alluvium (CALM, 2002). A mosaic of mixed eucalypt woodlands and mallee occur on calcareous earth plains and sandplains overlying Eocene limestone strata in the east (CALM, 2002).</p> <p>The subregion shows a very high degree of endemism, particularly in the Proteaceae family (632 spp, 99% endemic; 16 genera, 5 endemic), in particular the genera <i>Grevillea</i> and <i>Hakea</i> (CALM, 2002). <i>Eucalyptus</i>, <i>Acacia</i>, <i>Dryandra</i> and <i>Asteraceae</i> also contain very high numbers of endemics (CALM, 2002). Within the application area a total of 272 species were identified from 43 Families (Botanica Consulting, 2006; 2007; 2008). This is a very high level of speciation and reflects the diverse nature of both the eucalypt woodlands</p>
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and heathlands. Myrtaceae, Mimosaceae and Proteaceae families were most diverse within the application area, which is typical of the bioregion. The application area supports vegetation that includes Priority flora species. Areas of cleared farmland are included within the application area and vegetation within the cleared farmland area has been previously disturbed either by clearing or grazing.

More than 75 per cent of the Western Mallee IBRA subregion has been cleared for agriculture (CALM, 2002). Part of this application occurs within that part of the state that has been cleared for agricultural purposes (Intensive Land Use Zone). However, the majority of clearing required will occur within that area of the state that has not been extensively cleared (Extensive Land Use Zone). This part of the state is important for maintaining landscape ecosystem functions.

More than 35 per cent of the Mallee bioregion's original mammal fauna is now regionally extinct (CALM, 2002). This is mainly due to the extensive land clearing that has occurred. The application area is suitable habitat for many conservation significant fauna species, including Malleefowl (*Leipoa ocellata*), Chuditch (*Dasyurus geoffroi*) and the Lake Cronin Snake (*Paraplocephalus atriceps*) which is endemic to the area (Biota, 2007).

Based on the above, the proposed clearing is at variance to this Principle. The assessing officer recommends that should a permit be granted, conditions be imposed which ensure that Priority flora species be avoided where possible and that weed control measures be implemented.

Methodology Biota (2007)
Botanica Consulting (2006)
Botanica Consulting (2007)
Botanica Consulting (2008)
CALM (2002)

(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

Biota Environmental Sciences (Biota) were commissioned by Western Areas NL to conduct a Level 2 fauna assessment over the Digger Rocks project area as well as the proposed pipeline route from the Digger Rocks mine to cleared farmland (the application area) (Biota, 2007). The fauna survey aimed to describe the fauna habitats present, identify any conservation significant habitats, record the fauna assemblage from both desktop database searches and field survey, identify fauna of conservation significance and provide recommendations for the management of perceived impacts to fauna (Biota, 2007). The survey and subsequent report adequately meet the requirements of EPA Guidance Statement 56 "Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia" (EPA, 2004a).

The fauna survey recorded 28 Herpetofauna, 45 Avian and 16 Mammal species (Biota, 2007). Three potential short range endemic (SRE) species were also recorded within the pipeline route. Seven of the 12 fauna sampling sites were located within the application area.

As a result of the fauna survey, the following conservation significant fauna species were recorded or are likely to occur within the application area: Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Malleefowl (*Leipoa ocellata*), Chuditch (*Dasyurus geoffroi*), Western Rosella (*Platycercus icterotis xanthogenys*), South West Carpet Python (*Morelia spilota imbricata*), Shy Groundwren (*Hylacola cauta whitlocki*), Crested Bellbird (*Oreoica gutturalis gutturalis*), White Browed Babbler (*Pomatostomus superciliosus ashbyi*), Western Brush Wallaby (*Macropus irma*), Australian Bustard (*Ardeotis australis*) and Rainbow Bee-eater (*Merops ornatus*).

The Carnaby's White-tailed Black Cockatoo (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) forage in woodland and heath that is dominated by proteaceous species (DEC, 2006a). They nest in hollows of large eucalypts, usually Salmon Gum and Wandoo (DEC, 2006a). The species has severely declined between the 1970's and the present due mainly to extensive land clearing, shooting and nest robbing (DEC, 2006a). The Lake Cronin - Forrestania area is the eastern-most extent of its distribution and it was recorded on 27 occasions from the application area during the survey (Biota, 2007). It is not known if the species breeds in the area, but Biota have indicated that there are large hollow bearing salmon gums in nearby vegetation (Biota, 2007). Whilst the application area occurs within the species eastern-most range, the vegetation to be cleared does not represent significant habitat for the species due to a lack of suitable nesting hollows.

The Malleefowl (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2008*) is largely confined to arid and semi-arid woodland that is dominated by mallee eucalypts on sandy soils, with less than 430 millimetres of rainfall annually (DEC, 2006b). They may also be found in Mulga (*Acacia aneura*), and other sclerophyllous associations (DEC, 2006b). They require sandy soils with an abundance of leaf litter for breeding (DEC, 2006b). Whilst no birds or nesting mounds were recorded during the survey, Western Areas NL staff regularly record the species within the application area (Biota, 2007) and the species almost certainly occurs there. The assessing officer observed a bird several kilometres north of the existing Digger Rocks pit in November 2006. However, there is a large amount of suitable habitat for this species in the area and therefore, the application area is not significant habitat for the Malleefowl.

The Chuditch (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially*

Protected Fauna) Notice 2008) occupies a wide range of habitats from woodlands, dry sclerophyll (leafy) forests, riparian vegetation, beaches and deserts (DEC, 2006c). They have large home ranges of up to 15 sq. km (males) (DEC, 2006c). Chuditch den in hollow logs and burrows and have also been recorded in tree hollows and cavities. Suitable hollow or burrow entrance diameters are often at least 30 centimetres in diameter. An adult female chuditch may utilise an estimated 66 logs and 110 burrows within her home range (DEC, 2006c). This species has been recorded 40 km north of the application area several times by Biota (Biota, 2007). The species may occur within the application area, particularly given the feral animal control currently conducted by Western Areas NL and the availability of suitable habitat within the application area. However, given the species large home range, the vegetation within the application area is not significant habitat for this species.

The wheatbelt subspecies of Western Rosella (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2008*) lives in Eucalypt woodland and its persistence is associated with habitat remnants (Garnett et al, 2000). The main food of the western subspecies is the seeds of *Casuarina*, but it also takes seeds from grass, weedy herbs and fruit. Nesting of this subspecies is in Eucalypt hollows (Garnett et al, 2000). This species was recorded from within the application area (Biota, 2007). Biota has stated that the species requires small tree hollows to breed (Biota, 2007), suggesting the species is not reliant on mature trees. Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

The South West Carpet Python (Schedule 4 - Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice 2008*) is widespread throughout the south west from Northampton to Kalgoorlie to Esperance (DEC, 2006d). It is able to utilise a wide variety of habitats from semi-arid coastal and inland habitats, *Banksia* woodland, eucalypt woodlands and grasslands, where it occurs at low densities (DEC, 2006d). This species has been recorded 40km north of the application area (Biota, 2007). It may occur within the application area at low densities. Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

Shy Groundwrens (DEC - Priority 4) are known to inhabit dense mallee woodland (Garnett et al, 2000). A Shy Groundwren was recorded during the fauna survey and has been recorded previously within the local area (Biota, 2007). It is likely to be widespread within the application area and surrounds. Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

Crested Bellbirds (DEC - Priority 4) live in the shrub-layer of eucalypt woodland, mallee, *Acacia* shrubland, saltbush, spinifex grasslands and heath (Garnett et al, 2000). It appears to be particularly sensitive to subsequent fragmentation, with areas of apparently suitable habitat as large as 5,000 ha now unoccupied (Garnett et al, 2000). This species has been recorded within the local area during previous surveys and is likely to occur within the application area (Biota, 2007). Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

The White-browed Babbler (DEC - Priority 4) utilises Eucalypt forest and woodlands within the wheatbelt and Southern Goldfields/Great Southern region. It has declined severely in the agricultural region but persists in the uncleared continuous habitat surrounding the wheatbelt (Garnett et al, 2000). This species was recorded during the fauna survey (Biota, 2007). Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

The Western Brush Wallaby (DEC - Priority 4) prefers open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland (DEC, 2006e). This species was observed within the application area and is likely to occur within the local area at low densities. Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

The Australian Bustard (DEC Priority 4) prefers tussock grassland, *Triodia* hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). This species may occur within sandplain heath and fire regeneration vegetation within the application area. However, given the widespread distribution of this species and the extent of native vegetation that is available for this species in the local area, the vegetation within the application area is not significant habitat for this species.

The Rainbow Bee-eater (Migratory species under the *Environmental Protection and Biodiversity Conservation Act, 1996*) is able to utilise a wide range of habitat types and nests in sandy soils. It has been recorded in the local area during previous fauna surveys (Biota, 2007). It is likely that this species occurs within the application area whilst feeding. Given the large amount of suitable habitat surrounding the application area, the vegetation to be cleared is not significant habitat for this species.

Three species of mygalomorph spiders and one species of pseudoscorpion were also located within the application area (Biota, 2007). These species are possible short range endemics. However, the habitat in which these species were recorded is extensive and it is likely that they occur in similar habitat in the local area.

The fauna habitats within the application area are common and widespread throughout the surrounding areas. Furthermore, previous disturbances within the application area may have reduced the habitat value of the vegetation to be cleared. Therefore the assessing officer does not consider the vegetation within the

application area to be significant habitat for fauna, although it may be host to conservation significant fauna species.

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

Methodology Biota (2007)
DEC (2006a)
DEC (2006b)
DEC (2006c)
DEC (2006d)
DEC (2006e)
EPA (2004a)
Garnett et al (2000)

(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

Three separate vegetation and flora surveys have been conducted over the application area and surrounding areas (survey areas) (Botanica Consulting, 2006; 2007; 2008). These surveys involved a desktop search of DEC's Threatened Flora database and the Western Australian Herbarium database (WAHERB) for rare or priority flora species within known coordinates. A rare flora search was then conducted for these species in suitable habitat types within the application area (Botanica Consulting, 2006). Botanica Consulting (2006) also mapped vegetation communities within the application area and assessed the vegetation condition. The surveys and subsequent reports adequately meet the requirements of EPA Guidance Statement 51 "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" (EPA, 2004b).

As a result of these surveys a total of 272 species were identified from 43 Families. Of these, 13 species of conservation significance were recorded within the survey areas. These species are *Banksia sphaerocarpa* ssp. *dolichostyla* (R), *Dillwynia acerosa* (P1), *Grevillea lullfitzi* (P1), *Stenanthemum liberum* (P1), *Logania exilis* (P2), *Acacia singula* (P3), *Grevillea insignis* ssp. *elliottii* (P3), *Dryandra viscida* (P3), *Dryandra ferruginea* ssp. *flavescens* (P3), *Goodenia trichophylla* (P3), *Calytrix nematoclada* (P3), *Grevillea prostrata* (P3) and *Eucalyptus rugulata* (P4).

Of these populations of *Stenanthemum liberum*, *Grevillea prostrata*, *Eucalyptus rugulata* and *Grevillea lullfitzii* occur within the application area.

Eucalyptus rugulata is a small mallet tree that has only been recorded from lateritic gravel on hill tops in the South Ironcap, Hatters Hill area (Western Australian Herbarium, 1998-2008). It is common where it occurs, as the dominant species in an open woodland. The pipeline corridor passes through two stands of *E. rugulata* woodland. It is not expected that the removal of *E. rugulata* from these woodland areas will significantly impact the conservation of this species. This species is closely associated with lateritic gravel soils, which are common in elevated parts of the Ironcaps area. The small patches of *E. rugulata* woodland are not likely to be significant habitat for this species.

Grevillea prostrata is a prostrate shrub occurring on sandplains and loamy sands, occurring in heathlands or amongst medium trees (Western Australian Herbarium, 1998-2008). Sandplain habitat is widespread within the Ironcaps area and therefore it is likely to occur throughout the area is suitable habitat. The vegetation within the application area is not likely to be significant habitat for this species.

Grevillea lullfitzii is a shrub occurring on banded ironstone formations or lateric gravel (Western Australian Herbarium, 1998-2008). It has been collected many times in the Digger Rocks, Ironcap area and has been described as occurring from occasional to scattered in abundance (Western Australian Herbarium, 1998-2000). Lateric gravels are common in elevated parts of the Ironcaps area and it is unlikely that the vegetation within the application area is significant habitat for this species.

Stenanthemum liberum is a dwarf shrub that occurs in yellow sandy loam over laterite (Western Australian Herbarium, 1998-2008). It has only been collected from the Ironcaps area and during this survey was associated with the *Eucalyptus rugulata* woodland vegetation type. The flora survey noted population sizes of between 1 and 25 plants. This species has not been collected often and the vegetation within the application area may be significant habitat for this species.

Based on the above the proposed clearing may be at variance to this Principle due to the presence of *Stenanthemum liberum*. The assessing officer recommends that should a permit be granted, a condition be placed on the permit requiring the permit holder to avoid all populations of *S. liberum* that occur within the application area.

Methodology Botanica Consulting (2006)
Botanica Consulting (2007)
Botanica Consulting (2008)
EPA (2004b)
Western Australian Herbarium (1998-2008)

(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 (TEC) within the application area (GIS Database). The nearest TEC is located approximately 80km to the north (Parker Range System).

None of the vegetation types identified by Botanica Consulting (2006, 2007, 2008) within the application area are considered to be a TEC or an ecological community at risk.

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

Methodology Botanica Consulting (2006)
Botanica Consulting (2007)
Botanica Consulting (2008)
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 may be at variance to this Principle

According to available GIS databases, the application area occurs within the Mallee IBRA Bioregion and Western Mallee IBRA Sub-bioregion (GIS Databases). The Mallee IBRA Bioregion remains at approximately 54% of its pre-European vegetation extent. This gives the IBRA Bioregion a conservation status of "Least Concern" according to "Bioregional Conservation Status of Ecological Vegetation Classes" (Department of Natural Resources, 2002). See table below.

The bioregion straddles that area of the state subject to intensive land clearing (Intensive Landuse Zone - ILZ) and that area of the state that is largely uncleared (Extensive Landuse Zone - ELZ). The Western Mallee IBRA Sub-bioregion falls largely within the ILZ and remains at approximately 33% of its pre-European vegetation extent. This gives the Western Mallee IBRA Sub-bioregion a conservation status of "Depleted" according to "Bioregional Conservation Status of Ecological Vegetation Classes" (Department of Natural Resources, 2002). However, the application area falls within the ELZ. The proposed clearing will not cause vegetation extent to fall below threshold levels within either the bioregion or sub-bioregion. The threshold level below which species loss appears to accelerate exponentially at the ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type (EPA, 2000).

The application area falls within both the Shires of Lake Grace and Kondinin. Vegetation within the Shire of Kondinin remains at approximately 50% of its pre-European extent. The majority of the remaining vegetation is located within the ELZ. The assessing officer suggests that the conservation status of the remaining vegetation should be given a rating of "Depleted" as much of the vegetation remaining within the ILZ is of varying condition and occurs in small isolated remnants whose condition is likely to be in decline.

Vegetation within the Shire of Lake Grace remains at approximately 21.9% of its pre-European extent. This does not include salt lakes and saline flats. This gives the remaining vegetation within the shire a conservation status of "Vulnerable". However, it is not considered that the removal of vegetation within the Shire of Lake Grace as a result of this proposal will cause vegetation extents within the Shire to be significantly impacted.

Beard Vegetation types 519 and 936 remain at greater than 50% of their pre-European extent within the state and the Mallee Bioregion and are currently under no significant threat due to extensive clearing. The current extent of Beard Vegetation type 2048 is approximately 48% which gives it a conservation status of "Depleted". However, it is not considered that the removal of vegetation type 2048 as a result of this proposal will cause vegetation extents within the bioregion or sub-region to be significantly impacted.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves (and post clearing %)
IBRA Bioregion – Mallee	7,395,902	4,017,869	~54	Least Concern	18 (31)
IBRA Subregion – Western Mallee	3,981,720	1,307,541	~33	Depleted	10 (25)
Local Government – Kondinin	737,192	369,708	~50	Depleted	n/a
Lake Grace	1,031,972	1,031,972	~21.9	Vulnerable	n/a
Beard veg assoc. – State					
519	2,333,452	1,400,703	~60	Least Concern	2 (9)
936	698,754	675,658	~96	Least Concern	2 (2)
2048	322,222	155,960	~48.4	Depleted	7 (14)
Beard veg assoc. – Bioregion					
519	2,100,363	1,209,507	~58	Least Concern	11 (18)
936	77,222	57,300	~74	Least Concern	10 (13)
2048	313,734	150,045	~48	Depleted	7 (14)
Beard veg assoc. - subregion					
519	1,563,620	743,701	~48	Depleted	13 (26)
936	44,718	25,209	~56	Least Concern	15 (25)
2048	313,698	150,009	~48	Depleted	7 (14)

* Shepherd et al. (2001) updated 2005

** Department of Natural Resources and Environment (2002)

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

Analysis of aerial photography suggests the vegetation within the cleared paddock area that will be removed as a result of constructing the evaporation ponds are small isolated pockets of vegetation that may provide some connectivity for the movement of fauna between larger remnants in the local area, particularly Jackson Nature Reserve to the south of the application area.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that should a permit be granted, a condition be placed on the permit to recreate ecological linkage if remnants are removed as a result of the clearing.

Methodology Department of Natural Resources and Environment (2002)
 EPA (2000)
 Shepherd et al (2001) updated 2005
 GIS Databases:
 - Pre-European Vegetation } DA 01/01
 - Interim Biogeographic Regionalisation of Australia } EA 18/10/00
 - Interim Biogeographic Regionalisation of Australia (subregions) } EA 18/10/00

(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**
 According to available databases, a minor, non-perennial drainage line intersects with the pipeline route of the

application area on Carstairs Road in a north - south direction (GIS Database). Another minor non-perennial drainage line intersects with the application area on Mulcahy Road in an east-west direction. A further minor, non perennial drainage line flows through the evaporation pond part of the application area. Analysis of aerial photography suggests these drainage lines are very shallow drainage lines that capture surface water run-off during times of intense rainfall.

None of the vegetation types identified within the application area could be considered riparian in nature (Botanica Consulting, 2006b).

Based on the above, the proposed clearing is at variance to this principle. However, the proposed clearing is not likely to significantly impact the environmental values of any watercourse.

Methodology Botanica Consulting (2006)
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 is not likely to be at variance to this Principle

Soil types within the application area vary from red lateritic gravelly soils, to heavy red clay loams and clayey - sandy soils.

The red shallow gravel soils are described as being >20% gravel, mixed with sand or loam (Schoknecht, 2002). They have low wind and water erodability due to gravel content (Schoknecht, 2002).

The heavy red clay loam soil located in the lower undulating plains within the application area have a low wind erodability (Schoknecht, 2002).

Clayey - Sandy soils in the area may have a high wind erodability if left bare for long periods and are prone to waterlogging in winter (Schoknecht, 2002). It is not likely that the areas to be cleared will be left bare for long periods as an evaporation pond is to be built on top of the cleared areas.

Ground water levels at the existing Digger Rocks mine are in the order of 50m below ground level, and 22m below ground level at the existing evaporation pond (Western Areas, 2008). At these depths, the clearing of native vegetation is not likely to lead to a rise in groundwater, causing salinisation. Furthermore, groundwater pumping associated with the Digger Rocks mine is likely to significantly reduce groundwater levels in this area.

Groundwater levels at the proposed evaporation pond site are between 8 and 11 metres below the surface (Rockwater, 2007). However, minimal amounts of vegetation is to be cleared in this area and is not likely to significantly impact on groundwater levels in the area.

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

Methodology Rockwater (2007)
Schoknecht (2002)
Western Areas (2008)

(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 may be at variance to this Principle

The application area is located approximately 1 kilometre north-east of Jackson Nature Reserve (GIS Database). Most of the application area nearest the nature reserve is cleared farmland, however, there are several isolated pockets of vegetation within the farmland that may be cleared as a result of the construction of the evaporation pond. These pockets of vegetation may act as an ecological linkage between several larger patches of remnant vegetation to the north of the application area and the reserve.

Advice has been received from Western Areas (2008) that the evaporation ponds will avoid the majority of the remnant vegetation within the cleared farm area. As a result, the connectivity of the reserve to other remnants in the local area is not likely to be impacted.

Should the evaporation ponds be expanded beyond current designs, it is possible that this connectivity will be severed.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends a condition be placed on the permit to to recreate the ecological linkage lost as a result of the clearing should the evaporation ponds expand beyond current designs.

Methodology Western Areas (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 application area is not located within a Public Drinking Water Source Area (GIS Database).

The area receives an average rainfall of approximately 344.6 mm per year (BoM, 2008) and experiences a pan evaporation rate of 2200 mm per year (Luke et al, 1987). Therefore, there is likely to be little surface water flow during normal seasonal rains. Sedimentation or turbidity of waterbodies is not likely as there are no permanent water bodies in the application area, or its vicinity. Drainage lines that run through the application area is not likely to carry run-off unless there are very intense rainfall events.

Groundwater in the area has been measured at between 42,000 to 53,000 mg/L Total Dissolved Solids (TDS) (Rockwater, 2007). This groundwater is located between 8 metres (cleared farmland) and 50 metres (near Digger Rocks mine site) below the surface (Western Areas, 2008; Rockwater, 2007). Vegetation is not dependant on groundwater at this depth and at such hypersaline levels.

The low rainfall and high evaporation rates mentioned above suggest that the clearing of 55 hectares of vegetation is not likely to increase groundwater levels in the area.

It is noted by the assessing officer that Western Areas intends to pump saline groundwater from the Digger Rocks pit and discharge into evaporation ponds. Therefore, groundwater levels around the mine will fall during the life of the project.

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

Methodology BoM (2008)
Rockwater (2007)
Luke et al (1987)
Western Areas (2008)

(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

Average rainfall in the vicinity of the application area is approximately 344.6 mm per year (BoM, 2008). Rain falls mostly in winter with some summer falls associated with tropical depressions. The application area experiences an evaporation rate of 2200 mm per year (Luke et al, 1987). This suggests that water that pools on the ground is likely to evaporate quickly.

Surface water is minimal and is likely to evaporate or infiltrate the soil before pooling occurs. There is little likelihood that the area is subject to flooding. The proposed clearing is not likely to lead to an increase in catchment to the point of causing flooding.

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

Methodology BoM (2008)
Luke et al (1987)

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

Comments

The application area is not subject to any Native Title Claims (GIS Database).

No submissions were received during the advertised period.

There are no known Aboriginal Sites of Significance within the 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.

The Department of Water (DoW) advises that the application area falls within the Kondinin-Ravensthorpe Groundwater Area, a proclaimed area under the *Rights in Water and Irrigation Act, 1914*. The DoW advises that a license will be required to extract or dewater groundwater in this area. It is the proponent's responsibility to ensure that all other approvals have been obtained (DoW, 2007).

Methodology DoW (2007)
GIS Database:

- Aboriginal Sites of Significance - DIA
- Native Title Claims - DLI 7/11/05

4. Assessor's comments

Comment

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

It is recommended that conditions be placed on any permit granted to rehabilitate the pipeline corridor, except for a 4 metre wide access track, to manage weeds, to revegetate areas of cleared farmland if ecological linkage is disturbed, to record areas cleared and to report clearing on an annual basis.

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6. Glossary

Acronyms:

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

Definitions:

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

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

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

Schedule 1	Schedule 1 – Fauna that is rare or likely to become extinct: being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
Schedule 2	Schedule 2 – Fauna that is presumed to be extinct: being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.

- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is in 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.