



1. Application details

1.1. Permit application details

Permit application No.: 1627/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Australian Mines Limited

1.3. Property details

Property: Mining Leases 26/219, 26/220, 26/221, 26/289, 26/782
Local Government Area: City of Kalgoorlie - Boulder
Colloquial name: Woodline Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
49.2		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

The vegetation in the application area is broadly mapped as Beard Vegetation Association 468: Medium woodland, Salmon Gum and Goldfields Blackbutt. According to Shepherd et al (2001), there is approximately 100% of this vegetation type remaining in the Coolgardie bioregion.

G & G Environmental Pty Ltd (2006) conducted a 'Level 2' flora and vegetation survey of the Woodline Project area on the 4th and 5th of September 2006. This survey involved background research followed by reconnaissance, and was conducted in accordance with EPA Guidance Statement 51 'Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia' (G & G Environmental Pty Ltd, 2006; EPA, 2004a). A total of nine vegetation associations were identified, including one Chenopod shrubland, two Eucalypt forests and six Eucalypt woodlands:

- 1) Chenopod shrubland of *Atriplex nummularia* and *Maireana sedifolia* over *Maireana triptera* and *Sclerolaena brevifolia* with scattered *Eucalyptus salmonophloia* trees and *Senna artemisioides ssp. filifolia* shrubs in a red clayey loam soil in slight depressions.
- 2) Open *Eucalyptus lesouefii* forest with *E. transcontinentalis* and *E. celastroides ssp. virella* over scattered *Eremophila dempsteri*, *Olearia muelleri* and *Senna artemisioides ssp. filifolia* shrubs in red loamy soil with scattered to dense ironstone pebbles on flat plains and slight rises.
- 3) Closed *Eucalyptus salubris* forest with *E. celastroides ssp. virella* over scattered high *Eremophila dempsteri* shrubs over an open *Maireana sedifolia* shrubland in a loamy soil with scattered to dense ironstone pebbles on a flat plain.
- 4) Open *Eucalyptus salmonophloia* woodland over low open *Eucalyptus* woodlands including *E. celastroides ssp. virella*, *E. salubris* and *E. yilgarnensis* over a Chenopod shrubland (*Maireana sedifolia* and *Atriplex nummularia*) with *Senna artemisioides ssp. filifolia* and *Eremophila* species over scattered Chenopod herbs including *Maireana tomentosa* and *Sclerolaena brevifolia* in red loamy soils with scattered to mid-dense ironstone and quartz pebbles on flat plains.
- 5) Open *Eucalyptus salmonophloia* and *E. moderata* woodland with *Casuarina pauper* over low *Eucalyptus* woodlands including *E. lesouefii* and *E. salubris* over high open *Eremophila dempsteri* and *Eremophila oldfieldii* shrublands over mixed shrubland with *Atriplex nummularia*, *Eremophila maculata*, *Maireana sedifolia* and *Senna artemisioides ssp. filifolia* in red loamy soils with scattered to mid-dense ironstone and quartz pebbles on flat plains and calcareous soils with calcrete pebbles on low rises.
- 6) Open *Eucalyptus salmonophloia* woodland over a low *E. lesouefii*, *E. celastroides ssp. virella* and *Grevillea nematophylla ssp. nematophylla* woodland over a high mixed shrubland with *Acacia tetragonophylla*, *Alyxia buxifolia* and *Dodonaea lobulata* over a mixed shrubland including *Senna artemisioides*, *S. artemisioides ssp. filifolia* and *Maireana sedifolia* in red loamy soils with scattered to mid-dense ironstone and quartz pebbles on flat plains.

7). Low *Eucalyptus celastroides* ssp. *virella* over an open high shrubland of *Eremophila dempsteri* over an open shrubland of *Atriplex nummularia*, *Daviesia benthamii* and *Eremophila maculata* in a red clay soil with dense ironstone gravel in a drainage line.

8). Open *Eucalyptus salmonophloia* woodland over a low open *E. yilgarnensis* woodland over scattered high *Acacia hemiteles* and *Santalum acuminatum* shrubs over a *Senna artemisioides* ssp. *filifolia* heath in a red loamy clay soil with scattered to dense ironstone pebbles on flat plains.

9). Open *Eucalyptus salmonophloia* woodland over a low *E. ? gracilis*, *E. salubris* and *Melaleuca halmaturorum* woodland a mixed shrubland with *Atriplex nummularia*, *Eremophila scoparia* and *Halosarcia* sp. in a calcareous soil with scattered calcrete pebbles on a slight rise.

No weed species were identified during the vegetation and flora survey (G & G Environmental Pty Ltd, 2006).

Clearing Description

This clearing permit application is for a purpose permit to clear up to 49.2 hectares of native vegetation. The clearing will allow the proponent to develop the Woodline Open Cut Gold Mining Project at the Blair Mine, located approximately 30km south east of Kalgoorlie (Rally Environmental, 2006). Development of the Woodline Open Cut Project will involve the establishment of an open cut pit, run-of mine pad, waste dump, topsoil stockpiles and a haul road of approximately 12km in length to connect to existing haul roads (Rally Environmental, 2006). The proposed haul road will be approximately 12 metres wide, however vegetation clearing will be reduced as the haul road will be constructed along the route of an existing station track (Rally Environmental, 2007a).

Vegetation Condition

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)
to

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)

Comment

The area under application is within the Woolibar Pastoral Lease (GIS Database). G & G Environmental Pty Ltd (2006) and Western Wildlife (2006) both noted the presence of goats in the application area.

During a vegetation and flora survey of the application area between 4 - 5 September 2006, G & G Environmental Pty Ltd (2006) noted that disturbance was limited to a few vehicle tracks, historical exploration drill lines and associated pads, some animal tracks and grazing. According to G & G Environmental Pty Ltd (2006) grazing damage was largely restricted to two perennial species: *Cratystylis conocephala* (virtually all plants extensively grazed) and *Senna artemisioides* ssp. *filifolia* (some plants affected). There was an absence of grasses and annual species in the area, which may be a reflection of the below average rainfall in the area or historic grazing by native and domestic fauna. There was no evidence of recent fire (G & G Environmental Pty Ltd, 2006).

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 proposed clearing area is located in the Eastern Goldfields subregion of the Coolgardie Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Eastern Goldfields subregion is characterised by Mallee, Acacia thickets and shrub heaths on sandplains (CALM, 2001). There is an exceptionally high diversity of Eucalyptus species in the Eastern Goldfields, in addition to the high diversity of endemic Acacia species (CALM, 2001). Dominant land uses in the region include pastoralism, crown and freehold land, conservation and mining (CALM, 2001).

The proposed clearing area is situated approximately 30km south east of Kalgoorlie (GIS Database), and is within the Woolibar pastoral station (GIS Database). Consequently, some of the the vegetation displays evidence of goat grazing (Rally Environmental, 2006). Human disturbances in the form of access tracks, exploration drill lines and associated drill pads are present in parts of the application area (G & G Environmental Pty Ltd, 2006; GIS Database). Rally Environmental (2006) report that the Woodline project area is likely to have been subject to historical logging activities in the past 50 years, with the mining project name derived from the woodline train tracks that previously ran through the area. As a consequence of the above mentioned disturbances, the area under application is less likely to provide significant fauna habitat; including hollow-bearing Eucalyptus trees which provide important nesting and breeding habitat for native fauna species.

A vegetation and flora survey of the proposed clearing area was undertaken by G & G Environmental Pty Ltd (2006). Nine vegetation associations were described, including six Eucalyptus woodlands, two Eucalyptus forests and one Chenopod shrubland (G&G Environmental Pty Ltd, 2006). A total of 54 flora species were identified from 25 genera and 19 families (G & G Environmental Pty Ltd, 2006). Annual and ephemeral species were not recorded during the survey as a result of the below average annual rainfall, and it is therefore likely that more species may have been recorded in average or above average rainfall years (G & G Environmental Pty Ltd, 2006). In summary, the area under application contains vegetation associations well represented throughout the Coolgardie IBRA bioregion and Eastern Goldfields subregion (G & G Environmental Pty Ltd, 2006). There is no evidence to suggest the proposed clearance area contains a higher level of biological diversity than any other area in the Coolgardie IBRA bioregion or Eastern Goldfields subregion.

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

Methodology CALM (2001).
G & G Environmental Pty Ltd (2006).
Rally Environmental (2006).
GIS Database:
- IBRA - EA - 18/10/00.
- Kalgoorlie Kurnalpi 50cm Orthomosaic - DLI 00 (Image).
- Lake Lefroy 1.4m Orthomosaic - DLI 02 (Image).
- Pastoral Leases - DOLA 10/01.

(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

Western Wildlife (2006) conducted a 'Level 1' fauna assessment of the Woodline Project area in accordance with the EPA Position Statement No. 3: 'Terrestrial Biological Surveys as an element of biodiversity protection' (2002) and EPA Guidance Statement 56: 'Guidance for the Assessment of Environmental Factors - terrestrial fauna for Environmental Impact Assessment in Western Australia' (2004b).

Prior to conducting a site visit, Western Wildlife undertook desktop searches of the following databases in order to produce a list of fauna species likely to occur in the proposed clearing area: Faunabase (WA Museum), DEC's Threatened and Priority Fauna Database, Birds Australia Atlas Database and Environment Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool (Western Wildlife, 2006).

The following species of conservation significance were identified as potentially occurring in the Woodline Project area: Malleefowl, *Leiopoa ocellata*; Chuditch, *Dasyurus geoffroyi* (both Vulnerable and Schedule 1); Carpet Python, *Morelia spilota imbricata*; Peregrine Falcon, *Falco peregrinus*; Major Mitchell's Cockatoo, *Cacatua leadbeateri* (all Schedule 4); Rainbow Bee-eater, *Merops ornatus*; Fork-tailed Swift, *Apus pacificus* (both Migratory); Australian Bustard, *Ardeotis australis*; Shy Heathwren, *Hylacola cauta whitlocki*; Crested Bellbird, *Oreoica gutturalis gutturalis* and White-browed Babbler, *Pomatostomus superciliosus ashbyi* (all Priority 4). Two invertebrate species listed as Priority 1 by the Department of Environment and Conservation (DEC) were also identified as potentially occurring: Inland Hairstreak, *Jalmenus aridus* and Arid Bronze Azure, *Ogyris subterrestris pertrina* (Western Wildlife, 2006).

Western Wildlife undertook a site visit of the application area between 4 - 5 September 2006. This involved traversing the area of the proposed pit on foot, and the proposed haul road via vehicle and foot. All species opportunistically sighted during the visit were recorded (Western Wildlife, 2006). In order to assess the habitat values of the site, particular attention was paid to vegetation type, structure and condition, in addition to the presence of leaf litter, logs, hollows and other features. Of the above listed species, only the Peregrine Falcon and White-browed Babbler were observed during the site visit of the Woodline Project area (Western Wildlife, 2006).

Based on the desktop search results and site visit, Western Wildlife (2006) gauged the likelihood of conservation significant fauna occurring in the application area, potential impacts to these species, and the importance of the site as significant habitat for Western Australian fauna. In addition, Western Wildlife (2006) provided some recommendations as to how the clearing should be managed in order to minimise impacts to fauna species. The account given by Western Wildlife (2006) has been summarised below:

The Malleefowl is not likely to be found in the proposed clearing area for the open cut pit, as the vegetation here is generally too sparse and there is minimal leaf litter on the ground (Western Wildlife, 2006). However, the Malleefowl may be present in low densities in patches of dense vegetation along the area proposed for the haul road construction (Western Wildlife, 2006). There is no evidence to suggest that this area represents significant habitat for the Malleefowl.

The Chuditch is restricted to sclerophyll forests and woodlands in the southwest of Western Australia (Western Wildlife, 2006). It is generally considered extinct in semi-arid areas. This species was sighted at Kambalda East in 1974, and there have been some recent unconfirmed sightings from the region (Western Wildlife, 2006). Based on habitat preferences, it is possible (although unlikely) that the Chuditch may occur in the proposed clearing area (Western Wildlife, 2006).

The Carpet Python is known to inhabit forest, heath and wetland areas where it shelters in hollow logs or branches of large trees (Western Wildlife, 2006). Although on the eastern edge of its range, this species may occur in the proposed clearing area (Western Wildlife, 2006). Given the abundance of suitable habitat in the southwest of Western Australia, the proposed clearing area is unlikely to represent significant habitat.

The Peregrine Falcon was observed in the application area during a site visit conducted by Western Wildlife between 4 - 5 September 2006 (Western Wildlife, 2006). This species may use the taller Eucalypts in the area for nesting (Western Wildlife, 2006). Given that this species is wide ranging, the proposed clearing area is

unlikely to have a significant impact on the habitat for this species.

Major Mitchell's Cockatoo is an uncommon species, characterised by a patchy distribution throughout drier parts of Western Australia (Western Wildlife, 2006). Based on habitat preferences, this species may occur in the application area. Western Wildlife (2006) explain that Major Mitchell's Cockatoo typically breeds in hollows of large Eucalyptus species (particularly Salmon Gum). The proposed clearing area is unlikely to represent important habitat for breeding, given that much of the area has been historically logged, with woodline train tracks previously running through the area (Rally Environmental, 2006). As a consequence of the historical logging, most trees in the area are re-growth and are not mature enough to contain hollows (Rally Environmental, 2006). Studies by Rose (1993) indicate that Salmon Gums aged 60 years or younger in the eastern Wheatbelt do not have hollows. Western Wildlife (2006) have recommended that the proponent avoid any large trees where possible, especially Salmon Gums. Rally Environmental (2007a) have indicated that this approach will be adopted during the clearing process.

The Rainbow Bee-eater is a migratory species which may be a seasonal visitor to the proposed clearing area (Western Wildlife, 2006). This species would most likely move to adjacent undisturbed areas upon the commencement of clearing. The Woodline Project area is not likely to represent significant habitat for this species.

The Fork-tailed Swift is a migratory species. The proposed clearing is likely to have a negligible impact upon the Fork-tailed Swift given that this species is largely aerial (Western Wildlife, 2006).

The Australian Bustard is a wide ranging and nomadic species, moving in response to the availability of food (Western Wildlife, 2006). Based on habitat preferences, this species may occur in the woodlands of the proposed clearing area (Western Wildlife, 2006). There is no evidence to suggest that the Woodline Project area represents significant habitat for this species.

The Shy Heathwren is generally uncommon and patchily distributed in the vicinity of the proposed clearing area. This species has a preference for dense vegetation, and is therefore unlikely to occur over much of the proposed clearing area (Western Wildlife, 2006). Although this species may be found in small pockets of the proposed clearing area where vegetation is dense at ground level, this is unlikely to represent significant habitat.

The Crested Bellbird is a solitary and sedentary species inhabiting dry mallee woodlands and heath in southern Western Australia (Pizzey & Knight, 1997). Based on habitat preferences, this species may occur in the proposed clearing area (Western Wildlife, 2006). Given the abundance of suitable habitat in the Coolgardie bioregion, there is no evidence to suggest that the proposed clearing area represents significant habitat for this species.

The White-browed Babbler was recorded along the proposed haul road route in pockets of dense vegetation (Western Wildlife, 2006). This species is likely to be present in small groups in dense vegetation throughout the site (Western Wildlife, 2006). Given the abundance of suitable Eucalyptus forest and woodland habitat in the Coolgardie bioregion, it is unlikely that the proposed clearing area represents significant habitat for this species.

The Inland Hairstreak and Arid Bronze Azure are both butterfly species known only from the Lake Douglas area (approximately 30 - 35km northwest of the proposed clearing area) (Western Wildlife, 2006). Larvae of the Inland Hairstreak are known to feed on foliage of *Acacia tetragonophylla*, and are tended by *Froggatella kirbyii* ants (DEH, 2006a). Adults and larvae of the Inland Hairstreak have also been observed on foliage of *Senna artemisioides subsp. filifolia* (DEH, 2006a). Little is known about the Arid Bronze Azure, however it is understood that this species feeds on the secretions of the ant *Camponotus sp*, and lays eggs on mallee Eucalypts with ant nests at the base (DEH, 2006b). There is a possibility that both of these butterfly species may occur in the proposed clearing area if the associated ant species and larval food plants are present (Western Wildlife, 2006). However, there is no evidence to suggest that the proposed clearing area represents significant habitat for either species.

The area applied to clear is characterised by habitat common to the Coolgardie bioregion (GIS Database; Shepherd et al, 2001). Much of the area proposed for development of the open cut pit is sparsely vegetated and of lower habitat value than the proposed haul road development, where vegetation is more dense (Western Wildlife, 2006). It was also noted that the proposed open cut pit site generally lacked fallen timber, which provides habitat for numerous reptile species (Western Wildlife, 2006). Mineral exploration activities and goat grazing have further diminished the habitat values of the proposed clearance area (Rally Environmental, 2006). Furthermore, the Woodline Project area is unlikely to be an important breeding and nesting area for birds given that historical logging activities have resulted in a lack of hollow-bearing Eucalypts (Rally Environmental, 2006).

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

Methodology DEH (2006a).
DEH (2006b).
EPA (2002).
EPA (2004b).
Pizzey & Knight (1997).

Rally Environmental (2006).
Rally Environmental (2007a).
Rose (1993).
Shepherd et al (2001).
Western Wildlife (2006).
GIS Database:
- Pre-European Vegetation - DA 01/01.

(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

In accordance with EPA Guidance Statement 51, G & G Environmental Pty Ltd (2006) conducted a search of the DEC's Declared Rare and Priority Flora Database prior to undertaking a field survey of the proposed clearing area. The search was conducted for the area bounded by the following geographic coordinates: 30°40'S, 121°20'E, 31°10'S, and 122°00'E (G & G Environmental Pty Ltd, 2006). The search area encompassed the Eastern Goldfields subregion (including the proposed clearing area). No Declared Rare Flora (DRF) species were identified within the search area (G & G Environmental Pty Ltd, 2006). Eleven Priority Flora species were identified from 32 separate locations, however none of these locations were within the proposed clearing area (G & G Environmental Pty Ltd, 2006).

A field survey of the proposed clearing area was conducted by G & G Environmental Pty Ltd between 4 - 5 September 2006. No DRF or Priority Flora species were identified (G & G Environmental Pty Ltd, 2006). Following submission of this clearing permit application, the proponent elected to re-route the proposed haul road. The new sections of the proposed haul road which were not initially surveyed by G & G Environmental Pty Ltd (2006) were traversed on foot by Rally Environmental on 12 June 2007. A targeted search for DRF and Priority Flora was undertaken. No DRF or Priority Flora species were identified (Rally Environmental, 2007b).

No DRF or Priority Flora species are known within a 10km radius of the application area (GIS Database). One population of *Eremophila praecox* (P1) occurs approximately 12.5km northwest of the northern most section of the proposed clearing area (GIS Database). This is the nearest known population of Priority Flora.

None of the vegetation associations within the proposed clearing area are considered locally or regionally significant by Cofinas & Creighton (2001). It is therefore unlikely that the area applied to clear provides habitat necessary for the continued existence of DRF or Priority Flora species. There is no evidence to suggest that any flora species of conservation significance will be threatened by the proposed clearing.

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

Methodology Cofinas & Creighton (2001).
G & G Environmental Pty Ltd (2006).
Rally Environmental (2007b).
GIS Database - Declared Rare and Priority Flora List- CALM 01/07/05.

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

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

There are no known Threatened Ecological Communities (TEC's) in the proposed clearing area (GIS Database). G & G Environmental Pty Ltd (2006) report that no TEC's are currently listed for the Coolgardie bioregion. The nearest known TEC to the proposed clearing area is approximately 102km southeast (GIS Database).

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

Methodology G & G Environmental Pty Ltd (2006).
GIS Database - Threatened Ecological Communities - CALM 12/04/05.

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

Comments Proposal is not at variance to this Principle

The area applied to clear is within the IBRA Coolgardie bioregion (GIS Database). According to Shepherd et al (2001) there is approximately 98.4% of the pre-European vegetation remaining in this bioregion. The vegetation of the application area is classified as Beard Vegetation Association 468: Medium woodland; Salmon Gum and Goldfields Blackbutt (GIS Database). According to Shepherd et al (2001) there is approximately 100% of this vegetation type remaining. The area applied to clear does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European Area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% in IUCN Class I-IV Reserves*
IBRA Bioregion -Coolgardie City of Kalgoorlie/Boulder	12,912,208	12,707,623	~98.4%	Least concern	~9.9%
Beard Vegetation Association - -468	No Information Available	592,023	~100%	Least concern	~4.3%

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002).
Shepherd et al. (2001).
GIS Database:
- IBRA - EA - 18/10/00.
- Pre-European Vegetation - DA 01/01.

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

Comments Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the proposed clearing area (GIS Database). The proposed haul road will cross several ephemeral creeklines which transfer water (when flowing) in a westerly direction across the proposed haul road into a larger ephemeral creekline (Aquaterra, 2007). This larger creekline is approximately 1km west of, and runs parallel to, the proposed haul road (Aquaterra, 2007). There will inevitably be a loss of some creekline vegetation where the haul road crosses the smaller creeklines. However, given the impact of grazing in the area this is likely to be sparse vegetation.

Flora and vegetation surveys of the proposed haul road route and mine site were undertaken by G & G Environmental Pty Ltd in October 2006. Nine vegetation associations were identified, of which six were Eucalypt woodlands, two Eucalypt forests and one Chenopod shrubland (G & G Environmental Pty Ltd, 2006). Based on the descriptions and species compositions given for each unit, it is unlikely that any of the nine vegetation associations identified by G & G Environmental Pty Ltd (2006) are restricted to wetland environments or would be classified as wetland communities.

The creeklines which will be crossed by the proposed haul road are in an arid environment which is typified by low average annual rainfall and high average annual evaporation (G & G Environmental Pty Ltd, 2006). Consequently, the creeklines rarely experience any water flow. Aquaterra (2007) explain that water flow is unlikely to persist across the haul road for more than a few hours after significant rain, and culverts are not likely to be necessary. There is no evidence to suggest that these creeklines are likely to be environmentally significant, and it is unlikely that the vegetation of these creeklines would act as a significant buffer for any downstream areas.

The proposed clearing is at variance to this Principle given that it will involve the removal of some vegetation growing within a watercourse. However, the assessing officer is satisfied that the proposed clearing will not impact upon any significant watercourses or significant wetland vegetation communities onsite or offsite.

Methodology Aquaterra (2007).
G & G Environmental Pty Ltd (2006).
GIS Database - Hydrography, linear - DOE 01/02/04.

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

Comments Proposal may be at variance to this Principle

The majority of the application area lies within the Gumland Land System, whilst a small portion of the proposed haul road is found within the Moriarty Land System (GIS Database).

The Gumland land system is described as extensive pediplains, supporting Eucalypt woodlands over halophytic and non halophytic shrub understoreys (DAFWA, 2007). DAFWA (2007), suggest that the land unit likely to be cleared (loamy plains) has calcareous loamy earths and red loamy earth soils which are prone to soil erosion if the vegetation cover is removed or surface hydrology altered.

A small section of the haul road traverses the Moriarty land system. DAFWA (2007) have described this system as being characterised by low greenstone rises and stony plains supporting Eucalypt woodlands with Chenopod understoreys. Like the Gumland land system, the Moriarty land system is susceptible to soil erosion if vegetation is cleared or the surface hydrology altered (DAFWA, 2007).

The area where the proposed mine site is located is at the top of a small catchment, and natural drainage through the mine is in a northerly direction (Aquaterra, 2007). Aquaterra (2007), have advised that surface water will be diverted around mining infrastructure to the east side, so surface water flows are maintained downstream. This should be done through a series of drains and bunding around infrastructure.

The proposed haul road is characterised by relatively flat to slightly sloping land (Aquaterra, 2007). There are a number of minor seasonal creeklines which intersect the proposed road and discharge into a larger creek which runs parallel to the haul road. As a result of the proposed haul road construction, there is likely to be a disturbance to surface water flows moving westward towards the larger creekline. This may result in erosion and sedimentation problems, as well as loss of native vegetation downstream as a result of water starvation (DAFWA, 2007). In order to minimise these risks, it is advised that surface water controls and diversion and dispersion mechanisms be implemented. These include contour drains, sediment traps, culverts, water spreading mechanisms and guide bunds. The following condition has been imposed on the clearing permit as a precaution to reduce the likelihood of erosion:

The Permit Holder shall implement surface water management and erosion control measures to minimise potential erosion and sedimentation within the area approved to clear, and adjacent areas. Such measures could include, but are not limited to:

- (a) diversion banks;
- (b) floodways;
- (c) guide bunds;
- (d) longitudinal table drains;
- (e) sediment traps.

Based on the above, the proposal may be at variance to this Principle. However, provided that appropriate erosion control and surface water management measures are implemented, the potential impacts can be minimised.

Methodology Aquaterra (2007).
DAFWA (2007).
GIS Database:
- Rangeland Land System Mapping - DA.

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

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

The Lakeside Timber Reserve is located approximately 11.7km northwest of the northern most section of the application area (GIS Database). The Majestic Timber Reserve is located approximately 13km east-northeast of the southern most section of the application area (GIS Database). There are no other conservation areas nearby (GIS Database). The proposed clearing areas are not likely to act as significant remnants, buffers, or ecological linkages to any conservation areas given that the surrounding landscape has not been extensively cleared.

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

Methodology GIS Database- CALM Managed Lands and Waters - CALM 01/07/05.

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

Comments Proposal may be at variance to this Principle

The proposed clearing area represents 0.35% and 0.15% of the Bodgie and Stumpy Dam catchments respectively (Aquaterra, 2007). Given these figures, it is unlikely that the proposed clearing will have any adverse affects upon the local groundwater levels or quality. The proposed open pit mining operation is far more likely to impact upon the groundwater resource than clearing, however it is anticipated that this will also have a minimal impact as the open pit is not expected to encounter groundwater (Aquaterra, 2007). Should groundwater be encountered during the mining process, it will be used for dust suppression on site and transferred to the nearby Blair Nickel mine (Aquaterra, 2007).

According to Aquaterra (2007), the risk of sedimentation and deterioration to downstream watercourses is high if the proposed clearing and subsequent mining operations are not carefully managed. Aquaterra (2007) have also advised that surface water flowing northwards through the proposed mine will need to be diverted to the east in order to avoid mining operations.

Although the proposed clearing may be at variance to this Principle, the following strategies will be implemented by Australian Mines Ltd in order to minimise the risk of natural water flows being impeded, and surface waters flowing off unvegetated areas and depositing sediment in waterways:

- Ground disturbance will be kept to a minimum where possible, and areas of major erosion hazard will be identified and avoided where practical (Aquaterra, 2007);
- Given that vegetation cover is the most effective measure of minimising erosion and sedimentation, initial clearing will be limited to areas of workable size actively being used for construction (Aquaterra, 2007);
- Construction on or near natural flow paths will be planned for the dry season where practicable (Aquaterra, 2007);
- Disturbed areas, stockpiles and waste dumps will be bunded to capture sediment laden run-off (Aquaterra, 2007);
- Sediment traps will be constructed at low points in the landscape and sized appropriately for the regional rainfall. Water in sediment traps will either infiltrate and evaporate, or alternatively be pumped out. Sediments traps would be cleaned out prior to the commencement of the wet season (Aquaterra, 2007); and
- Should diverted surface water flows be discharged to sheet flow zones, the diverted water will be discharged over spreader mechanisms to encourage the flows to slow and disperse (Aquaterra, 2007).

It is the proponent's responsibility to liaise with the Department of Water to determine if a Bed and Banks permit is required for the proposed works, in accordance with Section 17 of the *Rights in Water and Irrigation Act 1914*.

The following condition has been imposed on the clearing permit as a precaution to reduce the likelihood of sedimentation:

The Permit Holder shall implement surface water management and erosion control measures to minimise potential erosion and sedimentation within the area approved to clear, and adjacent areas. Such measures could include, but are not limited to:

- (a) diversion banks;
- (b) floodways;
- (c) guide bunds;
- (d) longitudinal table drains;
- (e) sediment traps.

The assessing officer is satisfied that the above clearing permit condition and management measures which are included in the proponent's Mining Proposal (and are therefore legally binding under the *Mining Act 1978*), will control surface water flows in such a way to minimise the impact upon surface water quality on and off site. The Mining Proposal must be approved by DoIR prior to the commencement of the project.

Methodology Aquaterra (2007).

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

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

The proposed clearing area is located approximately 30km south east of Kalgoorlie (GIS Database). The average annual rainfall at Kalgoorlie is approximately 268mm (Aquaterra, 2007). Average annual evaporation is 2,228mm (Aquaterra, 2007). It is therefore expected that there would be little surface water flow in the project area during normal seasonal rains.

The regional drainage at the proposed clearing area includes a creek system approximately 1km to the north, flowing in a northerly direction towards Bodgie Dam 10km away, and a further 12km north to Stumpy Dam (Aquaterra, 2007). The proposed clearing of 49.2 hectares represents approximately 0.35% and 0.15% of the Bodgie and Stumpy Dam catchments respectively (Aquaterra, 2007). A creekline to the west of the proposed haul road and running parallel to the proposed haul road flows into nearby Penglaze and Sampson Dams. The proposed clearing for haul road establishment represents approximately 0.5% of the Penglaze Dam catchment (Aquaterra, 2007). It is not anticipated that the proposed clearing will lead to flooding in these catchment areas.

Aquaterra (2007) have identified that surface water flows of a 100 year average recurrence interval flood event would require diversion to the eastern side of the proposed mine site to avoid flooding (Aquaterra, 2007). It is the proponent's responsibility to liaise with the Department of Water to determine whether a Bed and Banks Permit is required for the proposed works, in accordance with Section 17 of the *Rights in Water and Irrigation Act 1914*. The high side of the proposed pit will require bunding to prevent surface water flooding the open cut pit (Aquaterra, 2007).

The proposed haul road and other infrastructure will be constructed in such a way that major flow paths are not disrupted. Culverts may be required should the haul road cross a significant creek, however this is not anticipated (Aquaterra, 2007). Longitudinal table drains and occasional floodways will be incorporated where necessary to transport water flows across the road (Aquaterra, 2007). Bunding may be required to direct water

flows to the specific floodway crossing points (Aquaterra, 2007).

The proposed clearing is not likely to exacerbate the incidence or intensity of natural flood events off site. Provided that the appropriate flood control measures are implemented, the proposed clearing is not likely to result in flooding of the proposed Woodline Project area, or any downstream areas.

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

Methodology Aquaterra (2007).

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

Comments

There are two native title claims over the area under application. These claims (WC98/027 & WC99/029) have been registered with the National Native Title Tribunal (GIS Database). However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

Methodology GIS Database:
- Aboriginal Sites of Significance - DIA 04/07/02.
- Native Title Claims - DLI 19/12/04.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Comment / recommendation
Mineral Production	Mechanical Removal	49.2	<p>The clearing principles have been addressed and the proposed clearing is at variance to principle (f), may be at variance to principle (g) and (i), is not likely to be at variance to principle (a), (b), (c), (d), (h) or (j), and is not at variance to principle (e).</p> <p>The assessing officer recommends that the clearing permit be granted, subject to the following conditions:</p> <ol style="list-style-type: none">1. The Permit Holder shall record the following for each instance of clearing:<ol style="list-style-type: none">(a) the location of where the clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system;(b) the size of the area cleared in hectares;(c) the dates on which the area was cleared;(d) the method of clearing;(e) the purpose of clearing.2. The Permit Holder shall implement surface water management and erosion control measures to minimise potential erosion and sedimentation within the areas approved to clear, and adjacent areas. Such measures could include, but are not limited to:<ol style="list-style-type: none">(a) diversion banks;(b) floodways;(c) guide bunds;(d) longitudinal table drains;(e) sediment traps.3. The Permit Holder shall retain the vegetative material and topsoil removed by clearing in accordance with this Permit, for use in rehabilitation.4. The Permit Holder shall provide a report to the Director, Environment, Department of Industry and Resources by 1 November 2008 and each subsequent year for the life of this permit, demonstrating adherence to all the conditions of this permit, and setting out the records required under condition 1 of this permit in relation to clearing carried out between 1

5. References

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- Rally Environmental (2007a) *Mining Proposal - Australian Mines Limited: Duplex Hill South Gold Project. Woodline 1 Open Cut Pit and Access Road*. March 2007. Prepared for Australian Mines Limited.
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- Western Wildlife (2006) *Woodline Tenement Area: A Fauna Assessment*. 25th October 2006.

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.

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

Definitions:

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

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

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

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

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

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

specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

- EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)** **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN** **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD** **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.