



1. Application details

1.1. Permit application details

Permit application No.: 998/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Magellan Metals Pty Ltd

1.3. Property details

Property: L53/149
Local Government Area: Shire Of Wiluna
Colloquial name: Magellan Gas Pipeline

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment	
Beard vegetation association 18: Low woodland; Mulga (<i>Acacia aneura</i>).	The proposed clearing consists of 78 ha for construction of a 39 km gas pipeline. Magellan Metals propose to construct a gas pipeline to service their mining and processing operations for purposes of mineral production. The pipeline will consist of a three inch (89 mm) buried steel pipeline running from the Wiluna Compressor Station on the Goldfields Gas Pipeline to the Magellan mine site. The clearing will be in the form of a 20 m right of way (ROW) along the pipeline length, which includes space for an access/maintenance track running adjacent to the pipeline, turnaround areas and temporary storage areas. Existing tracks and fence lines will be used wherever possible to minimise disturbance to native vegetation. The vegetation and topsoil will be stripped and stockpiled separately for use in rehabilitation works. The disturbed areas will be rehabilitated progressively as the pipeline is buried (Magellan Metals 2005).	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)	A site visit to the area was carried out by a DoIR Native Vegetation Assessor on 24 February 2006. It was observed during the site visit that the vegetation structure was excellent to very good (Keighery 1994). The soil and vegetation surrounding several watercourses within the claypan complex had been severely degraded by grazing livestock (Jim's Seeds, Weeds & Trees 2005). It was also evident in the form of tracks and drilling exploration that the area has previously been disturbed by historic mining activities.	
Beard vegetation association 204: Succulent steppe with open scrub; scattered Mulga & <i>Acacia sclerosperma</i> over saltbush & bluebush.		to	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)	The vegetation assessment by Jim's Seeds, Weeds & Trees and Western Botanical is sufficient enough to ascertain the condition and vegetation associations of the area, and is a more accurate depiction of the vegetation types found across the proposed pipeline route than the Beard vegetation associations which are based on 1:250,000 scale mapping.
Beard vegetation association 107: Hummock grasslands, shrub steppe; Mulga and <i>Eucalyptus kingsmillii</i> over hard spinifex.				
Beard vegetation association 39: Shrublands; Mulga scrub.				
Beard vegetation association 29: Sparse low woodland; Mulga, discontinuous in scattered groups.				
Beard vegetation association 28: Open low woodland; Mulga (Hopkins et al. 2001; Shepherd et al. 2001).				
Jim's Seeds, Weeds & Trees Pty Ltd conducted a flora survey of the revised pipeline route on 22-23 September and 15 November 2005.				

The following seven vegetation groups were identified along the proposed pipeline route:

1) Mulga woodland-dominant species were *Acacia aneura*. Understorey included *Acacia tetragonophylla*, *Eremophila forrestii*, *Santalum lanceolatum* and *Ptilotus schwartzii*.

2) Mulga/ spinifex complex- Mulga woodland with a Spinifex groundcover. Dominant species were *Acacia aneura* and *Triodia melvillei*. Understorey included *Acacia xanthocarpa*, *Eremophila latrobei*, *Solanum ferocissimum* and *Ptilotus schwartzii*.

3) Mulga creek line-dominant species included *Acacia aneura* with an understorey including *Acacia tetragonophylla*, *Senna artemisioides* spp *artemisioides* and *Rhodanthe charsleyae*.

4) Dense Mulga on rocky steep slope- dominant species were *Acacia aneura* and *Acacia rhodophloia* with an understorey including *Acacia xanthocarpa*, *Eremophila forrestii*, *Grevillea nematophylla* and *Grevillea berryana*. The Priority 1 species *Eremophila congesta* was located on the peaks of the rocky steep slopes.

5) Sandplain- dominant species were *Acacia aneura* and *Eucalyptus kingsmillii*. Understorey included *Acacia craspedocarpa*, *Eremophila longifolia*, *Triodia melvillei* and *Codonocarpus continifolius*.

6) *Acacia burkitti* woodland- dominant species was *Acacia burkitti* with an understorey consisting of *Senna artemisioides* spp *filifolia* and *Santalum lanceolatum*.

7) Claypan complex-dominant species was *Enneapogon caerulescens*. Other species included *Senna artemisioides* spp *filifolia*, *Convolvus angustissimus*, *Acacia aneura*, *Eremophila longifolia*, *Eucalyptus camaldulensis* and *Solanum lasiophyllum*. This vegetation group had been severely grazed by livestock.

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 area of proposed clearing is found within the Interim Biogeographic Regionalisation for Australia (IBRA) Eastern Murchison subregion which encompasses an area of 21,135,046 ha (GIS database). The vegetation types that have been identified and described for the areas applied to clear are common and widespread throughout the Northern Goldfields with almost 100% of the pre-European vegetation remaining (Shepherd et al. 2001).

From a site visit to the proposed clearing area in February 2006, it was evident from previous exploration tracks and drill holes that certain areas of vegetation along the proposed pipeline route have been disturbed as a result of historic mining activities in the area. Grazing has also contributed to the disturbance in the area, with numerous access tracks, fence lines and cattle observed across the length of the proposed pipeline route. The proponent has committed to clearing along existing fence lines and access tracks where possible in order to minimise the impact of the clearing on native vegetation (Magellan Metals 2005).

It is unlikely that the biodiversity at the site of this proposal will be considered outstanding or of higher diversity than in the surrounding bioregions or local area, or that the clearing of a 20 m wide corridor will significantly impact on the biodiversity values of the area.

In consideration of the above, the proposal is not likely to be at variance to this principle (CALM 2006).

Methodology

CALM (2006)

GIS Database:

- Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00

Magellan Metals (2005)

Shepherd et al. (2001)

(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

According to CALM's Threatened and Priority fauna database there are no records of any species of conservation significance within the application area (GIS database).

A desktop fauna assessment was undertaken along the proposed gas pipeline route by Bamford Consulting Ecologists in March 2005. A search was conducted of the WA Museum, Birds Australia, Department of Conservation and Land Management and the Environmental Protection and Biodiversity Conservation databases between the coordinates 26°00' S to 27°00' S and 119°00' E to 121°00' E to identify species of conservation significance that are expected to occur within the proposed clearing area (Bamford 2005). A subsequent field inspection was undertaken by Ninox Wildlife Consulting between 10 and 12 November 2005 to identify fauna habitats and to record observations of vertebrate fauna along the proposed pipeline route.

During the fauna survey Ninox identified three habitats of significance to vertebrate fauna in the vicinity of the pipeline route (Ninox 2005). These were;

- 1) very dense stand of Mulga shrubland which may act as nesting areas for birds, and as a cool daytime shelter, particularly for birds and kangaroos.
- 2) mixed shrubland over spinifex with emergent eucalypts on deep red sand, however, the proposed pipeline route only intercepts a narrow band of this habitat. This habitat may be a focal area for a large number of small animals as noted by the tracks in the sand; and,
- 3) tall *Eucalyptus camaldulensis* woodlands at various locations along the western portion of the proposed pipeline route. These stands contain hollow limbs of various sizes that are suitable for a large number of birds, bats, arboreal mammals and reptiles as shelter and breeding hollows.

Considering that the width of the clearing will be 20 m, and that cleared areas will be progressively rehabilitated, fragmentation of these habitats will be minimal and temporary. The clearing of a 20 m corridor of native vegetation is also unlikely to form a barrier to fauna dispersal through and between these habitats (Bamford 2005). The proponent has advised that during construction of the pipeline, trees with a trunk diameter greater than 300 mm and/ or substantial trees will be retained where practical (Magellan Metals 2005). A visit to the proposed clearing area revealed that the tall eucalypt woodland described by Ninox (2005) is located to the north of the proposed pipeline route, therefore, clearing for the pipeline will not impact on this habitat. There were several stand-alone eucalypts which may act as habitat trees observed in the direct vicinity of the proposed pipeline route, however, the vegetation surrounding these was sparse and it should not be difficult to ensure these eucalypts are retained where practical, as the proponent has committed (Magellan Metals 2005).

No species of conservation significance were recorded during the site assessment in November 2005 (Ninox

2005). As a result of the desk-top review, Bamford Consulting Ecologists (2005) identified several species of conservation significance which may potentially occur within the application area.

The Malleefowl (*Leipoa ocellata*), listed as Vulnerable under the *Environmental Protection and Biodiversity Act 1999* and under Schedule 1 (Fauna that is rare or is likely to become extinct) of the WA Wildlife Conservation (Specially Protected Fauna) Notice 2005, builds large mounds in which to incubate their eggs (Ninox 2005). No evidence was found during the site assessment that these birds were present and breeding in the area in recent times. It is unlikely that this bird currently occurs in the vicinity of the proposed pipeline route (Ninox 2005), and given that the clearing is in the form of a narrow corridor the proposal is not likely to affect this species or habitat for this species.

The Peregrine Falcon (*Falco peregrinus*), listed under Schedule 4 (Other specially protected fauna) of the WA Wildlife Conservation (Specially Protected Fauna) Notice 2005, is a wide ranging bird that is likely to occur in the area, although, it has not been recorded in the area by Birds Australia or the WA Museum (Bamford 2005). This species builds its nest in tall trees and may potentially utilise the Eucalypt woodland within the western portion of the proposed clearing area. A DoIR assessor inspected this portion of the application area and discovered that the Eucalypt woodland in fact lies to the north of the proposed pipeline route. Only several scattered eucalypts potentially remain within the proposed route and the proponent has committed to retaining trees with a trunk diameter of greater than 300mm and/ or substantial trees where practical (Magellan Metals 2005). In consideration of this, the proposal is not likely to impact on this species, or significant habitat for this species.

The Mulgara (*Dasyercus cristicauda*), listed as Vulnerable under the *Environmental Protection and Biodiversity Act 1999* and under Schedule 1 of the WA Wildlife Conservation (Specially Protected Fauna) Notice 2005, is a small carnivorous marsupial which may potentially occur in the sandplain habitat towards the western end of the pipeline route (Bamford 2005). However, deep, red sand dunes that support mixed shrubs, spinifex and occasional tall eucalypt trees occur just to the north of the proposed pipeline corridor and are more likely to support this marsupial than the less diverse sandplain habitat in the immediate vicinity of the pipeline route (Ninox 2005). The narrow corridor for the proposed clearing is not likely to impact on significant habitat for the Mulgara.

The Great Desert Skink (*Egernia kintorei*), listed as Vulnerable under the *Environmental Protection and Biodiversity Act 1999* and under Schedule 1 of the WA Wildlife Conservation (Specially Protected Fauna) Notice 2005 may occur in the sandplain habitat towards the western end of the pipeline route, although, only with a remote possibility (Ninox 2005). Like the Mulgara, the deep, red sand dunes that occur to the north of the proposed pipeline corridor are more likely to support this reptile, therefore, the proposal is not likely to impact on this species.

Three bird species listed on the Japan Australia Migratory Bird Agreement (JAMBA) or the China Australia Migratory Bird Agreement (CAMBA) were not recorded but may potentially occur within the application area.

- The Great Egret (*Ardea alba*; CAMBA) may use a variety of wetland habitats including flooded pastures, dams and drains (Ninox 2006). Most of the landforms along the proposed pipeline route are not associated with wetland habitats, and due to the narrow corridor of proposed clearing, this species is unlikely to be affected by the loss of a relatively small area of habitat along the pipeline route.

- The Rainbow Bee-eater (*Merops ornatus*; JAMBA) may be present seasonally but is unlikely to breed in the Wiluna area (Ninox 2006). Known breeding areas include the Kimberley and South-west (Johnstone and Storr 1998 as cited in Ninox 2006), therefore, the proposal is not likely to impact on this species.

- The Fork-tailed Swift (*Apus pacificus*; JAMBA and CAMBA) rarely lands in Australia but may fly overhead. The narrow corridor of clearing for the proposed pipeline is not likely to impact upon this species (Ninox 2006).

The proponent has developed and is committed to adhering to a fauna management plan in order to minimise the impact on local fauna. Management techniques outlined in the plan include undertaking pipeline construction during cooler months when reptiles in particular are less active, daily pipeline trench inspections to remove trapped fauna, and constructing and maintaining animal escape ramps and wildlife crossings at 1 km intervals across the pipeline length (Keith Lindbeck and Associates 2006).

The fauna assessment reports prepared by Ninox Wildlife Consulting and Bamford Consulting appear to adequately assess the potential impact of the proposal upon fauna habitat and fauna species within the area. The three habitats of significance to fauna discovered during the site assessment have a wide distribution throughout the surrounding Northern Goldfields (Magellan Metals 2005; CALM 2006). The clearing required for the proposed 20 m wide pipeline corridor is not likely to have an impact on significant habitat for fauna indigenous to Western Australia, therefore, this proposal is not likely to be at variance to this principle (CALM 2006).

Methodology Bamford (2005)
CALM (2006)
GIS Database:
- Threatened Fauna - CALM 30/9/05
Johnstone and Storr (1998)
Keith Lindbeck and Associates (2006)
Magellan Metals (2005)

Ninox (2005)
Ninox (2006)

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

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

According to CALM datasets, no Declared Rare Flora (DRF) species are known to occur within the area under application (GIS database).

During Spring 2004 Western Botanical conducted a flora and vegetation survey of the proposed gas pipeline alignment. The aim of the survey was to determine vegetation habitats found across the length of the pipeline, as well as record significant taxa found within and outside the proposed clearing area. In August 2004 the pipeline route was adjusted to avoid sites of Aboriginal significance, and as a result, Jims Seeds, Weeds & Trees Pty Ltd were commissioned to conduct a flora and vegetation survey on the revised pipeline route. The survey was undertaken on 22-23 September and 15 November 2005, and encompassed areas that had not been surveyed or were only opportunistically surveyed during the initial flora survey by Western Botanical (Magellan Metals 2005, Jim's Seeds, Weeds & Trees 2005).

No Declared Rare Flora species were located during the flora and vegetation surveys by Western Botanical (2004) and Jim's Seeds, Weeds & Trees (2005).

The Priority 1 species *Ptilotus astrolasius* var. *luteolus* was recorded in two populations approximately 500 m apart within the Stoney Ironstone Mulga Shrubland which was located within the eastern third of the proposed pipeline route. The species is known from just a few isolated and widely scattered populations in the Murchison Biogeographic Region, and is represented at the WA Herbarium by only seven voucher specimens, therefore, populations within the project area are regarded as significant (Western Botanical 2004). The species was present on both sides of the proposed pipeline route for a distance of 200 m, and distributed as far as 100 m to each side of the proposed route. Western Botanical (2004) counted 102 individuals within the proposed pipeline alignment and 165 individuals outside the proposed pipeline alignment. It was also observed that one of the populations extended further than 100 m south of the surveyed area in similar densities (Western Botanical 2004).

The proponent has liaised with CALM and advised of their intent to remove a maximum of 102 individuals of *Ptilotus astrolasius* var. *luteolus* and have subsequently submitted a request seeking permission to remove this species with the CALM Goldfields Regional Office. CALM advised that numerous other populations of *Ptilotus austrolasius* var. *luteolus* had been recorded and they believe that the removal of the individuals required during the clearing for the proposed gas pipeline route will have minimal impact on the conservation status of this species (CALM 2006; Keith Lindbeck and Associates 2006).

Eremophila congesta (Priority 1) was recorded during the survey by Jim's Seeds, Weeds & Trees (2005) and is known from five collections at the WA Herbarium, all of which are located within 30 km north or west of Wiluna on rocky, stoney, low lateritic, greenstone or quartzite hills. *Eremophila congesta* was located on the peaks of the rocky slopes within the central third of the proposed pipeline route. Upon these peaks an area of 30 ha was traversed and approximately 100-200 individuals were estimated. The proposed pipeline will intersect approximately 700 m of the vegetation in this area, thus given the estimated density this section of the pipeline will affect approximately 10-15 individual plants (Jim's Seeds, Weeds & Trees 2005). The removal of 10-15 individuals of *Eremophila congesta* is likely to have minimal impact on the conservation status of this species considering the extent of the population in the surrounding area (CALM 2006).

The proposal raises no threat to Declared Rare Flora or to the conservation status of Priority flora species, therefore, the proposal is not likely to be at variance to this principle (CALM 2006).

Methodology CALM (2006)
GIS Database:
- Declared Rare and Priority Flora List - CALM 01/07/05
Jim's Seeds, Weeds & Trees (2005)
Keith Lindbeck and Associates (2006)
Magellan Metals (2005)
Western Botanical (2004)

(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 records of Threatened Ecological Communities (TECs) within the area subject to be cleared (GIS database; Cowan 2001; Magellan Metals 2005). The nearest known TEC is located approximately 150 km south of the proposed clearing area (GIS database). The proposal is not likely to be at variance to this principle (CALM 2006).

Methodology CALM (2006)
 Cowan (2001)
 GIS Database:
 - Threatened Ecological Community Database - CALM 15/07/03
 Magellan Metals (2005)

(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 State Government is committed to the National Objectives Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with an extent below 30% of that present pre-European settlement (Department of Natural Resources and Environment 2002; EPA 2000).

While the benchmark of 15% representation in conservation reserves (JANIS Forests Criteria 1997) has not been met for Beard vegetation associations 18, 204, 107, 39, 29 and 28, approximately 99.3% or greater of the pre-European extent remains for these associations and it is therefore of 'least concern' for biodiversity conservation (Hopkins et al. 2001; Department of Natural Resources and Environment 2002).

	Pre-European area (ha)	Current extent (ha)	Remaining %*	Conservation Status**	% in IUCN Class I-IV reserves
IBRA Bioregion - Murchison	28,206,195*	28,206,195*	~100%	Least concern	
Shire of Wiluna	No information available				
Beard vegetation associations					
- 18	24,675,970	24,659,110	~99.9%	Least concern	2.0%
- 204	234,593	232,975	~99.3%	Least concern	0.0%
- 107	3,348,249	3,348,249	~100%	Least concern	3.1%
- 39	5,382,170	5,380,712	~100%	Least concern	8.2%
- 29	7,782,264	7,782,264	~100%	Least concern	0.3%
- 28	355,797	355,797	~100%	Least concern	0.0%

With consideration to the above, the proposal is not likely to be at variance to this principle

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

Methodology Department of Natural Resources and Environment (2002)
 EPA (2000)
 Hopkins et al. (2001)
 JANIS Forests Criteria (1997)
 Shepherd et al. (2001)

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

Comments Proposal may be at variance to this Principle

There are no permanent watercourses or wetlands within the proposed area to be cleared, although several minor, non-perennial watercourses including West Creek, Cockarow Creek and Negrara Creek intercept the proposed area of clearing (GIS database; Magellan Metals 2005). Non-perennial watercourses are widespread throughout the Northern Goldfields acting as drainage channels to disperse floodwaters during heavy rainfall events (GIS database). For most of the year these watercourses remain dry, however, the Wiluna region can be subject to sporadic heavy rainfall events, and it is after these events that the watercourses may experience surface flows.

Vegetation associated with the non-perennial watercourses in and around the areas which are proposed to be cleared is mostly *Acacia aneura*, with several understorey species including *Acacia tetragonophylla*, *Senna artemisioides* spp *artemisioides*, *Eremophila fraserii*, *Santalum spicatum* and *Erodium crinitum* (Jim's Seeds, Weeds & Trees 2005). It was observed from the site visit to the proposed clearing areas that this vegetation continued in both direction along the watercourses. For several of the watercourses the vegetation was quite sparse and did not appear to be prominent riparian vegetation. Dense Mulga was observed growing in association with one non-perennial watercourse, and any clearing of native vegetation for the pipeline corridor may increase surface water runoff or cause soil erosion in and around the watercourse.

On the site visit to proposed clearing area, it was evident that recent rainfall had caused surface water runoff into these watercourses, and it is likely that this had contributed to the slight degree of streambank erosion observed. A higher degree of erosion was observed around two watercourses where livestock were seen to congregate. In these areas the soil and vegetation had been severely disturbed by the grazing livestock (Jim's Seeds, Weeds & Trees 2005). The proponent has advised that the width of vegetation to be cleared along the length of the pipeline will be 20 m, and that the area of disturbance will be rehabilitated progressively as the

pipeline is buried (Keith Lindbeck and Associates 2006). Surface water runoff and soil erosion may be exacerbated in and around the watercourses which the proposed pipeline intercepts if native vegetation is cleared during heavy rainfall or surface flow events. This issue will be managed through a condition on the clearing permit which prevents clearing within 50 m of a watercourse, if the watercourse is flowing. A condition has also been placed on the clearing permit to prevent the clearing of native vegetation within 100 m of a drainage line or a defined non-perennial watercourse for any purpose other than for the pipeline right of way in order to minimise the area of vegetation growing in association with the watercourses which will be impacted on by the clearing.

With consideration to the above factors, this proposal may be at variance to this principle.

Methodology GIS Database:
- Hydrography, linear - DOE 1/2/04
- Rivers 250K - GA
- Lakes, 1M - GA 01/06/00
Jim's Seeds, Weeds & Trees (2005)
Keith Lindbeck and Associates (2006)
Magellan Metals (2005)

(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 Eastern Murchison Interim Biogeographic Regionalisation for Australia (IBRA) sub-region is characterised by gently undulating hills, with occasional ranges of low hills and extensive sand plains in the eastern half. The dominant soils types of the area are shallow earthy loams overlying red-brown hardpans, shallow stony loams on hills and red earthy sands on sand plains (Jim's Seeds, Weeds & Trees 2005).

Land system information from Mabutt et al. (1958), as cited in Magellan Metals (2005), for the project area revealed the pipeline route occurs in three major land systems:

- Diamond Land System: undulating terrain forming part of the old plateau; very gently undulating watersheds of moderate extent; rounded, stable crests and lightly stripped lower slopes, with a sparse, branching pattern of unchannelled, shallow valleys; relief below 3 m.
- Glengarry Land System: surfaces formed by dissection of old plateau; sandstone plateaux, bevelled ridges, and smaller hills, with steep, rocky slopes and minor lowland tracts, forming dissected watersheds of up to 16 km wide in centre of area; incised, moderately dense, strike-controlled drainage; also as narrower, lower tracts with radial drainage in east of area; relief mainly below 30 m, locally up to 60 m.
- Cunyu Land System: depositional surfaces - calcreted valley fills, up to 8 km wide, with a mosaic of calcrete platforms up to 5 m high, and narrow intervening alluvial floors, broader alluvial plains on outer margins, locally burying the calcrete, restricted channel drainage; gradients below 1 in 1000.

It was evident from the site visit that the majority of the land units along the proposed pipeline route were undisturbed and quite stable as a result of the intact rocky topsoils and protective vegetative cover. In the areas around two non-perennial watercourses where livestock were observed to graze there was evidence of land degradation in the form of soil erosion from the trampling of livestock.

DAWA (2006) have identified the following vegetation complexes, as mapped by Western Botanical that are likely to be affected by land degradation during clearing, construction or operational phases of the project .
V3- Stoney Acacia- Eremophila Shrublands: Soil Erosion and loss of native vegetation through water starvation.
V5- Open Mulga on stony lower slopes: Soils are prone to erosion if water is concentrated by the works and discharged in this zone.
V7- Dense Mulga woodland: Where this is associated with drainage tracts, it is prone to soil erosion.
V8- Stony Ironstone Mulga shrubland: It is only liable to erode where the protective stony mantle is disturbed, therefore, minimal disturbance is recommended.
V10- Loamy wash plain with annuals and isolated Mulga: This vegetation type makes up 8% of the pipeline's route, and is prone to soil erosion through loss of protective stony mantles and vegetation decline through water starvation.
V11- Hardpan Mulga shrublands: Comprises 10% of the proposed route. Excessive soil erosion and loss of native vegetation is likely to occur if the natural surface water flow regime is altered.
V12- Minerichie- Mulga over spinifex on plateaux: The lower slopes are likely to be particularly prone to soil erosion.

DAWA (2006) advise that the proposed clearing is likely to be at variance with principle (g) for soil erosion and or loss of native vegetation through water starvation on the sections of the pipeline that support plant communities described above.

The climate of the Wiluna region is arid and is characterised by sporadic low average rainfall (280 mm/yr) and a high evaporation rate (3800 mm/yr) (GIS database). The proposed clearing is in an area where there is little or no surface flow during normal season rains (Magellan Metals 2005), therefore, any potential water erosion and

water logging is only likely after heavy rainfall events. The areas within and surrounding the non-perennial watercourses will be most vulnerable to erosion, especially if clearing were to occur during or prior to heavy rainfall or surface flow events. In order to minimise the risk of erosion, a condition has been placed on the clearing permit that prevents clearing within 50 m of a watercourse, if the watercourse is flowing. Further to this, the proponent has advised that in order to minimise the risk of erosion, progressive rehabilitation will begin following pipeline burial using the following techniques (Keith Lindbeck and Associates 2006).

- Backfilling and compaction of the trench with stockpiled subsoil so that the profile resembles the pre-disturbed soil profile.
- Spreading windrowed vegetation over the disturbance area to provide soil nutrients, seed resources, habitat values and erosion resistance, as well as assisting to restrict access to the disturbed areas during rehabilitation,
- Constructing soil erosion control (mitre) banks across the easement on steep or long slopes to reduce downslope accumulation of runoff flow,
- Installing trench breakers, such as stabilised sandbags, at intervals along steep sections of the right of way (ROW) to limit subsurface flow, and;
- Undertaking regular internal audits and constructing site specific erosion control measures where necessary.

DAWA have expressed concern that the clearing for the proposed gas pipeline may result in loss of native vegetation through water starvation. There is a small likelihood of this occurring if the clearing for the proposed gas pipeline disrupts the natural drainage pattern of the landscape. The proponent has committed to restoring all drainage patterns to their original profile and to manage drainage flows to and from the ROW, in order to reduce the risk of this occurring (Keith Lindbeck and Associates 2006). To ensure clearing for the proposed pipeline corridor does not impact on natural drainage patterns, a condition has been placed on the clearing permit which states that the Permit Holder shall rehabilitate all cleared areas by re-shaping the surface so that it is consistent with the surrounding 5 metres of uncleared land, and re-spreading the topsoil and vegetative material over cleared areas.

In order to reduce the risk of wind erosion and subsequent land degradation, it is recommended that livestock be kept off the rehabilitated areas in order to avoid trampling and breakdown of the rehabilitated soil structure, and to ensure that the vegetation has the opportunity to establish.

With regard to salinity, groundwater salinities across the length of the pipeline range between 500 - 7000 Total Dissolved Solids (GIS database), however, considering the low average rainfall of the region and that the proposed pipeline corridor will be 20 m in width, any clearing is unlikely to increase salinisation either on-site or off-site.

No weed species were recorded along the proposed pipeline route (Keith Lindbeck and Associates 2006; J Williams, Botanist, Jim's Seeds, Weeds & Trees, pers. comm., 4 April 2006). A condition has been placed on the clearing permit which ensures all vehicles are blown down prior to entering the permit area in order to minimise the risk of introducing weed species, and the proponent has committed to undertaking weed control procedures in their Environmental Management Plan through using techniques such as.

- Restriction of vehicle access, and ensuring vehicles and equipment which will have access to the pipeline construction site are free from soil and vegetation prior to arrival,
- Application of hygiene measure such as vehicle blowdown to prevent transferring of weeds, and;
- Eradication of weeds where necessary.

The proposal may be at variance to this principle due to the risk of erosion occurring at the time of clearing.

Methodology DAWA (2006)
 GIS Database:
 - Evaporation Isopleths - BOM 09/98
 - Mean Annual Rainfall Surface (1975-2003) - DOE 09/05
 - Groundwater Salinity, Statewide - 22/02/00_1
 Jim's Seeds, Weeds & Trees (2005)
 Keith Lindbeck and Associates (2006)
 Mabutt et al. (1958)
 Magellan Metals (2005)

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

Comments **Proposal is not at variance to this Principle**
 There are no CALM managed conservation areas within the area to be cleared, with the nearest being Wanjarri Nature Reserve situated approximately 85 km south-east of the proposed clearing (GIS database). The vegetation within the proposal does not serve as a significant ecological linkage, or buffer to the regional conservation areas. Considering the distance between this proposal and the nearest CALM managed reserve, the proposed clearing is not at variance to this principle (CALM 2006).

Methodology CALM (2006)

GIS Database:
- CALM Managed Lands and Waters - CALM 1/07/05_1

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

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

There are no permanent watercourses or water bodies within the vicinity of the application area, however, there are numerous minor, non-perennial drainage lines which intercept the area of proposed clearing (GIS database, Magellan Metals 2005). These remain dry for the majority of the year and only flow to disperse floodwaters after significant rainfall events (Magellan Metals 2005). Heavy rainfall at the time of clearing could result in erosion and increased turbidity in these watercourses, although in the northern Goldfields any surface water quickly infiltrates or is evaporated, therefore, water quality is unlikely to be impacted on. Also, given that the clearing will be 20 m in width plus several turnaround/ work areas, and that area will be progressively rehabilitated as the pipeline is buried the likelihood of erosion and sediment export will be minimised. The clearing of native vegetation for the proposed gas pipeline corridor is not likely to cause deterioration in the quality of surface water.

The Wiluna Water Reserve is located approximately 2 km south from the eastern end of the proposed pipeline route. The region experiences low average rainfall (280 mm/yr) and a high evaporation rate (3800 mm/yr), so there would be expected to be little recharge to groundwater during normal rains (GIS database; Magellan Metals). It would only be during significant rainfall events that a reasonable amount of rainfall may infiltrate to groundwater. Given there is no major drainage into the water reserve and that clearing is localised, the clearing of native vegetation is not likely to cause deterioration in the quality of the water in the Wiluna Water Reserve.

This proposal raises no water quality issues, therefore, is not likely to be at variance to this principle.

Methodology GIS Database:
- Lakes, 1M - GA 01/06/00
- Hydrography, linear - DOE 1/2/04
- Evaporation Isopleths - BOM 09/98
- Mean Annual Rainfall Surface (1975-2003) - DOE 09/05
- Public Drinking Water Source Areas (PDWSAs) - DOE 07/02/06
Magellan Metals (2005)

(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 in an arid region and does not intercept any permanent watercourses or waterbodies (GIS database). The broad valleys of the northern Goldfields are designed to sustain and disperse floodwaters, and given the high annual evaporation (3800 mm/yr) and low average annual rainfall (280 mm/yr), flooding is only likely following major rainfall events (GIS database; Magellan Metals 2005). Clearing for the pipeline will be localised to a width of 20 m and vegetation will be rehabilitated progressively as the pipeline is buried (Magellan Metals 2005). The clearing of native vegetation is not likely to form a catchment area sufficiently large enough to cause or exacerbate the incidence of flooding, therefore, this proposal is not likely to be at variance to this principle.

Methodology GIS Database:
- Hydrography, linear - DOE 1/2/04
- Lakes, 1M - GA 01/06/00
- Evaporation Isopleths - BOM 09/98
- Mean Annual Rainfall Surface (1975-2003) - DOE 09/05
Magellan Metals (2005)

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

Comments

There is a native title claim over the area under application; WC99/024. This claim has been registered with the National Native Title Tribunal on behalf of Wiluna claimant group. 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*.

The proposed clearing occurs in an area that is covered by the following Registered Indigenous Heritage Sites - Wiluna North 6, ID: 14089; and Tjanapi, ID: 18824. 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.

The proponent does have a current Licence or Works Approval for this project granted under the *Environmental*

Protection Act 1986 (DoE 2006).

The proponent does not have a current ground or surface water licence for this project (DoE 2006).

The proponent has a current pipeline licence (PL73) issued under the *Petroleum Pipelines Act 1969*.

No submissions or objections have been received from direct interest parties.

Methodology DoE (2006)

GIS Database:

- Aboriginal Sites of Significance - DIA 28/02/03

- Native Title Claims - DLI 7/11/05

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Mineral Production	Mechanical Removal	78	Grant	<p>The clearing principles have been addressed and the proposed clearing is not at variance with principles e and h.</p> <p>The proposed clearing is not likely to be at variance with principles a, b, c, d, i and j.</p> <p>The proposed clearing may be at variance with principle f due to the risk of soil erosion and increased runoff occurring in and around the watercourses as a result of the clearing, especially if clearing were to occur during or prior to a significant rainfall event.</p> <p>The proposed clearing may be at variance with principle g as DAWA has advised that several land units associated with the clearing are vulnerable to soil erosion if the protective mantle is disturbed.</p> <p>The assessing officer recommends that the permit be granted with the following conditions.</p> <ol style="list-style-type: none">1) The Permit Holder shall not clear more than 102 individuals of the species <i>Ptilotus astrolasius</i> var. <i>luteolus</i>.2) The Permit Holder shall not clear more than 20 individuals of the species <i>Eremophila congesta</i>.3) The Permit Holder shall not clear native vegetation within 50 metres of a watercourse if the watercourse is flowing.4) The Permit Holder shall not clear within 100 metres of a drainage line or a defined non-perennial watercourse for any purpose other than for the pipeline right of way.5) The Permit Holder shall ensure that all vehicles and machinery prior to entering the permit area are blown down to remove soil and plant propagules.6) 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, and;d) the number of specimens of <i>Ptilotus astrolasius</i> var. <i>luteolus</i> and <i>Eremophila congesta</i> cleared.7) The Permit Holder shall provide a report to the Director, Environment, DoIR by 31 March each year, setting out the records required under condition 6 of this permit in relation to clearing carried out between 1 January and 31 December of the previous year. The Permit Holder shall submit a report each year until the clearing under this permit has been completed.8) For each instance of clearing recorded under condition 6, the Permit Holder must backfill the trench with stockpiled subsoil so that the profile resembles the predisturbance soil profile and spread stockpiled topsoil on the re-profiled landform so that the shape of the rehabilitated area is consistent with the shape of the surrounding 5 metres of uncleared land. Rehabilitation shall be completed within 6 months of pipeline burial.

5. References

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6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAWA	Department of Agriculture, Western Australia.
DA	Department of Agriculture, Western Australia.
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.
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.

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.

