



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2962/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Tuma Holdings Pty Ltd

1.3. Property details

Property: Mining Lease 70/836
Local Government Area: Shire of Northam
Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
9.3		Mechanical Removal	Sand Mining

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Vegetation within the application area has been mapped at a 1:250,000 scale as the following Beard vegetations association: (Shepherd et al., 2001; GIS Database):

- **4:** Medium woodland; marri & wandoo; and

- **3003:** Medium forest; jarrah & marri on laterite with wandoo in valleys, sandy swamps with teatree and Banksia.

A vegetation assessment was undertaken on Mining Lease 70/836 to record the species richness and diversity of the vegetation prior to mining (Landform Research, 1998). The vegetation that was surveyed is located immediately west of the application area (Landform Research, 1998). The vegetation community has been described as:

- Open Low Jarrah Woodland: Species comprised of scattered regrowth of *Eucalyptus marginata* with isolated *Banksia grandis* over an understorey dominated by *Stirlingia latifolia*, *Bossiaea eriocarpa*, *Dryandra lindleyana* with *Hibbertia huegellii*.

Clearing Description

Tuma Holdings Pty Ltd has applied to clear up to 9.3 hectares of native vegetation for the purpose of sand mining (Tuma Holdings Pty Ltd, 2008). Vegetation will be cleared by a front end loader with its blade down. Vegetation and topsoil will be removed and spread directly onto an area to be rehabilitated (Tuma Holdings Pty Ltd, 2008).

Vegetation Condition

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

Comment

The application area is located adjacent to an existing sand mining operation to the west and farmland to the south. Aerial imagery indicates that native vegetation borders the north and east of the application area, and this vegetation is located within the broad expanse of the Mundaring Weir Catchment Area.

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The application area is located within the Northern Jarrah Forest subregion of the Jarrah Forest Interim Biogeographic Regionalisation of Australia (IBRA) which covers an area of approximately 4,507,735 hectares (GIS Database). The vegetation of the subregion comprises of Jarrah-Marri forest in the west with Bullich and Blackbutt in the valleys, grading to Wandoo and Marri woodlands in the east with Powderbark on breakaways.

There are extensive but localised sand sheets with Banksia low woodlands. Heath is found on granite rocks and as a common understorey of forests and woodlands in the north and east. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions (Williams and Mitchell, 2001).

The vegetation within the application area has been described as 'Open Low Jarrah Woodland' (Landform Research, 1998). A site inspection by the Department of Environment and Conservation on 14 April 2005 of the vegetation adjacent to the application area determined the vegetation to be regrowth jarrah forest (Department of Environment and Conservation, 2007a). Landform Research (2006) has recorded a total of 60 flora species from 39 genera within an area of Jarrah woodland on Mining Lease 70/836 adjacent to the application area. In addition, Landform Research (1998) recorded a total of 23 flora species from 20 genera within an area of Jarrah Woodland adjacent to the application area. Given the similarity of the vegetation on Mining Lease 70/836, it is likely that the number and type of flora taxa recorded adjacent to the application area would be comparable to the vegetation within the application area.

The application area is located within the Mundaring Weir Catchment Area which covers an area of approximately 150,000 hectares (GIS Database). Only 3% of this catchment has been cleared (Smith et al., 2007). The vegetation community and the flora taxa that have been identified within the application area are likely to be well represented throughout the adjoining catchment area which remains largely uncleared.

Available datasets indicate that there are no Declared Rare Flora or Priority Flora within the application area, and the vegetation has not been identified as a Threatened Ecological Community (GIS Database).

Given that the 'Open Low Jarrah Woodland' vegetation community is common throughout the adjoining area and Mundaring Weir Catchment Area, the proposed clearing is unlikely to have any significant impact on the biodiversity of the area.

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

Methodology Department of Environment and Conservation (2007a)
Landform Research (1998)
Landform Research (2006)
Smith et al. (2007)
Williams and Mitchell (2001)
GIS Database:
- Declared Rare and Priority Flora List
- CAWSA Part IIA Clearing Control Catchments
- Interim Biogeographic Regionalisation of Australia
- Interim Biogeographic Regionalisation of Australia (subregions)
- Threatened Ecological Communities

(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 may be at variance to this Principle

A search of the Department of Environment and Conservation's (DEC) Nature Map database was undertaken by the Assessing Officer using the coordinates 31°54'32'S and 116°23'29'E, thereby representing a 40 kilometre radius area. This search identified 17 Amphibian, 109 Avian, 43 Mammalian and 74 Reptilian species that may occur within the application area (Department of Environment and Conservation, 2007b). A total of 35 fauna species of conservation significance have been recorded within the search area.

Based on habitat preferences, the following species of conservation significance have the potential to occur within the application area:

- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*), Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*;
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*; listed as 'Endangered' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Brush-tailed Phascogale (*Phascogale tapoatafa* subsp. *ssp.* (WAM M434)), Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*;
- Numbat (*Myrmecobius fasciatus*), Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Chuditch (*Dasyurus geoffroi*), Schedule 1 (Fauna that is rare or is likely to become extinct) of the

Wildlife Conservation (Specially Protected Fauna) Notice 2008(2); listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*; and

- Western Brush Wallaby (*Macropus irma*), listed DEC Priority 4.

The Forest Red-tailed Black Cockatoo has been recorded nesting in jarrah, karri and wandoo trees, and is known to feed on seeding marri, jarrah and blackbutt (Johnstone and Storr, 1998). The species prefers nest hollows in tree trunks, and occasionally in large branches (Department of Environment and Conservation, 2009a). This species is a large bird, therefore, nest hollows need to be correspondingly large (Department of Environment and Conservation, 2009a). Nest hollows in marri range from 8 to 14 metres above the ground, with the entrance size 12 to 41 centimetres and depth of hollow 1 to 5 metres (Johnstone and Storr, 1998).

Carnaby's Black Cockatoo are found in uncleared or remnant areas of Eucalypt woodland, primarily *Eucalyptus salmonphloia* and *Eucalyptus wandoo*, as well as shrubland or kwongan heath dominated by *Hakea* and *Banksia* species (Department of Environment and Conservation, 2009b). After breeding season, flocks will move to higher rainfall coastal areas within *Banksia* woodland and/or pine plantations. The species nests in the hollows of live or dead eucalypts, and nest hollows range from 2.5 to 12 metres above the ground, with the entrance size 23 to 30 centimetres and depth of hollows 1 to 2.5 metres (Department of Environment and Conservation, 2009b).

Baudin's Black Cockatoo are usually found in heavily forested areas that are dominated by *Corymbia calophylla* (Marri) and *Eucalyptus* species, especially Karri and Jarrah (Department of Environment, Water, Heritage and the Arts, 2009). It also occurs in *Eucalyptus wandoo* woodland and orchids and is occasionally recorded in farmland and grasslands (Department of Environment, Water, Heritage and the Arts, 2009). The main diet of *Calyptorhynchus baudinii* consists of eucalypt seeds, supplemented with insect larvae and seeds of other plants such as *Banksia*, *Hakea* and *Erodium*. There is no specific information available on the use of refuge habitats (Department of Environment, Water, Heritage and the Arts, 2009).

A site inspection of Mining Lease 70/836 was undertaken by the Department of Environment and Conservation on 8 June 2007 in relation to CPS 365/1 which is located immediately west of the application area (Department of Environment and Conservation, 2007a). The vegetation was considered to be in 'very good' condition and dominated by regrowth open *Eucalyptus marginata* forest with sparse understorey (Department of Environment and Conservation, 2007a). The application area is located within the Mundaring Weir Catchment Area, and Smith et al. (2007) confirm that virtually all the native forest within the catchment has been previously logged. The western quarter of the catchment was logged prior to 1950 and the remainder logged in the period from 1950-75 to provide firewood for the Wundowie charcoal-iron plant and for the Goldfields Water Supply pumps (Smith et al., 2007). Given the absence of any old growth timber which may support suitable sized hollows, the vegetation within the application area is unlikely to provide any suitable nesting habitat for the Forest Red-tailed Black Cockatoo, Carnaby's Black Cockatoo and Baudin's Black Cockatoo. However, the presence of *Eucalyptus marginata* and *Banksia grandis* within and adjoining the application area indicates that the vegetation may provide suitable foraging habitat for these species.

The Brush-tailed Phascogale inhabits dry sclerophyll forests and open woodlands that contain hollow bearing trees but a sparse ground cover (Department of Environment and Conservation, 2009c). Nesting habitat include hollow trees, rotted stumps and even bird nests (The Australian Museum Trust/Queensland Museum, 2008). Home ranges of females can span 20 to 40 hectares, and males often have home ranges greater than 100 hectares (Department of Environment and Conservation, 2009c; The Australian Museum Trust/Queensland Museum, 2008). Given the absence of any old growth timber which may support suitable sized hollows, the vegetation within the application area is unlikely to provide any suitable nesting habitat for this species. The large home range indicates that the vegetation may be used for foraging habitat.

The Numbat is found throughout a range of habitats that includes Jarrah Forest, open eucalypt woodlands, banksia woodlands and tall closed shrubland (Department of Environment and Conservation, 2009d). The Numbat uses hollow logs (and sometimes hollows in trees) and burrows as refuges and den sites, but may also dig burrows where they construct nests and sleep, particularly in winter (Department of Environment and Conservation, 2009d; The Australian Museum Trust/Queensland Museum, 2008). Home range sizes vary from 25 to 50 hectares, however, males roam in search of females over a larger area prior to and during the breeding season (Department of Environment and Conservation, 2009d; The Australian Museum Trust/Queensland Museum, 2008). A sand mining operation is located west and farmland immediately south of the application area. The disturbances associated with the mining operation and farmland is likely to have reduced the habitat value of the vegetation for the Numbat. It is unlikely that the species would be found within the application area.

The Chuditch is predominantly located throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of southwest Western Australia (Department of Environment and Conservation, 2009e; Orell and Morris, 1994). The Chuditch is found in a wide range of habitats, including woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. However, it has been known to show preference for woodland and mallee habitats (Department of Environment and Conservation, 2009e; Orell and Morris, 1994). In certain areas of the Jarrah Forest where foxes are not controlled, male chuditch have a home range of approximately 15 square kilometres, whilst females have a home range of approximately 3 to 4 square kilometres (Department of Environment and Conservation, 2009e; Orell and Morris, 1994). Chuditch are known to occupy hollow logs and burrows, and have also been recorded in tree hollows and cavities. Suitable hollow or burrow entrance for the Chuditch is often at least 30 centimetres in diameter (Department of Environment and Conservation, 2009e; Orell and Morris, 1994). Tree hollows generally take a long time to form and in particular may only

occur in large trees which are approximately 100-150 years old (DEC NSW, 2004). The vegetation within the application area has previously been cleared and the current vegetation is regrowth (Department of Environment and Conservation, 2007; Smith et al., 2007). The trees within the application area are not likely to be of sufficient age to have formed hollows of suitable size to provide habitat for the Chuditch. Large expanses of intact vegetation are available throughout the Mundaring State Forest. The proposed clearing is unlikely to impact on significant habitat for the Chuditch.

The Western Brush Wallaby prefers open forest or woodland, particularly open, seasonally wet flats with low grasses and open scrubby thickets (Department of Environment and Conservation, 2009f; The Australian Museum Trust/Queensland Museum, 2008). There is the potential for this species to utilise the habitat within the application area, however, the disturbances associated with the adjacent mining operation and farmland are likely to have reduced the habitat value of the vegetation within the application area. Large areas of intact vegetation are available throughout the Mundaring State Forest which is likely to be of higher habitat value for this species.

The vegetation within the application area is part of a large expanse of native vegetation that is located within the Mundaring State Forest which covers an area in excess of 50,000 hectares (GIS Database). Large areas of intact vegetation are available adjacent to the application area and throughout the Mundaring State Forest. These areas are likely to provide higher quality fauna habitat than the vegetation within the application area given the presence of the adjoining sand mining operation and farmland. The vegetation within the application area is unlikely to be considered as significant habitat for any other fauna species which may utilise the application area.

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

Methodology DEC NSW (2004)
Department of Environment and Conservation (2007a)
Department of Environment and Conservation (2007b)
Department of Environment and Conservation (2009a)
Department of Environment and Conservation (2009b)
Department of Environment and Conservation (2009c)
Department of Environment and Conservation (2009d)
Department of Environment and Conservation (2009e)
Department of Environment and Conservation (2009f)
Department of Environment, Water, Heritage and the Arts (2009)
Johnstone and Storr (1998)
Orell and Morris (1994)
Smith et al. (2007)
The Australian Museum Trust/Queensland Museum (2008)

(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 available datasets there are no known records of Declared Rare Flora (DRF) or Priority Flora species within the application area (GIS database). A population of *Dryandra aurantia* (DRF) has been recorded approximately 14 kilometres south-east, and a population of *Lechenaultia laricina* has been recorded approximately 15 kilometres east, north-east of the application area.

Florabase records indicate that the taxon name *Dryandra aurantia* is 'not current' and that this species is a nonmenclatural synonym of *Banksia aurantia* (A.S George) (Western Australian Herbarium, 1998 - 2009). *Banksia aurantia* (A.S George) is a prostrate lignotuberous shrub that is found on white/grey sands and seasonally waterlogged plains (Western Australian Herbarium, 1998 - 2009). The soils within the application area are characterised by well drained coarse quartz sands (Landform Research, 1998). The application area is unlikely to represent suitable habitat for this species.

Lechenaultia laricina is described as a diffuse ascending shrub which grows between 0.15 metres to 0.7 metres high and is found on sand and gravelly loam soils (Western Australian Herbarium, 1998 - 2009). The soils within the application area are characterised by well drained coarse quartz sands (Landform Research, 1998), which is unlikely to represent suitable habitat for *Lechenaultia laricina*.

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

Methodology Landform Research (1998)
Western Australian Herbarium (1998 - 2009)
GIS Database:
- Declared Rare and Priority Flora List

(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 (TEC's) within the application area (GIS database). The nearest known TEC is located approximately 32 kilometres west of the application area (GIS database).

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

Methodology GIS Database:
- Threatened Ecological Communities

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

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

The clearing application area is located within the Jarrah Forest Interim Biogeographic Regionalisation for Australia (IBRA) bioregion. Approximately 54.2% of the pre-European vegetation remains within the bioregion (see table) (GIS database; Shepherd, 2007).

The vegetation of the clearing application area has been mapped as Beard vegetation association 4: Medium woodland; marri & wandoo, and 3003: Medium forest; jarrah & marri on laterite with wandoo in valleys, sandy swamps with teatree and Banksia (GIS Database). According to Shepherd (2007), approximately 24.2% and 61.3% of Beard vegetation associations 4 and 3003 remains within the Jarrah Forest bioregion (see table).

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Jarrah Forest bioregion and Beard vegetation association 3003 (within the bioregion) is of "Least Concern" (see table) (Department of Natural Resources and Environment, 2002). The conservation status for Beard vegetation association 4 (within the Jarrah Forest Bioregion) is "Vulnerable" (Department of Natural Resources and Environment, 2002).

Only a small percentage of Beard vegetation associations 4 and 3003 within the Jarrah Forest bioregion are protected within conservation reserves (see table) (Shepherd, 2007).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves
IBRA bioregion – Jarrah Forest	4,506,656	2144009410	~54.2	Least Concern	13.8
Beard veg assoc. – State					
4	1,054,280	254,657	~24.2	Vulnerable	4.4
3003	66,452	40,721	~61.3	Least Concern	7.9
Beard veg assoc. – Bioregion					
4	1,022,713	247,942	~24.2	Vulnerable	6.49
3003	66,452	40,721	~61.3	Least Concern	7.9
Shire					
Northam	141,410	31,229	~22%	Vulnerable	No information available

* Shepherd (2007)

** Department of Natural Resources and Environment (2002)

Although the extent Beard vegetation association 4 and native vegetation in the Shire of Northam is below the 30% threshold, the application area is located in the western extent of the Shire and is surrounded by a broad expanse of native vegetation within the Mundaring Weir Catchment Area.

Smith et al. (2007) confirm that virtually all the native forest within the catchment has been previously logged. The western quarter of the catchment was logged prior to 1950 and the remainder logged in the period from 1950-75 to provide firewood for the Wundowie charcoal-iron plant and for the Goldfields Water Supply pumps (Smith et al., 2007). The regrowth vegetation is not regarded as remnant native vegetation.

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2007)

Smith et al. (2007)
GIS Database:
- Interim Biogeographic Regionalisation of Australia (subregions)
- Pre-European Vegetation

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

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

There are no permanent watercourses, wetlands or drainage systems within the application area (GIS Database). Wariin Brook is located approximately 210 metres north and Helena River is located approximately 3.4 kilometres south of the application area (GIS Database). The vegetation within the application area is not considered to be growing in association with a wetland or watercourse.

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

Methodology GIS Database:
- Hydrography, linear_1

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

Comments Proposal is at variance to this Principle

The application area is located in the north of the Mundaring Weir Catchment Area on the Darling Plateau (GIS Database; Smith et al., 2007). The soils on Mining Lease 70/836, within which the application area lies, consist of quartz sands with small but variable amounts of duricrust (Landform Research, 1998). The sand is very porous, with no surface water runoff and low levels of water retention through summer (Landform Research, 1998). The sand overlays basal beds enriched in clay, and depth to groundwater is approximately 15 to 20 metres below the surface (Landform Research, 1998). The high porosity of the sandy soils is likely to minimise the risk of water erosion, however, due to the sandy nature of the soils there is a potential for wind erosion to occur should native vegetation be removed.

Given the high porosity of the soils within the application area it is likely that a high proportion of rainfall that occurs on site will infiltrate to groundwater. Groundwater recharge and discharge influence the quality and flow of surface water that enters into the nearby Wariin Brook (situated approximately 210 metres north of the application) which is ultimately held by Mundaring Weir on the Helena River (Smith et al., 2007).

A seepage area is located approximately 1.2 kilometres west of the application area and this area is situated immediately adjacent to a previously mined area on Mining Lease 70/233. Topographic contour information demonstrates that the seepage area is located down slope from the application area (GIS Database). This area is clearly evident in aerial imagery and located approximately 80 metres from Wariin Brook (GIS Database). The salinity of the water at the seep has been measured at 950 milligrams per litre Total Dissolved Solids (MWES, 2009).

The proposed clearing of 9.3 hectares of native vegetation and mining of the underlying soils will increase groundwater recharge which would subsequently continue or increase brackish to saline groundwater discharge into Wariin Brook. With an increase in the volume of water discharged at the seep it is probable that there will be an increased risk of waterlogging to a larger area at this seepage site, and this may make the area prone to increased salinisation during summer due to increased capillary evaporation and resultant salt deposition (MWES, 2009). Department of Agriculture and Food (2009) consider that the proposed clearing is liable to incrementally increase salinity in the sub-catchment.

The proposed clearing of 9.3 hectares of native vegetation is likely to increase recharge which is likely to continue or increase waterlogging and salinisation to land down gradient from the application area, and in Wariin Brook.

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

Methodology Department of Agriculture and Food (2009)
Landform Research (1998)
MWES (2009)
Smith et al. (2007)
GIS Database:
- CAWSA Part IIA Clearing Control Catchments
- Hydrography, linear_1
- Topographic Contours, Statewide

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

Comments Proposal may be at variance to this Principle

The application area is located with the Mundaring State Forest which is vested by the Conservation Commission for the purpose of State Forest (GIS Database). Wandoo National Park is located approximately 3 kilometres east of the application area (GIS Database), and Woottating Nature Reserve, Beechina Nature Reserve, Beechina North Nature Reserve and Inkpen Road Nature Reserve are located within 10 kilometres of the application area (GIS Database).

The proposed clearing is located approximately 2 kilometres from a Phytopthera risk area to the east, approximately 3 kilometres from a risk area to the south and between 3 and 5 kilometres from a risk area to the west (Department of Environment and Conservation, 2007a). Furthermore the disease risk area may be more extensive than currently known given that there are not always indicator species present (Department of Environment and Conservation, 2007a). The spread of dieback has the potential to impact on the conservation values and biodiversity of nearby conservation areas.

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

Tuma Holdings Pty Ltd identified in its application to clear that it will adopt the following dieback management strategies to minimise the risk of introducing or spreading dieback (Tuma Holdings Pty Ltd, 2008; Landform Research, 2006):

- Quarantine of all future resources to reduce the risk of infection;
- Excavation vehicles will be washed down prior to leaving another site and prior to entering State Forest;
- The access road will be maintained from dieback free material with prior approval of CALM (now the Department of Environment and Conservation) District Manager before the use of additional material on the access roads;
- No soils or vegetative materials will be brought to the site;
- There will be no ponding of surface water in the active or completed quarry; and
- Signs will be erected at the pit entry notifying cartage contractors that they should maintain their vehicles in a clean condition with no mud or soil.

Adoption of these dieback management strategies by the proponent is likely to minimise the risk of introducing or spreading dieback within Mining Lease 70/836, or local area.

Methodology Department of Environment and Conservation (2007a)
Landform Research (2006)
Tuma Holdings Pty Ltd (2008)
GIS Database:
- CALM Managed Lands and Waters

(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 seriously at variance to this Principle

The application area is located within the *Country Areas Water Supply Act 1947* Zone A area of the Mundaring Weir Catchment Area which covers approximately 150,000 hectares (Department of Water, 2009; GIS Database). Zone A areas are recognised as having very high salinity risk (Department of Water, 2009). The Mundaring Weir Catchment Area has been subject to native vegetation clearing controls since December 1978 (Department of Water, 2009). Clearing controls were implemented to protect the quality of existing and potential water supply catchments where clearing of native vegetation would cause salinisation of water resources (Department of Environment and Conservation, 2007c).

The Mundaring Weir is located approximately 17 kilometres south-west of the application area (GIS Database). The Mundaring Reservoir supplies the Goldfields and Agricultural areas and is one of the larger surface water resources in the south-west of Western Australia, with a capacity of 63.6 gigalitres and a mean annual flow of 17.1 gigalitres (Smith et al., 2007, p. 1, 49, 84). The reservoir has a desired potable limit of 500 milligrams per litre (Smith et al., 2007, p. 1), and this resource has always been sensitive to even small areas of clearing (Smith et al., 2007, p. 1). The small residual clearings within the catchment total only 3% but remain a significant concern for the salinity of inflow to the reservoir. Recovery to potable salinity has required revegetation from 1908 and for a second time from the 1960s to 1980s, followed by clearing controls from 1978 (Smith et al., 2007, p. 29).

The application area is located within the Helena River sub-catchment of the Mundaring Weir Catchment (Smith et al., 2007, p. 6, 32, 84). This sub-catchment is known to contribute 63% of the reservoirs salt load and only 30% of the inflow (Smith et al., 2007, p. 54). Groundwater salinities within the Helena River sub-catchment are known to range between 2,000 to 18,000 milligrams per litre Total Dissolved Solids (Smith et al., 2007, p. 22, 44). Smith et al. (2007, p. 43, 123, 129) state that groundwater salinities range from 140 to 2,000 milligrams per litre and possibly as high as 4,000 milligrams per litre near discharge points along Wariin Brook

which is located approximately 210 metres north of the application area (GIS Database; Smith, 2003). The salinity of water entering the Mundaring Reservoir from the Helena River sub-catchment alone has been measured at approximately 1,500 milligrams per litre (Smith et al., 2007, p. 39). The Mundaring Reservoir inflow salinity, with a mean of 510 milligrams per litre, is above the desired potable limit (Smith et al. 2007, p. 1). Smith et al. (2007, p. 1) report that the inflow salinity into Mundaring Reservoir has exceeded 500 milligrams per litre Total Dissolved Solids in 7 of the 10 years up to 2002.

Rain and surface water readily infiltrate the soil over much of the Mundaring Weir Catchment and recharge the various aquifers. Increased recharge is known to follow land clearing which alters the water level and salinity according to the landscape setting (Smith et al., 2007, p. 44, 45, 50, 64). A significant threat to the quality of groundwater within the Mundaring Weir Catchment is the 'mixing' of saline groundwater with relatively fresh surface water (Smith et al., 2007, p. 2, 25, 35, 42, 45, 50, 76). Given the high permeability of soils within the application area this is most likely to occur at, or down gradient of sand mining operations where the removal of deep rooted perennial native vegetation and removal of significant resources of sand create conditions that bring ground and surface water resources closer together. Groundwater recharge and discharge influence the quality and flow of surface water that flows into the nearby Wariin Brook which is ultimately held by Mundaring Weir on the Helena River (Department of Environment and Conservation, 2007a).

Tuma Holdings Pty Ltd commissioned Meyer Water Environmental Solutions (MWES) Consulting to supervise the installation of two groundwater monitoring bores on 22 and 23 September 2009, and to measure the water level and salinity content of each bore. Both groundwater monitoring bores are located west and down gradient of the application area. Bore ACT MB1 is located at the entry to the quarry on Mining Lease 70/836, and bore ACT MB2 is located in the mid-eastern section of the existing quarry (MWES, 2009). Surface water samples were also taken from an existing bore and sump within the quarry, as well as from a seepage area that is located approximately 700 metres west of the quarry on Mining Lease 70/836.

Groundwater salinities for ACT MB1 (26.5 metre depth) and ACT MB2 (29.5 metre depth) were measured at 2,030 milligram per litre Total Dissolved Solids, and 2,980 milligrams per litre Total Dissolved Solids respectively (MWES, 2009). Groundwater salinities of the existing bore ACT EXIST (17.3 metre depth) and ACT SEEP (surface) were measured at 770 milligram per litre Total Dissolved Solids, and 950 milligrams per litre Total Dissolved Solids respectively (MWES, 2009). Smith (2003) has previously measured salinities within Wariin Brook, 2 kilometres west of the application area, of 1,700 milligrams per litre Total Dissolved Solids.

MWES (2009) have acknowledged in their report that the Total Dissolved Solid content of the newly installed monitoring bores, the existing monitor bore and the seep were higher than the Australian Water Quality Guideline for human drinking.

MWES (2009) found that the source of salinity in the sand aquifer to be the saline groundwater and brackish surface water runoff from properties to the south of the sand quarry. Monitor bores 08AB01D, 08AB02D and 08AB03D located on land owned by the Water Corporation had progressively higher salinities from north closest to the paleochannel to the south, closest to shallow basement (MWES, 2009). The groundwater salinity in these bores was measured at 4,500 milligrams per litre Total Dissolved Solids, 10,000 milligrams per litre Total Dissolved Solids and 15,000 milligrams per litre Total Dissolved Solids (bore logs provided to MWES by Department of Water (MWES, 2009)). This aquifer is saline due to historical land clearing and subsequent rise in the water table mobilising salt from the laterite soil profile on the farmland to the south (MWES, 2009).

The seepage, west of the quarry, contains more than 500 milligrams per litre Total Dissolved Solids of salt so is a disproportionately high salt contributor (Department of Water, 2009). The Department of Water strategy is to limit such discharge, so limiting groundwater recharge is part of that strategy (Department of Water, 2009).

The proposed clearing of up to 9.3 hectares of native vegetation has the potential to have an adverse salinity impact as a high proportion of rainfall that occurs on the site will end up as groundwater recharge. It is likely that the clearing will continue or increase brackish to saline groundwater discharge into Wariin Brook which would in turn increase the salt load entering the Mundaring Reservoir. The proposed clearing has the real potential to adversely impact on the quality of groundwater and surface water within the Mundaring Weir Catchment. Given the importance of the Mundaring Reservoir as a drinking water resource for the Goldfields and Agricultural areas, the proposed clearing presents an unacceptable risk.

Smith et al., (2007, p. 1) in the Helena River Salinity Situation Statement state that land clearing remains the major evident risk to the reservoir salinity, so the catchment requires a level of salinity management. Two of the key management recommendations by Smith et al., (2007, p. 2, 3, 78) is to disconnect groundwater discharge from surface water flow and to maintain the current clearing controls so that no clearing is permitted. The proposed clearing has the potential to compromise these recommendations and the overarching objective to reduce the salinity of the Mundaring Weir inflow to below 500 milligrams per litre.

The Department of Water has advised that they are strongly opposed to any clearing of native vegetation in the very high salinity risk part (Zone A) of all controlled catchments because there will be increased salinisation of water resources following the removal of native vegetation (Department of Water, 2009). Critically, at the subject site, the salinisation could adversely impact the quality of the Mundaring Weir Reservoir (Department of Water, 2009).

Land within the Mundaring Weir Catchment Area is managed for Priority 1 (P1) water source protection (Department of Water, 2007). P1 water source protection areas are defined and managed to ensure there is

no degradation of the water resource in these areas. Protection of the public water supply outweighs virtually all other considerations in respect to the use of this land, which is managed in accordance with the principle of risk avoidance (Western Australian Planning Commission, 2003; Department of Water, 2007).

The proposed clearing of 9.3 hectares carries an unacceptable risk given the known salinity issues and social importance of the Mundaring Weir Catchment.

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

Methodology Department of Environment and Conservation (2007a)
Department of Environment and Conservation (2007c)
Department of Water (2007)
Department of Water (2009)
MWES (2009)
Smith (2003)
Smith et al. (2007)
Western Australian Planning Commission (2003)
GIS Database:
- CAWSA Part IIA Clearing Control Catchments

(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 application area experiences mean annual rainfall of approximately 800 millimetres and mean annual evaporation of approximately 2,000 millimetres (GIS Database). Topographic contour information indicates that the application area is not associated within any low-lying drainage area (GIS Database). The soils within the application area are characterised by deep, coarse quartz yellow or red sands which are considered to be well drained (Landform Research, 1998). Given the high permeability of the soil, all rainfall that occurs on-site is likely to end up as groundwater recharge (Department of Water, 2009). The proposed clearing is not considered to result in an increase in either peak flood height or duration.

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

Methodology Department of Water (2009)
Landform Research (1998)
GIS Database:
- Evaporation Isopleths
- Hydrography, linear_1
- Rainfall, Mean Annual
- Topographic Contours, Statewide

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

Comments
Tuma Holdings Pty Ltd applied to clear (CPS 365/1) up to 2 hectares of native vegetation within an area immediately west of the application area (GIS Database). CPS 365/1 was refused by the Department of Environment and Conservation (DEC) on 5 July 2007 as the proposal was considered to be 'seriously at variance' to Principle (i) (GIS Database). The refusal of CPS 365/1 was appealed by Tuma Holdings Pty Ltd, however the appeal was subsequently dismissed by the Minister for Environment (Appeal Number C027 of 2007). The Minister's decision did not prevent the appellant from lodging a fresh application with the DEC that addresses the concerns of the original proposal. Tuma Holdings Pty Ltd were advised by the Minister that any such application should specifically identify measures to reduce salinity impacts, such as identifying appropriate offset plantings.

A Vegetation Conservation Notice CPS 2483/2 has been issued by the Department of Environment and Conservation to the Directors of Tuma Holdings Pty Ltd for the area covered by Mining Lease 70/836, Goods Road, The Lakes.

The application area is not located with a Priority Resource Location or Key Extraction Area as defined and mapped in the Western Australian Planning Commission Statement of Planning Policy No 2.4 Basic Raw Materials (Western Australian Planning Commission, 2000).

There are no native title claims over the area under application (GIS Database).

There is one registered Site 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.

One public submission was received stating no objection to the application.

- Methodology** GIS Database
- Clearing Instruments
 - Native Title Claims
 - Sites of Aboriginal Significance

4. Assessor's comments

Comment

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

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6. Glossary

Acronyms:

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