

**Main Roads Western
Australia**

Report for Geraldton to Mt
Magnet Road at 40.96 to 41.8
SLK

Preliminary Environmental
Impact Assessment

January 2007

FINAL DRAFT



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Figure 1 Site Location and Declared Rare and Priority Flora
(CALM Database, 2006)

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- A Department of Environment Clearing Principles
- B Consultation
- C CALM Rare and Priority Flora Search
- D CALM Threatened Fauna Search



1. Introduction and Project Description

1.1 Introduction

GHD Pty Ltd were engaged by Main Roads Western Australia's Mid West Region to prepare a desktop Preliminary Environmental Impact Assessment (PEIA) for an extension to the west bound passing lane on the Geraldton to Mt Magnet Road at Eradu. The site location has been presented in Figure 1.

This report details the requested PEIA, which:

- » Describes the significant aspects of the existing project environment; and
- » Details the primary environmental and social impacts of the proposed works.

This PEIA has been prepared based on:

- » Brief site inspection conducted on the 16th November 2006;
- » Discussions with the Main Roads WA Project Manager;
- » Consultation with the relevant government agencies, including the Department of Environment and Conservation (DEC), the Department of Water (DOW), Water Corporation (WC) and the Shire of Greenough, refer to **Appendix B** for details; and
- » A review of relevant databases.

Environmental and social aspects identified as requiring consideration during the project have been identified in Table 1.

1.2 Project Description

This upgrade comprises a 0.84km extension to an existing west-bound passing lane on the Geraldton to Mt Magnet Road at Eradu. The extension is situated at 40.96 to 41.8 SLK, located between Mullewa Road and the railway / road intersection.

Key features of the proposed road project include:

- » Road widening of approximately 7 metres from the edge of the existing seal;
- » Construction of a 0.84km long west bound passing lane extension; and
- » The project is proposed to be completed during 2007.



Table 1 Environmental and Social Aspects Considered

Aspect	Section
Surrounding Area Land Use	2.1
Reserves and conservation areas	2.2
Surface waters / drainage (watercourses, stormwater disposal, water quality, proclaimed waterways)	2.3
Wetlands	2.3
Groundwater	2.4
Salinity	2.5
Acid Sulphate Soils	2.6
Vegetation	2.7
Fauna	2.8
Contaminated sites	2.9
Aboriginal heritage	2.10
European cultural heritage	2.11
Air quality	2.12
Dust	2.12
Noise and vibration	2.13
Visual amenity	2.14
Public safety and risk (industrial plant, gas pipeline, unexploded ordinance)	2.15



2. Environmental Aspects

2.1 Surrounding Area Land Use and Tenure

The project area is zoned as “General Farming”, under the Shire of Greenough Town Planning Scheme No. 4. The Australian Government (2006) describes the land uses to the north of the Geraldton to Mount Magnet Road as “cropping” and to the south as “other minimal use”.

The project area is located on land identified as “Reserved Crown Land”, directly north of the project area the land tenure changes to private freehold land (Australian Government, 2006).

2.2 Reserves and Conservation Areas

The Wicherina Reserve is a Crown Reserve (No. 17711) vested to the Water Corporation for the purposes of “Reservoir – Geraldton Water Supply”. The reserve is located both to the north and south of the project area, with the current Geraldton to Mt Magnet Road bisecting a small northeastern area of the reserve. It is known that the DEC also has an interest in the reserve as one of the last remaining significant patches of remnant vegetation within an area that has largely been cleared. Water Corporation have advised that the reserve is currently under consideration for vesting with the DEC (refer to **Appendix B**).

The Shire of Greenough have a reserve to the immediate north west of the road works, adjacent to the Wicherina Reserve.

The Eradu Nature Reserve that is vested in the National Parks and Nature Conservation Authority is located 3km east of the project area.

2.3 Wetlands / Surface Waters & Drainage

The subject property is located within the Greenough River Surface Water Area as proclaimed under the *Rights in Water and Irrigation Act 1914*. Any taking or diversion of surface water in this proclaimed area for purposes other than domestic and/or stock watering is subject to licensing by the Department of Water (DOW).

In addition, the Greenough River, including all tributaries and catchment area, is identified as a priority river for management in the Northern Agricultural Catchment Council Regional Natural Resource Management Strategy 2005 and it is advised that stormwater should not be diverted into tributaries of the Greenough River.

No *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998* wetlands or wetlands listed under the Ramsar Convention (1971) occur within the project area.

The Greenough River is located approximately 2km to the east, and the Wicherina Creek 0.5km to the south of the site. These areas will not be impacted by the roadworks.

2.4 Groundwater

The proposal is located within the Gascoyne groundwater area, proclaimed under the *Rights in Water and Irrigation Act 1914*. Construction of bores in this area require a 26D Licence under the *Rights in Water and Irrigation Act (1914)*. Taking water (eg for dust suppression) will also require a licence.



The site works are located in a Public Drinking Water Source Area (PDWSA), Wicherina Catchment Area, which does not have a priority level assigned. Certain landuses need to be assessed as to whether it is likely to harm the drinking water source.

More information regarding PDWSA's can be provided by the DOW.

2.5 Salinity

The DOW (2006) identifies the area as having on average groundwater salinity levels of between 500 and 1000 mg/L total dissolved solids (TDS).

The site is within the Greenough River catchment area. The Greenough River has been defined as moderately saline, having recorded a mean salinity level of 3700 mg/L TDS between 1993 and 2002 (DEC, 2005).

The vegetation clearing required for the proposed roadworks is unlikely to be of sufficient scale to result in, or exacerbate, salinity at the project site.

2.6 Acid Sulphate Soils

The project area has not been mapped for potential acid sulphate soils as part of the Western Australian Planning Commission's (2003) Planning Bulletin No. 64.

The project area may contain Acid Sulphate Soils at depth owing to the location of the Wicherina Creek and Greenough River within a 1-2km radius. However, based upon the fact that the roadworks are high in the landscape and not expected to require deep excavation, it is considered unlikely that Acid Sulphate Soils will require management during the project.

2.7 Vegetation

2.7.1 Site Vegetation Composition

The composition of remnant native vegetation in the project area was interpreted from mapping conducted by Beard (1976). According to this mapping, the project area is likely to contain one vegetation community; being scrub heath and sandplain-coastal association. This vegetation community is described as a open tall shrub layer in which species of Proteaceae are prominent and a dense heath ground layer mainly of Myrtaceae on deep sand soils.

The site inspection identified that the road verge predominantly consisted of *Acacia blakelyi* shrubland. Other common genus identified included *Banksia*, *Allocasuarina* and *Hakea*.

2.7.2 Site Vegetation Condition

Vegetation condition was assessed via a brief site inspection on the 16th November 2006 and aerial photography (Department of Land Information, 2006) and considered factors such as the continuity and extent of vegetation, adjacent land use, proximity to existing roads and other disturbance / disease vectors.

The vegetation on the road verge was generally of good quality however historical disturbance was evident given the presence of *Acacia* species (which is generally a pioneering species) and weeds.



This vegetation is adjacent to vegetation of the Wicherina Reserve which is in very good (to better) condition.

2.7.3 Site Vegetation in a Regional Context

The relative importance of conserving remnant native vegetation in the project area at a regional scale was determined via the analysis of satellite imagery and digital orthophotos by Shepherd *et al* (2002), the dataset has been archived as the 1997 vegetation extent. The results of this assessment are summarised in Table 2 below.

Table 2 Regional Assessment of Vegetation Extent

Vegetation Association	Description	Pre-European Extent (Ha)	Current Extent (Ha)	% Remaining (1997)
380	Shrublands: scrub- health and sandplain.	607,325	317,763	52.3

The Environmental Protection Authority (EPA) has established through Position Statement No. 2. (*Environmental Protection of Native Vegetation in Western Australia*), the “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level. This is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type (EPA, 2000).

In the case of Vegetation System Association 380 detailed in Table 2 above, more than 52% of the original regional extent remained intact in 1997. It is expected that the proposed clearing required for the project will have a negligible impact upon Vegetation System Association 380.

2.7.4 Declared Rare Flora

A search was undertaken through the CALM Threatened (*Declared Rare*) Flora Database (TFD) and the *Western Australian Herbarium Specimen* (WAHERB) database for species of rare and priority flora located within the project area, including a 100 metre buffer from the project site. See Table 3 for a description of each of the species and Figure 1 for known locations of the populations.

CALM also provided results from a search of their *Declared Rare and Priority Flora* (DR&PF) list. The species in this list known to exist in the general locality of the site, not at this project site specifically. CALM’s search response, including this list, have been provided in **Appendix C**.

Table 3 Threatened and Priority Flora

Species	Conservation Category	Database	Description (FloraBase, 2006)
<i>Acacia leptospermoides</i> ssp. <i>psammophila</i>	P3	WAHERB	Spreading shrub of 0.3 to 1.5 m high. Small, fleshy, thick, narrowly obovate phyllodes. Flowers yellow. Occurs on yellow or red sand and gravelly soils in sandplains.
<i>Acacia megacephala</i>	P2	WAHERB	Erect, often spindly, spinose shrub, growing 0.9 to 2 m high. Flowers yellow in July to September. Occurs on white and yellow sand in sandplains.
<i>Baeckea staminosa</i>	P1	WAHERB	Spreading shrub, growing to 0.25 m high. Occurs in wetland environments.



<i>Banksia elegans</i>	P4	WAHERB	Shrub from 1 to 4 m high, with fire-tolerant rootstock, therefore often suckering in habit. Flowers yellow, green in October to November. Occurs on yellow, white or red sand, in sandplains and low consolidated dunes.
<i>Caladenia wanosa</i> ¹	DRF	TFD	Tuberous, perennial herb of 0.12 to 0.2 m high. Flowers cream and red from August to September. Occurs on sand, in sandstone outcrops and top edges of gorges.
<i>Calectasia browneana</i>	P2	WAHERB	Spreading, caespitose perennial, herb, of 0.2 to 0.5 m high, to 0.4 m wide. Flowers blue/purple in June to August. Occurs on white-grey sand and laterite, adjacent to wet areas.
<i>Dampiera krauseana</i>	P2	WAHERB	Erect, branched shrub of 0.3 to 0.6 m high. Flowers blue, violet from June to November. Occurs on sand and gravel.
<i>Dicrastylis incana</i>	P2	WAHERB	Shrub of 0.3 to 1.5 m high. Stem hairs dentritic, to 2 to 3.5 mm long, with glands terminating hair branches; leaves sessile. Flowers white from September to November. Occurs on yellow sand in low and open woodlands.
<i>Drakaea concolor</i>	DRF	TFD	Tuberous, perennial herb of 0.25 to 0.3 m high. Flowers red, yellow in August to September. Occurs on sand.
<i>Eucalyptus ebbanoensis</i> subsp. <i>photina</i>	P4	TFD WAHERB	Mallee of 2 to 6 m high, adult leaves glossy. Flowers white / cream, from September to March. Occurs on sandy clay and red sand in lateritic breakaways and sandplains.
<i>Galeznowia verrucosa</i> subsp. <i>formosa</i>	P3	WAHERB	Rounded, erect, branching, woody shrub, to 1.5 m high. Flowers yellow from August to October. Occurs on white/orange-brown sand, gravel, laterite, sandstone, limestone and disturbed edges of quarries, slopes.
<i>Grevillea granulosa</i>	P3	WAHERB	Compact shrub, 0.4–1.5(–4) m high. Fl. red, Jul–Oct. Gravelly sand, loam, clay. Sandplains.
<i>Grevillea phanerophlebia</i>	DRF	TFD WAHERB	Shrub of 0.9 to 1.5 m high. Flowers white in September. Occurs on sand.
<i>Hemigenia saligna</i>	P3	WAHERB	Shrub of 0.3 to 1 m high. Flowers blue, purple, and violet in July to October. Occurs on lateritic and sandy soils.
<i>Leucopogon marginatus</i> ²	DRF	TFD WAHERB	Erect spreading shrub, of 0.4 to 1 m high. Flowers white from July to August. Occurs on yellow and gravelly lateritic sand, in undulating plains.
<i>Levenhookia octomaculata</i>	P3	WAHERB	Annual (ephemeral) herb. Flowers pink from September to October. Occurs on sandy soils.
<i>Scholtzia</i> sp. Eradu (RD Royce 8016)	P2	WAHERB	Shrub of 1.8 to 2.4 m high. Flowers pink in October. Occurs on yellow sand.



<i>Verticordia chrysostachys</i> var. <i>pallida</i>	P3	WAHERB	Erect to spreading shrub, grows from 0.6 to 2 m high. Flowers yellow/cream from September to January. Occurs on yellow sand, on sandplains and sand dunes.
<i>Verticordia densiflora</i> var. <i>roseostella</i>	P3	WAHERB	Open shrub, grows 0.4 to 1.3 m high. Flowers pink/white from September to December. Occurs on sandy gravelly soils.
<i>Verticordia muelleriana</i> subsp. <i>minor</i>	P2	WAHERB	Shrub, growing to 0.7 to 2 m high. Flowers pink, red and brown from September to December. Occurs on white/grey or yellow sand over gravel.
<i>Verticordia penicillaris</i>	P4	WAHERB	

Note:

1. This species is protected under the Commonwealth *Environmental Protection and Biodiversity Act (1999)*, as well as the State *Wildlife Conservation Act (1950)* and has been categorised as 'vulnerable'.

This species is protected under the Commonwealth *Environmental Protection and Biodiversity Act (1999)*, as well as the State *Wildlife Conservation Act (1950)* and has been categorised as 'endangered'.

Local DEC officers advised that the presence of the DRF (*Caldenia wanosa*, *Drakaea concolor*, *Leucopogon marginatus* and *Grevillea phanerophlebia*) as well as other Priority Flora species were considered more extensive than current surveys have suggested.

It is recommended a targeted priority flora survey be undertaken in Spring to identify the presence of the species listed in Table 3, prior to construction of the road (refer to Section 3.2 Recommendation 1a). Other priority species may also exist at the site (refer to **Appendix C**) and these should also be identified during the field survey.

2.7.5 Environmentally Sensitive Areas

No Environmentally Sensitive Areas (ESAs) have been identified at the project site (DEC, 2006). The nearest ESA is located approximately 2km to the southeast of the site.

2.7.6 Threatened Ecological Communities

A search of the CALM Threatened Ecological Community (TEC) Database was undertaken. No TECs are known to be located within the near vicinity of the site.

CALM have advised that occurrences of TECs encountered during the project works should be reported to CALM to ensure their ongoing management.

The site inspection determined that the road verge vegetation did not comprise a TEC.

2.7.7 Diseases or Pathogens

The project area can be considered as susceptible to the development of the dieback pathogen, *Phytophthora cinnamomi* (Dieback Consultative Council, 2001).

There are dieback susceptible species in the area, including *Banksia*. Several *Banksia* plants were noted to have died, however, the deaths were not necessarily due to the dieback pathogen, but could have been caused by drought, fire or impact by previous road works in the area.



Condition 15a of the MRWA Clearing Permit relating to dieback hygiene measures should be adhered to during roadworks, incorporating the following steps:

- » Clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- » Avoid the movement of soil in wet conditions
- » If movement of soil in wet conditions is necessary, the permit holder must prepare, implement and adhere to a dieback management plan, developed in consultation with CALM;
- » Ensure that no dieback affected road building materials, mulches or fill are brought into an area that is not affected by dieback; and
- » Restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

Management measures should be included in the Construction Environmental Management Plan (refer to Section 3.2 Recommendation 3).

2.7.8 Weeds

The Department of Agriculture and Food (DAF) have declared 80 species as Declared Plants within the Shire of Greenough.

The site inspection did not reveal the presence of any declared weeds, although pasture weeds such as velt grass, wild oats, turnip weed and brome grass were present, throughout the section of the road verge to be cleared.

MRWAs Term Network Contractors are aware of their operational responsibilities under the *Agriculture and Related Resources Protection Act (1976)*, which stipulates that landowners whose properties support declared species are legally responsible for the management of the species.

The DAF has recommended the adoption of a biosecurity protocol to ensure weeds are not spread to other locations from the sites and, new weeds are not introduced to the sites through road materials and machinery. Management measures should be included in the Construction Environmental Management Plan (refer to Section 3.2 Recommendation 3).

2.7.9 Project Clearing Impact

The road reserve contains remnant *Acacia* dominated scrubland vegetation, in good to fair condition, which will be impacted by the proposed road works.

MRWA have advised that a maximum of 7 metres is required from the edge of the existing seal to accommodate the proposed road works. The site currently has a gravel shoulder of between 5 to 7 metres in width. An extra 2 metres clearing (maximum) over the 0.84km passing lane equates to approximately 0.2 hectares of good to fair quality remnant vegetation that will be required to be cleared.

MRWA has been granted a Purpose Clearing Permit (CPS 818/1) under the provisions of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. This permit provides for MRWA to conduct vegetation clearing associated with roadworks projects where that clearing is:

- » not within an Environmentally Sensitive Area, and
- » the clearing is not at variance with the 'Ten Clearing Principles'



The DEC (2006) do not identify any Environmentally Sensitive Areas (ESAs) at the project site, however, the clearing is considered to be potentially at variance with the following 'Ten Clearing Principles':

c) Does the area to be cleared include, or is necessary for the continued existence of rare flora?

Refer to Section 2.7.4 and **Appendix A and B** for details.

2.8 Fauna

A search was undertaken through CALM Threatened Fauna database, which includes species declared as 'Rare or likely to become extinct (Schedule 1)', 'Birds protected under an international agreement (Schedule 3)', and 'Other specially protected fauna (Schedule 4)'. See Table 4 and **Appendix D** for the CALM search results.

Based upon the clearing area associated with the project, it is considered unlikely that the project will significantly impact upon the long-term survival of any species of threatened fauna that may occur in the area.

Table 4 Threatened Fauna

Scientific Name	Common Name	Record No / Date	General Information	Site Assessment
<i>Ardeotis australis</i>	Australian Bustard	1 from 1983	This species is uncommon and may occur in open or lightly wooded grasslands.	The species is known to occur in grasslands, scrublands and open woodlands and could potentially use the Site for foraging. However, tussock to hummock grasslands.
<i>Calyptorhynchus latirostris</i> ¹	Carnaby's Black Cockatoo	2 in 1984/1985	This species moves around seasonally in flocks to feeding areas in proteaceous scrubs and heaths and eucalypt woodlands as well as pine plantations. Breeding occurs in winter/spring, mainly in the eastern forests and wheatbelt where they can find mature hollow-bearing trees to nest in.	The Site contains plant species that are feed species of Carnaby's Cockatoo and this species may utilise the Site for foraging. There is some suitable breeding habitat for Carnaby's Cockatoo in the general region but the Site does not contain suitable breeding trees for this species. The species may occasionally utilise the Site, however the minimal nature of clearing and the presence of surrounding habitat would not impact on their survival in the area.
<i>Falco peregrinus</i>	Peregrine Falcon	4 from 1975 to 1983	This species is uncommon and prefers areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land.	While this species could potentially utilise the Site for foraging, it prefers areas with rocky ledges, cliffs and watercourses for breeding habitat.



Scientific Name	Common Name	Record No / Date	General Information	Site Assessment
Idiosoma nigrum	Shield-backed Trapdoor Spider	1 in 1971	This species is in decline in its patchy distribution through the northern and central wheatbelt and coastal plain. It is a long-lived species that is very sensitive to disturbance.	The site is quite highly disturbed by previous road construction activities. It is also generally known to exist to the south of the Moore River.

Note:

1. These species are protected under the Commonwealth *Environmental Protection and Biodiversity Act (1999)*, as well as the State *Wildlife Conservation Act (1950)* and have been categorised as 'endangered'.

2.9 Contaminated Sites

A search for Potentially Contaminated Sites through the DOW Water Information (WIN) database was conducted. This search concluded that no previously recorded contaminated sites occur within the project area, which is consistent with the pattern of historical land use in the project area.

2.10 Aboriginal Heritage

A search of the Department of Indigenous Affairs (DIA) Register of Aboriginal Sites was conducted to determine the likelihood of the project impacting on listed Aboriginal heritage sites.

The database indicated that no known Aboriginal Heritage sites occur within the vicinity of the proposed project site.

It is known that Aboriginal groups have an interest in the Wicherina Reserve and it may be possible that there are unregistered sites in the project area. It is recommended that the MRWA Project Officer liaise with the MRWA Heritage Liaison Officer and appropriate representatives of the local Aboriginal community to determine the presence of unregistered sites (refer to Section 3.2 Recommendation 2).

MRWA and their contractors need to be aware of their obligations under the *Aboriginal Heritage Act (1972)* during the construction of passing lane.

2.11 European Heritage

A search of the Heritage Council of Western Australia's (2006) Heritage Places database was conducted to determine the likelihood of the project impacting upon a listed heritage site.

The Wicherina Dam is located in the Water Corporation Reserve adjacent to the site, however, this site will not be affected by the road works.

2.12 Air Quality

The road is not expected to significantly impact on regional air quality.

Dust may be generated during construction and should be managed for the protection of road users and any adjoining landholders.



2.13 Noise and Vibration

Noise and vibration during the construction phase are not expected to be an issue, due to the lack of sensitive receptors in the area.

Noise and vibration should be controlled by MRWA standard work procedures in order to comply with the requirements of the *Environmental Protection (Noise) Regulations (1997)*.

2.14 Visual Amenity

Visual amenity for road users will be impacted, due to the clearing of remnant vegetation within the road reserve, however, given the adjacent area is well vegetated, these impacts are expected to be minimal.

2.15 Public Safety and Risk

Infrastructure for the Dampier to Bunbury Gas Pipeline is approximately 12km east of the project area. Given this distance the road works is not anticipated to interfere with the gas infrastructure.

MRWA will make the appropriate enquiries to ensure all services in the immediate area of the proposed roadworks are identified. Work will be undertaken in accordance with all requirements as part of MRWA routine design investigations and construction management procedures. Public safety and traffic safety during construction will be managed in accordance with Standard Contract Specifications.



3. Conclusions and Recommendations

3.1 Aspects Not Considered Relevant

Through the results of this PEIA and based upon available information, it is considered unlikely that the following will be impacted upon by, or will otherwise be of concern during, the proposed roadworks:

- » Wetlands, Waterways and Groundwater;
- » Threatened fauna;
- » Acid Sulphate Soils;
- » Contaminated Sites;
- » European Heritage Sites;
- » Air Quality;
- » Noise and Vibration; or
- » Visual Amenity.

3.2 Recommendations

To ensure that the impact of the project are fully identified it is suggested that the following site investigations be conducted in order to resolve issues discussed throughout this report:

1. Development of EIA documentation to confirm the potential variances, including undertaking field surveys targeting rare and priority flora species. The species identified as existing in this area should be surveyed in Spring, this will also allow the survey of other priority flora species that may exist at the site.
2. It is recommended that MRWA Project Officer liaise with the MRWA Heritage Liaison Officer and appropriate representatives of the local Aboriginal community to determine the occurrence of any unregistered sites in the project area. Should MRWA discover any Aboriginal heritage artefacts during construction, works should be ceased immediately and an Archaeologist called to identify any artefacts and consult with the DIA.
3. Development of a Construction Environmental Management Plan by MRWA and its contractor. Issues to be considered in this management plan include:
 - a. Vegetation clearing;
 - b. Protection of threatened flora habitat;
 - c. Damage to public property;
 - d. Public consultation;
 - e. Dust control;
 - f. Traffic safety and access;
 - g. Fire management;
 - h. Vehicle servicing;



- i. Weed and dieback management;
- j. Drainage management;
- k. Erosion control;
- l. Fuel and chemical storage and management;
- m. Rubbish disposal; and
- n. Environmental training.



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Ramsar Convention on Wetlands (1971)

Rights in the Water and Irrigation Act (1914).

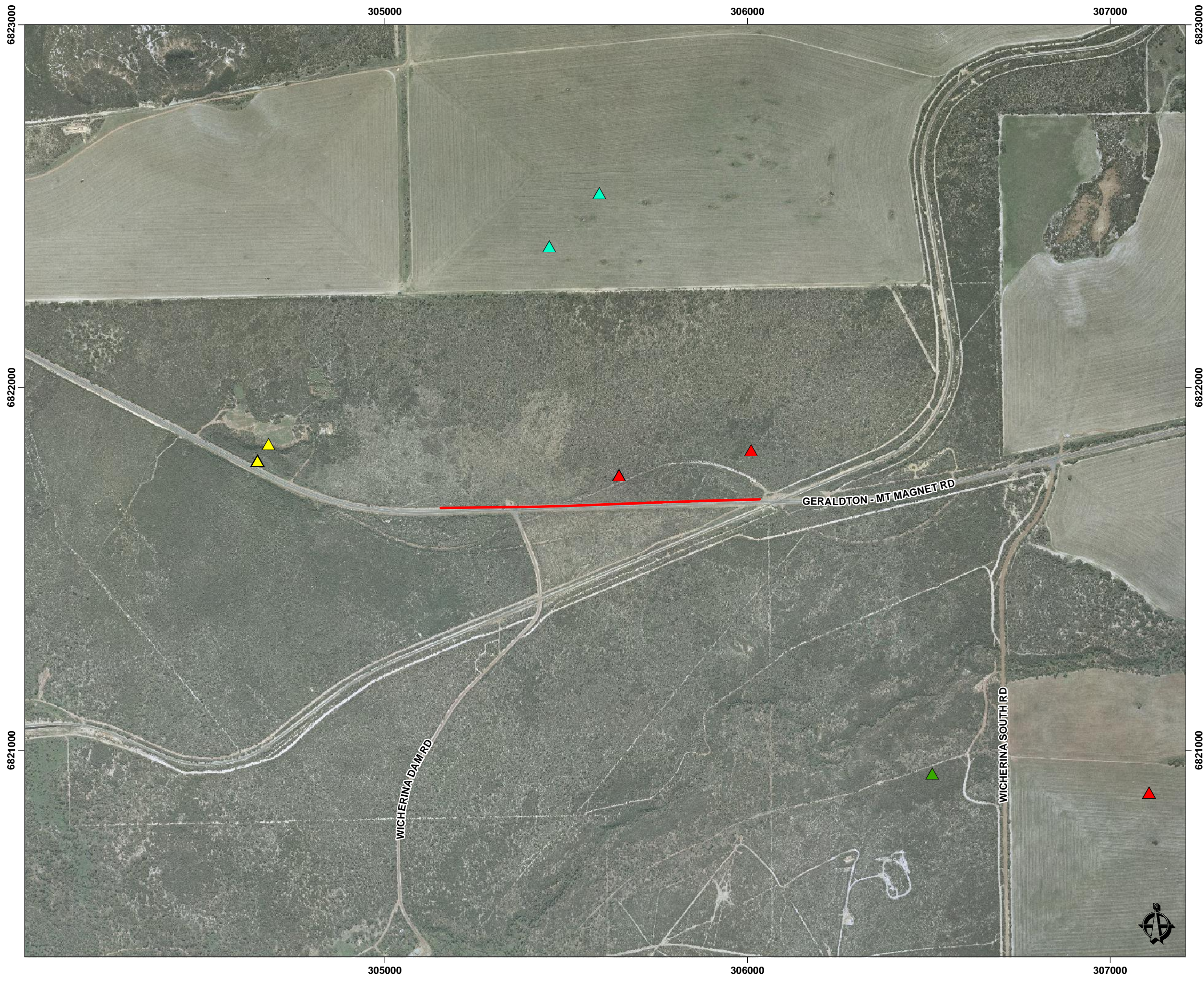
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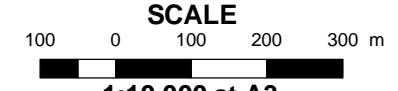
Figure



LEGEND

- Proposed Passing Lane
- Declared Rare & Priority Flora**
- ▲ (R) Declared Rare Flora - Extant Taxa
- ▲ Priority 1 - Poorly Known Taxa
- ▲ Priority 2 - Poorly Known Taxa
- ▲ Priority 3 - Poorly Known Taxa
- ▲ Priority 4 - Rare Taxa

MAP UNITS PROJECTED IN MGA ZONE 50
 NOTE THAT POSITIONAL ERRORS CAN BE > 5M IN SOME AREAS
 AERIAL PHOTOGRAPHY SOURCED FROM DLI - GERALDTON MOSAIC
 JUNE 2001
 REPRODUCED BY PERMISSION OF THE DEPT. OF LAND INFORMATION,
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LOCALITY MAP



Central West

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CREATED BY	CHECKED	APPROVED
NT		
HORIZONTAL DATUM: GDA94		PROJECTION: MGA ZONE 50
HEIGHT DATUM:		METADATA RECORDED:
DATE	FILE LOCATION	
15.12.06	N:\6118768\GIS\MXD\6118768-G1.mxd	
REVISION	DRAWING NO	
0	6118768-G1	



Passing Lane Extension - Geraldton-Mt Magnet Road

Declared Rare & Priority Flora



Appendix A
Department of Environment Clearing
Principles



An assessment of the clearing principles has been undertaken based on a desktop review and a brief site visit carried out on the 16th November 2006.

Principle Number	Principle	Assessment	Outcome
(a)	Native vegetation should not be cleared if it comprises a high level of biological diversity.	The remnant native vegetation is considered to contain a moderate to low level of biological diversity, with a considerably lower level of diversity to the remaining native vegetation in the area.	Vegetation may be considered for clearing.
(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.	The vegetation comprises habitat for a number of fauna species, but this habitat is not considered significant habitat for fauna indigenous to Western Australia.	Vegetation may be considered for clearing. Appropriate management measures, and minimisation of clearing, should mitigate potential impacts on fauna.
(c)	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Declared Rare Flora (DRF) is known to exist on the northern side of the road (CALM yellow marker posts). However, the southern section is to be impacted by clearing and no DRF was identified during the site visit and the vegetation communities on this side of the road is different to that on the north. However, DEC have suggested a DRF species (<i>Caladenia wanosa</i>) known to exist in the vicinity would not have been picked up in the November survey, as it flowers generally from August to September. CALM Flora Officers suggest the species, and other Priority Flora, is likely to be more extensive than current records suggest and recommend a MRWA undertake a spring survey.	No evidence of Priority Flora was found during the November site visit, however, CALM suggest the clearing is potentially at variance with this clearing principle.
(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.	No Threatened Ecological Communities were recorded during the site visit, and none have been recorded in the near vicinity of this Site.	Vegetation may be considered for clearing.
(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.	The amount of clearing required for this project is minimal. A large area of remnant vegetation will be retained within the rest of the road reserve and in the surrounding Wicherina Reserve. The Vegetation Association for the area (380) is not considered to be under-represented.	Vegetation may be considered for clearing. Where possible, the amount of vegetation clearing should be minimised and the disturbed area adjacent to the existing highway shoulder should be used.



Principle Number	Principle	Assessment	Outcome
(f)	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	There are no watercourses or wetlands within the Site.	Vegetation may be considered for clearing.
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Partial clearing within the Site is likely to cause some, but not considerable, land degradation to adjacent bushland areas. Impacts are already present due to the existing highway and impacts are not expected to increase significantly.	Vegetation may be considered for clearing. Appropriate management measures should mitigate potential impacts.
(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.	The Wicherina Reserve, a water supply reserve, is located adjacent to the project area. The project disturbance is minimal and no considerable degradation of the reserve would be expected.	Vegetation may be considered for clearing. Appropriate management measures should mitigate potential impacts.
(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.	Vegetation clearing is not likely to cause increased deterioration in the quality of surface or underground water. Any impacts from run-off etc would already be present due to the existing highway.	Vegetation may be considered for clearing. Appropriate management measures should mitigate potential impacts.
(j)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The clearing of native vegetation is not expected to cause, or exacerbate the incidence or intensity of flooding. The increased road surface from the additional lane may increase run-off immediately adjacent to the highway but this will not be significant.	Vegetation may be considered for clearing. Appropriate management measures should mitigate potential impacts.



Appendix B
Consultation



During the preparation of this PEIA GHD contacted the following stakeholders by e-mail on 10th November 2006. The responses to our request for comments are detailed below.

Ms Kerry Wray, Geraldton Regional Office - Department of Water.

Ms Wray advised that:

- » The proposal is located within the Gascoyne groundwater area (Yuna / Eradu subarea), proclaimed under the *Rights in Water and Irrigation Act 1914*, where there is a need to obtain a licence before a bore or well being constructed. The licence is issued by the Department of Water
- » and may contain a number of conditions. A separate licence to take water may also be required.
- » The subject site is located within the Greenough River Surface Water Area as proclaimed under the *Rights in Water and Irrigation Act 1914*. Any taking or diversion of surface water in this proclaimed area for purposes other than domestic and/or stock watering is subject to licensing by the Department of Water. The issuing of a surface water licence is not guaranteed but if issued will contain a number of conditions that are binding upon the landowners. Also any interference with the bed or banks or a watercourse in this proclaimed area will require a permit from the Department of Water.
- » The subject site is located in a Public Drinking Water Source Area (PDWSA), Wicherina Catchment Area, which does not have a priority level assigned. Certain landuses need to be assessed as to whether it is likely to harm the drinking water source. More information on PDWSA's can be provided by the Department of Water.
- » The Greenough River, including all tributaries and catchment area, is identified as a priority river for management in the Northern Agricultural Catchment Council Regional Natural Resource Management Strategy 2005 and it is advised that stormwater should not be diverted into tributaries of the Greenough River.

Ms Natalie Lauritsen, Geraldton Regional Office - Department of Environment and Conservation.

Ms Lauritsen advised that the main vegetation issue was declared rare flora that was known to exist in the vicinity of the site. A flora survey prior to clearing was recommended.

Ms Deanne Pember, Operations Officer - Geraldton District Office - Department of Environment and Conservation (formerly CALM).

No formal comment was received prior to the completion of the December 2006 Draft PEIA report.

However, verbal comment was sought from Deanne Pember. Ms Pember advised that an orchid (*Caladenia wanosa*) was known to exist on the southern side of the road, and this would not have been picked up in a November survey, as it generally flowers from August to September. CALM have undertaken further survey work in this area that did not identify the species, but believes a follow-up survey was going to be undertaken to confirm the presence or absence of this and other rare and priority species.

Ms Pember followed this up with the CALM Flora Officer and her comments (provided in January 2007) are included below.

Ms Alanna Chant, Flora Officer - Geraldton District Office - Department of Environment and Conservation (formerly CALM).

Ms Chant advised of the following in relation to surveys carried out in the area by CALM:



- » In spring 2005 the Western Australian Native Orchid Study Association (WANOSA) found populations of *Caladenia wanosa* and *Drakea concolor* on the north side of the road. After receiving this information CALM Officers surveyed the site and found the Drakea, but were too late for the Caladenia (it shrivels up pretty quickly in warm weather as its so tiny). CALM Officers also undertook a brief inspection of the southern side of the road reserve. Neither of the orchids were found, but Ms Chant states that the CALM survey can in no way be considered comprehensive as it was undertaken late in the spring and did not cover much ground.
- » Further survey was intended for spring 2006, however due to very low rainfall none of our DRF orchid populations flowered and further surveying would not have been worthwhile.
- » In 2003 CALM found *Grevillea phanerophlebia* nearby and surveyed the entire area of the reserve north of the highway due to a motocross track being proposed for the reserve. No new populations were located beyond the original location near the gravel pit. This survey didn't cover south of the road.
- » In 2004 the Geraldton Herbarium group located *Leucopogon marginatus* and *Grevillea phanerophlebia* at several locations south of the highway. CALM also found a single *Leucopogon marginatus* plant on the north road verge, this survey didn't cover south of the road.

Ms Chant considered that there is a good likelihood of the orchids, as well as other DRF and priority flora, being more extensive in the area and CALM will undertake further surveys when conditions permit.

Mr Richard Gorbunow, Director of Engineer Services, Shire of Greenough.

No formal comment was received prior to the completion of this report.

However, verbal advice was sought from Richard Gorbunow. Mr Gorbunow indicated that Council would have no concerns with the development of a passing lane in the area and would welcome any new passing lanes. He did mention that should the passing lanes cross any local roads the intersection would require adequate design. No local roads are impacted by the proposed passing lane.

Mr Andrew Arnold – UXO Liaison Officer, Fire and Emergency Services Authority.

Mr Arnold advised that the location of the Geraldton to Mt Magnet Road passing lane works lies just outside the boundary (south east corner) of one of the former Artillery Range (Northern Gully Artillery Range WW11, UXO Register site C-267). Mr Arnold suggested the area posed minimal risk as far as UXO contamination was concerned. The layout of the template for this Range area indicates that any UXO contamination should be located well to the west and north of the Geraldton to Mt Magnet Road.

Mr Arnold had no objection to the proposal and made no recommendations to conduct any site UXO investigations prior to construction activities by Main Roads. However, FESA can give no absolute guarantee that this site is in fact free from UXO.

Any ordnance found during the PEIA or at any other time must be treated as dangerous, not handled and reported as soon as possible to the nearest Police (Geraldton) or Defence establishment.

Mr Frank Thomson – Lands Officer, Water Corporation

Mr Thomson advised that Water Corporation would have no concerns with the development of the passing lanes, as it is expected the Main Roads design will appropriately ensure the safety and operability of the connection of the Water Corporation access to the new passing lane.



It was also noted for Main Roads information that the water main from the dam to Eradu and Mullewa follows the railway line (south side) and crosses the road east of the railway/road crossing. So should not be impacted, given the locational information supplied by Main Roads.

Mr Thomson advised that Water Corporation are currently in the process of transferring the catchment area of the dam to another agency, so he assumed that the Department of Environment and Conservation would be given the opportunity to comment in respect to any impact on the flora and fauna, as they have a keen interest in the area.



Appendix C
CALM Rare and Priority Flora Search



Department of Environment and Conservation

Your reference:
Our reference: 2006-003551
Enquiries: Ben Lullfitz

Phone: 9334 0123
Fax: 9334 0278
Email: ben.lullfitz@dec.wa.gov.au

GHD
76 Forrest Street
GERALDTON WA 6530

Attention: Cathee Miller

Dear Ms Miller

REQUEST FOR RARE FLORA INFORMATION

I refer to your request of 8 November 2006 for information on rare flora in the Eradu area. The search coordinates used were 28° 41' - 28° 46' S and 114° 58' - 115° 03' E.

A search was undertaken for this area of (1) the Department's *Threatened (Declared Rare) Flora* database (for results, *if any*, see "Threatened Flora Data" – coordinates are GDA94), (2) the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, *if any*, see "WAHERB"– coordinates are GDA94 – see condition number 9 in the attached 'Conditions in Respect of Supply' and (3), the Department's *Declared Rare and Priority Flora List* [this list is searched using 'place names'. This list which may also be used as a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, *if any*, see "Declared Rare and Priority Flora List"]. The results are attached electronically to this email.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point, which refers to the requirement to undertake field investigations for the accurate determination of rare flora occurrence at a site. *The information supplied should be regarded as an indication only of the rare flora that may be present and may be used as a target list in any surveys undertaken.*

The information provided does not preclude you from obtaining and complying with, where necessary, land clearing approvals from other agencies.

It would be appreciated if any populations of rare flora encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss rare flora management, please contact my Principal Botanist, Dr Ken Atkins, on (08) 9334 0425.

Yours faithfully

BR Lullfitz

.....
for Keiran McNamara
DIRECTOR GENERAL
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

9 November, 2006

Please note: Co-ordinates supplied for all data search requests must be provided in latitude/longitude format, 'eastings and northings' are no longer suitable. Thank you.

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

RARE FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Director General, Department of Environment and Conservation, Attention: Threatened Flora Database Officer, Species and Communities Branch.
2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Director General, Department of Environment and Conservation.
3. Specific locality information for Declared Rare Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for DRF may not be used in public reports without the written permission of the Director General, Department of Environment and Conservation. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Department is to be contacted for guidance on the presentation of rare flora information.
4. Note that the Department of Environment and Conservation respects the privacy of private landowners who may have rare flora on their property. Rare flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Environment and Conservation.
5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Environment and Conservation accepts no responsibility for this.
6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
7. **It should be noted that the supplied data do not necessarily represent a comprehensive listing of the rare flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.**
8. Acknowledgment of the Department of Environment and Conservation as source of the data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention: The Manager, Species and Communities Branch.
9. The development of the PERTH Herbarium database was not originally intended for electronic mapping (eg. GIS ArcView). The latitude and longitude coordinates for each entry are not verified prior to being databased. It is only in recent times that collections have been submitted to PERTH with GPS recorded in latitude and longitude coordinates. Therefore, be aware when using this data in ArcView that some records may not plot to the locality description given with each collection.

THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DECLARED RARE AND PRIORITY FLORA LIST

for Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

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.

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.

1: 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.

2: 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.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: 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.

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

VESTING

AGR Chief Exec Dept of Agriculture
 ALT Aboriginal Land Trust
 BAP Baptist Union of WA Inc
 BSA Boy Scouts Association
 CC Conservation Commission – NPNCA - LFC
 CGT Crown Grant in Trust
 COM Commonwealth of Australia
 CRO Crown Freehold-Govt Ownership
 DOL Dept of Land Administration
 DPU Ministry for Planning
 EXD Exec Direc CALM
 FRE Freehold
 HOW Homeswest
 ILD Industrial Lands Develop. Auth
 JOI Joint Vesting-NPNCA & Shire
 LAC LandCorp
 LFC Lands and Forests Commission
 MAG Minister for Agriculture
 MED Ministry of Education
 MHE Minister for Health
 MIN Minister for Mines
 MPL Ministry for Planning
 MPR Minister for Prisons
 MRD Main Roads WA
 MTR Minister for Transport
 MWA Minister for Water Resources
 MWO Minister for Works
 NAT Natural Trust of Australia WA
 NON Not Vested
 NPN NPNCA
 OTH Other
 PRI Private
 RAI Westrail
 SEC Western Power
 SHI Shire
 SPC State Planning Commission
 TEL Telstra
 TGR Timber Govt Requirement
 TOW TOWN
 UNK Unknown
 WAT Water Corporation
 WEL Minister Community Welfare
 WRC Water & Rivers Commission
 XPL Ex-Pastoral Lease

PURPOSES

ABR Aboriginal Reserve
 AER Aerodrome
 CAM Camping
 CAR Caravan park
 CEM Cemetery
 CFA Conservation of Fauna
 CFF Conservation Of Flora & Fauna
 CFL Conservation of Flora
 CHU Church
 CPK Car Park
 COM Common
 CON Conservation Park
 DEF Defence
 DRA Drain
 EDE Educational Endowment
 EDU Educational purposes UWA
 ENE Enjoyment of Natural Environ.
 EXC Excepted from sale

EXL Exploration Lease
 EXP Experimental Farm
 FIR Firing Range
 FOR State Forest
 GHA Grain Handling
 GOL Golf
 GRA Gravel Pit
 GRE Green Belt
 GVT Government Requirements
 HAR Harbour Purposes
 HEP Heritage Purposes
 HER Heritage trail
 HOS Hospital
 KEN Kennels
 MIN Mining lease
 MUN Municipal Purposes
 NPK National Park
 NRE Nature Reserve
 OTH Other
 PAC Public access
 PAR Parkland (& Recreation)
 PAS Pastoral lease
 PFL Protection of Flora
 PIC Picnic ground
 PLA Plantation
 POS Public Open Space
 PPA Public parkland
 PRS Prison site
 PUT Public Utility
 QUA Quarry
 RAD Radio Station
 RAC Racecourse
 REC Recreation
 REH Rehabilitation
 RNP Re-establish Native Plants
 RRE Railway Reserve
 RUB Rubbish
 SAN Sand
 SCH School-site
 SET Settlers requirements
 SHI Shire Requirements
 SHO Showgrounds
 SNN Sanitary
 STO Stopping place
 TIM Timber
 TOU Tourism
 TOW Town-site
 TRA Training Ground
 TRI Trig station
 TVT Television transmitting
 UNK Unknown
 UTI Utilities
 VCL Vacant Crown Land
 VER Road Verge
 VPF Vermin Proof Fence
 WAT Water
 WCO Water & Conservation of F & F
 WOO Firewood

* Please note that LFC now comes under the Conservation Commission.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
DECLARED RARE AND PRIORITY FLORA LIST
30 June 2006

SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
<i>Acacia leptospermoides</i> subsp. <i>psammophila</i>	3	MW	Geraldton, Yuna, Indarra, Eradu	
<i>Acacia megacephala</i>	2	MW	E of Geraldton, Kojarena, Burma Road	Jun-Sep
<i>Baeckea</i> sp. Walkaway (AS George 11249)	3	MW	Nanson, Ambania, Walkaway, Burma Road Reserve, Mt Fanny, Mt Horner	Jan, Apr
<i>Baeckea staminosa</i>	1	MW	Greenough River, Eradu, Mullewa, Yuna	Oct
<i>Chorizema humile</i>	R	MW	Strawberry, Carnamah, Geraldton, Kojarena, Coorow	Jul-Sep
<i>Comesperma rhadinocarpum</i>	2	MW, SW	Mullewa, Kenwick, Cataby, (Greenough River, Irwin River)	Oct-Nov
<i>Dicrastylis incana</i>	2	MW	E of Geraldton, Yuna, Eradu	Sep, Nov
<i>Eucalyptus ebbanoensis</i> subsp. <i>photina</i>	4	MW	Nanson, Mt Michael, Eradu, Mt Horner, Morseby Range	-
<i>Grevillea phanerophlebia</i>	R	MW	Mullewa, Mingenew, Eradu	
<i>Jacksonia velutina</i>	4	MW	Kalbarri, Ajana, Binnu, East Yuna, Eradu, Watheroo, E of Hamelin Pool	Aug-Sep, Nov
<i>Levenhookia octomaculata</i>	3	MW, SC, S R	Kalbarri, Northampton, Bolgart, Canna, Lesueur, Ravensthorpe, Wicherina, Dinninup, Perenjori	Nov
<i>Malleostemon</i> sp. Unmade Road (Griffin 7537)	1	MW	Ambania	
<i>Scaevola kallophylla</i>	4	MW	Kalbarri, Greenough River	Aug-Dec
<i>Scholtzia</i> sp. Eradu (RD Royce 8016)	2	MW	Eradu, Yuna, Coorow, Murchison River, Kalbarri	Oct, Nov
<i>Scholtzia</i> sp. Kojarena (AM Ashby 1904)	1	MW	Kojarena	
<i>Verticordia muelleriana</i> subsp. <i>minor</i>	2	MW	Wicherina	Dec

THREATENED FLORA DATABASE RESULTS - 9/11/2006

SPNAME	CONSVCODE	GDA94LAT	GDA94LONG	VESTING	PURPOSE1	SHEETNO
Caladenia wanosa	R	-28.71688889	115.01019444	MWA	WAT	22620
Grevillea phanerophlebia	R	-28.69877778	115.03497222	RAI	RRE	20379
Grevillea phanerophlebia	R	-28.72500000	115.02500000	SHI	GRA	20380
Grevillea phanerophlebia	R	-28.73544444	115.01355556	MWA	WAT	20778
Leucopogon marginatus	R	-28.73347222	115.01552778	MWA	WAT	21696
Leucopogon marginatus	R	-28.71631119	115.01393416	MWA	WAT	21689
Eucalyptus ebbanoensis subsp. photi	4	-28.70986672	115.00976741	PRI		7418
Drakaea concolor	R	-28.71688889	115.01019444	SHI	SHI	22568

WA HERBARIUM DATABASE RESULTS - 9/11/2006

SHEET_NO.	GENUS	SPECIES	RANK	INFRASP	CONS.CODE	SITE
PERTH 01401459	Verticordia	muelleriana	subsp.	minor	P2	Grey and white sand over gravelly sandy clay, hard.
PERTH 02344467	Grevillea	granulosa			P3	Sandplain.
PERTH 02029197	Verticordia	chrysostachys	var.	pallida	P3	Yellow sand.
PERTH 02524279	Acacia	leptospermoides	subsp.	psammophila	P3	
PERTH 1025724	Dampiera	krauseana			P2	In aernosis lutosus.
PERTH 01401424	Verticordia	muelleriana	subsp.	minor	P2	Hard white sand.
PERTH 1149733	Banksia	elegans			P4	
PERTH 01406701	Verticordia	chrysostachys	var.	pallida	P3	Hard white sand.
PERTH 03668436	Dicrasyliis	incana			P2	
PERTH 01404555	Verticordia	densiflora	var.	roseostella	P3	Yellow sand.
PERTH 01406736	Verticordia	chrysostachys	var.	pallida	P3	Yellow sand.
PERTH 00968595	Geleznowia	verrucosa	subsp.	formosa	P3	
PERTH 03666441	Dicrasyliis	incana			P2	Sandy soil.
PERTH 173355	Acacia	megacephala			P2	Yellow sand.
PERTH 00896942	Acacia	megacephala			P2	
PERTH 01401432	Verticordia	muelleriana	subsp.	minor	P2	Hard white sand.
PERTH 01407201	Verticordia	chrysostachys	var.	pallida	P3	
PERTH 01406728	Verticordia	chrysostachys	var.	pallida	P3	Hard white sand.
PERTH 01401440	Verticordia	muelleriana	subsp.	minor	P2	Grey and white sand over gravelly sandy clay, hard.
PERTH 02034336	Verticordia	muelleriana	subsp.	minor	P2	Yellow sand.
PERTH 01401416	Verticordia	muelleriana	subsp.	minor	P2	Yellow sand.
PERTH 01401408	Verticordia	muelleriana	subsp.	minor	P2	Grey and white sand over hard gravelly sand and clay.
PERTH 609803	Acacia	leptospermoides	subsp.	psammophila	P3	
PERTH 145653	Acacia	leptospermoides	subsp.	psammophila	P3	
PERTH 00767441	Acacia	leptospermoides	subsp.	psammophila	P3	
PERTH 00738344	Acacia	leptospermoides	subsp.	psammophila	P3	
PERTH 03460444	Levenhookia	octomaculata			P3	Landform: scarp footslope, Slope - 2; Soil: pale yellow sand/ gravel; Drainage: goo
PERTH 02032287	Verticordia	penicillaris			P4	Yellow sand over decomposed granite.
PERTH 04715322	Grevillea	phanerophlebia			R	Flat, close to Greenough River. Yellow brown sandy loam.
PERTH 04715330	Grevillea	phanerophlebia			R	Flat, close to Greenough River. Yellow brown sandy loam.
PERTH 1073907	Hemigenia	saligna			P3	
PERTH 06166768	Grevillea	phanerophlebia			R	At edge of gravel pit. Moist, grey-white-brown, sand-loam-gravel-laterite.
PERTH 06371256	Grevillea	phanerophlebia			R	Crest of hill above river valley. Red clay loam.
PERTH 06371264	Grevillea	phanerophlebia			R	Hill slope; yellow sand.
PERTH 06371191	Grevillea	phanerophlebia			R	Hill crest above river valley. Red clay loam.
PERTH 06371310	Grevillea	phanerophlebia			R	Hill; red clay loam.
PERTH 06371183	Grevillea	phanerophlebia			R	Hillcrest above river valley.
PERTH 1191527	Eucalyptus	ebbanoensis	subsp.	photina	P4	Gravel pit. On south facing laterite breakaway.
PERTH 01606123	Baeckea	staminosa			P1	
PERTH 06694764	Baeckea	staminosa			P1	
PERTH 06694837	Baeckea	staminosa			P1	
PERTH 05895650	Grevillea	phanerophlebia			R	Hilltop. Red sandy clay.
PERTH 06752055	Grevillea	phanerophlebia			R	Sandplain, midslope. Moist, light brown sand over laterite.
PERTH 06809146	Grevillea	phanerophlebia			R	Hill crest above river valley.
PERTH 06809162	Grevillea	phanerophlebia			R	Hill crest above river valley.
PERTH 06809170	Grevillea	phanerophlebia			R	Hill crest above river valley.
PERTH 06809197	Grevillea	phanerophlebia			R	Hill crest above river valley.
PERTH 05958911	Calectasia	browneana			P2	E aspect. Slight slope. Lateritic rise.
PERTH 03628051	Scholtzia	sp. Eradu (R.D. Royce 8016)			P2	Sandy soil.
PERTH 06844936	Dampiera	krauseana			P2	Sandplain, upper slope. Dry white sand.
PERTH 06844731	Leucopogon	marginatus			R	Sandy ridge. Soil surface: mulch. Yellow sand over gravel. Laterite.
PERTH 06844871	Verticordia	densiflora	var.	roseostella	P3	Sandplain upper slope. Dry pale clayey sand.

VEGETATION

Among Casuarina and Grevillia.
With Casuarina and Acacia.

Associated with Banksia, Grevillea, Hakea.

Structure (Muir 1977): Scattered Tall Shrubs/ Heath B/ Open Low Sedges/ Very Open Herbs; Major spp: Allocasuarina campestris, Ecdeiocolea monostachya, Acacia rostel

Heath to 1 m.
Heath to 1 m.

Shrubland. Allocasuarina campestris, Grevillea biternata, Grevillea amplexans, Grevillea leucopteris, Hibbertia hypercoides.
Open heath. Grevillea biternata.
Open heath with mallees. Eucalyptus endesmoides.
Open heath. Grevillea biternata.
Open heath. Grevillea biternata.
Open heath. Grevillea biternata.
Heath.

Open shrubland with mallees and tammar. Associated species: Lepidosperma sp.
Heath. Calothamnus homalophyllus, Melaleuca depressa, Allocasuarina campestris.
Open heath.
Open heath.
Open heath.
Open heath.
Allocasuarina heath.

Heath. With Banksia scabrella, Desmocladius asper, Melaleuca aff. depressa.
Open scrub heath. With Acacia speciosa, Melaleuca, Hibbertia hypericoides.
Dense scrub, heath. With Banksia scabrella, Allocasuarina campestris, Lechenaultia linarioides.

LOCALITY	LAT	LONG
Near Wicherina	-28.71638	115.00000
Eradu	-28.69833	115.03806
Wicherina	-28.71638	115.00000
Eradu (Eradu is c. 50 km ENE of Geraldton), South West Division	-28.70000	115.03333
Prope Eradu [near Eradu]	-28.70000	115.03333
E of Wicherina Reserve	-28.71638	115.00000
Greenough River.	-28.71666	115.03333
E of Wicherina Reserve	-28.71638	115.00000
Eradu	-28.69833	115.03806
Wicherina	-28.71638	115.00000
Wicherina	-28.71638	115.00000
Eradu, ca. 45 km E of Geraldton.	-28.69833	115.03806
0.5 miles E of Greenough River at Eradu	-28.69833	115.03806
Eradu, S of Greenough River	-28.70000	115.03333
22 miles E of Geraldton	-28.71666	114.96667
E of Wicherina Reserve	-28.71638	115.00000
Eradu	-28.69833	115.03806
E of Wicherina Reserve	-28.71638	115.00000
Near Wicherina	-28.71638	115.00000
Wicherina	-28.71638	115.00000
Wicherina	-28.71638	115.00000
Wicherina South Road	-28.71638	115.00000
Eradu	-28.70000	115.03333
30 miles E of Geraldton	-28.71666	115.05000
Greenough River Crossing, near Mullewa	-28.71666	115.03333
Eradu	-28.69833	115.03806
AMG-Zone 50 306510mE 6820925mN; E boundary, S of Geraldton-Mullewa Rd, Wicherrina water (Reserve 17711), E of Geraldton.	-28.72444	115.01889
NE of Eradu	-28.69833	115.03806
Railway reserve, c. 100 m W of river crossing at Eradu	-28.68333	115.03333
Railway reserve, c. 100 m W of river crossing at Eradu	-28.68333	115.03333
SW Division. S of Eradu. (Eradu is ca 50 km ENE of Geraldton)	-28.70000	115.03333
Shire Gravel Reserve, at edge of area previously used for gravel, Wicherina	-28.72500	115.02500
Railway reserve E of Eradu, c. 50 m beyond first turnoff on track	-28.69766	115.03642
W of Eradu, rail reserve c. 100 m beyond river crossing	-28.69777	115.03519
Railway reserve W of Eradu, c. 50 m beyond first turnoff on track	-28.69642	115.03785
W of Eradu, railway access track c. 50 m beyond first turnoff after river crossing	-28.69642	115.03785
Rail reserve W of Eradu, beyond first turnoff from track after river crossing	-28.69642	115.03785
Gravel pit on Mullewa Road opposite Wicharena Water Reserve, Hill top	-28.71116	115.00833
Greenough River crossing	-28.69833	115.03806
30 miles E of Geraldton	-28.71666	115.05000
30 miles E of Geraldton	-28.71666	115.05000
Eradu, railway reserve, W of river crossing, ca 10 m W of fork in track beyond river, ca 10 m from track towards railway,	-28.69625	115.03727
Site 4, Wicherina Reserve	-28.73420	115.01499
Eradu, railway access track SW of river crossing	-28.69642	115.03785
Eradu, railway access track SW of river crossing	-28.69642	115.03785
Eradu, railway access track SW of river crossing	-28.69642	115.03785
Eradu, railway access track SW of river crossing	-28.69642	115.03785
45 km E of Geraldton on the Geraldton - Mount Magnet road, Irwin District	-28.71597	115.00032
Eradu, .5 miles from Greenough River	-28.69833	115.03806
Wicherina (Site 3)	-28.73581	115.01891
Wicherina Reserve (Site 2/4), 40 km E of Geraldton on Mullewa Road	-28.73133	115.01741
Wicherina (Site 3)	-28.73581	115.01891



Appendix D
CALM Threatened Fauna Search



Your Ref:
Our Ref: 2006F003868V01
Enquires: Kellie Mantle

Phone: 9334 0579
Fax: 9334 0278
Email: kellie.mantle@dec.wa.gov.au

Cathee Miller
GHD
PO Box 164
Geraldton WA 6531

Dear Cathee

REQUEST FOR THREATENED FAUNA INFORMATION

I refer to your request of 8th November for information on threatened fauna occurring in the vicinity of Eradu along the Geraldton-Mt Magnet Road (plus ~20km buffer).

A search was undertaken for this area of the Department's Threatened Fauna database, which includes species which are declared as '*Rare or likely to become extinct* (Schedule 1)', '*Birds protected under an international agreement* (Schedule 3)', and '*Other specially protected fauna* (Schedule 4)'.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the sixth point that refers to the requirement to undertake field investigations for the accurate determination of threatened fauna occurrence at a site. The information supplied should be regarded as an indication only of the threatened fauna that may be present.

An invoice for \$150.00 (plus GST), being the set charge for the supply of this information, will be forwarded.

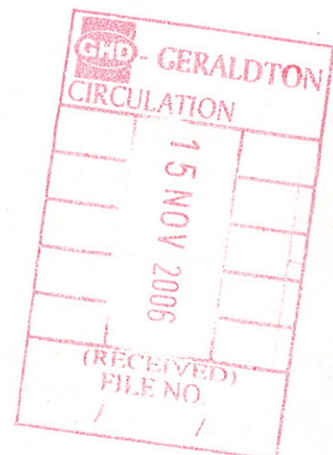
It would be appreciated if any populations of threatened fauna encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss threatened fauna management, please contact my Principal Zoologist, Dr Peter Mawson on 08 93340421.

Yours sincerely

.....
for Keiran McNamara
DIRECTOR GENERAL
Department of Environment and Conservation

10th November, 2006



Attachment

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

THREATENED FAUNA INFORMATION

Conditions In Respect Of Supply Of Information

- * All requests for data to be made in writing to the Executive Director, Department of Environment and Conservation, Attention: Principal Zoologist, Species and Communities Branch.
- * The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided without the prior consent of the Executive Director, Department of Environment and Conservation
- * Specific locality information for Threatened Fauna is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for Threatened Fauna may not be used in reports without the written permission of the Executive Director, Department of Environment and Conservation. Reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Principal Zoologist is to be contacted for guidance on the presentation of Threatened Fauna information.
- * Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data, they may be present. The Department of Environment and Conservation accepts no responsibility for this.
- * Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
- * It should be noted that the supplied data do not necessarily represent a comprehensive listing of the Threatened Fauna of the area in question. Its comprehensiveness is dependent of the amount of survey carried out within a specified area. The receiving organisation should employ a biologist/zoologist, if required, to undertake a survey of the area under consideration.
- * Acknowledgment of the Department of Environment and Conservation as the source of data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention; Principal Zoologist, Species and Communities Branch.

28.9092 °S 114.794 °E / 28.5286 °S 115.232 °E GERALTON-MT MAGNET RD AT ERA DU (PLUS ~20KM BUFFER)

* *Date* *Certainty* *Seen* *Location Name* *Method*

Schedule 1 - Fauna that is rare or is likely to become extinct

Calyptrorhynchus latirostris **Carnaby's Black-Cockatoo** *2 records*

This species moves around seasonally in flocks to feeding areas in proteaceous scrubs and heaths and eucalypt woodlands as well as pine plantations. Breeding occurs in winter/spring, mainly in the eastern forests and wheatbelt where they can find mature hollow-bearing trees to nest in.

Date	Certainty	Seen	Location Name	Method
1984	1	23	Wicherina	Day sighting
1985	1		Ellendale	Day sighting

Idiosoma nigrum **Shield-backed Trapdoor Spider** *1 records*

This species is in decline in its patchy distribution through the northern and central wheatbelt and coastal plain. It is a long-lived species that is very sensitive to disturbance.

Date	Certainty	Seen	Location Name	Method
1971	1	1	Minnenooka	Caught or trapped

Schedule 4 - Other specially protected fauna

Falco peregrinus **Peregrine Falcon** *4 records*

This species is uncommon and prefers areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land.

Date	Certainty	Seen	Location Name	Method
1975	1	0	Ellendale	Eggs
1975	1	3	Ellendale	Caught or trapped
1982	1	1	Ellendale	Day sighting
1983	1	2	Ellendale	Day sighting

Priority Four: Taxa in need of monitoring

Ardeotis australis **Australian Bustard** *1 records*

This species is uncommon and may occur in open or lightly wooded grasslands.

Date	Certainty	Seen	Location Name	Method
1983	1	1	Tenindewa	Day sighting

* Information relating to any records provided for listed species:-

Date: date of recorded observation

Certainty (of correct species identification): 1=Very certain; 2=Moderately certain; and 3=Not sure.

Seen: Number of individuals observed.

Location Name: Name of reserve or nearest locality where observation was made

Method: Method or type of observation





GHD Pty Ltd ABN 39 008 488 373

76 Forrest Street Geraldton WA 6530


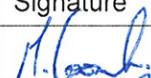
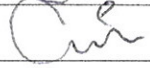
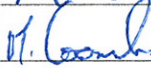
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		Name	Signature	Name	Signature	Date
0	F. Tibbett	C. Miller		M. Coombes		22/12/06
1	F. Tibbett	C. Miller		M. Coombes		31/1/07