

Main Roads WA Goldfields Esperance Region

**PRELIMINARY ENVIRONMENTAL IMPACT
ASSESSMENT**

**GOLDFIELDS HIGHWAY (H049) SHERWOOD STATION
FENCING**

748.11 SLK TO 775.75 SLK ON THE NORTH

775.75 SLK TO 786.46 SLK ON THE SOUTH

Declared Rare Flora Mt Augustus Foxglove or *Pityrodia augustensis*



MARCH 2008

Contents

1.	Executive Summary	4
2.	Introduction.....	5
3.	Project Description	5
	Environmental Aspects and Management	6
	Dieback & other diseases or pathogens	6
	Acid Sulfate Soils.....	6
	Salinity	6
	Air Quality	6
	Dust.....	6
	Noise and Vibration	6
	Visual Amenity	6
	Public Safety and Risk.....	6
	Weeds.....	6
	Sensitive Adjoining Land Use / Sensitive Receivers	6
	Conservation Areas and Reserves	7
	Contaminated Sites	7
	Surface Water Drainage.....	7
	Public Drinking Water Source Areas	7
	Wetlands	7
	European Heritage Sites.....	7
4.	Environmental Desktop Assessment	7
4.1	Climate.....	7
4.2	Soils and Geology.....	8
4.3	Landuse.....	8
4.4	Groundwater and Dewatering.....	8
4.5	Clearing	8
4.6	Vegetation Associations.....	9
4.7	Threatened Flora	10
4.8	Environmentally Sensitive Areas.....	10
4.9	Threatened Ecological Communities	10
4.10	Threatened Fauna	10
4.11	Aboriginal Heritage	11
4.12	Consultation.....	12
5.	Environmental Approvals.....	12
6.	Recommendations.....	13
7.	References	14
8.	Database Report	26
8.1	Caveat.....	29
8.2	Acknowledgment	29

FRONT COVER: Mt Augustus Foxglove *Pityrodia augustensis*

SOURCE: www.florabase.calm.wa.gov.au on 29/02/08 at 2.22PM

List of Tables

- Table 1 Environmental Aspects Considered Not relevant to this Project
- Table 2 Threatened Flora
- Table 3 Threatened Fauna

List of Appendixes

- A Low Impact Environmental Screening Checklist
- B Project Location
- C Assessment Against the 10 Clearing Principles
- D Vegetation Associations
- E DEWHA Environmental Reporting Tool Database Search
- F DEC's ESA Database Search
- G DIA's Aboriginal Heritage Sites Search
- H DIA's Aboriginal Heritage Surveys Search

1. Executive Summary

Main Roads Goldfields Esperance Region is proposing to fence a 38.2 km section of the Sherwood Station, located 6 km east of Meekatharra on the Goldfields Highway. Currently the station's stock (primarily cattle) are not confined to the property and have full access to the highway. There have been some incidents where vehicles have collided with stock with major financial (to the owners of the livestock and the vehicle) and social (can cause personal injury or fatality) impacts. The aim of the fencing is to avoid all vehicle stock collisions and their detrimental impacts.

A low impact environmental screening checklist was completed for the project by the regions' Senior Project Manager, Mark Russell and reviewed by the regions' Environmental Graduate, Joann Johnston. As the project requires the clearing of native vegetation a Preliminary Environmental Impact Assessment is required, this document fulfils this requirement.

The most significant environmental impact associated with this project is the clearing of approximately 11 ha of native vegetation and the possible impact to a registered Aboriginal heritage site. Due to the low significance of the projects impacts to the surrounding environment, the project does not warrant referral to the Environmental Protection Authority or the Commonwealth Department of Environment, Heritage and the Arts. A Section 18 approval under the *Aboriginal Heritage Act (1972)* may be required.

2. Introduction

Main Roads Goldfields Esperance Region is proposing to fence a 38.2 km section of the Sherwood Station, located 6 km east of Meekatharra on the Goldfields Highway. Currently the station's stock (primarily cattle) is not confined to the property and has full access to the highway. There have been some incidents where vehicles have collided with stock with major financial (to the owners of the livestock and the vehicle) and social (can cause personal injury or fatality) impacts. The aim of the fencing is to avoid all vehicle stock collisions and their detrimental impacts.

A low impact environmental screening checklist was completed for the project by the regions' Senior Project Manager, Mark Russell and reviewed by the regions' Environmental Officer, Joann Johnston (See Appendix A). As the project requires the clearing of native vegetation a Preliminary Environmental Impact Assessment is required. This report fulfils this requirement and has been prepared by the Regions' Environmental Officer, Joann Johnston and approved by the Senior Project Manager, Mark Russell.

In accordance with the Main Roads Guideline; Environmental Assessment and Approval Process this report;

- describes the significant aspects of the existing environment
- details the primary environmental and social impacts of the proposed works
- identifies any matters likely to warrant referral for formal assessment and
- provides recommendations.

3. Project Description

The project location and environmental constraints map can be seen in Appendix B. The fencing will be constructed at the following locations;

- 748.11 SLK to 775.75 SLK (27.64 km long) to be offset 50 – 100 m to the North (RHS) of the existing Goldfields Highway
- 775.75 SLK to 786.46 SLK (10.71 km long) to be offset 50 – 100 m to the South (LHS) of the existing Goldfields Highway

This fencing will compliment past fencing undertaken on the station and on adjacent properties (Killara Station) to ensure that stock cannot access the Goldfields Highway.

Environmental Aspects and Management

The following sections provide a desktop assessment of the project's environment, its likely impacts and the results of a biological survey. Environmental and social aspects and impacts are identified and discussed relevant to the proposed works. Where appropriate, recommendations to minimise the risk to the environment have been made.

Main Roads guideline identifies a number of environmental aspects to be assessed in a preliminary environmental impact investigation however some of these aspects are considered irrelevant to this project. Table 1 identifies these aspects and provides reasons why they were considered irrelevant for this project.

Environmental Aspect	Justification of Irrelevance
Dieback & other diseases or pathogens	- The dieback fungus (<i>Phytophthora</i>) is known to thrive in the high rainfall areas in south-west Western Australia, the proposed fenceline is located outside of this area and this aspect is therefore considered irrelevant.
Acid Sulfate Soils	- Given the superficial nature of the proposed works, impacts to acid sulphate soils are not expected and this aspect is considered irrelevant.
Salinity	- Given the small area of vegetation proposed to be cleared and the large area of native vegetation in the region, the project is not expected to have an impact on salinity and this aspect is considered irrelevant.
Air Quality	- Given the nature of the proposed works, impacts to air quality are not expected and this aspect is considered irrelevant.
Dust	- Given the nature of the proposed works, the project is not expected to create significant levels of air borne dust and this aspect is considered irrelevant.
Noise and Vibration	- Given the nature of the proposed works, the project is not expected to create noise or vibration impacts, and this aspect is considered irrelevant.
Visual Amenity	- Given the nature of the proposed works, visual amenity impacts are not expected and this aspect is considered irrelevant.
Public Safety and Risk	- Given the nature and location of the proposed works, public safety is not considered to be at risk and this aspect is considered irrelevant.
Weeds	- Given the nature of the proposed works, weeds are not expected to be introduced or spread by the project and this aspect is considered irrelevant.
Sensitive Adjoining Land Use / Sensitive Receivers	- Given the location of the proposed works, sensitive adjoining land uses and receivers are not expected to be impacted by the project and this aspect is considered irrelevant.

Table 1 CONTINUED
Environmental Aspects Considered Not Relevant to the Project

Environmental Aspect	Justification of Irrelevance
Conservation Areas and Reserves	- Given that the project is not located within a conservation area or reserve this aspect is considered irrelevant.
Contaminated Sites	- Given the past and present landuse of the project are (Pastoral Lease for Cattle/Sheep grazing), contaminated materials are not expected to be present and this aspect is considered irrelevant.
Surface Water Drainage	- Given the nature and scale of the works proposed, surface water drainage patterns and flow are not expected to be impacted by the project and this aspect is considered irrelevant.
Public Drinking Water Source Areas	- The project is not located within a PDWSA or other protected surface water area therefore this aspect is considered irrelevant.
Wetlands	- The project is not located within or adjacent to a significant wetland therefore this aspect is considered irrelevant.
European Heritage Sites	- The site inspection of the project area did not identify any suspected sites of European Heritage therefore this aspect is considered irrelevant.

4. Environmental Desktop Assessment

4.1 Climate

The closest weather station to the project area is in Meekatharra, approximately 6 km to the west of the proposed fenceline. Meekatharra experiences a climate of generally cool wet winters and hot dry summers however the rainfall in the Western Australian rangelands is highly unreliable. It occurs in winter as a result of rain-bearing depressions that stray from the northeast agricultural areas but the heaviest rainfall events occur due to tropical cyclones that develop in the northwest during summer. This means that the vegetation in the area can experience two growing seasons in summer and in winter depending on rainfall. The average annual rainfall at the Meekatharra weather station is 237 mm. In February 2008, as a result of Cyclone Nicholas, a single rainfall event produced 60 mm on the Sherwood Station.

The average maximum and minimum temperature in Meekatharra for July were 18.8 °C and 7.4 °C with overnight temperatures falling to 5 °C. January is the hottest month with average maximum and minimum temperatures of 38.1 °C and 27 °C.

4.2 Soils and Geology

Information on the soils and geology of the project area was obtained from an online database through the Department of Industry and Resources (DOIR) website.

GeoVIEW.WA is an online browser-based visual tool for exploring Geological Survey of Western Australia's (GSWA) geoscience datasets. The geology of the project area is a mosaic of "Archaean: metamorphosed basic and ultrabasic volcanic and intrusive rocks", "Archaean: metamorphosed sedimentary and acid volcanic rocks", "Archaean: granite and acid gneiss" and "Proterozoic: sandstone and shale".

The Department of Agriculture and Food's (DAF's) Shared Land Information Platform (SLIP) database indicated that the soils of the project area is a mosaic of "rocky or stony soils", "shallow soils", "deep sandy and sandy earths" and "loamy earths".

4.3 Landuse

The project is located within the Shire of Meekatharra where the dominant landuse is Pastoral leases for cattle, goats and some sheep and mineral exploration and mining.

4.4 Groundwater and Dewatering

According to the DoW (2006b) the project area is located within a proclaimed groundwater management area. Under the *Rights in Water and Irrigation Act (1914)* a license is required to take groundwater from a new or existing bore or other groundwater source within a proclaimed area. Taking groundwater within these areas without a license is illegal and DoW has the authority to issue fines under this act to the offender.

Recommendation 1

In compliance with the *Rights in Water and Irrigations Act (1914)* obtain a groundwater abstraction license prior to taking groundwater within the project area.

4.5 Clearing

A 20 ha (38200 m length and 5 m width) area will be required to be free of vegetation to construct and maintain the proposed fenceline. The vegetation in the region however is typically sparse with 40 % bare soil to 60 % vegetative cover ("drip-line" estimate). When calculating the amount of vegetation required to be cleared, based on the vegetation "drip-line", 12 ha is a more accurate an estimate.

The clearing will be undertaken under Main Roads State Wide Purpose Permit CPS 818-4 and has therefore been assessed against the 10 clearing principles in accordance with the conditions of this permit, see Appendix C. As the proposed clearing is not at variance to the 10 clearing principles further consultation and offsets are not required.

This clearing is classified as Permanent Clearing under the meaning of CPS 818-4 and will not require a Revegetation Management Plan.

4.6 Vegetation Associations

The SLIP database indicates that the vegetation in the project area is a mosaic of the following vegetation types (see Appendix D);

- Vegetation Association No. 18 which is described as “Low woodland; *Acacia aneura*” of which 100% of this vegetation association’s pre-European extent still remains today (DEC 2006²).
- Vegetation Association No. 29 which is described as “Sparse low woodland; mulga discontinuous in scattered groups” of which 100% of this vegetation association’s pre-European extent still remains today (DEC 2006²).
- Vegetation Association No. 39 which is described as “Shrublands; mulga scrub” of which 100% of this vegetation association’s pre-European extent still remains today (DEC 2006²).
- Vegetation Association No. 107 which is described as “Hummock grasslands; shrub steppe, mulga and *Eucalyptus kingsmillii* over hard Spinifex” of which 100% of this vegetation association’s pre-European extent still remains today (DEC 2006²).

Vegetation is considered underrepresented and ecologically unstable if there is less than 30 % of its’ original (pre-European/1950) distribution is remaining (DEC 2006c). The clearing of vegetation below this 30 % threshold will require further consultation with the DEC, possibly the need to apply for a separate clearing permit (i.e. CPS 181-4 cannot be used) and the possible provision of offsets. All of the vegetation associations present in the survey area are well above this threshold (>90%). The proposed clearing isn’t expected to be of interest to the DEC and may be cleared under CPS 818-4.

4.7 Threatened Flora

A search of the Department of Environment Water, Heritage and the Arts (DEWHA) Environmental Reporting Tool (Appendix E) database indicates that the (Vulnerable) Declared Rare Flora species Mt Augustus Foxglove (*Pityrodia augustensis*) has the potential to occur within the project area. This species grows on rocky hillsides in the Mt Augustus area and on Mt Fraser in the Robinson Range approximately 50 km north of the project area.

The DEC's Threatened Species and Communities Branch were contacted to undertake a search of their Threatened Flora database for the project area. There are no Declared Rare Flora species known to occur within the project area. The following priority flora species were found to occur within a 10km radius of the project area;

- *Melaleuca coccinea* (Priority 3)
- *Eucalyptus x brachyphylla* (Priority 4)
- *Astartea* sp. Red Hill (Priority 1)
- *Sowerbaea multicaulis* (Priority 4)

There are currently no known locations of Declared Rare or Priority flora within the project area, threatened flora species are not expected to be impacted by the proposed project.

4.8 Environmentally Sensitive Areas

According to the DEC's Environmentally Sensitive Areas Database there are no ESAs within a 10 km radius of the project area, see Appendix F.

4.9 Threatened Ecological Communities

In 2007 the DEC's provided Main Roads with a geographically referenced database of all the known Threatened Species and Communities within Western Australia (See Appendix D). The database was examined for the project area and it was identified that there are currently no known locations of Threatened Ecological Communities within 10 km radius of the project area

4.10 Threatened Fauna

A search of the DEWHA Environmental Reporting Tool (Appendix E) database indicates that the Vulnerable Slender-Billed Thornbill (*Acanthiza iredalei iredalei*) species has the

potential to occur within the project area. The DEWR Species Profile and Threats Database describes the species preferred habitat as “chenopod shrublands that are dominated by samphires or *Maireana* and *Atriplex* associations” and “it occasionally occurs in acacia shrublands and mangroves adjacent to more preferred habitat”. Given the mobile nature of the species, the small area of vegetation proposed to be cleared and the dissimilarity of preferred habitat type and vegetation present in the project area, the species is not expected to be impacted by the proposed works.

The DEWR Environmental Reporting Tool search also indicates that other migratory bird species including terrestrial, marine and wetland species, have the potential to occur within the project area. Given the small area of vegetation proposed to be cleared and the mobile nature of the species, the species listed are not expected to be located within or impacted by the project.

4.11 Aboriginal Heritage

There are two Aboriginal heritage groups claiming a cultural affiliation with the lands in which the project is located and include;

- the Yugunga-Nya people and
- the Wiluna Traditional Elders

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Inquiry System database was undertaken to identify if any Aboriginal heritage sites were located within the project area (See Appendix G). An artefact scatter (DIA Site ID 20010) is located in the proposed alignment of the fenceline and the site file describes it as follows; “It is sparse artefact scatter on an alluvial plain south of a rockshelter. It commences approximately 20 m to the north of the Goldfields Highway and extends approximately one hundred metres further to the north.”

As the artefacts may have moved since they were originally recorded, site confirmation will be required to determine the exact location and extent of the artefacts scatter. Consultation regarding the possible impacts to this site with the relevant Aboriginal groups will also be required. If an impact to the site is unavoidable a Section 18 approval under the *Aboriginal Heritage Act (1972)* will be required from the Minister of Indigenous Affairs.

Given the number of surveys conducted in the vicinity of the project area (Appendix H), it is unlikely that further sites will be discovered within the project area.

Recommendation 2

Undertake an archaeological and ethnographic assessment of the project area to determine the extent of possible impacts to Aboriginal heritage sites.

Recommendation 3

Avoid all impacts to sites of Aboriginal heritage.

Recommendation 4

Where impacts to Aboriginal heritage sites are unavoidable apply for a Section 18 approval under the *Aboriginal Heritage Act (1972)* to disturb the site and under direction of the conditional approval, minimise all impacts to such sites.

Recommendation 5

Ensure all site workers are made aware of their obligations and penalties issued under the *Aboriginal Heritage Act (1972)*.

4.12 Consultation

Consultation was undertaken with the regional DEC office regarding the projects impacts, especially to Threatened flora.

5. Environmental Approvals

The project is unlikely to interest the DEC, EPA or DEWHA given the minimal impact the project will have on the environment. Referral under the *Environmental Protection Act (1986)* or the *Environmental Protection and Biodiversity Conservation Act (1999)* to the EPA or the DEWHA is not required.

If impacts to Aboriginal heritage sites are unavoidable, a Section 18 approval will be required under the *Aboriginal Heritage Act (1972)*. Applications for approval are to be made via the Western Australian, Department of Indigenous Affairs. Applications should be made in conformance with the Aboriginal Cultural Materials Committee (ACMC) requirements and the appropriate number (15) of copies of the report submitted for their consideration.

The project meets the requirements for authorised clearing under the Main Roads Purpose Clearing Permit (CPS 818-4) and the proposed clearing is not at variance to the

10 clearing principles. The clearing may therefore be undertaken using the Main Roads clearing permit and an application for a project specific clearing permit is not required.

6. Recommendations

The following recommendations and actions should be incorporated into the project contractual documentation and the environmental management plan for the project where applicable.

Recommendation 1

Obtain a groundwater abstraction license prior to taking groundwater within proclaimed groundwater management areas under the *Rights in Water and Irrigations Act (1914)*.

Recommendation 2

Undertake an archaeological and ethnographic assessment of the project area to determine the extent of possible impacts to Aboriginal heritage sites.

Recommendation 3

Avoid all impacts to sites of Aboriginal heritage.

Recommendation 4

Where impacts to Aboriginal heritage sites are unavoidable apply for a Section 18 approval under the *Aboriginal Heritage Act (1972)* to disturb the site and under direction of the conditional approval, minimise all impacts to such sites.

Recommendation 5

Ensure all site workers are made aware of their obligations and penalties issued under the Aboriginal Heritage Act (1972).

7. References

DEC 2004, *Contaminated Sites Management Series: Potentially Contaminating Activities, Industries and Landuses*. October 2004. Department of Environment and Conservation, Western Australia., Western Australia.

DEC 2006a, *Contaminated Sites Management Series: Reporting of Known or Suspected Contaminated Sites*. November 2006. Department of Environment and Conservation, Western Australia.

DEC 2006b, *CAR RESERVE ANALYSIS 2006*. Unpublished data. Department of Environment and Conservation, Western Australia.

DoW 2006a, *Rights in Water and Irrigation Act (1914) Surface Water Management Areas Map*. Department of Water, Western Australia.

DoW 2006b, *Rights in Water and Irrigation Act (1914) Groundwater Management Areas Map*. Department of Water, Western Australia.

Government of Western Australia (2000). *Volume 2: Directory of Bush Forever Sites*. Department of Environmental Protection, Western Australia.

DEC 2006c, *Guide to Assessment: Clearing of Native Vegetation under the Environmental Protection Act*. Department of Environment and Conservation, Western Australia.

Appendix A

Low Impact Environmental Screening Checklist

Checklist - Low Impact Screening Checklist

The Low Impact Screening Checklist is part of the environmental assessment and approval process, refer to in Figure 2 in the Main Roads environmental guideline Environment Assessment and Approvals. It should be noted that the checklist does not address Aboriginal heritage issues. Please refer to Main Roads guideline *Aboriginal Heritage* for the heritage assessment process.

All projects are to be screened to identify those that are Low Impact.

Projects that have "No" to **all** items are classed as Low Impact and should be implemented using standard contract clauses in the Tender Document Process.

Projects that have "Yes" to **any** item will require further environmental assessment and will be implemented using an Environmental Management Plan.

Tick "Yes" or "No" for every item.

Project Name GOLDFIELDS Hwy H049 Sherwood Stn Project
775-781 SLK

ITEM NO.	ITEM	Y	N
1	New road or road reserve to be created or expansion of existing road reserve.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Works require clearing of native vegetation outside the maintenance zone.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Works require clearing of native vegetation that is older than 10 years old within the maintenance zone.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Works to occur outside normal working hours.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Passes over, adjoins or drains directly into a wetland or sensitive watercourse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Local natural drainage regime / hydrology will be changed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Dewatering, or a new water bore required.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Known potential source of hazardous materials within or adjoining project area. e.g. Acid Sulphate Soils, existing petrol station, industrial site or waste disposal site (landfill)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Buildings will require demolition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Completed By: Signature *Mark Russell* Date 13/02/08
Name Mark Russell Title A/PM

To be reviewed by a Main Roads Environment Officer Signature *Joan Johnston* Date 13/02/08
Name Joan Johnston Title E/O

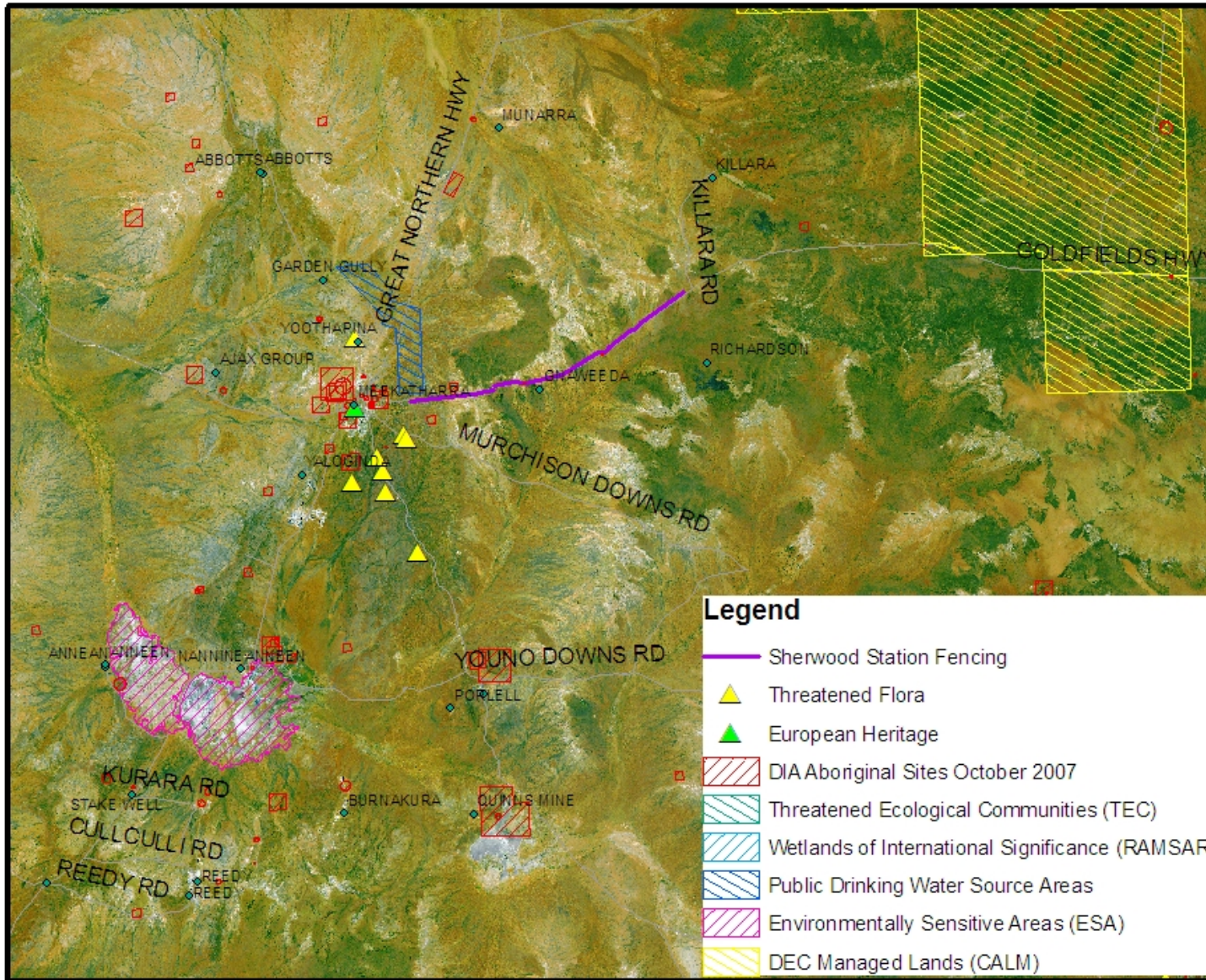
Comments: _____

Appendix B

Project Location, Aerial Photography and Site Photographs



Goldfields Highway (H049) Sherwood Station Fencing



Appendix C

Assessment of Proposed Clearing Against the 10 Principles of Clearing

MRWA Vegetation Clearing Assessment Report
Great Eastern Highway
Kurrawang Road Intersection Improvements

This guideline has been prepared to assist MRWA in addressing condition 7 "Assessment of Clearing Impacts" under Clearing Permit CPS 818/3.

For guidance on how to complete the form, refer to DEC completed reports (active permits) at http://203.20.251.100/cps_reports/.

1.0 AREA UNDER ASSESSMENT DETAILS

1.1 Proponent details

Proponent's name: MRWA Kalgoorlie Esperance Region
Contacts
 Name: Joann Johnston
 Phone: (08) 9323 4323
 Fax: (08) 9221 4007
 Email: joann.johnston@mainroads.wa.gov.au

1.2 Property details

Property: Main Roads Road Reserve
Colloquial name: Goldfields Highway (H049)

1.3 Area under assessment

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:	Site Plan Attached
0.1	N/A	Mechanical	Intersection Upgrade	

1.4 Avoidance/Minimise clearing

How have the clearing impacts been minimised?

Materials to be sourced from previously cleared commercial pits.
 Minimum number of shrubs will be cleared for construction of the passing bulge.

2.0 BACKGROUND

2.1 Existing environment and information

2.1.1 Description of the native vegetation under application

Site Visit Undertaken	Yes	Fauna / Flora Survey Undertaken	Flora Yes
			Fauna No
	Yes		Flora Yes

Site Report Attached	Yes	Fauna / Flora Survey Report Attached	Fauna No
Site Photos Attached		Other Relevant References Attached	No
Vegetation Complex	Clearing Description	Vegetation Condition	Comment

See report attached.

3.0 ASSESSMENT OF APPLICATION AGAINST 10 CLEARING PRINCIPLES

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

Comments Proposal is not at variance to this Principle

Vegetation type is common throughout the Goldfields Region (99% of pre-European extent remains).

Methodology

(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 not at variance to this Principle

Unlikely due to the amount of vegetation to be cleared

Methodology

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

Comments Proposal is not at variance to this Principle

Threatened flora is not expected to be impacted by the proposed works.

Methodology

(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 at variance to this Principle

The project is not expected to have an impact on a Threatened Ecological Community.

Methodology

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

Comments **Proposal is not at variance to this Principle EC'**
Vegetation type is common throughout the Goldfields Region (99% of pre-European extent remains).

Methodology

(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 at variance to this Principle**

The vegetation to be cleared is not associated with a natural watercourse or wetland.

Methodology

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

Comments **Proposal is not at variance to this Principle**

Not likely due to the amount of vegetation to be cleared.

Methodology

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

Comments **Proposal is not at variance to this Principle**

There are no conservation areas within the vicinity of the project.

Methodology

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

Comments **Proposal is not at variance to this Principle**

Unlikely due to the small area of vegetation to be cleared.

Methodology

(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 at variance to this Principle**

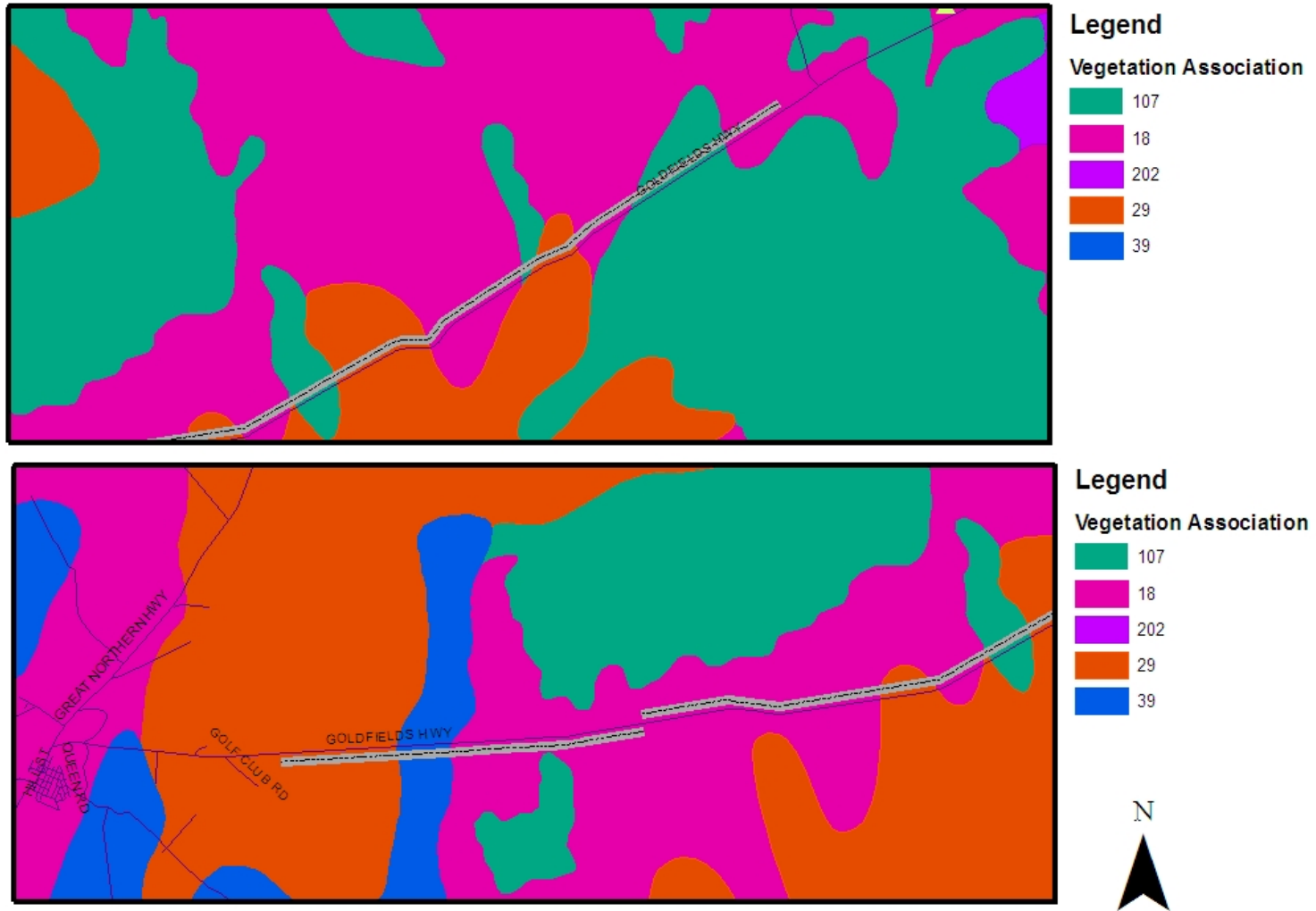
Unlikely due to the amount of vegetation to be cleared.

Methodology

Appendix D

Vegetation Associations

H049 Sherwood Station Vegetation Types



Appendix E

DEWR – Environmental Reporting Tool



Australian Government

Department of the Environment, Water, Heritage and the Arts

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Environmental Reporting Tool

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8. DATABASE REPORT

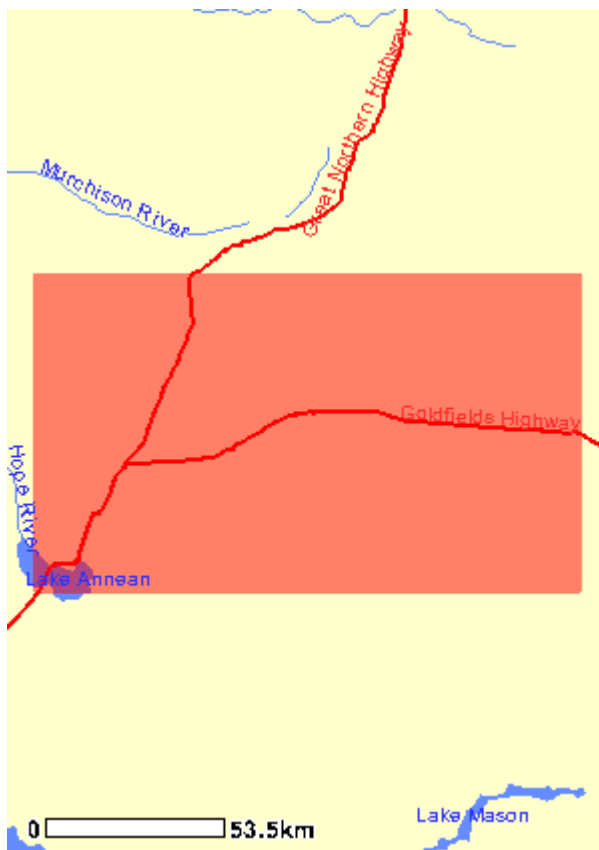
18 February 2008 17:26

This report includes places of national environmental significance that are registered in the Department of the Environment and Water Resources' databases, for the selected area. The information presented here has been provided by a range of groups across Australia, and the accuracy and resolution varies.

Search Type: Area
Buffer: 0 km
Coordinates: -26.0306,118.2267, -26.9774,118.2267, -26.9774,119.8546, -26.030,119.8546



Report Contents: [Summary](#) >> [Details](#) >> [Caveat](#) >> [Acknowledgment](#)



This map may contain data which are
 © Commonwealth of Australia (Geoscience Australia)
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Biodiversity

<u>Threatened Species:</u>	4
<u>Migratory Species:</u>	5
<u>Listed Marine Species:</u>	4
<u>Invasive Species:</u>	7
Whales and Other Cetaceans:	None
Threatened Ecological Communities:	None

Heritage

World Heritage Properties:	None
<u>Australian Heritage Sites:</u>	1

Wetlands

Ramsar sites: (Internationally important)	None
<u>Nationally Important Wetlands:</u>	1

National Pollutant Inventory

<u>Reporting Facilities:</u>	4
Airsheds:	None
Catchments:	None

Protected Areas

Reserves and Conservation Areas:	None
Regional Forest Agreements:	None

Biodiversity

Threatened Species [Dataset Information]	Status	Comments
Birds		
<i>Acanthiza iredalei iredalei</i> Slender-billed Thornbill (western)	Vulnerable	Species or species habitat likely to occur within area
Mammals		
<i>Rhinonicteris aurantius (Pilbara form)</i> Pilbara Leaf-nosed Bat	Vulnerable	Community likely to occur within area
Reptiles		
<i>Egernia kintorei</i> Great Desert Skink, Tjakura, Warrarna, Mulyamiji	Vulnerable	Species or species habitat may occur within area
Plants		
<i>Pityrodia augustensis</i> Mt Augustus Foxglove	Vulnerable	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	Status	Comments

Migratory Terrestrial Species

Birds

<u><i>Merops ornatus</i></u> Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
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Migratory Wetland Species

Birds

<u><i>Ardea alba</i></u> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
--	-----------	--

<u><i>Charadrius veredus</i></u> Oriental Plover, Oriental Dotterel	Migratory	Species or species habitat may occur within area
--	-----------	--

Migratory Marine Birds

<u><i>Apus pacificus</i></u> Fork-tailed Swift	Migratory	Species or species habitat may occur within area
---	-----------	--

<u><i>Ardea alba</i></u> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
--	-----------	--

Listed Marine Species [[Dataset Information](#)]

Status

Comments

Birds

<u><i>Apus pacificus</i></u> Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
---	------------------------------	--

<u><i>Ardea alba</i></u> Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
--	------------------------------	--

<u><i>Charadrius veredus</i></u> Oriental Plover, Oriental Dotterel	Listed - overfly marine area	Species or species habitat may occur within area
--	------------------------------	--

<u><i>Merops ornatus</i></u> Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
---	------------------------------	--

Invasive Species [[Dataset Information](#)]

Status

Comments

Selected Invasive Species: Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Mammals

<u><i>Capra hircus</i></u> Goat	Feral	Species or species habitat likely to occur within area
------------------------------------	-------	--

<u><i>Felis catus</i></u> Cat, House Cat, Domestic Cat	Feral	Species or species habitat likely to occur within area
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<u><i>Oryctolagus cuniculus</i></u> Rabbit, European Rabbit	Feral	Species or species habitat likely to occur within area
--	-------	--

<u><i>Vulpes vulpes</i></u> Red Fox, Fox	Feral	Species or species habitat likely to occur within area
---	-------	--

Plants

<u><i>Carrichtera annua</i></u> Ward's Weed	Invasive	Species or species habitat may occur within area
<u><i>Cenchrus ciliaris</i></u> Buffel-grass, Black Buffel-grass	Invasive	Species or species habitat likely to occur within area
<u><i>Prosopis spp.</i></u> Mesquite	WoNS	Species or species habitat may occur within area

Heritage

Australian Heritage Sites [[Dataset Information](#)]
Note that not all Indigenous sites may be listed.

Historic

Old Courthouse WA









Wetlands

Nationally Important Wetland Sites [[Dataset Information](#)]

Lake Annean (Lake Nannine), WA

National Pollutant Inventory

NPI Location Report

Reporting Facility [Dataset Information]	Top Substance	Source
Substance emissions are ranked on a scale of 1-100: 1=lowest; 100=highest. Rankings are shown as:  =0-25;  =26-50;  =51-75;  =76-100.		
<u>BP AUST LTD (AIR BP MEEKATHARRA, MEEKATHARRA WA)</u>	Total Volatile Organic Compounds  [Low]	Bulk petroleum storage facility
<u>ENERGY GENERATION P/L (MEEKATHARRA POWER STATION, MEEKATHARRA WA)</u>	Oxides of Nitrogen  [Low]	DIESEL POWER STATION SUPPLYING POWER TO MEEKATHARRA
<u>ST BARBARA MINES LIMITED (BLUEBIRD MINESITE, Meekatharra WA)</u>	Cyanide (inorganic) compounds  [Low]	GOLD MINING AND PROCESSING
<u>WESTERN POWER CORPORATION (Meekatharra Power Station, MEEKATHARRA WA)</u>	Cumene (1-methylethylbenzene)  [Low]	Power generation and distribution

8.1 Caveat

The information presented here has been drawn from a range of sources, compiled for a variety of purposes. Details of the coverage of each dataset are included in the metadata [Dataset Information] links above.

8.2 Acknowledgment

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- [New South Wales National Parks and Wildlife Service](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)

- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUClIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution. The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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[Department of the Environment, Water, Heritage and the Arts](#)
 GPO Box 787 Canberra ACT 2601 Australia
 Telephone: (02) 6274 1111

Appendix F

DEC – ESA Database Search

http://maps.dec.wa.gov.au - Department of Environment and Conservation - Native Vegetation - Microsoft Internet Explorer provid

Department of Environment and Conservation
Our environment, our future

Native Vegetation Map Viewer

Welcome Search Metadata Help

Welcome

Welcome to the Native Vegetation Map Viewer. This site helps you to identify the following:

- The location of environmentally sensitive areas, as declared by a Notice under section 51B of the Environmental Protection Act 1986.
- Areas where low impact mineral and petroleum activities can NOT occur, as defined under Schedule 1 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

Click on the links below for more information on:

- [Environmentally Sensitive Areas](#)
- [Low Impact Mineral and Petroleum Activities](#)
- [Native Vegetation Disclaimer](#)

Click [here](#) for a quick tutorial on using the Native Vegetation Protection map viewer.

0 50km 1:695,028

Multi-tool. Press and hold a button, dragging mouse to navigate.

Applet map started

Policy & Legislation | Clearing Permits | Public Reports
DEC Home | Contacts | Copyright | Disclaimer

start | Inbox - Microsoft Ou... | TopDrawer - All Docu... | TRIM Context | Sherwood Statioin P... | 2 Internet Explorer | 3:23 PM Monday 18/02/2008

Appendix G

DIA Aboriginal Heritage Sites Search

Sites in a search box - Aboriginal Heritage Inquiry System - Microsoft Internet Explorer provided by MRWA . . .

File Edit View Favorites Tools Help

Address <http://www.dia.wa.gov.au/AHIS/Default.aspx> Go Links >>

Show on map

Aboriginal Sites

Heritage Surveys

[refresh](#) [more](#)

Map size

Small

Medium

Large

next map

Street State

Aboriginal Heritage Sites f

[Clear Results](#)

[Printable - All results \(wi](#)

[Related Survey Reports](#)

1 2 3 4

ID	Name
875	Deafy Bore 1
876	Deafy Bore 2
6062	Meekatharra Racecourse 1
6063	Meekatharra Racecourse 2
6064	Meekatharra Racecourse 3
6065	Meekatharra Racecourse 4
6066	Meekatharra Racecourse 5
6149	Meekatharra Complex.
6181	Meekatharra Creek
6188	Mikadah/meekatha

Lat: -26°36'12" Long: 118°54'31" | East: 690044 North: 7056077 Zone=50 | 250k Map Sheet: GLENGARRY (SG50 12)

start | Inbox - Microsoft Ou... | TopDrawer - All Docu... | TRIM Context | Sherwood Statioin P... | Sites in a search box ... | 3:37 PM Monday 18/02/2008



Aboriginal Heritage Inquiry System

Register of Aboriginal Sites



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
875	P	O	N	Deafy Bore 1	Artefacts / Scatter			645140mE 7068953mN Zone 50 [Reliable]	P07289
876	P	O	N	Deafy Bore 2	Man-Made Structure, Artefacts / Scatter			645140mE 7068953mN Zone 50 [Unreliable]	P07290
6062	P	O	N	Meekatharra Racecourse 1	Artefacts / Scatter			650540mE 7058753mN Zone 50 [Reliable]	P07055
6063	P	O	N	Meekatharra Racecourse 2	Quarry, Artefacts / Scatter			651640mE 7058653mN Zone 50 [Reliable]	P07056
6064	P	O	N	Meekatharra Racecourse 3	Quarry, Artefacts / Scatter			652440mE 7059453mN Zone 50 [Unreliable]	P07057
6065	P	O	N	Meekatharra Racecourse 4	Quarry, Artefacts / Scatter			652840mE 7059953mN Zone 50 [Unreliable]	P07058
6066	P	O	N	Meekatharra Racecourse 5	Artefacts / Scatter			651540mE 7060153mN Zone 50 [Reliable]	P07059
6149	P	C	N	Meekatharra Complex.	Ceremonial, Mythological, Repository / cache, Skeletal material/Burial, Man-Made Structure, Artefacts / Scatter	Water Source, [Other: CHARCOAL]		Not available for closed sites	P06986
6181	P	O	N	Meekatharra Creek	Artefacts / Scatter			647640mE 7056653mN Zone 50 [Unreliable]	P06966



Aboriginal Heritage Inquiry System

Register of Aboriginal Sites



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
6188	P	O	N	Mikadah/meekatharra Soak.		Camp, Water Source		648060mE 7056973mN Zone 50 [Reliable]	P06921
6189	P	O	N	Bumba/camel Soak.		Camp, Water Source	*Registered Informant names available from DIA.	649150mE 7058671mN Zone 50 [Reliable]	P06922
6190	S	O	N	Meekatharra East				649983mE 7059034mN Zone 50 [Reliable]	P06923
6191	S	O	N	One Night Public Dance Pl.				650340mE 7061497mN Zone 50 [Reliable]	P06924
6192	P	C	N	Meekatharra-Wiluna Road	Ceremonial		*Registered Informant names available from DIA.	Not available for closed sites	P06925
6212	P	C	N	Wadjari Mens Ritual	Ceremonial, Mythological		*Registered Informant names available from DIA.	Not available for closed sites	P06733
6216	I	O	N	Meekatharra-Granites Complx	Ceremonial		*Registered Informant names available from DIA.	647691mE 7060386mN Zone 50 [Reliable]	P06737
6256	P	O	N	Meekatharra South	Artefacts / Scatter			645640mE 7052653mN Zone 50 [Unreliable]	P06726
6306	P	C	N	Meekatharra	Ceremonial, Man-Made Structure		*Registered Informant names available from DIA.	Not available for closed sites	P06675
7004	S	O	N	Halcyon 1	Artefacts / Scatter			651240mE 7057953mN Zone 50 [Unreliable]	P05940
7005	S	O	N	Halcyon 2	Artefacts / Scatter			651040mE 7057953mN Zone 50 [Unreliable]	P05941



Aboriginal Heritage Inquiry System

Register of Aboriginal Sites



DEPARTMENT OF INDIGENOUS AFFAIRS

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
7006	S	O	N	Halcyon 3	Artefacts / Scatter			651140mE 7057753mN Zone 50 [Unreliable]	P05942
7493	I	C	N	Meekatharra	Ceremonial			Not available for closed sites	P05413
7494	I	O	N	Meekatharra	Skeletal material/Burial		*Registered Informant names available from DIA.	648197mE 7057976mN Zone 50 [Reliable]	P05414
7546	I	C	N	Meekatharra	Ceremonial			Not available for closed sites	P05412
10042	P	C	M	Meekatharra Cave A	Painting			Not available for closed sites	P02159
10043	P	O	N	Meekatharra Cave B	Painting			658640mE 7055653mN Zone 50 [Unreliable]	P02160
11058	P	O	N	Meekatharra Grinding.	Grinding patches / grooves	Camp		661640mE 7059653mN Zone 50 [Unreliable]	P01104
15818	P	O	N	Wiluna-Meekatharra 06	Artefacts / Scatter	Rockshelter		670643mE 7059767mN Zone 50 [Reliable]	
19616	L	O	N	Meekatharra Quarry	Quarry, Artefacts / Scatter		*Registered Informant names available from DIA.	652697mE 7052569mN Zone 50 [Reliable]	
20009	P	O	N	Goldfields Highway Rockhole		Camp, Hunting Place, Water Source	*Registered Informant names available from DIA.	661476mE 7058730mN Zone 50 [Reliable]	
20010	P	O	N	Opa2 - Artefact Scatter	Artefacts / Scatter		*Registered Informant names available from DIA.	670289mE 7059642mN Zone 50 [Reliable]	



Department of Indigenous Affairs
Government of Western Australia

Aboriginal Heritage Inquiry System

Register of Aboriginal Sites



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
20013	P	O	N	Goldfields Highway Ceremonial Area	Ceremonial, Mythological		*Registered Informant names available from DIA.	680469mE 7062839mN Zone 50 [Reliable]	


Appendix H

DIA Aboriginal Heritage Surveys Search


Sites in a search box - Aboriginal Heritage Inquiry System - Microsoft Internet Explorer provided by MRWA . . .

File Edit View Favorites Tools Help

Address <http://www.dia.wa.gov.au/AHIS/Default.aspx> Go Links



Department of Indigenous Affairs
 Government of Western Australia

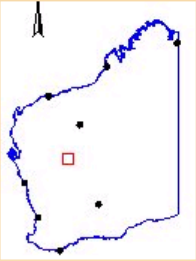
Aboriginal Heritage Inquiry System


 DEPARTMENT OF INDIGENOUS AFFAIRS

What do you want to do? [Search](#) | [Metadata](#) | [Feedback](#) | [DIA Home](#) | [Getting Started](#)

Search for Surveys in... : ...

show legend 



Show on map

Aboriginal Sites

Heritage Surveys

refresh more


Map size

Small

Medium

Large

next map



next map

Sites in a search box

Aboriginal Heritage Sites f

✕ Clear Results

Printable - All results (with...)

Related Survey Reports

1 2 3 4

ID	Name
875	Deafy Bore 1
876	Deafy Bore 2
6062	Meekatharra Racecourse 1
6063	Meekatharra Racecourse 2
6064	Meekatharra Racecourse 3
6065	Meekatharra Racecourse 4
6066	Meekatharra

Done Internet

start | Inbox - Microsoft Ou... | TopDrawer - All Docu... | TRIM Context | Sherwood Statioin P... | Sites in a search box ...

3:42 PM
Monday
18/02/2008



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
875	P	O	N	Deafy Bore 1	Artefacts / Scatter			646140mE 7068953mN Zone 50 [Reliable]	P07289
876	P	O	N	Deafy Bore 2	Man-Made Structure, Artefacts / Scatter			646140mE 7068953mN Zone 50 [Unreliable]	P07290
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6063	P	O	N	Meekatharra Racecourse 2	Quarry, Artefacts / Scatter			651840mE 7058653mN Zone 50 [Reliable]	P07056
6064	P	O	N	Meekatharra Racecourse 3	Quarry, Artefacts / Scatter			652440mE 7059453mN Zone 50 [Unreliable]	P07057
6065	P	O	N	Meekatharra Racecourse 4	Quarry, Artefacts / Scatter			652840mE 7059953mN Zone 50 [Unreliable]	P07058
6066	P	O	N	Meekatharra Racecourse 5	Artefacts / Scatter			651540mE 7060153mN Zone 50 [Reliable]	P07059
6149	P	C	N	Meekatharra Complex.	Ceremonial, Mythological, Repository / cache, Skeletal material/Burial, Man-Made Structure, Artefacts / Scatter	Water Source, [Other: CHARCOAL]		Not available for closed sites	P08986
6181	P	O	N	Meekatharra Creek	Artefacts / Scatter			647640mE 7058653mN Zone 50 [Unreliable]	P08986



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
6188	P	O	N	Mikadah/meekatharra Soak.		Camp, Water Source		648060mE 7066973mN Zone 50 [Reliable]	P08921
6189	P	O	N	Bumba/camel Soak.		Camp, Water Source	*Registered Informant names available from DIA.	649150mE 7068671mN Zone 50 [Reliable]	P08922
6190	S	O	N	Meekatharra East				649983mE 7069034mN Zone 50 [Reliable]	P08923
6191	S	O	N	One Night Public Dance Pl.				650340mE 7061497mN Zone 50 [Reliable]	P08924
6192	P	C	N	Meekatharra-Wiluna Road	Ceremonial		*Registered Informant names available from DIA.	Not available for closed sites	P08925
6212	P	C	N	Wadjari Mens Ritual	Ceremonial, Mythological		*Registered Informant names available from DIA.	Not available for closed sites	P08733
6216	I	O	N	Meekatharra-Granites Complx	Ceremonial		*Registered Informant names available from DIA.	647691mE 7060386mN Zone 50 [Reliable]	P08737
6256	P	O	N	Meekatharra South	Artefacts / Scatter			646640mE 7062653mN Zone 50 [Unreliable]	P08726
6306	P	C	N	Meekatharra	Ceremonial, Man-Made Structure		*Registered Informant names available from DIA.	Not available for closed sites	P08675
7004	S	O	N	Halcyon 1	Artefacts / Scatter			651240mE 7067953mN Zone 50 [Unreliable]	P05940
7005	S	O	N	Halcyon 2	Artefacts / Scatter			651040mE 7067953mN Zone 50 [Unreliable]	P05941



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
7006	S	O	N	Halcyon 3	Artefacts / Scatter			651140mE 7057753mN Zone 50 [Unreliable]	P05942
7493	I	C	N	Meekatharra	Ceremonial			Not available for closed sites	P05413
7494	I	O	N	Meekatharra	Skeletal material/Burial		*Registered Informant names available from DIA.	648197mE 7057976mN Zone 50 [Reliable]	P05414
7546	I	C	N	Meekatharra	Ceremonial			Not available for closed sites	P05412
10042	P	C	M	Meekatharra Cave A	Painting			Not available for closed sites	P02159
10043	P	O	N	Meekatharra Cave B	Painting			658640mE 7055653mN Zone 50 [Unreliable]	P02160
11058	P	O	N	Meekatharra Grinding.	Grinding patches / grooves	Camp		661640mE 7059653mN Zone 50 [Unreliable]	P01104
15818	P	O	N	Wiluna-Meekatharra 06	Artefacts / Scatter	Rockshelter		670643mE 7059767mN Zone 50 [Reliable]	
19616	L	O	N	Meekatharra Quarry	Quarry, Artefacts / Scatter		*Registered Informant names available from DIA.	652897mE 7052569mN Zone 50 [Reliable]	
20009	P	O	N	Goldfields Highway Rockhole		Camp, Hunting Place, Water Source	*Registered Informant names available from DIA.	661476mE 7058730mN Zone 50 [Reliable]	
20010	P	O	N	Opa2 - Artefact Scatter	Artefacts / Scatter		*Registered Informant names available from DIA.	670289mE 7059642mN Zone 50 [Reliable]	



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
20013	P	O	N	Goldfields Highway Ceremonial Area	Ceremonial, Mythological		*Registered Informant names available from DIA.	680469mE 7062839mN Zone 50 [Reliable]	