



Main Roads WA

**Derby Highway Reconstruction**

Environmental Impact Assessment and  
Management Plan

Project No: 01-02-0146

February 2006



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## Executive Summary

The environmental impact assessment conducted for the Derby Highway Upgrade indicates that no environmental constraints associated with the proposed works were recorded for the locations surveyed.

In summary, the following conclusions on environmental aspects are made:

- A field survey was undertaken in November 2005 by an experienced botanist/zoologist and environmental scientist.
- Vegetation at the sites surveyed is pindan scrubland/woodland. This vegetation type is not considered to be under-represented or under threat.
- Vegetation condition across the sites ranged from *Excellent* to *Very Good*, however, the recently burnt status of a number of sites confounded the rating.
- No Threatened Ecological Communities were recorded within the survey area.
- No Declared Rare or Priority Flora species were recorded within the survey area.
- Only one weed/introduced species was identified during the survey.
- Vegetation and flora survey was limited due to climate and season – the ideal survey period occurs following the season of greatest rainfall, which for the Kimberley is March – May. This survey is considered to have missed a large proportion of the annual species that may have occurred at each site.
- No Significant (Threatened) Fauna species were recorded during the survey.
- It is not considered that the extraction of material for the highway upgrade will significantly alter the fauna habitat of the region. It can be considered that a disturbance will occur on a local scale, which is likely to impact on individual animals, rather than a population.
- Each site is wholly surrounded by continuous vegetation, with major disturbance by fire and/or livestock grazing.
- Hydrology and drainage is not considered likely to be adversely impacted by this project.
- There are no European or Aboriginal cultural heritage sites within 1 km of the project area;
- The Boab (*Adansonia gregorii*) is present within the survey area, and along the road reserve where clearing is required for the installation of an access track during the highway upgrade. These trees are culturally significant and are not to be disturbed if possible.
- The DoE LEGACI contaminated sites database has not identified any potentially contaminated sites within proximity of the project area; and
- Noise, dust and vibration from construction works are not likely to cause an impact, however, should be managed for the safety of road users and construction personnel.



- An assessment against the Ten Clearing Principles was undertaken as part of best practice procedures to consider the requirement for referral of this project due to vegetation clearing.
- It is not considered that this project requires referral to the Environmental Protection Authority (under Part IV of the Act ) or the Commonwealth Department of Environment and Heritage.
- The requirement for a clearing permit should be considered in relation to Main Roads Purpose Permit exemptions.



## 1. Introduction

Main Roads Western Australia (MRWA) commissioned GHD to conduct an Environmental Assessment and produce an Environmental Management Plan (EAMP) for the sections of work for the Derby Highway reconstruction and rehabilitation project.

This report can be used in the environmental assessment and approvals process. It can also provide the basis for discussion, with relevant environmental agencies, about the need to refer the proposal for statutory approval.

### 1.1 Project Description

Reconstruction and rehabilitation works are required on sections of the Derby Highway between the intersection with the Great Northern Highway and Derby townsite. The location and boundaries of the study area are shown on Figure 1. It is understood that culvert and floodway works will be carried out between SLK 0.25 to SLK 19.2 along the Derby Highway. Reconstruction modifications involve:

- No changes to the existing horizontal road alignment;
- reconstruction of the floodway sections;
- overlay of the raised pavement sections;
- clearing to approximately 10 m wide (approximately 19 ha) and construction of a side track on the western side of the existing alignment at an off-set of approximately 60 m from the existing Highway;
- clearing and extraction of material from nine borrow pits of approximately one hectare each, located approximately 200 m from the road centreline on the eastern side of the alignment; and
- regrading and refurbishment of existing drainage structures.

### 1.2 Scope of the Report

A previous EAMP was prepared by GHD in April 2001, for the reconstruction of sections SLK 0.25 to SLK 33.19 on the Derby Highway. The scope of work for this project was to prepare an EAMP for the remaining sections of work from SLK 0.25 to SLK 19.2. Specifically, the scope of work involved the following tasks:

#### Desktop Assessment

- Conducting an initial assessment to determine the key environmental aspects that may impact this project;
- Assessing all environmental aspects likely to require referral of the project to the EPA;
- A review of a previous EAMP report written by GHD, for the Derby Highway reconstruction from SLK 0.25 to SLK 33.19 (GHD, 2001);



- A review of Department of Conservation and Land Management (CALM) database for declared rare flora (DRF) and threatened species;
- A review of CALM Wildlife Branch Threatened Fauna database;
- A review of local and regional significance of plant communities;
- A review of the Department of Environment (DoE) Environmentally Sensitive Areas; and
- A review of the Department of Environment and Heritage (DEH) database for areas listed under the Environment Protection and Biodiversity Conservation Act 1999;
- A review of the Western Australian Museum database for threatened and endangered fauna.

A review of European and Aboriginal heritage within the study area including information from:

- The Western Australian Heritage Commission;
- A review of the Australian Heritage places Inventory; and
- Records held on Municipal databases.
- National Native Title Tribunal (NNTT)
- Department of Aboriginal Heritage WA

A consideration of the impacts on:

- Air quality;
- Dust;
- Fauna;
- European cultural heritage;
- Aboriginal heritage;
- Surface waters/drainage;
- Groundwater;
- Wetlands and waterways;
- Noise and Vibration;
- Visual amenity;
- Reserves and conservation areas; and
- Construction issues such as traffic management.

Determining clearances required under other legislative provisions, including those required by the following acts:

- *Conservation and Land Management Act 1984;*
- *Wildlife Conservation Act 1950;*
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004;*





- *Heritage of Western Australia Act 1990*;
- *Aboriginal Heritage Act 1972*;

#### **Consultation**

The following agencies were consulted to determine relevant environmental aspects associated with this project:

- Department of Conservation and Land Management;
- Department of Environment;
- Department for Planning and Infrastructure;
- Western Australian Heritage Commission;
- Australian Heritage Places Inventory (State and Commonwealth);
- Department of Aboriginal Heritage Western Australia;
- National Native Title Tribunal (NNTT); and
- Shire of Derby

#### **Flora and Vegetation Survey**

A flora and vegetation survey included:

- A site visit by a qualified GHD Botanist/Zoologist and Environmental Scientist;
- A description and condition rating of plant communities in the study area;
- An inventory of the vascular plant species in the survey area;
- An inventory of exotic plants;
- An inventory and GIS mapping of plant species considered to be rare and endangered;
- An inventory and GIS mapping of TECs;
- Opportunistic observation of fauna.



**Figure 1    Project Location Overview**



## 2. Existing Environment

### 2.1 Survey Location

The project area is located between Derby and the Willare Roadhouse, in the Kimberley, Western Australia. Sites examined were between the Gibb River Road turnoff and Derby townsite.

A total of 10 borrow pit sites (each approximately 200 m x 200 m) and one culvert were investigated for this project (Figure 2). A survey for the presence of the culturally significant Boab (*Adansonia gregorii*) was undertaken between SLK 0.25 and 19.2.

### 2.2 Climate

The climate for Derby is described as having a winter where days and nights are warm and sunny. Summer is sultry, hot and humid with rain and thunderstorms. Spring and autumn are also hot and quite humid. The "build-up" to the monsoon season (November) is the least comfortable time of year; temperatures are generally at their highest and humidity is also high, without the benefit of cooling rainfall.

The closest Bureau of Meteorology weather station to the project area is the Derby Aerodrome and recorded climatic data for this station is summarised below:

#### Derby Aerodrome

Mean Daily Maximum Temperature Range: 30.5°C (June) to 37.9°C (November)

Mean Daily Minimum Temperature Range: 15°C (July) to 26.3°C (December)

Mean Annual Rainfall: 622.1 mm

Mean Annual Rain days per year: 46.7 days

(Source: Bureau of Meteorology, 2005)

### 2.3 Geology and Soils

A search of the Geological Survey of Western Australia GeoView database indicates that the project area is underlain by alluvial, shoreline and aeolian deposits. The Kimberley Development Commission has characterised soil in the project area as 'deep sands' (Kimberley Development Commission, 1996).

During the field survey loamy red pindan sand and finer textured, pale sandy soils were observed.



**Figure 2    Survey Area, Aboriginal Heritage Locations**



## **2.4 Hydrology**

### **2.4.1 Wetlands and Waterways**

The Department of Environment and Heritage (DEH) manages the Australian Wetlands Database, which contains information on wetlands listed under the Ramsar Convention and nationally important wetlands listed in *A Directory of Important Wetlands in Australia*. A search of this database indicated that there no Ramsar wetlands or other important wetlands in the vicinity of the project area.

### **2.4.2 Drainage**

The natural terrain of the survey area is relatively flat. Surface water drains directly off the surface of the road and into the adjoining sandy soils. Due to high rainfall during the wet season, substantial amounts of water may flow across or along the road verge.

## **2.5 Reserves and Conservation Areas**

A review of the Department of Conservation and Land Management (CALM) NatureBase database, and the Protected Matters Search Tool from the Department of Environment and Heritage, indicated no reserves or national parks in close proximity to the project area.

## **2.6 Vegetation**

### **2.6.1 Vegetation Description**

The vegetation of the project area has been broadly mapped by Beard (1979) and classified as Pindan on Sandridges or Sandplain.

Pindan is a distinctive vegetation type associated with the red sandy soils of the project area. This vegetation is characterised by scattered low Eucalypts and other small trees with a dense mid-storey of Acacia or other shrubs (Wheeler, *et al.*, 1992).

According to Kenneally *et al.*, (1996), canopy height is typically low (3 m to 8 m), although occasional bloodwoods emerge above the wattle layer.

The grass layer consists of sometimes dense grass swards with scattered low shrubs and other herbs. The major difference between the Pindan on Sandridges and Pindan on Sandplain is the density of the plants. The drier sandridges support less plants while the sandplain vegetation can be quite dense with a larger range of species. Little variation in plant species occurs in the poorly defined creek and drainage lines (Wheeler *et al.*, 1992).

### **2.6.2 Vegetation Extent**

A vegetation type is considered to be under-represented if there is less than 30 percent of its pre-clearing distribution remaining and 'endangered' if there is less than 10% remaining (EPA, 2000).



Extent of vegetation remaining and that occurring in Pre-European times has been generated for Western Australia by Shepherd *et al.* (2002). It can be seen from the comparison presented in Table 1 that the vegetation type in the study area is considered to retain 100% of the Pre-European Extent.

**Table 1** Vegetation Type, Extent and Conservation Status (after Shepherd *et al.*, 2002) for the Derby Highway Upgrade Study Area (SLK 0.25 – 19.2).

Beard Code	Vegetation Association Number	Association Description	Pre-European Extent (Ha)	Current Extent (Ha)	% Remaining	% IUCN Class I-IV Reserves	% Other Reserves
e24,53Lr a28,29Sc cp3Gi	764	Shrublands, pindan; Acacia eriopoda & A. tumida shrubland with scattered low bloodwood & Eucalyptus setosa over ribbon & curly spinifex	581,958	581,958	100.0	0.0	0.0

### 2.6.3 Threatened Ecological Communities

Ecological communities are defined as 'naturally occurring biological assemblages that occur in a particular type of habitat' (English and Blythe, 1997). Threatened Ecological Communities (TECs) are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e. Presumed Totally Destroyed, Critically Endangered, Endangered, and Vulnerable. Some TECs are protected under the Commonwealth *Environmental Protection (Biodiversity) Conservation Act*, 1999 (EPBC Act). Although TECs are not formally protected under the State *Wildlife Conservation Act 1950*, the loss of, or disturbance to some TECs trigger the EPBC Act. The Environmental Protection Authority's position on TECs states that proposals that result in the direct loss of TECs are likely to be formally assessed.

A review of the DEH database for areas listed under the *Environment Protection and Biodiversity Conservation Act 1999* found no TECs within the project area.

### 2.6.4 Vegetation Condition

The vegetation at the survey areas was given a condition rating based on the Bush Forever Vegetation Ratings Scale (Government of Western Australia, 2000).

This scale recognises a level of intactness of vegetation which is defined by the following:

- completeness of structural levels;
- extent of weed invasion;
- historical disturbance from tracks and other clearing or dumping;
- the potential for natural or assisted regeneration.



The scale therefore consists of six rating levels as below :

1. *Pristine or nearly so.* No obvious signs of disturbance.
2. *Excellent* . Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species.
3. *Very Good.* Vegetation structure altered, obvious signs of disturbance.
4. *Good.* Vegetation structure significantly altered by very obvious signs of multiple disturbance, retains basic vegetation structure or ability to regenerate it.
5. *Degraded.* Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6. *Completely degraded.* The structure of the vegetation is no longer intact and the area is completely or almost without native species.

#### Plant Pathogens

Standard environmental impact assessments undertake assessments for the potential of plant pathogens to occur within the survey area. Such surveys are generally tailored towards surveys of *Phytophthora cinnamomi*, the water mould that causes the symptoms of "Dieback." At present, dieback is considered to be limited to causing damage in the south-west of Western Australia. As this survey is occurring in the Kimberley region, dieback is not considered to be an issue for this project.

## 2.7 Flora

This survey recorded vegetation types and dominant species in each vegetation type. A list of species was generated for each vegetation type, with confirmations made at the Perth Western Australian Herbarium (WAHERB). The presence of Declared Rare or Priority Flora was noted and commented upon. The condition and weed status of the vegetation were also noted.

### 2.7.1 Declared Rare and Priority Flora

The CALM Wildlife Branch records indicate that no Priority species and no Declared Rare species have been observed as occurring within the vicinity of the project area. One Priority 2 species has been recorded approximately 15 km north of Site 10 (Table 2 and Figure 2).

**Table 2 Priority flora recorded in the Derby Area (sourced from CALM, 2005)**

Taxon	Conservation Code (CALM)	Description	Preferred Habitat	Known Locations
<i>Gomphrena cucullata</i>	P2	Spreading or erect annual, herb, to 0.25 m high. Fl. white, Feb–Apr.	Red sandy loam. River crossing	Derby, King Sound, Pt Hedland



## 2.8 Fauna

The conservation status of fauna species is assessed under State and Commonwealth Acts: in particular the *Western Australian Wildlife Conservation Act 1950* and the *Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*.

### 2.8.1 Environmental Protection and Biodiversity Conservation (EPBC) Act

The significance levels for fauna used in the *EPBC Act* are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN).

The *EPBC Act* also protects migratory species that are listed under the following International Agreements:

- ▶ Appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a Range State under the Convention;
- ▶ The Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA); and
- ▶ The Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA).

Listed migratory species also include species identified in other international agreements approved by the Commonwealth Environment Minister.

The Act also protects marine species on Commonwealth lands and waters, which are not applicable to this investigation.

#### EPBC Act Fauna Conservation Categories

##### *Listed threatened species and ecological communities*

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- ▶ extinct in the wild,
- ▶ critically endangered,
- ▶ endangered, or
- ▶ vulnerable.

An action will also require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:

- ▶ critically endangered, or
- ▶ endangered.





#### **Critically endangered and endangered species**

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered species if it does, will, or is likely to:

- ▶ lead to a long-term decrease in the size of a population, or
- ▶ reduce the area of occupancy of the species, or
- ▶ fragment an existing population into two or more populations, or
- ▶ adversely affect habitat critical to the survival of a species, or
- ▶ disrupt the breeding cycle of a population, or
- ▶ modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- ▶ result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat\*, or
- ▶ interfere with the recovery of the species.

*\*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a critically endangered or endangered species by direct competition, modification of habitat, or predation.*

#### **Vulnerable species**

An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- ▶ lead to a long-term decrease in the size of an important population of a species, or
- ▶ reduce the area of occupancy of an important population, or
- ▶ fragment an existing important population into two or more populations, or
- ▶ adversely affect habitat critical to the survival of a species, or
- ▶ disrupt the breeding cycle of an important population, or
- ▶ modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- ▶ result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat\*, or
- ▶ interferes substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

- ▶ key source populations either for breeding or dispersal,
- ▶ populations that are necessary for maintaining genetic diversity, and/or
- ▶ populations that are near the limit of the species range.



"Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a vulnerable species by direct competition, modification of habitat, or predation.

#### **Listed migratory species**

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The criteria below are relevant to migratory species that are not threatened.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- ▶ substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or
- ▶ result in invasive species that is harmful to the migratory species becoming established\* in an area of important habitat of the migratory species, or
- ▶ seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

An area of important habitat is:

habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or

habitat utilised by a migratory species which is at the limit of the species range, or

habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an ecologically significant proportion of the population varies with the species (each circumstance will need to be evaluated).

\*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a migratory species by direct competition, modification of habitat, or predation.

#### **The Commonwealth marine environment**

An action will require approval from the Environment Minister if:

- ▶ the action is taken in a Commonwealth marine area and the action has, will have, or is likely to have a significant effect on the environment, or
- ▶ the action is taken outside a Commonwealth marine area and the action has, will have, or is likely to have a significant effect on the environment in a Commonwealth marine area.

An action has, will have or is likely to have a significant impact on the environment in a Commonwealth marine area if it does, will, or is likely to:



- result in a known or potential pest species becoming established in the Commonwealth marine area\*, or
- modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area results, or
- have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (eg breeding, feeding, migration behaviour, and life expectancy) and spatial distribution, or
- result in a substantial change in air quality\*\* or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or
- result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected.

\*Translocating or introducing a pest species may result in that species becoming established.

\*\*The Commonwealth marine area includes any airspace over Commonwealth waters.

### 2.8.2 Western Australian Wildlife Conservation Act

The *WA Wildlife Conservation Act, 1950* uses a set of Schedules but also classifies species using some of the IUCN categories. These Schedules are described in Table 3.

Rare species of fauna that have been gazetted in the *Wildlife Conservation Act 1950*; *Wildlife Conservation (Specially Protected Fauna) Notice 2003*, are described by the following conservation codes (Table 3). If there is significant damage to species listed under these schedules, the project may trigger the provisions of the Federal *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*.

**Table 3 Conservation Codes for Gazetted Fauna**

Conservation Code	Description
Schedule 1	"...fauna that is rare or likely to become extinct, are declared to be fauna that is in need of special protection."
Schedule 2	"...fauna that is presumed to be extinct, are declared to be fauna that is in need of special protection."
Schedule 3	"...birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is in need of special protection."
Schedule 4	"...fauna that is in need of special protection, otherwise than for the reasons mentioned [in Schedule 1 – 3]"

In Western Australia, the Department of Conservation and Land Management (CALM) also produces a supplementary list of Priority Fauna, being species that are not



considered Threatened under the Western Australian Wildlife Conservation Act but for which the Department feels there is a cause for concern. These species have no special legislative protection, but their presence would normally be considered. Such taxa need further survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna. Levels of Priority are described in Table 4.

**Table 4 Conservation Codes for Priority Fauna**

Conservation Code	Description
Priority 1	Taxa with few, poorly known populations on threatened lands.
Priority 2	Taxa with few, poorly known populations on conservation lands. Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown Land, water reserves, etc.
Priority 3	Taxa, which are known from few specimens or sight records, some of which are on lands not under immediate threat of habitat destruction or degradation.
Priority 4	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.
Priority 5	Taxa in need of Monitoring. Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

### 2.8.3 Significant Species Records

The Department of the Environment and Heritage (DEH) maintains a database of matters of national environmental significance that are protected under the *Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)*. An *EPBC Act Protected Matters Report* was generated, for the matters of significance that may occur in, or may relate to, the study area.

A search of CALM's Threatened fauna database for any rare and priority species that may occur in the study area was undertaken.

From the CALM and DEH databases and the records of the WA Museum a number of protected fauna species were identified as potentially occurring within the study site Table 5.



**Table 5 Potentially Occurring Significant, Rare and Priority Fauna Species – Derby Highway Upgrade**

Family	Genus	Species	Common Name	Wildlife Conservation (Specially Protected Fauna) Notice 2005 / CALM Rating	EPBC Act Rating	CALM Database	EPBC Protected Matters Search	WA Museum Records
Rostratulidae	<i>Rostratula</i>	<i>benghalensis s. lat</i>	Painted Snipe	Schedule 1	Vulnerable	X	X	X
Accipitridae	<i>Haliaeetus</i>	<i>leucogaster</i>	White-Bellied Sea Eagle	Schedule 3	Migratory, Marine		X	X
Petroicidae	<i>Poecilodryas</i>	<i>supercilliosa cerviniventris</i>	Derby White-browed Robin		Migratory		X	X
Crocodylidae	<i>Crocodylus</i>	<i>johnstoni</i>	Freshwater Crocodile	Schedule 4	Marine		X	X
Crocodylidae	<i>Crocodylus</i>	<i>porosus</i>	Estuarine Crocodile, Salt Water Crocodile	Schedule 4	Marine		X	X
Anatidae	<i>Anseranas</i>	<i>semipalmate</i>	Magpie Goose, Pied Goose		Marine		X	X
Hirundinidae	<i>Apus</i>	<i>pacificus</i>	Fork-tailed Swift		Marine		X	X
Ardeidae	<i>Ardea</i>	<i>alba</i>	Great Egret, White Egret		Marine		X	X
Ardeidae	<i>Ardea</i>	<i>ibis</i>	Cattle Egret		Marine		X	X
Charadriidae	<i>Charadrius</i>	<i>veredus</i>	Oriental Plover, Oriental Dotterel	Schedule 3	Migratory, Marine			X
Glareolidae	<i>Glareola</i>	<i>maldivarum</i>	Oriental Pratincole	Schedule 3	Migratory, Marine			X
Hirundinidae	<i>Hirundo</i>	<i>rustica</i>	Barn Swallow	Schedule 3	Migratory, Marine			X
Scolopacidae	<i>Numenius</i>	<i>minutus</i>	Little Curlew, Little Whimbrel	Schedule 3	Migratory, Marine			X



## 2.9 Acid Sulphate Soils

According to the DoE, acid sulphate soils (ASS) are naturally occurring soils and sediments containing sulphide minerals, predominantly pyrite. In an undisturbed state below the watertable, these soils are benign and not acidic. Acid sulphate soils in Western Australia commonly occur in low lying wetlands, back-swamps, estuaries, salt marshes and tidal flats, though are not constrained to coastal regions.

The potential for ASS to occur is considered more significant for the Perth and South West region and has not been mapped by the DoE for the Derby area. In addition, the project area does not occur in low lying wetlands, salt marshes or tidal flats. It is therefore considered that ASS would not pose an environmental constraint.

## 2.10 Contaminated Sites

A search of the DoE LEGACI contaminated sites database, on an approximate three kilometre radius of the project area, indicated no known potentially contaminated sites within the area.

## 2.11 European Cultural Heritage

A search of the Heritage Council of Western Australia database of European heritage sites indicated that there were no such sites within the immediate vicinity of the project area.

## 2.12 Aboriginal Heritage

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Sites Register indicated that two Aboriginal heritage sites have been recorded within 1.5 km of the project area. Details of the sites are presented in Appendix A and shown in Figure 2.

It is likely that neither of these sites will be impacted by the works, however, it is possible that there may be evidence of unrecorded sites in the area of the proposed works.

In addition, it should be noted that a search under the DIA database does not comprise of a full assessment under the *Aboriginal Heritage Act WA* (1972). This would require consultation with Aboriginal people with knowledge of the area (usually, but not necessarily Native Title Claimants), and an archaeological survey.

Under the *Aboriginal Heritage Act WA* (1972), it is an offence to disturb an Aboriginal heritage site whether it is registered or not. The proponent should be made aware of this in any decision making with respect to whether they should proceed to a full Aboriginal site assessment.



### **2.13 Native Title**

It is understood that the proposed works will be constructed in existing road reserves. The National Native Title Tribunal states: "*Native Title is extinguished on privately owned land (including family homes or freehold farms), on residential, commercial and certain other exclusive possession leases and in areas where government has built roads or other public works*" (National Native Title Tribunal, 2000 p4).

### **2.14 Surrounding Land Use**

To the east, the project area is flanked by pastoral land and there are also a number of quarries located within approximately 1 km and 7 kms of the project area. Curtin RAAF Airbase is located directly east of the project area; however, no direct potential impact on the operation of the base is deemed likely.

### **2.15 Noise and Vibration**

There are no nearby residents in close proximity of the proposed works who will be impacted by noise or vibration generated during construction and rehabilitation.

Noise and vibration from traffic occurs at present, however, the volume of traffic is low and is not likely to change as a result of the proposed works.

### **2.16 Ambient Air Quality**

As traffic volumes are not expected to increase as a result of the proposed works, air quality is also not likely to change.

The sandy soils of the project area may create a potential for the generation of dust during construction and rehabilitation, especially at the proposed burrow pits sites. However, the surrounding project area is not populated and it is therefore considered that dust generated will not cause a significant environmental constraint.

### **2.17 Review of Shire Information**

The Shire of Derby West Kimberley was contacted to ascertain whether they hold information or reports with respect to heritage and environmental issues. The environmental health officer for the shire advised that no such information is available for the project area, and that they are unaware of any European heritage or environmental constraints for this area.



### 3. Results of Field Survey

#### 3.1 Methodology

A qualified Botanist/Zoologist and an Environmental Scientist conducted the field survey on the 3rd and 4th of November, 2005. Each site was examined on foot. Vegetation, flora (including weeds) and fauna surveys were undertaken at each site. A visual examination of hydrology was also included.

The botanical survey was conducted in accordance with EPA Guidance Statement No. 51. The vegetation and flora survey was conducted over the zone of direct impact of potential works. Vegetation and flora within these areas was considered as a representation of regional vegetation.

This survey recorded vegetation types and dominant species in each vegetation type. A list of species was generated for each vegetation type, with confirmations made at the Western Australian State Herbarium. The presence of Declared Rare or Priority Flora was assessed. The condition and weed status of the vegetation were also assessed.

A reconnaissance (opportunistic) fauna survey was conducted in conjunction with the vegetation and flora survey, in accordance with EPA Guidance Statement No. 56.

#### 3.2 Hydrology and Drainage

There are a number of minor creeklines and floodway crossings along the Derby Highway. All waterways are ephemeral, undefined, and no permanent pools were observed close to the road reserve during the field survey. Floodway sections carry wide expanses of shallow water after heavy rainfall and have no defined banks or channels.

The natural terrain of the survey area is relatively flat. Surface water drains directly off the surface of the road and into the adjoining sandy soils. Due to high rainfall during the wet season, substantial amounts of water may flow across or along the road verge; however, there was no evidence of long-term inundation or scouring in areas close to the Highway.

#### 3.3 Vegetation

A description of each site is given in Appendix B. These include an examination of vegetation community present, vegetation condition rating, dominant families and genera, flora lists and details of any Declared Rare and Priority Flora or weed species present.

A total of 10 borrow pit sites were examined, each approximately 200 m x 200 m. One culvert was examined due to the volume of fill required to construct the side access track during the highway upgrade.





### 3.3.1 Vegetation Condition

The condition of the vegetation varies between *Excellent* and *Very Good*. A number of sites had been recently burnt, reducing the ability to rate sites. The greatest influence on vegetation condition is grazing by livestock.

### 3.3.2 Threatened Ecological Communities

No Threatened Ecological Communities were recorded within the survey area.

## 3.4 Flora

A total of 72 species from 32 families were recorded from the survey area. Dominant families included:

Poaceae (grasses): 8 taxa

Mimosaceae (wattles): 7 taxa

Myrtaceae (bloodwoods, eucalypts): 6 taxa

Papilionaceae (peas): 5 taxa

Dominant genera recorded from the survey area included:

*Acacia* 7 species

*Eriachne* 3 species

*Tephrosia* 3 species

### 3.4.1 Declared Rare and Priority Flora

No DRF or Priority species were recorded, although *Adansonia gregorii* (Boab) is a culturally significant species and individual plants should not be disturbed. A survey of Boab plants was undertaken at each site and along the road reserve. Table 19 (Appendix B) lists the location and number of Boab trees within the road reserve which are likely to be disturbed.

### 3.4.2 Weeds and Introduced Species

Only one introduced species was recorded from the survey area. Spiked Malvastrum (*Malvastrum americanum*) was recorded from a number of survey sites. It is likely that introduced grasses were present at each site. However, due to the survey period being undertaken in November 2005, all grasses were either senescent, or in the process of dying.

No Declared Plants were recorded from the survey area.

## 3.5 Fauna

A total of 6 bird species, 1 mammal species, and one reptile species were recorded during the survey. Fauna species recorded are tabled in Appendix C.



#### **3.5.1 Significant Species**

No species were recorded that are recognised as at risk under the Western Australian *Wildlife Conservation Act 1950* or the Commonwealth's EPBC Act.

#### **3.5.2 Fauna Habitat**

It is not considered that the extraction of material for the highway upgrade will significantly alter the fauna habitat of the region. It can be considered that a disturbance will occur on a local scale, which is likely to impact on individual animals, rather than a species.

Each site is wholly surrounded by continuous vegetation, with major disturbance by fire and/or livestock grazing. None of the areas surveyed contain vegetation or habitat zones that are not present within the surrounding areas.



## 4. Management of Environmental Impacts

A range of environmental impacts are possible during construction works at the project area. The potential impacts and general management are detailed below.

### 4.1 Loss of Vegetation

Construction works are not considered likely to impact on Declared Rare or Priority species and no vegetation in the project area is of particular significance.

#### 4.1.1 Management of Vegetation Impacts

The following management commitments will be adhered to:

- clearing will be kept to the minimum necessary for the soil extraction and access tracks;
- disturbance to Boab trees will be avoided wherever possible;
- access tracks, vehicle parking and temporary materials storage will be located on existing cleared areas or on grassy sites which incur minimum loss of trees and shrubs; and
- once the pits are exhausted, the disturbed areas will be rehabilitated with appropriate vegetation species as soon as possible.

#### 4.1.2 Treatment of Cleared Vegetation and Topsoil

Any vegetation or soil removed as part of the works will be treated so as not to damage remaining vegetation or alter surface drainage. The following management actions will apply:

- cleared vegetation will be retained on-site for use in site rehabilitation and erosion control;
- cleared vegetation will not be burnt on-site;
- stripped topsoil will be retained adjacent to the pits for use in site rehabilitation;
- materials and topsoil stockpiles will be located so as not to restrict or interfere with existing road surface drainage; and
- any spoil produced will be used to fill hollows or spread evenly over cleared or thinly vegetated areas to ensure that sheet flow drainage is not adversely impacted by windrows or stockpiles.

### 4.2 Risks to Fauna

There are unlikely to be any detrimental impacts to fauna species present in the project area. Individual animals of terrestrial native species are likely to move from the areas disturbed by construction activities, but should return once the works are complete and the land rehabilitated.



It is unlikely that the Threatened bird species, *Rostratula benghalensis australis* (Australian Painted Snipe) will be impacted by this project. The preferred habitat of this wader bird is inland wetlands with none identified in the survey area. The 'Birds Australia' website states that "most records of Australian Painted Snipe are from temporary or infrequently filled freshwater wetlands and although they have occurred at many sites, no site can be identified in which they are resident or regular in occurrence" (Birds Australia, 2004). A number of waterways in the surrounding project area are considered to be ephemeral. Any works undertaken should occur when waterways are dry.

During the works the following management options should apply:

- no pets, traps or firearms will be allowed on the project site
- any animals disturbed by the works should be allowed to leave the site before further work occurs.

#### **4.3 Visual Amenity**

There will be no visual impact from the Derby Highway of the proposed borrow pits. During the field investigation, it was determined that surrounding bushland aids in obscuring the view of all burrow pits from passing motorists.

Machinery storage areas and stockpiling of soils during works will be a temporary source of visual impact.

To minimise the longer term visual impact the following should occur:

- rehabilitation will be carried out as soon as possible following completion of works in each area.

#### **4.4 Construction Issues**

A range of construction impacts are predicted or possible. These include:

- noise and vibration;
- dust production;
- pollution through the use of fuels, chemicals or from general construction litter;
- traffic management requirements.

The management of these impacts will include the following general actions.

##### **4.4.1 Noise and Vibration**

Construction noise will occur due to works required for clearing of vegetation for the burrow pits and vehicle movement along Derby Highway and the access tracks. As there are no residents in close proximity, noise and vibration should not pose a social or environmental constraint.

Throughout construction activities the contractor should observe all relevant obligations under the *Environmental Protection (Noise) Regulations (1997)* and Section 6 of



AS2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.

For construction between 7.00 am and 7.00 pm Monday to Saturday (excluding public holidays) the contractor will minimise the effects of noise on the occupants of adjacent properties by:

- ▶ locating stationary plant and plant compounds as far as possible from noise sensitive receivers;
- ▶ ensuring noise-generating plant and equipment used is the quietest practicable for the work;
- ▶ regularly assessing noise emission levels of all critical plant and equipment to ensure compliance with noise limits appropriate to those items, as defined in AS2436:1981;
- ▶ undertaking noise-generating activities during times where the impact will be minimised wherever possible.

#### **4.4.2 Dust Reduction and Mitigation**

Dust may be generated from the clearing of vegetation, spillage of soil material and vehicle movements along sealed and unsealed roads. The following methods of dust management will be used:

- ▶ weather conditions will be considered with regard to vegetation and soil stripping and earthworks;
- ▶ water tankers will be available at all times to wet down exposed surfaces on works areas, laydown sites, spoil dumps and topsoil and materials heaps;
- ▶ dust lift will be monitored through visual and other means and all complaints responded to rapidly;
- ▶ dust from movement of vehicles will be managed at all times. This will include road sweeping, covering of loads and education of personnel.

#### **4.4.3 Pollution and Litter**

There is a minor risk that the construction works will create temporary pollution as a result of fuel or chemical spills or mismanagement of construction materials. This will be managed through the following general actions:

- ▶ no fuels or chemicals will be stored on site;
- ▶ if vehicle or machinery servicing is to occur on site it will occur in designated servicing areas which are supplied with adequate spill trays and spill response equipment; and
- ▶ all litter and construction waste will be contained in lidded bins and removed regularly to an approved landfill.



#### **4.4.4 Access and Traffic Management**

The construction of the borrow pits occurs in areas accessible by unsealed tracks. Increased traffic volumes arising from the movement of construction and transport vehicles may result in some localised short-term adverse impacts on local and regional traffic movements. The following potential impacts have been identified:

- risk of injury to road users due to construction vehicles entering and leaving the site; and
- potential damage to roads and spillage of carted materials, particularly sand.

Management strategies to be employed will include:

- the use of appropriate personal safety and traffic management signs;
- advance notification of construction activities, particularly to local Derby residents; and
- any significant amounts of material spilled from construction vehicles will be cleaned up on occurrence.

#### **4.5 Alterations to Drainage**

Drainage impacts during construction works are issues in respect to maintaining existing surface water flows. As the drainage on the surveyed areas is intermittent and poorly defined the risks of significant impacts to surface water flows are low. However, the following impacts are likely to occur:

- Works on the floodway zone have the potential to provide extra material for downstream deposition and there are minor risks of erosion in the pit areas.
- Pit excavation has the potential to create temporary pools following rainfall.

##### **4.5.1 Drainage Management**

In order to mitigate any drainage impacts that may occur, the following management measures will be initiated:

- existing natural drainage paths and drainage channels along road reserves will not be unnecessarily blocked or restricted by material stockpiles;
- any material that is found to block drainage will be immediately removed.

Rehabilitation works carried out on road edges have the potential to temporarily impact on local drainage flows through scouring and subsequent silt deposition.

The following management will be applied:

- vegetation and soil disturbance will be minimised around works;
- disturbed areas will be compacted and stabilised as soon as possible.



#### **4.6 Rehabilitation**

Rehabilitation of the project area is important to ensure that any visual and environmental impacts of the works are short term. The following rehabilitation procedures will be carried out during and after construction works:

- ▶ Pits will be shaped and contoured to ensure that the likelihood of water ponding is reduced;
- ▶ any compacted ground will be ripped or scarified where revegetation is required;
- ▶ Cleared topsoil and vegetation will be respread over the pit areas;
- ▶ all rubbish, materials heaps or other debris will be removed; and
- ▶ access tracks will be deep ripped and blocked off where possible.

#### **4.7 Environmental Incident Management**

The process that will be followed in the event of an environmental incident occurring will include:

- ▶ reporting of the incident in an incident log;
- ▶ time limits for incident reporting and response;
- ▶ assessment of the significance of each incident;
- ▶ discontinuation of the work which gave rise to the incident;
- ▶ reporting incidents to regulatory authorities and stakeholders;
- ▶ satisfactory and timely remediation/mitigation of impacts.



## 5. Approvals Required

### 5.1 Commonwealth Government

#### 5.1.1 Environmental Protection (Biodiversity) Conservation Act (1999)

No Threatened Ecological Communities or flora listed under the Commonwealth's *Environmental Protection (Biodiversity) Conservation Act* (1999) have been identified within the project area.

Some bird species listed under the Act could potentially occur in the survey areas. However, this would only trigger referral if the impacts on the species were considered to be significant. As the sites being impacted are relatively small (4 ha each), and the sites are scattered through regionally well represented native vegetation community types, it is considered that the impacts would not be significant. The guidelines on significance, which relate to the *EPBC Act*, mention that significance means loss of a large area of breeding or feeding grounds or a direct loss of a considerable percentage of the population of the species.

No other issues which would trigger referral under the *EPBC Act* are present in or adjoining the project area.

### 5.2 Western Australian Government

#### 5.2.1 Wildlife Conservation Act 1950

No Declared Rare or Priority Flora species were recorded from the survey.

No Threatened Ecological Communities were recorded from the survey.

No Protected Fauna species were recorded from the survey.

No formal approvals are required under the *Wildlife Conservation Act*, 1950.

#### 5.2.2 Environmental Protection Act 1986

##### Assessment Against Ten Clearing Principles

Any clearing of native vegetation will require a permit under Part V of the *Environmental Protection Act* 1986, except where an exemption applies under Schedule 6 of the Act or is prescribed by regulation in the *Environmental Protection (Clearing of Native Vegetation) Regulations* 2004, and not in an Environmentally Sensitive Area (ESA). The proposed works do not encompass or intersect an Environmentally Sensitive Area (ESA), and as such, exemptions under the Regulations will apply.

As part of best practice, Main Roads has requested that all EIAs undertaken that require native vegetation clearing be assessed against the Ten Clearing Principles.





Clearing applications are assessed against the ten principles outlined in Schedule 5 of the *Environmental Protection Amendment Act 2003*. These principles aim to ensure that all potential impacts resulting from removal of native vegetation can be assessed in an integrated way.

An examination of the Ten Clearing Principles applied against the findings of the EIA is completed in Table 6.

**Table 6 Assessment of Project against Ten Clearing Principles**

Principle Number	Principle	Assessment
(a)	Native vegetation should not be cleared if it comprises a high level of biological diversity	The remnant native vegetation is not considered to contain a high level of biological diversity, with sites containing monotypic Pindan scrubland and woodland. Many of the sites were recently burnt, limiting the capability of environmental assessment.
(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	<p>The current extent of the native vegetation at each site is considered to remain identical in extent to that existing in the pre-European condition.</p> <p>The vegetation type (pindan) forms a similar habitat across a large areal extent of the north of Western Australia and is the project area is not considered significant habitat.</p>
(c)	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora	<p>No Declared Rare Flora species were recorded during this survey. No DRF has been previously recorded in the project area (CALM 2005).</p> <p>No Priority Flora was recorded during this survey. Priority Flora has not been recorded previously within the project area (CALM 2005).</p>
(d)	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a TEC	The native vegetation within the survey area does not comprise of the whole or part of, nor is necessary for the maintenance of a TEC.
(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 native vegetation recorded from the survey area is not considered to be under-represented, with 100% of the vegetation type remaining.
(f)	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland	The remnant native vegetation is not growing in association with a watercourse or wetland. There is the occasional undefined ephemeral floodway within the survey area, one of which has been lined to provide a water source from a culvert. No vegetation in the study area is considered to be wetland dependent or growing in association with the waterway.
(g)	Native vegetation should not be	The clearing of remnant native vegetation for



Principle Number	Principle	Assessment
	cleared if the clearing of the vegetation is likely to cause appreciable land degradation	the purposes of this project will not cause appreciable land degradation, with topography relatively flat, and clearing envelopes limited to 4 hectares in extent.
(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 remnant native vegetation is not associated with any adjacent or nearby conservation areas.
(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	The potential clearing of remnant native vegetation is not likely to cause a deterioration in the quality of surface or underground waters.
(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 remnant vegetation for this project is not considered to be likely to cause, exacerbate, the incidence or intensity of flooding events.

### 5.2.3 Requirement for Referral

It is considered that this project is not likely to need referral to the Environmental Protection Authority. However, the requirement for a clearing permit should be considered in relation to Main Roads Purpose Permit exemptions.

There are no issues that would trigger the provisions of the Commonwealth's EPBC Act, and therefore referral to the Department of the Environment and Heritage is not required.



## 6. Conclusion

The environmental impact assessment conducted for the Derby Highway Upgrade indicates that no environmental constraints associated with the proposed works were recorded for the locations surveyed.

In summary, the following conclusions on environmental aspects are made:

- ▶ Field Survey was undertaken in November 2005 by an experienced botanist/zoologist and environmental scientist.
- ▶ Vegetation at the sites surveyed is pindan scrubland/woodland. This vegetation type is not considered to be under-represented or under threat.
- ▶ Vegetation condition across the sites ranged from *Excellent* to *Very Good*, however, the recently burnt status of a number of sites confounded the rating.
- ▶ No Threatened Ecological Communities were recorded in the survey area.
- ▶ No Declared Rare or Priority Flora species were recorded in the survey area.
- ▶ Only one weed/introduced species was identified during the survey.
- ▶ Vegetation and flora survey was limited due to climate and season – the ideal survey period occurs during the season following the season of greatest rainfall, which for the Kimberley is March – May. This survey is considered to have missed a large proportion of the annual species that may have occurred at each site.
- ▶ No Significant (Threatened) Fauna species were recorded during the survey.
- ▶ It is not considered that the extraction of material for the highway upgrade will significantly alter the fauna habitat of the region. It can be considered that a disturbance will occur on a local scale, which is likely to impact on individual animals, rather than a species.
- ▶ Each site is wholly surrounded by continuous vegetation, with major disturbance by fire and/or livestock grazing.
- ▶ Hydrology and drainage is not considered to be adversely impacted by this project.
- ▶ There are no European or Aboriginal cultural heritage sites within 1 km of the project area;
- ▶ The Boab (*Adansonia gregorii*) is present on a number of sites, and along the road reserve where clearing is required for the installation of an access track during the highway upgrade. These trees are culturally significant and are not to be disturbed.
- ▶ The DoE LEGACI contaminated sites database has not identified any potentially contaminated sites within proximity of the project area; and
- ▶ Noise, dust and vibration from construction works are not likely to cause an impact, however, should be managed for the safety of road users and construction personnel.



- An assessment against the Ten Clearing Principles was undertaken as part of best practice procedures to consider the requirement for referral of this project based on vegetation clearing.

It is not considered that this project and its associated works require referral to the Environmental Protection Authority or the Commonwealth Department of Environment and Heritage.

The requirement for a clearing permit should be considered in relation to Main Roads Purpose Permit exemptions.



## 7. Limitations

It is considered best practice that vegetation and flora surveys be undertaken in the season following greatest rainfall, maximising the likelihood of sampling species at peak flowering. This allows for greatest ease of species identification and the greatest likelihood for collecting a representative sample from sites surveyed. The field survey for this project was undertaken during November, 2005, with annual plant species absent from the flora list and grass species senescent. As a result the flora list is indicative of the perennial plant species present within the survey area.

This report presents the results of a desktop Environmental Site Assessment prepared for the purpose of this commission. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent engineer / scientist before being used for any other purpose. GHD Pty Ltd accepts no responsibility for other use of the data.

Where reports, searches, any third party information and similar work have been performed and recorded by others the data is included and used in the form provided by others. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

An understanding of the site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experience based. Hence this report should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances that arise from the issue of the report that has been modified in any way as outlined above.

For these investigations GHD has conducted desktop data searches and field surveys. The conclusions of this report were based on the information gathered during these investigations and thus reflect the environment of the site at the time of survey. GHD accepts no responsibility for any variation in the flora and fauna present at the site due to natural and seasonal variability.



## 8. References

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Appendix A

## Aboriginal Heritage

Results of Aboriginal Heritage Search, Derby









## Appendix B

# Survey Site Descriptions

Vegetation Description

Vegetation Condition Rating

Flora List

Declared Rare Flora and Priority Assessment

Weed Assessment



JOB DESCRIPTION: **Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2**  
JOB NUMBER: 61/16912  
SITE: **SITE 1**  
LOCATION: SLK 0.6, RHS 200m  
DATE OF SURVEY: 3 November 2005  
SURVEYED BY: J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia ancistrocarpa*, *Acacia eriopoda*, with scattered *Hakea macrocarpa*, *Atalaya hemiglauc*, *Carissa spinarum* over senescent grasses. Five Boabs (*Adansonia gregorii*) present on site (NE Corner).

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent* . Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.



Number of Species Recorded:	28
Dominant Families:	Mimosaceae (5 taxa) Poaceae (4 taxa) Malvaceae (3 taxa)
Dominant Genera:	<i>Acacia</i> (5 species) <i>Triodia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species, although <i>Adansonia gregorii</i> (Boab) is a culturally significant species and individual plants should not be disturbed.
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

**Table 7 Flora List Site 1**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Gomphrena</i>	<i>tenella</i>		
Apocynaceae	<i>Carissa</i>	<i>spinarum</i>		
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Bombacaceae	<i>Adansonia</i>	<i>gregorii</i>	Boab, Baobab	
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Lamiaceae	<i>Hyptis</i>	<i>suaveolens</i>	Hyptis, Mint Weed	
Malvaceae	<i>Hibiscus</i>	<i>leptocladus</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>ancistrocarpa</i>	Fitzroy Wattle	
Mimosaceae	<i>Acacia</i>	<i>eriopoda</i>	Broome Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>farnesiana</i>	Mimosa Bush	
Mimosaceae	<i>Acacia</i>	<i>monticola</i>	Gawar	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Oleaceae	<i>Jasminum</i>	<i>didymum</i> subsp. <i>lineare</i>		
Papilionaceae	<i>Crotalaria</i>	<i>novae-hollandiae</i>		
Papilionaceae	<i>Tephrosia</i>	<i>?coriacea</i>		
Poaceae	<i>Aristida</i>	<i>holathera</i>	Erect Kerosene Grass	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderrie Grass	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	<i>sp. (not flowering)</i>		
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Proteaceae	<i>Hakea</i>	<i>macrocarpa</i>		
Sapindaceae	<i>Atalaya</i>	<i>hemiglauca</i>	Whitewood	
Scrophulariaceae	<i>Striga</i>	<i>squamigera</i>		
Ulmaceae	<i>Trema</i>	<i>tomentosa</i>	Peachleaf Poison Bush	



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 2</b>
LOCATION:	SLK 2.7, RHS 200m
DATE OF SURVEY:	3 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Brachychiton diversifolius*, *Bauhinia cunninghamii*, *Gyrocarpus americanus* with scattered *Grevillea striata*, *Hakea macrocarpa*, *Ehretia saligna*, and emergent *Corymbia cadophora*, *Corymbia opaca* over *Trichodesma zeylanicum*, *Sida rohlenae*, *Carissa spinarum* over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent*. Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.



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Number of Species Recorded:	26
Dominant Families:	Poaceae (4 taxa) Boraginaceae (2 taxa) Malvaceae (2 taxa) Myrtaceae (2 taxa) Proteaceae (2 taxa)
Dominant Genera:	<i>Triodia</i> (2 species) <i>Corymbia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 8 Flora List Site 2**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Ptilotus</i>	<i>fusiformis</i>		
Apocynaceae	<i>Carissa</i>	<i>spinorum</i>		
Asteraceae	<i>Pluchea</i>	<i>ferdinandi-muelleri</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Boraginaceae	<i>Trichodesma</i>	<i>zeylanicum</i>	Camel Bush	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Capparaceae	<i>Capparis</i>	<i>umbonata</i>	Wild Orange	
Euphorbiaceae	<i>Flueggea</i>	<i>virosa</i>	Bullwood	
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Moraceae	<i>Ficus</i>	? <i>coronulata</i> (juvenile)	River Fig	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Papilionaceae	<i>Crotalaria</i>	<i>novae-hollandiae</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderrie Grass	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Proteaceae	<i>Hakea</i>	<i>macrocarpa</i>		
Rubiaceae	<i>Spermacoce</i>	<i>auriculata</i>		
Santalaceae	<i>Santalum</i>	<i>lanceolatum</i>	Northern Sandalwood	
Solanaceae	<i>Solanum</i>	<i>beaugleholei</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	





JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 3</b>
LOCATION:	SLK 4.4, RHS 200m
DATE OF SURVEY:	3 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Bauhinia cunninghamii*, *Gyrocarpus americanus* with scattered *Grevillea pyramidalis*, and emergent *Corymbia cadophora*, *Corymbia opaca* over *Pterocaulon serrulatum*, *Corchorus aestuans* over senescent grasses. Vegetation recently burnt.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

3. *Very Good*. Vegetation structure altered, obvious signs of disturbance. Disturbance has occurred from grazing pressures from cattle. While weed species are absent, the more palatable species have been browsed. Vegetation has been recently burnt, reducing the ability to determine condition.



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Number of Species Recorded:	15
Dominant Families:	Poaceae (3 taxa) Myrtaceae (2 taxa)
Dominant Genera:	<i>Triodia</i> (2 species) <i>Corymbia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	nil
Presence of Declared Plants:	nil

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**Table 9     Flora List Site 3**

Family	Genus	Species	Common Name	Status
Apocynaceae	<i>Carissa</i>	<i>spinarum</i>		
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Lamiaceae	<i>Hyptis</i>	<i>suaveolens</i>	Hyptis, Mint Weed	
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Poaceae	<i>Eriachne</i>	<i>pulchella</i> subsp. <i>dominii</i>	Pretty Wanderrie	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>pyramidalis</i>	Caustic Bush	
Tiliaceae	<i>Corchorus</i>	<i>aestuans</i>		



JOB DESCRIPTION: **Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2**  
JOB NUMBER: 61/16912  
SITE: **SITE 4**  
LOCATION: SLK 6.42, RHS 200m  
DATE OF SURVEY: 3 November 2005  
SURVEYED BY: J Foster, G. Busby

Pindan Scrub: *Acacia tumida*, *Bauhinia cunninghamii*, *Gyrocarpus americanus* with scattered *Grevillea striata*, *Grevillea pyramidalis*, *Ehretia saligna*, and emergent *Corymbia cadophora*, *Corymbia opaca* over *Trichodesma zeylanicum*, *Sida rohlenae*, *Solanum beaueholei*, *Distichostemon hispidulus* var. *aridus*, *Pterocaulon serrulatum*, *Tephrosia remotiflora* over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent*. Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. Thick stands of senescent grasses occur on site at time of survey.



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Number of Species Recorded:	27
Dominant Families:	Poaceae (1 taxa)
Dominant Genera:	<i>Triodia</i> (2 species)
Presence of Declared Rare Flora or Priority Species:	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 10 Flora List Site 4**

Family	Genus	Species	Common Name	Status
Asclepiadaceae	<i>Marsdenia</i>	<i>angustata</i>		
Asteraceae	<i>Pluchea</i>	<i>ferdinandi-muelleri</i>		
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Boraginaceae	<i>Trichodesma</i>	<i>zeylanicum</i>	Camel Bush	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Caesalpiniaceae	<i>Senna</i>	<i>costata</i>		
Capparaceae	<i>Capparis</i>	<i>umbonata</i>	Wild Orange	
Goodeniaceae	<i>Velleia</i>	<i>panduriformis</i>		
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Papilionaceae	<i>Crotalaria</i>	<i>novae-hollandiae</i>		
Papilionaceae	<i>Tephrosia</i>	<i>?coriacea</i>		
Papilionaceae	<i>Tephrosia</i>	<i>remotiflora</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderie Grass	
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>pyramidalis</i>	Caustic Bush	
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Rubiaceae	<i>Spermacoce</i>	<i>auriculata</i>		
Sapindaceae	<i>Distichostemon</i>	<i>hispidulus</i> var. <i>aridus</i>		
Solanaceae	<i>Solanum</i>	<i>beaugleholei</i>		



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 5</b>
LOCATION:	SLK 8.45, RHS 200m
DATE OF SURVEY:	3 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Petalostigma pubescens* with scattered *Grevillea striata*, and emergent *Corymbia cadophora*, *Corymbia opaca* over *Pterocaulon serrulatum*, *Corchorus aestuans* over senescent grasses. Vegetation recently burnt.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent*. Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. Thick stands of senescent grasses occur on site at time of survey.



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Number of Species Recorded:	19
Dominant Families:	Papilionaceae (3 taxa) Mimosaceae (3 taxa) Malvaceae (2 taxa) Myrtaceae (2 taxa) Poaceae (1 taxa)
Dominant Genera:	Acacia (3 species) Corymbia (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 11 Flora List Site 5**

Family	Genus	Species	Common Name	Status
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>monticola</i>	Gawar	
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Oleaceae	<i>Jasminum</i>	<i>didymum</i> subsp. <i>lineare</i>		
Papilionaceae	<i>Tephrosia</i>	<i>leptoclada</i>		
Papilionaceae	<i>Crotalaria</i>	<i>novae-hollandiae</i>		
Papilionaceae	<i>Tephrosia</i>	<i>remotiflora</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Solanaceae	<i>Solanum</i>	<i>beaugleholei</i>		
Tiliaceae	<i>Corchorus</i>	<i>aestuans</i>		



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 6</b>
LOCATION:	SLK 10.55, RHS 200m
DATE OF SURVEY:	3 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Brachychiton diversifolius*, *Petalostigma pubescens*,, with scattered *Grevillea striata*, *Grevillea pyramidalis*, and emergent *Corymbia cadophora*, *Corymbia opaca* over *Senna costata*, *Calytrix exstipulata* over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent* Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.



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Number of Species Recorded:	20
Dominant Families:	Poaceae (3 taxa) Myrtaceae (3 taxa) Malvaceae (2 taxa) Mimosaceae (2 taxa)
Dominant Genera:	<i>Acacia</i> (2 species) <i>Corymbia</i> (2 species) <i>Grevillea</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 12 Flora List Site 6**

Family	Genus	Species	Common Name	Status
Asteraceae	<i>Pluchea</i>	<i>ferdinandi-muelleri</i>		
Caesalpiniaceae	<i>Senna</i>	<i>costata</i>		
Convolvulaceae	<i>Polymeria</i>	<i>ambigua</i>	Morning Glory	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Calytrix</i>	<i>exstipulata</i>	Kimberley Heather	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Papilionaceae	<i>Tephrosia</i>	<i>?coriacea</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threawn	
Poaceae	<i>Eriachne</i>	<i>ciliata</i>	Slender Wanderrie Grass	
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>pyramidalis</i>	Caustic Bush	
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Rubiaceae	<i>Spermacoce</i>	<i>auriculata</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	
Tiliaceae	<i>Corchorus</i>	<i>aestuans</i>		



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 7</b>
LOCATION:	SLK 12.01, RHS 200m
DATE OF SURVEY:	3 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia platycarpa*, *Erythrophleum chlorostachys*, *Ehretia saligna* with scattered *Grevillea striata*, and emergent *Eucalyptus* (not flowering) over *Distichostemon hispidulus* var. *aridus*, *Calytrix exstipulata* over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent* Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.



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Number of Species Recorded:	18
Dominant Families:	Poaceae (5 taxa) Myrtaceae (2 taxa)
Dominant Genera:	<i>Triodia</i> (2 species) <i>Eriachne</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 13 Flora List Site 7**

Family	Genus	Species	Common Name	Status
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Caesalpiniaceae	<i>Erythrophleum</i>	<i>chlorostachys</i>	Ironwood	
Convolvulaceae	<i>Polymeria</i>	<i>ambigua</i>	Morning Glory	
Dioscoreaceae	<i>Dioscorea</i>	<i>bulbifera</i>	Ganmanngu	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Goodeniaceae	<i>Velleia</i>	<i>panduriformis</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Myrtaceae	<i>Calytrix</i>	<i>exstipulata</i>	Kimberley Heather	
Myrtaceae	<i>Eucalyptus</i>	Grey Bark (not flowering, no fruit)		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Eriachne</i>	<i>ciliata</i>	Slender Wanderrie Grass	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderrie Grass	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Sapindaceae	<i>Distichostemon</i>	<i>hispidulus</i> var. <i>aridus</i>		



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 8</b>
LOCATION:	SLK 14.4, RHS 200m
DATE OF SURVEY:	4 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Petalostigma pubescens*, *Corymbia opaca*, *Corymbia cadophora*, *Brachychiton diversifolius*, *Bauhinia cunninghamii*, *Ehretia saligna* over *Distichostemon hispidulus* var. *aridus*, *Sida rohlenae*, *Solanum beaugeholei* over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

2. *Excellent* Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.





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Number of Species Recorded:	24
Dominant Families:	Poaceae (5 taxa) Myrtaceae (2 taxa) Malvaceae (2 taxa)
Dominant Genera:	<i>Triodia</i> (2 species) <i>Corymbia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 14 Flora List Site 8**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Ptilotus</i>	<i>polystachyus</i>	Prince of Wales Feather	
Asclepiadaceae	<i>Marsdenia</i>	<i>angustata</i>		
Asteraceae	<i>Pluchea</i>	<i>ferdinandi-muelleri</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Goodeniaceae	<i>Goodenia</i>	<i>armitiana</i>		
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>rohlena</i>		
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Moraceae	<i>Ficus</i>	? <i>coronulata</i> (juvenile)	River Fig	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Papilionaceae	<i>Crotalaria</i>	<i>mysorensis</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Eragrostis</i>	<i>setifolia</i>	Neverfail Grass	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderrie Grass	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Sapindaceae	<i>Atalaya</i>	<i>hemiglauc</i>	Whitewood	
Sapindaceae	<i>Distichostemon</i>	<i>hispidulus</i> var. <i>aridus</i>		
Solanaceae	<i>Solanum</i>	<i>beaupleholei</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>SITE 9</b>
LOCATION:	SLK 16.98, RHS 200m
DATE OF SURVEY:	4 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Acacia platycarpa*, *Adansonia gregorii*, *Melaleuca leucodendra*, *Atalaya hemiglauc* over *Sida arenicola*, *Gomphrena tenella*, *Solanum beaugeholei* over senescent grasses. Vegetation recently burnt. Three Boabs (*Adansonia gregorii*) present on site (Centre and North).

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

3. *Very Good*. Vegetation structure altered, obvious signs of disturbance. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed. Vegetation has also been recently burnt, reducing ability to determine condition.



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Number of Species Recorded:	15
Dominant Families:	Mimosaceae (2 taxa) Myrtaceae (2 taxa) Malvaceae (2 taxa)
Dominant Genera:	<i>Acacia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded, although <i>Adansonia gregorii</i> (Boab) is a culturally significant species and individual plants should not be disturbed.
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 15 Flora List Site 9**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Gomphrena</i>	<i>tenella</i>		
Asclepiadaceae	<i>Marsdenia</i>	<i>viridiflora</i> subsp. <i>tropica</i>		
Bombacaceae	<i>Adansonia</i>	<i>gregorii</i>	Boab, Baobab	
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>arenicola</i>		
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Moraceae	<i>Ficus</i>	? <i>coronulata</i> (juvenile)	River Fig	
Myrtaceae	<i>Eucalyptus</i>	Fissured Bark (not flowering, no fruit)		
Myrtaceae	<i>Melaleuca</i>	<i>leucodendra</i>	Cadjebut	
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Sapindaceae	<i>Atalaya</i>	<i>hemiglauc</i>	Whitewood	
Scrophulariaceae	<i>Striga</i>	<i>squamigera</i>		
Solanaceae	<i>Solanum</i>	<i>beaueholei</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	

JOB DESCRIPTION: **Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2**

JOB NUMBER: 61/16912

SITE: **SITE 10**

LOCATION: SLK 18.5, RHS 200m

DATE OF SURVEY: 4 November 2005

SURVEYED BY: J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Acacia platycarpa*, *Adansonia gregorii*, *Melaleuca leucodendra*, *Atalaya hemiglauc* over *Sida arenicola*, *Gomphrena tenella*, *Solanum beaueholei* over senescent grasses. Vegetation recently burnt. Three Boabs (*Adansonia gregorii*) present on site (approximately in the centre).



Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

3. *Very Good*. Vegetation structure altered, obvious signs of disturbance. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed. Vegetation has also been recently burnt, reducing ability to determine condition.



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Number of Species Recorded: 13

Dominant Families: Myrtaceae (3 taxa)



Dominant Genera: nil

Presence of Declared Rare Flora or Priority Species

No DRF or Priority species recorded, although *Adansonia gregorii* (Boab) is a culturally significant species and individual plants should not be disturbed.

Number of Weed Species: nil

Presence of Declared Plants: nil

**Table 16 Flora List Site 10**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Gomphrena</i>	<i>tenella</i>		
Bombacaceae	<i>Adansonia</i>	<i>gregorii</i>	Boab, Baobab	
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Haemodoraceae	<i>Haemodorum</i>	<i>gracile</i>		
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Eucalyptus</i>	Fissured Bark (not flowering, no fruit)		
Myrtaceae	<i>Melaleuca</i>	<i>leucodendra</i>	Cadjebut	
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Rubiaceae	<i>Spermacoce</i>	<i>auriculata</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	
Tiliaceae	<i>Corchorus</i>	<i>aestuans</i>		



JOB DESCRIPTION:	<b>Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2</b>
JOB NUMBER:	61/16912
SITE:	<b>Culvert</b>
LOCATION:	SLK 11.2, LHS 20m
DATE OF SURVEY:	4 November 2005
SURVEYED BY:	J Foster, G. Busby

Vegetation Community Description:

Pindan Scrub: *Acacia tumida*, *Acacia platycarpa*, *Melaleuca leucodendra*, *Santalum lanceolatum*, *Petalostigma pubescens*, over *Ptilotus fusiformis*, *Distichostemon hispidulus* var. *aridus*, over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Across entire site - monotypic

Vegetation Condition:

3. *Very Good*. Vegetation structure altered, obvious signs of disturbance. Disturbance has occurred from grazing pressures from cattle. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed. Site has been excavated previously with a lined dam constructed in the culvert





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Number of Species Recorded:	15
Dominant Families:	Mimosaceae (2 taxa) Poaceae (2 taxa)
Dominant Genera:	<i>Acacia</i> (2 species)
Presence of Declared Rare Flora or Priority Species	No DRF or Priority species recorded
Number of Weed Species:	1 ( <i>Malvastrum americanum</i> )
Presence of Declared Plants:	nil

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**Table 17 Flora List, Culvert 11.2 SLK**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Ptilotus</i>	<i>fusiformis</i>		
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Caesalpiniaceae	<i>Senna</i>	<i>notabilis</i>		
Convolvulaceae	<i>Polymeria</i>	<i>ambigua</i>	Morning Glory	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Loranthaceae	<i>Dendrophthoe</i>	<i>acacioides</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Myrtaceae	<i>Calytrix</i>	<i>exstipulata</i>	Kimberley Heather	
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Santalaceae	<i>Santalum</i>	<i>lanceolatum</i>	Northern Sandalwood	
Sapindaceae	<i>Distichostemon</i>	<i>hispidulus</i> var. <i>aridus</i>		



JOB DESCRIPTION: **Derby Highway Upgrade – EIA and EMP, SLK 0.5 – 19.2**  
JOB NUMBER: 61/16912  
SITE: **Road Reserve**  
LOCATION: SLK 0.25 – SLK 19.2, LHS 0 - 20m (approximately)  
DATE OF SURVEY: 4 November 2005  
SURVEYED BY: J Foster, G. Busby

Vegetation Community Descriptions:

a) Pindan Scrub: *Acacia ancistrocarpa*, *Acacia eriopoda*, *Atalaya hemiglauca*, *Adansonia gregorii*, *Hakea macrocarpa*, *Grevillea striata* over senscent grasses; grading into

b) Pindan Scrub: *Acacia tumida*, *Acacia platycarpa* dominants, with *Petalostigma pubescens*, *Adansonia gregorii*, *Corymbia opaca*, *Corymbia cadophora*, *Santalum lanceolatum*, *Grevillea striata*, over *Sida rohlenae*, *Ehretia saligna*, *Pterocaulon serrulatum*, over senescent grasses.

Community Type

Pindan Scrub, Woodland

Occurrence on Site:

Grades across length of roadside – with *Acacia ancistrocarpa* dominated scrub grading upslope into *Acacia tumida* dominated scrub (between Site 1 and Site 2). Towards the northern end of the survey, slightly damper areas (ill-defined floodways) have *Melaleuca leucodendra* occurring in the midstorey.

Vegetation Condition:

3. **Very Good.** Vegetation structure altered, obvious signs of disturbance. Disturbance has occurred from grazing pressures from cattle and associated road construction and maintenance activities. While weed species are absent (apart from *Malvastrum americanum*), the more palatable species have been browsed.

Number of Species Recorded: 72

Dominant Families:	Poaceae:	(8 taxa)
	Mimosaceae:	(7 taxa)
	Myrtaceae:	(6 taxa)
	Papilionaceae:	(5 taxa)
Dominant Genera:	<i>Acacia</i>	(7 species)
	<i>Eriachne</i>	(3 species)
	<i>Tephrosia</i>	(3 species)

Presence of Declared Rare Flora or Priority Species



No DRF or Priority species recorded, although *Adansonia gregorii* (Boab) is a culturally significant species and individual plants should not be disturbed. Table 2 (see below) lists the location and number of Boab within the road reserve likely to be disturbed.

Number of Weed Species: 1 (*Malvastrum americanum*)

Presence of Declared Plants: nil

**Table 18 Flora List (SLK 0.25 – 19.2) – Derby Highway Upgrade**

Family	Genus	Species	Common Name	Status
Amaranthaceae	<i>Gomphrena</i>	<i>tenella</i>		
Amaranthaceae	<i>Ptilotus</i>	<i>fusiformis</i>		
Amaranthaceae	<i>Ptilotus</i>	<i>polystachyus</i>	Prince of Wales Feather	
Apocynaceae	<i>Carissa</i>	<i>spinorum</i>		
Asclepiadaceae	<i>Marsdenia</i>	<i>angustata</i>		
Asclepiadaceae	<i>Marsdenia</i>	<i>viridiflora</i> subsp. <i>tropica</i>		
Asteraceae	<i>Pluchea</i>	<i>ferdinandi-muelleri</i>		
Asteraceae	<i>Pterocaulon</i>	<i>serrulatum</i>		
Bombacaceae	<i>Adansonia</i>	<i>gregorii</i>	Boab, Baobab	
Boraginaceae	<i>Ehretia</i>	<i>saligna</i>	False Cedar	
Boraginaceae	<i>Trichodesma</i>	<i>zeylanicum</i>	Camel Bush	
Caesalpiniaceae	<i>Bauhinia</i>	<i>cunninghamii</i>	Bauhinia	
Caesalpiniaceae	<i>Erythrophleum</i>	<i>chlorostachys</i>	Ironwood	
Caesalpiniaceae	<i>Senna</i>	<i>costata</i>		
Caesalpiniaceae	<i>Senna</i>	<i>notabilis</i>		
Capparaceae	<i>Capparis</i>	<i>umbonata</i>	Wild Orange	
Convolvulaceae	<i>Polymeria</i>	<i>ambigua</i>	Morning Glory	
Dioscoreaceae	<i>Dioscorea</i>	<i>bulbifera</i>	Ganmannngu	
Euphorbiaceae	<i>Euphorbia</i>	<i>drummondii</i>	Caustic Weed	
Euphorbiaceae	<i>Flueggea</i>	<i>virosa</i>	Bullwood	
Euphorbiaceae	<i>Petalostigma</i>	<i>pubescens</i>		
Goodeniaceae	<i>Goodenia</i>	<i>armitiana</i>		
Goodeniaceae	<i>Velleia</i>	<i>panduriformis</i>		
Haemodoraceae	<i>Haemodorum</i>	<i>gracile</i>		
Hernandiaceae	<i>Gyrocarpus</i>	<i>americanus</i>	Helicopter Tree	
Lamiaceae	<i>Hyptis</i>	<i>suaveolens</i>	Hyptis, Mint Weed	



Family	Genus	Species	Common Name	Status
Loranthaceae	<i>Dendrophthoe</i>	<i>acacioides</i>		
Malvaceae	<i>Hibiscus</i>	<i>leptocladus</i>		
Malvaceae	<i>Malvastrum</i>	<i>americanum</i>	Spiked Malvastrum	*
Malvaceae	<i>Sida</i>	<i>arenicola</i>		
Malvaceae	<i>Sida</i>	<i>rohlenae</i>		
Mimosaceae	<i>Acacia</i>	<i>ancistrocarpa</i>	Fitzroy Wattle	
Mimosaceae	<i>Acacia</i>	<i>eriopoda</i>	Broome Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>farnesiana</i>	Mimosa Bush	
Mimosaceae	<i>Acacia</i>	<i>monticola</i>	Gawar	
Mimosaceae	<i>Acacia</i>	<i>platycarpa</i>	Pindan Wattle	
Mimosaceae	<i>Acacia</i>	<i>tumida</i> var. <i>tumida</i>	Pindan Wattle	
Mimosaceae	<i>Neptunia</i>	<i>dimorphantha</i>		
Moraceae	<i>Ficus</i>	? <i>coronulata</i> (juvenile)	River Fig	
Myrtaceae	<i>Calytrix</i>	<i>exstipulata</i>	Kimberley Heather	
Myrtaceae	<i>Corymbia</i>	<i>cadophora</i>	Twin-leaf Bloodwood	
Myrtaceae	<i>Corymbia</i>	<i>opaca</i>	Inland Bloodwood	
Myrtaceae	<i>Eucalyptus</i>	Grey Bark (not flowering, no fruit)		
Myrtaceae	<i>Eucalyptus</i>	Fissured Bark (not flowering, no fruit)		
Myrtaceae	<i>Melaleuca</i>	<i>leucodendra</i>	Cadjebut	
Oleaceae	<i>Jasminum</i>	<i>didymum</i> subsp. <i>lineare</i>		
Papilionaceae	<i>Tephrosia</i>	<i>leptoclada</i>		
Papilionaceae	<i>Crotalaria</i>	<i>mysorensis</i>		
Papilionaceae	<i>Crotalaria</i>	<i>novae-hollandiae</i>		
Papilionaceae	<i>Tephrosia</i>	? <i>coriacea</i>		
Papilionaceae	<i>Tephrosia</i>	<i>remotiflora</i>		
Poaceae	<i>Aristida</i>	<i>inaequiglumis</i>	Feathertop Threeawn	
Poaceae	<i>Aristida</i>	<i>holathera</i>	Erect Kerosene Grass	
Poaceae	<i>Eragrostis</i>	<i>setifolia</i>	Neverfail Grass	
Poaceae	<i>Eriachne</i>	<i>ciliata</i>	Slender Wanderrie Grass	
Poaceae	<i>Eriachne</i>	<i>obtusa</i>	Northern Wanderrie Grass	
Poaceae	<i>Eriachne</i>	<i>pulchella</i> subsp. <i>dominii</i>	Pretty Wanderrie	
Poaceae	<i>Triodia</i>	<i>schinzii</i>		
Poaceae	<i>Triodia</i>	sp. (not flowering)		
Proteaceae	<i>Grevillea</i>	<i>pyramidalis</i>	Caustic Bush	



Family	Genus	Species	Common Name	Status
Proteaceae	<i>Grevillea</i>	<i>striata</i>	Beefwood	
Proteaceae	<i>Hakea</i>	<i>macrocarpa</i>		
Rubiaceae	<i>Dentella</i>	<i>misera</i>		
Rubiaceae	<i>Spermacoce</i>	<i>auriculata</i>		
Santalaceae	<i>Santalum</i>	<i>lanceolatum</i>	Northern Sandalwood	
Sapindaceae	<i>Atalaya</i>	<i>hemiglauc</i>	Whitewood	
Sapindaceae	<i>Distichostemon</i>	<i>hispidulus</i> var. <i>aridus</i>		
Scrophulariaceae	<i>Striga</i>	<i>squamigera</i>		
Solanaceae	<i>Solanum</i>	<i>beaugleholei</i>		
Sterculiaceae	<i>Brachychiton</i>	<i>diversifolius</i>	Northern Kurrajong	
Tiliaceae	<i>Corchorus</i>	<i>aestuans</i>		
Ulmaceae	<i>Trema</i>	<i>tomentosa</i>	Peachleaf Poison Bush	

\* Introduced species

**Table 19 Number and Location of Boab Trees within Road Reserve (SLK 0.2 – 19.5)**

SLK	Numbers of Boab Trees
0.30	2
0.40	1
0.60	1
8.40	1
14.80	1
15.60	2
16.00	4
16.40	2
16.50	1
16.90	3
16.95	6
17.00	7
17.20	5
17.25	3
17.60	2
17.70	10 (all small)



Appendix C  
**Fauna Survey**

Records of the WA Museum  
Results of the Opportunistic Site Survey

**Table 20 Results of Fauna Desktop Assessment and Site Survey, Derby highway Upgrade**

Family	Genus	Species	Common Name	Status	WAM	Survey
<b>Amphibians</b>						
Hylidae	<i>Cyclorana</i>	<i>australis</i>	Giant Frog		x	
Hylidae	<i>Cyclorana</i>	<i>cryptotis</i>	Hidden-Ear Frog		x	
Hylidae	<i>Cyclorana</i>	<i>longipes</i>	Long-footed Frog		x	
Hylidae	<i>Cyclorana</i>	sp.			x	
Hylidae	<i>Cyclorana</i>	<i>vagitatus</i>	Wailing Frog		x	
Hylidae	<i>Litoria</i>	<i>caerulea</i>	Green Tree Frog		x	
Hylidae	<i>Litoria</i>	<i>inermis</i>	Peters' Frog		x	
Hylidae	<i>Litoria</i>	<i>rubella</i>	Desert Tree Frog		x	
Myobatrachidae	<i>Limnodynastes</i>	<i>ornatus</i>	Ornate Frog		x	
Myobatrachidae	<i>Neobatrachus</i>	<i>aquilonius</i>	Northern Burrowing Frog		x	
Myobatrachidae	<i>Notaden</i>	<i>nichollsi</i>	Desert Spadefoot		x	
Myobatrachidae	<i>Uperoleia</i>	<i>aspera</i>	Derby Toadlet		x	
Myobatrachidae	<i>Uperoleia</i>	<i>mjobergi</i>	Mjobergs Toadlet		x	
Myobatrachidae	<i>Uperoleia</i>	sp.			x	
Myobatrachidae	<i>Uperoleia</i>	<i>talpa</i>	Mole Toadlet		x	
<b>Birds</b>						
Artamidae	<i>Artamus</i>	<i>cinereus</i>	Black-faced Woodswallow			x
Campephagidae	<i>Coracina</i>	<i>novaeollandiae</i>	Black-faced Cuckoo-Shrike			x
Columbidae	<i>Geopelia</i>	<i>striata</i>	Peaceful Dove			x
Dicruridae	<i>Rhipidura</i>	<i>leucophrys</i>	Willie Wagtail			x
Laridae	<i>Sterna</i>	<i>albitrons</i>	Little Tern		x	
Pachycephalidae	<i>Colluricincla</i>	<i>hamonica brunnea</i>	Grey Shrike-Thrush		x	
Pachycephalidae	<i>Pachycephala</i>	<i>rufiventris</i>	Rufous Whistler			x
Petroicidae	<i>Poecilodryas</i>	<i>supercilliosa cerviniventris</i>	Derby White-browed Robin	Migratory	x	
Pittidae	<i>Pitta</i>	<i>moluccensis</i>	Blue-winged Pitta		x	
Pomatostomidae	<i>Pomatostomus</i>	<i>temporalis rubeculus</i>	Grey-crowned Babbler			x
Sylviidae	<i>Acrocephalus</i>	<i>australis gouldii</i>	Australian Reed Warbler		x	
Sylviidae	<i>Cisticola</i>	<i>exilis exilis</i>	Golden-headed Cisticola		x	
<b>Mammals</b>						
Emballonuridae	<i>Saccolaimus</i>	<i>flaviventris</i>	Yellow-bellied Sheattail Bat		x	
Emballonuridae	<i>Taphozou</i>	<i>georgianus</i>	Common Sheattail Bat		x	





Family	Genus	Species	Common Name	Status	WAM	Survey
Macropodidae	<i>Macropus</i>	<i>agilis</i>	Agile Wallaby		x	
Macropodidae	<i>Macropus</i>	sp.			x	x
Muridae	<i>Pseudomys</i>	<i>delicatus</i>	Delicate Mouse		x	
Pteropodidae	<i>Pteropus</i>	<i>scapulatus</i>	Little Red Flying-fox		x	
Vespertilionidae	<i>Chalinolobus</i>	<i>nigrogriseus</i>	Hoary Wattled Bat		x	
Vespertilionidae	<i>Miniopterus</i>	<i>schreibersii orianae</i>			x	
Vespertilionidae	<i>Scotorepens</i>	<i>greyii</i>	Little Broad-nosed Bat		x	
<b>Reptiles</b>						
Agamidae	<i>Diporiphora</i>	<i>pindan</i>			x	
Agamidae	<i>Diporiphora</i>	sp.			x	
Agamidae	<i>Lophognathus</i>	<i>gilberti</i>	Gilbert's Dragon, Ta-Ta Lizard		x	x
Agamidae	<i>Pogona</i>	<i>minor mitchelli</i>	Bearded Dragon		x	
Boidae	<i>Antaresia</i>	<i>stimsoni stimsoni</i>	Western Stimson's Python		x	
Elapidae	<i>Demansia</i>	<i>olivacea</i>	Olive-headed Whipsnake		x	
Elapidae	<i>Furina</i>	<i>ornata</i>	Moon Snake		x	
Elapidae	<i>Pseudechis</i>	<i>australis</i>	Mulga Snake		x	
Elapidae	<i>Suta</i>	<i>punctata</i>	Spotted Snake		x	
Gekkonidae	<i>Gehyra</i>	<i>pilbara</i>			x	
Gekkonidae	<i>Hemidactylus</i>	<i>frenatus</i>	Asian House Gecko		x	
Gekkonidae	<i>Heteronotia</i>	<i>binoei</i>	Binoe's Gecko		x	
Pygopodidae	<i>Pygopus</i>	<i>nigriceps</i>	Hooded Scaly-foot		x	
Scincidae	<i>Cryptoblepharus</i>	<i>camabyi</i>			x	
Scincidae	<i>Cryptoblepharus</i>	<i>plagiocephalus</i>	Fence Skink, Wall Skink		x	
Scincidae	<i>Ctenotus</i>	<i>serventyi</i>			x	
Scincidae	<i>Glaphyromorphus</i>	<i>isolepis</i>			x	
Scincidae	<i>Lerista</i>	<i>bipes</i>			x	
Scincidae	<i>Lerista</i>	<i>greeri</i>			x	
Scincidae	<i>Menetia</i>	<i>greyii</i>	Common Dwarf Skink		x	
Scincidae	<i>Menetia</i>	<i>maini</i>			x	
Scincidae	<i>Morethia</i>	<i>ruficauda ruficauda</i>	Fire-tailed Skink		x	
Typhlopidae	<i>Ramphotyphlops</i>	<i>diversus</i>			x	

WAM = Records of the WA Museum



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**Document Status**

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	G. Busby	J. Foster				
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