International Power

APPENDIX E

Flora and Fauna

URS

R E P O R T

Proposed Peaking Power Plant, Parkes

Flora & Fauna Assessment

Prepared for

International Power Ltd

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Contents

1 Introduction 1-1

1.1 Scope of Report 1-1

1.2 Proposed Development 1-1

1.2.1 Plant Site 1-1

1.2.2 Gas Pipeline 1-2

1.2.3 Alternative Section 1 1-2

1.3 Geology, Soils and Topography 1-2

1.4 Climate 1-3

2 Legislative Framework 2-1

2.1 Environmental Planning & Assessment Act 1979 (EP&A Act) and Threatened Species Conservation Act 1995 (TSC Act) 2-1

2.2 Native Vegetation Act 2003 (NV Act) 2-1

2.3 Noxious Weeds Act 1993 (NW Act) 2-1

2.4 State Environmental Planning Policy 44 – Koala Habitat Protection (SEPP 44) 2-1

2.5 Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) 2-2

3 Methodology 3-1

3.1 Methodology 3-1

3.1.1 Literature Review 3-1

3.1.2 Flora Survey 3-1

3.1.3 Fauna Survey 3-3

4 Results 4-1

4.1 Literature Review 4-1

4.1.1 Flora 4-1

4.1.2 Fauna 4-1

4.2 Field Assessment 4-2

4.2.1 Flora 4-2

4.2.2 Fauna 4-8

4.3 Habitat Assessment 4-9

4.3.1 Fuzzy Box Woodland 4-9

4.3.2 Disturbed Woodland 4-10

4.3.3 Cleared Cropland and Pasture 4-10

4.3.4 Ground Debris 4-10

4.4 Noxious Weeds 4-10

Contents

5 Impact Assessment 5-1

5.1 Conservation Significance 5-1

5.2 Power Plant Site 5-2

5.2.1 Vegetation Clearing and Construction Impacts 5-2

5.2.2 Secondary and Operational Impacts 5-4

5.3 Gas Pipeline 5-5

5.3.1 Vegetation Clearing and Construction Impacts 5-6

5.3.2 Secondary and Operational Impacts 5-10

5.4 Alternative Section 1 5-10

5.4.1 Vegetation Clearing and Construction Impacts 5-10

5.4.2 Secondary and Operational Impacts 5-10

6 Mitigation Measures 6-1

6.1 Assessment of Alternatives 6-1

6.2 Planning 6-1

6.3 Final Route Selection 6-1

6.3.1 Gas Pipeline 6-1

6.4 Low Impact Construction Approach 6-2

6.5 Groundcover Clearance Protocol 6-2

6.6 Tree Clearance Protocol 6-2

6.7 Revegetation 6-3

6.8 Weed and Pest Management 6-3

6.8.1 Noxious Weeds 6-3

6.9 Soil Erosion / Runoff 6-4

6.10 Site Management 6-4

7 Conclusions 7-1

7.1 Plant Site 7-1

7.2 Gas Pipeline and Alternative Section 1 7-1

7.3 General 7-1

8 References 8-1

9 Limitations 9-1

Section 1 Introduction

1.1 Scope of Report

URS Australia Pty Ltd (URS) was engaged by International Power (Australia) Pty Ltd (IPRA) in October 2006 to undertake a flora and fauna assessment of potential sites associated with the proposed Parkes Peaking Power Plant, west of Parkes, NSW (as shown on **Figure 1**). The following were assessed as part of this report:

1) a site for the proposed Peaking Power Plant and associated electricity transmission line, adjacent to the Transgrid Substation (the Plant Site, illustrated in **Figure 2a)**;

2) a proposed gas pipeline route running east from the Plant Site to the Central West Pipeline west of Parkes, and an alternative route that is preferable from an impacts perspective, but may be prevented by access constraints (the Gas Pipeline and Alternative Section 1 illustrated in **Figure 2b and 2c).**

The "study area" refers to the local vicinity of these two sites and encompasses shared features of the natural environment.

This report assesses the flora and flora impacts of the proposed Parkes Peaking Power Plant with regard to Commonwealth and NSW State planning and environmental legislation (including the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, the *Environmental Planning and Assessment Act 1979 (EP&A Act)*, the *Threatened Species Conservation Act 1995 (TSC Act)*, *Native Vegetation Act 2003*, State Environmental Planning Policy (SEPP) 44 and the *Noxious Weeds Act 1993*.

1.2 Proposed Development

The proposed development is a gas-fired peaking power plant (known as the Parkes Peaking Power Plant Project) at a site near Parkes NSW. The Parkes Peaking Power Plant Project would comprise three gas turbines with the electricity generated fed into the 132 kV transmission network via an existing switchyard in the adjacent TransGrid substation. The peaking power plant would use natural gas supplied by a new gas pipeline connected to the Central West Pipeline in Parkes and distillate as a back up fuel. The route of the gas pipeline traverses road reserve and private property. This report addresses the potential impact on flora and fauna in the entire study area (at the Plant Site, along the Gas Pipeline route and Alternative Section 1).

1.2.1 Plant Site

The Plant Site is located close to Condobolin Road, approximately 10km west of Parkes. Developments immediately surrounding the Plant Site are predominantly rural enterprises on medium size holdings, primarily related to wheat cultivation (refer to **Figure 1**). An existing substation adjoins the northern boundary of the Plant Site and an unsealed road adjoins the western boundary. Wheat cultivation adjoins the eastern and southern boundaries.

The Plant Site currently operates as a wheat farm. The entire Plant Site is cleared and used for wheat cultivation. There are no improvements on the site other than boundary fencing to the northern and western boundaries.

The surrounding land use is predominantly cleared agricultural land used for wheat cultivation and grazing. The Parkes Township lies approximately 10km east of the Plant Site.

Section 1 Introduction

1.2.2 Gas Pipeline

The proposed gas pipeline easement route traverses approximately ten kilometres of agricultural land and road reserve east from the Plant Site to the existing gas main on the outskirts of the regional town of Parkes (refer to **Figure 2b**). Tree cover is generally sparse, with the majority of the original vegetation now cleared for wheat crops and mixed grazing. It crosses an area of intact woodland in the road reserve adjoining Condobolin Road, which is also designated as a travelling stock route. The gas pipeline route will likely require drilling or boring beneath Condobolin Rd, near the midpoint, and Back Trundle Rd near its eastern end. In the eastern portion the proposed Gas Pipeline passes through an area with moderately dense tree cover along an unnamed road reserve. A natural gas valve station (approximately 100m^2) will be required at the connection to the CWP pipeline in Goldrush Road Parkes to ensure flow control, pressure control and isolation.

The Gas Pipeline route shown in all Figures in this report is indicative only. Air photos have not been orthorectified and the proposed route has not been surveyed. This assessment was conducted on the basis of an originally proposed route marked out on the ground by a IPRA's Land Access Consultant and so can be relied upon as an accurate assessment of the proposed route at the time of writing. A 30m wide strip was assessed along this route to account for construction impacts. The route is indicated through the centre of this strip on **Figure 2b** and other figures in this Report for the purposes of clarity . The gas pipeline will be positioned as close to existing fencelines as is practicable with construction areas, access roads and spoil stockpiles positioned to one side of the easement.

A portion of the proposed route was realigned at the crossing of Condobolin Road in February 2007 in order to reduce impacts on native vegetation (see **Chapter 3** of the Environmental Assessment, URS 2007).

1.2.3 Alternative Section 1

Alternative Section 1 is a short alternative route for the proposed pipeline immediately south of the Condobolin Road crossing. This may accommodate local property access needs, if necessary. This alternative section is also located in the road reserve but passes through an area of highly disturbed vegetation around an existing access road.

1.3 Geology, Soils and Topography

The Parkes Shire is located on the western edge of the Great Dividing Range within the Central West Region of NSW. The Central West consists of the Tablelands, and the Slopes and Plains regions.

The topography in the shire can generally be described flat to gently undulating. The area forms part of the catchment for two main river systems, the Bogan and the Lachlan Rivers, which are major tributaries of the Murray-Darling Basin System. Most watercourses in the Shire are not permanent, being reduced to a series of waterholes for the majority of the year. The site is located on flat to very gently inclined plains west of Parkes.

The 1:250,000 Forbes Geology sheet (SI55-7) shows the study area to be underlain by both Quaternary deposits of sand, silt and gravel; and Mugincoble Beds and Goonumbla Volcanics. Mugincoble Beds consist of phyllite, schist, micaceous and silty sandstones and siltstone, andesite and limestone lenses. Goonumbla Volcanics consist of prophyritic andesite with interbeds of shale and limestone.

Reference is made to the Forbes 1:250 000 soil landscape sheet (www.dnr.nsw.gov.au/care/soil/ssu/pubstat/pdfs/forbes_sl_map_web.pdf). The study area falls within the Brolgan Plains (bp) Soil Landscapes System. The local geomorphology consists of flat to gently undulating plains dissected by ephemeral, channel confined drainage lines. Soil types include: deep (>100cm), imperfectly drained Red Brown Earths and moderately well-drained Red Podzolics on footslopes and plains; non-calcic Brown Earths and deep (>100cm) moderately well drained Yellow

Section 1 Introduction

Podzolic Soils occur in lower lying situations; and Yellow Earths and Alluvial soils along some drainage depressions. Limitations of these soils include water erosion hazard, and soils of low fertility with localised hard setting surfaces.

1.4 Climate

The study area is located within the Parkes meteorological region and has a dry, continental climate. It experiences mean annual rainfall of 585mm, and a mean daily temperature range of 10.9 to 23.4 degrees (BOM, 2004). The region was experiencing a prolonged, severe drought at the time of the survey which may have limited plant species encountered at the time of surveying.

Section 2 Legislative Framework

2.1 Environmental Planning & Assessment Act 1979 (EP&A Act) and Threatened Species Conservation Act 1995 (TSC Act)

On 31 October 2005, the majority of the provisions under the *Threatened Species Legislation Amendment Act 2004* and all the remaining provisions under the *Threatened Species Conservation Amendment Act 2002* commenced. A key amendment, which affects this Flora and Fauna Assessment, include the replacement of the Eight Part Test of Significance with a Seven Part Assessment of Significance. This amendment affects both Section 5A of the *EP&A Act* and Section 94 of the *TSC Act*. The revised factors retain the same intent in assessing the potential impacts of a proposed development on a threatened species, population (including their habitats) or endangered ecological community (EEC), however the new 7-part test requires assessment of significance at a local scale rather than at a regional scale.

For development applications under Part 4 and 5 of the EP&A Act, if the 7-part test concludes that there is 'likely' to be 'a significant effect' on a listed species, population or EEC, a Species Impact Statement (SIS) must be prepared. Under Part 3A of the EP&A Act, there is no requirement for Section 5A of the EP&A Act to be addressed, hence there is no requirement for an SIS. However, the approach herein has been to address s.5A and complete the 7-part test as a guide to assessing impacts on threatened biota that could be affected by the proposal.

2.2 Native Vegetation Act 2003 (NV Act)

The NSW Government released the regulations for the *NV Act* on 14 November 2005, which came into effect on 1 December 2005. The *NV Act* regulates the clearing of native vegetation on all land in NSW except for land listed in Schedule 1 of the Act. Excluded land under Schedule 1 of the Act includes National Parks and other conservation areas, State forests and reserves, and urban areas. Specifically, urban areas, which are excluded, include areas zoned residential (but not rural residential), village, township, industrial or business.

Under Part 3A (s75U(e) of the *Environment Planning and Assessment Act 1979*, section 12 the NV Act does not apply.

2.3 Noxious Weeds Act 1993 (NW Act)

Under the *Noxious Weeds Act 1993* (*NW Act*), the Parkes Shire Council is responsible for the control of noxious weeds in its local government area (LGA). The *NW Act* provides for the declaration of noxious weeds by the Minister of Agriculture. Noxious weeds may be considered noxious on a National, State, Regional or Local scale. All private landowners, occupiers, public authorities and Councils are required to control noxious weeds on their land under Part 3 Division 1 of the *NW Act.*

2.4 State Environmental Planning Policy 44 – Koala Habitat Protection (SEPP 44)

As the study area exists within the Parkes Local Government Area (listed in Schedule 1 of SEPP 44) SEPP 44 applies to this assessment.

Where potential habitat is identified, the area must be investigated for core koala habitat, defined as *"an area of land with a resident breeding population of koalas, evidenced by attributes such as breeding females and recent sightings and historical records of a population"*. Where core koala habitat is found to occur, SEPP 44 requires that a site-specific Koala Plan of Management be prepared.

Section 2 Legislative Framework

2.5 Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The purpose of the Commonwealth *EPBC Act* is to ensure that actions likely to cause a significant impact on a matter of national environmental significance undergo an assessment and approval process.

Under the *EPBC Act*, an action includes a project, undertaking, development or activity.

An action that "*has, will have or is likely to have a significant impact on a matter of national environmental significance*" may not be undertaken without prior approval from the Commonwealth Minister for the Environment and Heritage.

The *EPBC Act* identifies matters of national environmental significance as:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

The Administrative Guidelines for the *EPBC Act* set out criteria intended to assist in determining whether an action requires approval. In particular, the Guidelines contain criteria for determining whether a proposed action is likely to have a "significant impact" on a matter of national environmental significance. Should the proponent deem the proposal to have a significant potential impact on a mater of NES, a referral to the Commonwealth Minister of Environment and Heritage would be undertaken to obtain a confirmation as to whether the Commonwealth considers the proposal a "controlled action" requiring Commonwealth approval.

EPBC Act listed species recorded or predicted to occur on the Site are also listed under the *TSC Act* and have been assessed in relation to the current proposal under Section 5A of the EP&A Act (see **Appendix B**).

Section 3 Methodology

3.1 Methodology

3.1.1 Literature Review

A desktop literature review was undertaken by URS to identify the representative spectrum of Threatened species, populations and ecological communities listed under the *TSC Act* and the Commonwealth *EPBC Act* that could be expected to occur within the study area, based on habitats present. To this end, the following documentation was reviewed prior to the conduct of the field investigations:

- a search of the NSW NPWS Wildlife Atlas database for the Plant Site (November 2006 - Selected area for Flora on coordinates - 148.02528,-33.15293,148.12528,-33.05294 and selected area for Fauna on coordinates – 148.02528,-33.15293,148.12528,-33.05293);
- a search of the NSW NPWS Wildlife Atlas database (November 2006 - Selected Parkes LGA to cover the Gas Pipeline);
- EPBC online Protected Matters Database Search for the Plant Site (November 2006 – a Selected Polygon centred on the Site buffered at 10km); and
- EPBC online Protected Matters Database Search for the Gas Pipeline (November 2006 - Selected Line tracing the Gas Pipeline route buffered at 10km).

3.1.2 Flora Survey

Flora surveys were conducted at and within the vicinity of the Site (the study area) on the 17 and 18 October 2006. Surveys were conducted along the Gas Pipeline route on 18 October and 4-5 December 2006. The primary objectives of the survey were to:

- map and describe the vegetation communities occurring within the study area;
- compile a flora list of those species occurring within the vegetation communities, identifying any threatened, nationally, regionally or locally significant species and communities; and
- assess the likely impacts of the proposed development and provide recommendations to assist in minimising impacts to flora in the study area.

The botanical surveys were generally consistent with the *DEC Threatened Biodiversity and Assessment; Guidelines for Developments and Activities Working Draft* (2004). All vascular taxa observed were recorded on appropriate proforma field data sheets.

Plant specimens not readily identifiable in the field were collected and subsequently identified using standard botanical texts and where required were compared with voucher specimens held in the National Herbarium of New South Wales Online Reference Collection. Flora is described according to classifications made by Specht (1970). Plant identifications were made according to nomenclature in Harden (1990, 1991, 1992, 1993). Plant specimens which were difficult to identify (either insufficient sample collected or buds/fruiting bodies were not available at the time of the survey) were submitted to the NSW National Herbarium for identification. Suspected *TSC Act* or *EPBC Act* listed species were submitted to Herbarium for verification.

Conservation status of species and communities recorded across the study area in October and December 2006 were determined with reference to relevant legislation including the *TSC Act* and the *EPBC Act*.

Section 3 Methodology

Plant Site

On the basis of air photo interpretation, the initial site walkover and habitat assessment the Plant Site was divided into three stratification units i.e. functionally similar units for the purposes of environmental assessment according to the Draft DEC (2004) survey guidelines. The study area consists of:

1) approximately 5 ha of cleared agricultural land within the proposed Plant Site footprint;

2) approximately 1.6 ha of highly disturbed natural vegetation that may be impacted by the proposed access road; and

3) a nearby area of relatively undisturbed natural vegetation in the road reserve along Condobolin Rd to the north of Site.

Vegetation surveys of the Plant Site were undertaken on 17 and 18 October 2006 to inventory and map plant taxa and target vegetation communities within the study area. Two 100m survey transects were assessed in the natural vegetation consistent with the Draft DEC (2004) survey guidelines. The location of transects was based on the distribution of vegetation types present within the study area such that the extent of vegetation which may be disturbed as a result of the proposal was appropriately assessed (**Figure 3a**). The survey incorporated 20x20m quadrats along each survey transect. A further quadrat was placed in cleared agricultural land within the Plant Site footprint. Due to the highly disturbed and uniform nature of the ploughed cropland in this area, this was considered sufficient to capture the range of species present.

Whilst the above sampling method provides a broad inventory of species and enables description of the vegetation community, it does not account for threatened flora that occur at much lower densities than widespread or common species. Therefore the random meander technique was employed in an effort to capture any species overlooked during quadrat surveys. This technique involved traversing the entire survey site and recording any species not found within previous quadrat surveys. This survey methodology, prescribed by Cropper (1993), is considered appropriate by DEC for this type of work.

Gas Pipeline and Alternative Section 1

Vegetation surveys of the Gas Pipeline, and Alternative Section 1, were conducted on the 18 October and 4 and 5 December 2006. These utilised indicative design drawings on a handheld GPS unit however the precise location of survey areas followed a route marked out on the ground by a IPRA's Land Access Consultant who were consulted through all stages of the field survey to ensure a spatially accurate assessment of the area that may potentially be impacted.

The study area consisted of:

1) approximately 15 ha of cleared agricultural land, along 6km of the proposed route;

2) approximately 1.87 ha of highly disturbed natural vegetation along 600m of the proposed route; and

3) approximately 3 ha of intact natural vegetation in the vicinity of a 260m section of the proposed route through the road reserve along Condobolin Rd.

A random meander search was considered appropriate for the majority of the gas pipeline route due to the length of the study area and the disturbed nature of the vegetation. A 30m wide strip was assessed to account for variations in the route within the Gas Pipeline easement and the potential extent of construction impacts. Wider areas were assessed through intact natural vegetation, in the vicinity of directional drilling locations and at the site of the proposed gas intake. Areas of relatively intact vegetation were also described with concentrated searches of 20x20m quadrats. A Section of the proposed Gas Pipeline Route was realigned in February 2007 in order to reduce the length of the route impacting upon Fuzzy Box Woodland in the Condobolin Rd road reserve (**Chapter 3**, URS 2007). No further field surveys were conducted along this Section as the December 2006 assessments included detailed surveys in the

Section 3 Methodology

vicinity and within the same Stratification Unit (extant Fuzzy Box Woodland). It is unlikely that further targeted searches for threatened flora species would have increased the likelihood of their detection due to the ongoing drought (**Section 4.2.1**). Targeted fauna surveys and habitat assessments conducted during the October and December 2006 surveys featured a level of survey effort for the Stratification Unit consistent with the DEC (2004) working draft survey guidelines. Accordingly the prior field surveys were considered an appropriate assessment of the likelihood of threatened species and communities through this section of the proposed route. Survey effort and locations are shown on **Figure 3b.**

3.1.3 Fauna Survey

Fauna surveys were carried out on 17 and 18 October 2006 and 4 and 5 December 2006 and were generally consistent with the DEC (2004) working draft survey guidelines. Methodologies employed to survey fauna included Random Meander (Cropper 1993), opportunistic observations, diurnal bird counts, and track and scat analyses. The survey design was based on the likelihood of threatened species identified in the literature review occurring on site and the initial habitat assessment. No “special habitats” such as substantial rock outcrops, wetlands or watercourses were identified in the Study Area and so the fauna survey design was based on the Stratification Units adopted in the flora survey (**Section 3.1.2**). Therefore no mammal trapping (terrestrial/arboreal), bat surveys, or call playbacks for frogs, gliders or large forest owls were undertaken during the October or December 2006 surveys.

The basis for the fauna survey methodology is outlined in **Table 5**.

Table 5. [heading?]

Survey Technique	Survey Effort	Justification
Diurnal Bird counts.	One 1Ha search for at least 20 minutes, per stratification unit, at dawn and at dusk on two consecutive days.	17 threatened bird species previously recorded in vicinity of Site.
Mammal trapping.	None performed.	Desktop assessment found no threatened terrestrial mammals previously recorded in vicinity of Site.
Spotlighting.	None performed.	Presence of Koalas determined on the basis of habitat assessment (ie presence of feed trees). No other threatened arboreal mammals previously recorded in vicinity of Site.
Call Playback.	None performed.	Desktop assessment found no threatened frogs, gliders or forest owls previously recorded in vicinity of Site. No significant habitat for frogs observed during surveys. Unsuitable survey conditions (prolonged drought) throughout study period.

Section 3 Methodology

Survey Technique	Survey Effort	Justification
Bat surveys (spotlighting, Anabat, harp trapping).	None performed.	Presence of threatened bats determined on basis of habitat assessment (tree hollows, foraging habitat) and historical records.
Reptile surveys (active searches, pitfall traps, spider tubes).	None performed.	Desktop assessment found no threatened reptiles previously recorded in vicinity of Site. No "special habitats" for reptiles (rock outcrops, significant areas of rock fragments) observed during surveys.

Weather experienced during the October survey comprised dry, warm-hot, windy days (25-31^{o}C) and mild nights (14-20^{o}C). During the December survey the weather featured hot (29-32 ^{o}C) dry, days and mild nights (14-20 ^{o}C) (http://www.bom.gov.au/climate).

Diurnal Bird Counts

Diurnal bird counts were undertaken during the October and December surveys and consisted of area searches through habitat on Site. Searches were conducted at dawn and dusk, for at least 20 minutes over approximately 1 Ha consistent with the DEC (2004) working draft survey guidelines. The locations of diurnal bird counts are given in **Figure 3a** and **Figure 3b.** Opportunistic observations of bird species were recorded throughout all days spent on Site. Species were identified by visual observation and call and were documented along with numbers of individuals, behaviour, breeding activity and habitat type on proforma data sheets.

Weather during the October survey was unsuitable with strong winds (up to 65km/h) (http://www.bom.gov.au/climate). The weather experienced during the December diurnal bird counts was fine and sunny with little or no wind.

Opportunistic Observations

Opportunistic and incidental observations of fauna species were recorded during the conduct of the October and December 2006 field surveys.

Fauna Habitat Assessment

An assessment of the quality of habitats present for *TSC* and *EPBC Act* listed species was made during the 2006 field surveys. Habitat quality was based on the level of breeding, nesting, feeding and roosting resources available. Indicative habitat criteria for targeted threatened species (ie recorded in the *TSC and EPBC Act* searches) were identified prior to fieldwork. Criteria were based on information provided in *TSC Act* species profiles (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile), field notebooks and the knowledge and experience of URS field ecologists. This technique is important in assisting in the compilation of a comprehensive list of fauna that are predicted within the vicinity of the Site, rather than relying solely on one off surveys that are subject to seasonal limitations and may only represent a snapshot of assemblages present.

The locations and quantitative descriptions of significant habitat features were captured with a handheld GPS unit and photographed where appropriate.

Section 3 Methodology

Other Methods Considered

Ground debris searches, including active searches for scats, were undertaken during the entire survey period while incidentally traversing the Site.

Section 4 Results

4.1 Literature Review

Results for all study areas are presented together since the buffered search area for historical records of threatened species encompassed the Plant Site, Gas Pipeline and Alternative Section 1.

4.1.1 Flora

The results of the desktop literature review indicate five (5) threatened plant species listed under the *EPBC Act* and/or the *TSC Act*, which have been previously recorded within the vicinity of the Site. Four of these species are classed as Vulnerable and one Endangered under the *Acts.* All of these species were considered likely to occur in the study area. This list of threatened plant species, including their conservation status, is presented in **Table 1** and summarised below:

- *Diuris sheaffiana* (V) Tricolour Diuris
- *Goodenia macbarronii* (V) Narrow Goodenia
- *Austrostipa metatoris* (V) A Spear Grass
- *Austrostipa wakoolica* (E & E1) A Spear Grass
- *Swainsona murrayana* (V) Slender Darling-pea, Slender Swainson, Murray Swainson-pea

The review also revealed that the *EPBC Act* listed EEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the Fuzzy Box Woodland listed as an Endangered Ecological Community (EEC) under the NSW *TSC Act* may occur in the study area.

4.1.2 Fauna

Results from fauna desktop reviews indicate the potential presence of approximately twenty-two (22) threatened fauna species listed under the *TSC Act* and/or the *EPBC Act* which have been previously recorded within the region. This list of threatened fauna species, including their conservation status, is presented in **Table 2.**

A review of the specific habitat requirements of these species, and the habitat present within the study area and its surrounds allowed a number of these species to be immediately eliminated as having no (or very low) likelihood of occurrence at the Site. Those that remain as having a potential medium to high likelihood of occurrence at the Site and immediate surrounds are indicated in **Table 2.** Sixteen (16) species are considered likely to occur on Site of which fourteen (14) are classed as Vulnerable and two (2) Endangered under the *TSC* and/or *EPBC Acts*.

Over 70% of temperate woodland in NSW has been cleared and many woodland bird species are considered to be declining or near-threatened (Reid,, 1999 at http://www.deh.gov.au/biodiversity/threatened/publications/action/birds2000/ pubs/regions/temperate-woodlands). Accordingly the suite of woodland bird species are of conservation significance even though individual species recorded are not listed under the *TSC Act* or *EPBC Act*. The Reid (1999) report into Threatened and Declining Birds in the NSW Sheep Wheat Belt identified 20 bird species as declining and at risk. Suitable habitat for these species is present within the study area. Declining woodland birds recorded during the survey are indicated in **Table 4.**

Section 4 Results

4.2 Field Assessment

4.2.1 Flora

A total of seventy four (74) species were identified from the targeted field surveys conducted by URS Ecology Personnel. None of these species are listed as Endangered under the *TSC* or *EPBC Act*. The species recorded are presented in **Table 3**.

The region was in a period of prolonged drought at the time of the survey and it is likely that many species present as dormant tubers or in the soil seed bank may not have been detected. These may include threatened species detected during the *TSC* and *EPBC Act* searches. Notably *Goodenia macbarronii* and *Swainsona murrayana* are annual herbs that appear after rainfall. Suitable habitat and species known to occur in the same habitat/locality were detected during the present survey.

The perennial tussock grasses *Austrostipa metatoris* and *A. wakoolica* have previously been recorded in the region. Fertile fruits are required for species-level identification of this Genus, however both species only flower and fruit after rainfall. A number of low grade vouchers, comprising infertile material, were collected during the October and November 2006 and identified by NSW Herbarium staff to the *Austrostipa* Genus level. It should be noted that four unprotected species of *Austrostipa* were positively identified (**Table 3**) and, as such, it is likely that the voucher specimens are replicated in survey results. However the presence of *Austrostipa metatoris* and *A. wakoolica* can not be discounted from the Site due to the drought conditions.

Woodland surveyed in the study area was identified as the *TSC Act* listed EEC Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains & the Brigalow Belt South Bioregions (Fuzzy Box Woodland).

Descriptions of the main vegetation communities recorded during the field surveys are summarised below.

Community No. 1 Fuzzy Box Woodland

Transects:	T2
Quadrats:	5 – 2 vicinity Plant Site, 3 Gas Pipeline
Area of Random Meander:	see **Figures 3a** and **3b**
Listed flora:	Nil
Legislative listing:	*TSC Act* listed EEC Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains & the Brigalow Belt South Bioregions
Areas on Site:	Approximately 47.5 ha in the study area. 1800 m^2 intersected by the Gas Pipeline - see **Figures 5b** and **5c.**
Corresponding Map Units:	Yellow Box/Bimble Box/White Cypress Pine Woodland and Grey Box/White Cypress Pine Woodland (Parkes Shire Council Roadside Management Plan, 2001); 'Fuzzy Box / Grey Box open-woodland on levees and alluvial flats' (Kerr and Jowett, 2003); and 'Community P13 Grey Box Woodlands' (Metcalfe et al, 2003).

The Fuzzy Box Woodland consisted of open woodland (Specht, 1970) with a moderate to dense ground layer of grasses, herbs and exotic weeds (**Plate 4.1**). The dominant canopy species were *Eucalyptus microcarpa* (Grey Box) and *Callitris glaucophylla* with occasional *E. conica* (Fuzzy Box), *E. blakelyi, E. meliodora* and *Brachicyhton populneus*.

Section 4 Results

The shrub-small tree layer was patchy and variable. There were dense stands of juvenile *Callitris glaucophylla* to three metres in height, open areas featuring sparse cover of *Acacia deanii, Dodonea viscosa* and *Senna form taxon 'zygophylla'* to 1.5m, and very sparse cover of *Maireana microphylla* and *Sclerolaena muricata* to 0.5 under denser stands of mature eucalypts.

The groundcover was dense and grassy outside areas dominated by juvenile *Callitris.* It was dominated by native, perennial tussock grasses including *Aristida behriana*, *Austrostipa blackii* and *A.setaceae* along with exotic pasture and environmental weeds including *Lollium perrene*, Paspalum urvilleii** and *Bromus diandus.** Other native groundcover species included the herbs *Vittadenia gracilis, Sida corrugata* and *Calotis cuneifolia* and the scrambler *Eremophila debilis.*

This description is consistent with the *TSC Act* listed EEC Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains & the Brigalow Belt South Bioregions (Fuzzy Box Woodland). Fuzzy Box woodland in the road reserve occurred on alluvial soils associated with an ephemeral drainage channel and colluvial soils on adjacent valley flats. This geomorphic setting is typical of that associated with the EEC. Fuzzy Box (*E. conica)* was sub-dominant in the area surveyed however this is not inconsistent with the listing for the EEC which states that Fuzzy Box often occurs with Inland Grey Box (*E. microcarpa*). Other vegetation community mapping systems record this association as 'Fuzzy Box / Grey Box open-woodland on levees and alluvial flats' (Kerr and Jowett, 2003) and 'Community P13 Grey Box Woodlands' (Metcalfe et al, 2003). The structural description and species composition of the shrub and groundcover layers provided by the DEC is also consistent with the URS field description. The majority of indicative species highlighted in the NSW Scientific Committee final determination were recorded in field surveys. These include *Acacia deanii, Maireana microphylla, Sclerolaena muricata*, *Calotis cuneifolia* and *Eremophila debilis* (Source: http://www.nationalparks.nsw.gov.au/npws.nsf/Content/fuzzy_box_woodland_endangered)

In the Parkes Shire Council Roadside Management Plan (2001) and associated vegetation mapping the study area is mapped as Yellow Box/Bimble Box/White Cypress Pine Woodland and Grey Box/White Cypress Pine Woodland. It is recognised as being of High Conservation Significance.

The Fuzzy Box Woodland is highly fragmented in the regional landscape and features moderate to high levels of disturbance. Areas within the study area are bisected by Condobolin Rd and crossed by several gravel entrance roads and transmission line easements. Smaller fire trails and access roads also pass through the community, particularly towards the western end of the study area in the vicinity of the TransGrid Substation.

Section 4 Results

Plate 4.1. Fuzzy Box Woodland in road reserve south of Condobolin Rd.

Community No 2 Disturbed Remnant Woodland

Transects:	T1
Quadrats:	4 - 3 Plant Site, 1 Gas Pipeline
Area of Random Meander:	see **Figures 3 a and 3b.**
Listed flora:	Nil
Legislative listing:	None
Areas on Site:	Approximately 25 ha in the study area. Approx 500m^2 affected by the Plant Site access road. 1.87 ha intersected by the Gas Pipeline. 2247m^2 intersected by Alternative Section 1. See **Figures 5a**, **5b**, **5c** and **5d**
Corresponding Map Units:	Not applicable

The disturbed remnant woodland consisted of open woodland (Specht, 1970) with a sparse ground layer of grasses, herbs and exotic weeds (**Plate 4.2**). The dominant canopy species were *Eucalyptus microcarpa* and *Callitris glaucophylla* with occasional *E. blakelyi*.

The shrub-small tree layer was patchy or entirely absent. Where present it was dominated by juvenile *Callitris glaucophylla* to three metres in height or *Lycium ferocissimum** to one metre. Other native shrubs were heavily grazed and drought-affected and included the chenopods *Maireana microphylla* and *Sclerolaena diacantha*,

The sparse, patchy ground layer was severely drought affected and heavily grazed with many species appearing dead or dormant at the time of the survey. The groundcover was dominated by native grasses including *Aristida behriana* and *Austrostipa setaceae*, and exotic pasture and crop species including *Hordeum leporinum**(Barley) and *Triticum aestivum** (wheat).

Section 4 Results

There was a patchy cover of native herbs including *Vittadenia gracilis*, *Einadia nutans* subs *linifolia* and *Calotis cuneifolia*.

Plate 4.2. Disturbed Remnant Woodland in Goldrush Rd road reserve in eastern portion of Gas Pipeline.

Community No 3 Ungrazed Cleared Land

Transects:	-
Quadrats:	-
Area of Random Meander:	see **Figures 3a** and **3b**
Listed flora:	Nil
Legislative listing:	None
Areas on Site:	4500 m^2 affected by the Plant Site access road. <1 ha intersected by the Gas Pipeline and Alternative Section 1.
Corresponding Map Units:	Not applicable

Ungrazed Cleared Land consisted of grassland or shrubland (Specht, 1970) with occasional isolated paddock trees. This community was restricted to the margins of croplands, fencelines and road reserves and was differentiated from the more widespread Grazed Cleared Land by its moderate to dense ground cover (**Plate 4.3**).

Isolated trees included *E. microcarpa*, *Callitris glaucophylla, Brachichyton populneus* and *Melia azederach*.* The shrub-small tree layer was patchy and dominated by *Lycium ferocissimum**, and *Acacia deanii* to one metre or smaller native shrubs included the chenopods *Maireana microphylla* and *Sclerolaena diacantha.*

Groundcover was moderate to dense, but still noticeably drought affected. Percentage cover was visibly related to local variation in soil moisture and was greatest on road margins and drainage lines. Species composition was diverse and highly variable with individual patches dominated by native shrubs and

Section 4 Results

herbs, tussock grasses or environmental weeds respectively. Examples included: perennial native grasses such as *Austrostipa nodosa* and *A. setaceae;* the chenopods *Maireana microphylla* and *Sclerolaena diacantha*; escaped crops including wheat and barley; pasture grasses; and environmental weeds such as *Cyrsium vulgare*, Carthamus lanatus** and *Echium plantagineum*.*

Plate 4.3. Ungrazed cleared land along Gas Pipeline route.

Community No 4 Grazed Cleared Land

Transects:	-
Quadrats:	-
Area of Random Meander:	See **Figure 3b**
Listed flora:	Nil
Legislative listing:	None
Areas on Site:	Over 500 ha in the study area. 8 ha intersected by the Gas Pipeline.
Corresponding Map Units:	Not applicable

Grazed Cleared Land consisted of very open (tussock) grassland or dwarf open-heathland (Specht, 1970) with occasional isolated paddock trees (**Plate 4.4**).

Isolated trees and the shrub-small tree layer were equivalent to Community 4 (above).

The groundcover was sparse, heavily grazed and severely drought affected. Most grasses were dry, infertile and dormant, making identification impossible. Species diversity was very low and dominated by escaped crops including wheat and barley; pasture grasses; and environmental weeds such as *Cyrsium vulgare*, Carthamus lanatus** and *Echium plantagineum*.* Native vegetation was restricted to: very sparse cover of the herb *Vittadenia gracillis;* heavily grazed chenopods; saltbush *Einadia nutans* subsp *linifolia;* and isolated clumps of perennial native grasses such as *Austrostipa setaceae.*

Section 4 Results

Plate 4.4. Grazed Cleared land along Gas Pipeline route.

Community No 5 Ploughed Cropland

Transects:	-
Quadrats:	P4
Area of Random Meander:	See **Figures 3a, 3b**
Listed flora:	Nil
Legislative listing:	None
Areas on Site:	Over 500 ha in the study area. The entire Plant Site footprint of 4.7ha, 5.9 ha intersected by the Gas Pipeline.
Corresponding Map Units:	Not applicable

Cropland contained the occasional isolated paddock tree with the shrub-small tree layer entirely absent (**Plate 4.5**).

The groundcover was sparse and severely drought affected with wheat crops either severely stunted, absent or converted to grazing. Species diversity was very low and dominated by the environmental weeds *Echium plantagineum** and *Hypochaeris radicata**. Native vegetation was restricted to very sparse cover of the herb *Vittadenia gracillis* and the occasional saltbush *Einadia nutans* subsp *linifolia.* Grasses were typically dry and dormant, making identification impossible.

Section 4 Results

Plate 4.5. Ploughed cropland along the Gas Pipeline route.

4.2.2 Fauna

The 2006 fauna surveys recorded one species of reptile, thirty eight (38) species of bird, and four mammals. These species are listed in **Table 4,** the majority of which are generally common and widespread species. One species threatened species was recorded during surveying, the Grey-crowned Babbler and is listed as Vulnerable under the *TSC Act.*

The thirty eight (38) species of bird were recorded during both diurnal surveys and opportunistically whilst traversing the Site (see **Table 4**). Species observed in cleared agricultural land included common open country species such as Galahs, Australian Magpie and Noisy Miner. A wider range of species were observed in disturbed woodland remnants and in cleared land along the margins of intact native vegetation. These included the Apostlebird, White-winged Chough, Willy Wagtail, Eastern Rosella, Blue Bonnet and Red-rumped Parrot.

Intact Fuzzy Box Woodland supported the greatest diversity of bird species including all observations of the *TSC Act* listed Grey-crowned Babbler and declining woodland bird species identified in the Reid (1999) report. These included the Rufous Whistler, Red-capped Robin, Varied Sitella and Dusky Woodswallow. Other bird species observed included the Brown-headed Honeyeater, Brown Thornbill, Yellow-rumped Thornbill, White-plumed Honeyeater and Blue-faced Honeyeater.

One native mammal was recorded: the common and widespread Eastern Grey Kangaroo. Other mammals observed were exotic pest species.

One reptile species, *Cryptoblepharus carnabyi*, was recorded opportunistically on a tree trunk in disturbed woodland in the eastern portion of the Proposed Gas Pipeline route. The limited number of reptiles observed was unexpected given the timing of the surveys, and may reflect poor quality habitat through the study area. However it may also reflect the extended drought currently affecting the region and a lack of insect prey for reptiles.

No amphibians were recorded during the 2006 surveys, reflecting and indicative of the extended drought currently affecting the region.

Section 4 Results

4.3 Habitat Assessment

Habitat features considered in assigning the quality of habitat on Site were:

- native diversity in ground flora;
- structural and floristic diversity of vegetation layers, particularly presence or absence of midstorey vegetation in areas of remnant vegetation (shrubs and regenerating eucalypts) and presence of native tussock grasses;
- presence and quantity of litter layer and fallen dead timber;
- level of shelter, breeding, roosting and nesting resources available;
- presence of stem hollows and quantity of mature hollow bearing trees;
- exfoliated bark, feed trees and shrubs;
- fauna movement corridors;
- position in the landform, connectivity or value as a habitat corridor;
- presence of rocky outcrops or scattered partially buried rocks; and
- presence, size and ecological integrity of remnant communities.

4.3.1 Fuzzy Box Woodland

The Fuzzy Box Woodland was found to support a medium range of flora species and a structural and floristic diversity of vegetation layers. This vegetation is characterised by open woodland featuring mature canopy trees with a moderate to dense ground layer of grasses, herbs and exotic weeds which could support a variety of native fauna species. This vegetation type is fragmented regionally; however a thin strip of degraded woodland vegetation creates an intermittent connection to other remnants.

Goodenia macbarronii is an annual which appears seasonally and opportunistically in ephemerally damp or wet sites. It can be found in sites with some form of recent disturbance, such as depressions and clearings made by grading and excavation along roadsides, open grazing land and paddocks inundated by weed species, so this species could occur in Fuzzy Box Woodland during wetter periods. *Diuris sheaffiana* grows in sclerophyll forest among grass, so it is possible this species could occur within this vegetation type in the study area. The threatened spear grasses including *Austrostipa metatoris* and *A. wakoolica* require sandy floodplains areas so are unlikely to be found within the Fuzzy Box Woodland. *Swainsona murrayana* often grows with *Maireana* species on heavy soils. This species could potentially occur within Fuzzy Box Woodland in the study area.

A number of large hollows particularly within mature *Eucalyptus* trees were observed within the Fuzzy Box Woodland community (refer **Figure 5b**) which may provide habitat to woodland birds, microchiropteran bats (micro bats), and some local reptile species Given the limited extent and connectivity of woodland and/or forest in the study area it is unlikely that large forest owls or arboreal fauna species are abundant.

Schedule 2 of *SEPP 44* identifies key feed tree species for the koala and defines potential koala habitat as areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. No primary food tree species were recorded within the study area. Therefore *SEPP 44* does will not apply to the proposed development.

Section 4 Results

However the species is also listed under the TSC Act and the draft Recovery Plan for the koala lists Secondary Food Tree Species for each Koala Management Area[1]. The study area falls within Area No. 6 (Western Slopes and Plains). Fuzzy Box Woodland observed on Site contained high densities (>75% of the total number of trees) of the Secondary Food Trees *Eucalyptus microcarpa* and *E. blakelyi*. These may provide high-quality habitat for the species. There are two historical records for the species in the Parkes LGA, including one in an equivalent area of road reserve vegetation[2]. On this basis Fuzzy Box Woodland in the study area was considered potentially significant habitat for the species. However no Koala scats or scratch marks were recorded during the survey period.

4.3.2 Disturbed Woodland

Disturbed woodland vegetation was found to support some mature canopy trees and a sparse midstorey (lack of diversity and abundance in shrubs and regenerating eucalypts) with moderately sparse ground cover of grasses, herbs and weeds. Some of the threatened species previously identified in the wider area could potentially be found within this vegetation type however due to the lack of ephemerally damp areas the threatened *Goodenia macbarronii* is unlikely to occur in this vegetation type.

Due to the fragmented nature of this vegetation type and lack of midstorey, Disturbed Woodland has limited potential to provide habitat for threatened species, however it could support some fauna species and provide habitat such as hollows and fallen timber.

4.3.3 Cleared Cropland and Pasture

The majority of the study area classified as Cleared Cropland and Pasture has been previously cleared for agriculture, particularly wheat which involves the tilling of the surface layer, and sheep grazing (Refer to **Figure 5a,5b,**and **5c,**). Cleared cropland and pasture is unlikely to provide optimal habitat for native mammals expected to occur in the surrounding habitat.

4.3.4 Ground Debris

The study area contains areas (Fuzzy Box Woodland in particular) with significant numbers of fallen hollow bearing logs, woody debris, some areas of leaf litter and in some isolated places, a structural and floristically diverse understorey, which would provide habitat for a number of fauna species including woodland birds and reptiles.

4.4 Noxious Weeds

The *Noxious Weeds Act 1993* provides for the declaration of noxious weeds in local government areas. Landowners and occupiers must control noxious weeds according to the control category specified in the Act. Public authorities must control noxious weeds according to the control category to the extent necessary to prevent their spread to adjoining land.

The October and December 2006 baseline surveys revealed relatively widespread and abundant weed species, including Noxious weeds on and adjoining the Site. Noxious Weeds identified during these surveys are listed in **Table 6**. These species are declared Noxious for the Parkes Shire Council and listed under the NSW Department of Primary Industry website[3] which lists the weed, the control class and the control requirements for each species declared.

[1] http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Koala+-+draft+recovery+plan
[2] http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/
[3] http://www.dpi.nsw.gov.au/agriculture/noxweed

Section 4 Results

It must be noted that Parkes Shire Council lists some different species as being Noxious that are not listed by the NSW Department of Primary Industry as being Noxious for this Local Government Area. These species are marked with (**). Additionally, the weed *Echium plantagineum** (Patterson's Curse) is not listed but was abundant at the study area and is declared Noxious for some nearby Local Government Areas and should be included in the management of the site.

Active management on site during construction and operation is required to ensure noxious species do not colonise native vegetation in adjoining areas.

Table 6. Noxious Weeds Recorded

Botanical name Family name	Common Name	Status
Acacia nilotica	Prickly Acacia	1
Lycium ferocissimum	African boxthorn	4
Onopordum acanthium, *and other Onopordum spp.*	Scotch Thistle, Taurean Thistle etc	4
*Sclerolaena birchii***	Galvanised Burr	2

** Declared noxious on Parkes Shire Council website (an invasive native plant)

The Class 1 weed *Acacia nilotica* must be notified to the local control authority and fully and continuously suppressed and destroyed. (http://www.dpi.nsw.gov.au/agriculture/noxweed/).

The Class 2 weed *Sclerolaena birchii* must be fully and continuously suppressed and destroyed.

For the Class 4 weeds including all *Onopordum species* and *Lycium ferocissimum,* the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.

Section 5 Impact Assessment

5.1 Conservation Significance

Three threatened fauna species and one EEC were either recorded during URS field surveys or considered a high likelihood of occurring in the study area. These include:

- Fuzzy Box Woodland;
- Grey Crowned Babbler (*Pomatostomus temporalis temporalis)* - South-eastern population ;*;*
- Koala *(Phascolarctos cinereus);* and
- Greater Long-eared Bat (*Nyctophilus timoriensis)* - South-eastern form*.*

Potential impacts upon these threatened biota as a result of the construction and operation of the proposed power plant and gas pipeline are outlined below. Section 5A of the EP&A Act, although not formally required as part of the Part 3A assessment process, has been addressed as a guide to the consideration of impacts on threatened species, populations and ecological communities listed under the TSC Act. Accordingly, specific 7-part tests of significance were performed for the above-listed biota and are included in **Appendix B**. The assessments conclude that the proposed development is not 'likely' to impose a 'significant effect' on these biota.

Construction at the proposed Plant Site will also affect potential habitat for a number of other listed threatened species that may occur within the study area on a seasonal or transitory basis. A 7-part test of significance was performed for species previously recorded, or predicted to occur in the study area for which suitable habitat is present and is included in **Appendix B**. The full list of these species, and a summary of their habitat requirements and likelihood of occurrence is presented in **Table 2**. The following species were assessed in the generic 7-part test (**Appendix B**):

- *Stagonopleura guttata* Diamond Firetail;
- *Climacteris picumnus* Brown Treecreeper;
- *Burhinus grallarius* Bush Stone-curlew;
- *Cacatua leadbeateri* Major Mitchell's Cockatoo;
- *Grantiella picta* Painted Honeyeater;
- *Lathamus discolor* Swift Parrot;
- *Lophoictinia isura* Square-tailed Kite;
- *Melanodryas cucullata* Hooded Robin;
- *Melithreptus gularis gularis* Black-chinned Honeyeater (eastern subspecies);
- *Ninnox connivens* Barking Owl;
- *Tyto novaehollandiae* Masked Owl;
- *Polytelis swainsonii* Superb Parrot;
- *Xanthomyza phrygia* Regent Honeyeater;
- *Petaurus norfolcensis* Squirrel Glider;
- *Pteropus poliocephalus* Grey-headed Flying-fox;

Section 5 Impact Assessment

The assessment concludes that the proposed development is not 'likely' to impose a 'significant effect' on these species.

5.2 Power Plant Site

5.2.1 Vegetation Clearing and Construction Impacts

The peaking power plant contractor, prior to commencement on the Development Site, would prepare detailed construction programs and methods. These would be dependent on the detailed design and would need to demonstrate compliance with conditions of consent issued for the Parkes Peaking Power Plant Project and other statutory requirements. The power plant site will occupy an area of approximately 4.7 ha on a plot of 200 metres by 235 metres. Buildings would be constructed on site to provide for office work area, amenities, control room, workshop and stores facilities. The plant footprint would be surrounded by a chain mesh fence. Construction activities are to be taken within the site footprint and should not impact on any additional areas of native vegetation.

Flora

No species listed as Threatened under the *TSC* or *EPBC Act* were observed during the field surveys of the Plant Site and there are no previous records of threatened flora occurring on the site.

The Plant Site footprint is located entirely within ploughed cropland. This community has low ecological value. A small number of native plants will be removed however these individuals would be subject to ploughing or grazing if retained in its present state.

Construction of the proposed access road will impact upon up to 8700m^2 of ungrazed, cleared land around the existing Pat Meredith Drive and entrance road to the TransGrid Substation. This area contains moderate quality regrowth of native species.

Construction of the proposed Plant Site will impact upon an approximately 50m wide strip of Disturbed Woodland where the entrance enters the Peaking Power Plant. This strip of vegetation contains mature *E. microcarpa* and *E. blakelyii* (**Figure 5a**). The indicative plant layout places this entrance road in the northwest corner of the Plant Site (**Figure 2a**). This will utilise a gap created by existing fence lines and entrance gates and should result in the removal of less than five mature trees (**Plate 5.1**). It is recommended that an ecologist is present during the detailed design phase to ensure that the final placement of the entrance road impacts upon as few mature trees as is practicable. Understorey through the disturbed woodland was sparse, patchy and consisted of common and widespread species. Clearing of understorey for the entrance road is not likely to be significant.

It is recommended that entire area of remnant woodland to the west of the Peaking Power Plant is combined with proposed landscape plantings, fenced, and planted with understorey species representative of the Fuzzy Box Woodland. This is likely to improve the value of remaining disturbed woodland. The impacts associated with the Peaking Power Plant location with regard to flora are minor in the context of 47.5 Ha of intact woodland in the study area and the disturbed nature of the existing vegetation.

Fauna

The Grey-crowned Babbler, listed as Vulnerable under the *TSC Act* was observed in the vicinity of the Site, whilst surveying for Gas Pipeline and Alternative Sections. Cleared and disturbed woodland habitat in the vicinity of the Plant Site is unlikely to support a local population of the Grey-Crowned Babbler due to a lack of shrub layer and understorey. These areas are also unlikely to provide habitat for declining woodland birds again due to the absence of a shrub layer (Reid, 1993).

Section 5 Impact Assessment

The Plant Site may provide potential foraging habitat for the Greater Long-eared Bat and so a 7-Part test of significance was performed and is included in **Appendix B**. Development at the Plant Site will impact upon up to 8700m^2 of potential foraging habitat associated with clearing of ungrazed cleared land and disturbed woodland for the construction of the proposed access road. The recommended position for the access road will not require the clearing of any significant hollow-bearing trees. Impacts associated with the Plant Site are restricted to previously cleared land and relatively low-grade foraging habitat. It was determined that this not have a significant impact on the long term survival of the Greater Long-eared Bat in the locality.

The Peaking Power Plant Site has moderate habitat value for other native fauna including large macropods and birds. The loss of this area of habitat is of low significance as:

- fauna utilising these areas are likely to be generalist open country species, which are common and widespread in the area; and
- there are substantial areas of equivalent habitat in the vicinity.

The strip of Disturbed Woodland to the west of the Plant Site contains mature *E. microcarpa* and *E. blakelyii* including significant hollow bearing trees (**Figure 5a**). This area contains significant habitat for native birds and possibly also arboreal mammals. An approximately 50m wide strip of Disturbed Woodland will be impacted where the entrance enters the Peaking Power Plant as previously discussed. This will result in the removal of less than five (5) mature trees and no hollow-bearing trees. Again, it is recommended that an ecologist be consulted during the detailed design phase to ensure that the final placement of the entrance road impacts upon as few mature trees as is practicable, and no hollow bearing trees.

Construction of the Plant Site is unlikely to have significant impacts on surrounding areas of higher grade fauna habitat, including Fuzzy Box Woodlands. Areas of quality fauna habitat are already subject to human induced impacts such as disturbance, fragmentation and weed invasion due to the developed nature of the surrounding region. In this context the development of the Plant Site will not significantly increase the degree of disturbance.

Section 5 Impact Assessment

Plate 5.1 Approximate location of proposed entrance road to Plant Site.

5.2.2 Secondary and Operational Impacts

Sediments and runoff

The CEMP should include safeguards and mitigation measures to minimise potential impacts from additional runoff and associated erosion and transfer of sediments. The risk of additional impacts is probably low because:

- the majority of the Plant Site is located on ploughed cropland, which already features substantial areas of bare earth subject to erosion;
- the local area is very flat;
- the local region features low rainfall; and
- there are no water bodies or other sensitive receptors in the vicinity of the Site.

Artificial lighting

Night-time security or operational lighting can potentially discourage habitat use where diffuse light penetrates into adjoining areas of vegetation. Nocturnal foraging regimes could be disrupted and may advantage predators such as cats, dogs and foxes as they are not strictly nocturnal foragers.

Nocturnal species' (such as owls, gliders and possums) eyesight is hindered by bright lights, and where they are affected by this, they become more susceptible to predation.

Construction would only occur during daylight hours and so it unlikely that large floodlights would be required during the construction. It is likely that some lighting may be required for emergencies, maintenance or security. Such lighting should be designed as 'down lights' and not spill outside the areas of disturbance proposed by the development.

Section 5 Impact Assessment

Roads and access

Access off Condobolin Road will be via the existing road, Pat Meredith Drive. Predicted traffic volumes during the construction phase include 70 light vehicle and 8 heavy vehicle trips per day. This will represent a substantial increase in the risk of vehicle collisions with fauna utilising habitats along Pat Meredith drive (the entrance road). Construction would only occur during daylight hours and so vehicle collisions with macro- fauna are unlikely to correspond to travel periods for species present in the area. However as a precautionary measure speed zones from Condobolin Road to the site should be reduced to below 40km/hr during construction.

During the operational phase staff levels are expected to average one (1) full time person with up to two (2) more on an intermittent basis would be generated generating up to two (2) vehicle trips over the morning and evening peak periods. This volume of operational traffic is likely to have a minor impact upon travelling macro-fauna. Additional traffic generated by the Parkes Peaking Power Plant is expected to be negligible compared to the current use of the Condobolin Road and so is unlikely to have significant impacts on native fauna utilising habitats through this area.

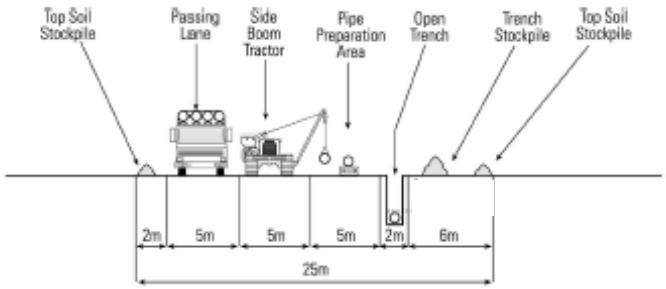
5.3 Gas Pipeline

The Gas Pipeline will be constructed in accordance with the requirements of AS 2885 and the APIA *Code of Environmental Practice*.

Construction activities will be typical of modern gas pipeline projects and will involve the following key steps:

- Clearing of vegetation and grading of the right-of-way to prepare a safe construction area and to protect and preserve top soil.
- Creation of a trench in which to lay the gas pipeline. This will be undertaken by a trenching machine or excavator, but may involve rock hammers or blasting in isolated areas if necessary.
- Crossing watercourses by open cut, boring or horizontal directional drilling methods.
- Crossing of railway and major roads by open cut, boring or horizontal directional drilling methods appropriate to the requirements of the respective asset owners.
- Installation of cathodic protection systems
- Cleaning up and restoring the construction right-of-way and all disturbed work areas.
- Installation of appropriate signage

The figure below illustrates the layout of a typical construction right-of-way



Section 5 Impact Assessment

5.3.1 Vegetation Clearing and Construction Impacts

The most efficient and cost-effective construction techniques are likely to involve large excavators and other plant, and impact upon a width of approximately 25m. It is recommended that a low impact construction approach be adopted through sensitive environments, such as extant Fuzzy Box Woodland in the road reserve along Condobolin Road and in the vicinity of significant habitat trees (**Section 6**). Such an approach will reduce the width of construction impacts to as little as 7m. Construction techniques and equipment will be finalised after the detailed design process and once the contract for construction has been awarded. Areas impacted are estimated based on the indicative construction footprints outlined above.

The Gas Pipeline will impact upon approximately 1,800 m^2 (or 0.18 hectares) of *TSC Act* listed Fuzzy Box Woodland. Assuming a 25m strip of direct construction impacts outside the Fuzzy Box Community, the Gas Pipeline will also impact upon approximately:

- 1.87 ha of disturbed woodland;
- 8 ha of grazed cleared land;
- <1 ha of ungrazed cleared land, comprising 0.45 ha at its eastern end and isolated strips in the vicinity of fencelines and road crossings; and
- 5.9 ha of ploughed cropland.

Flora

No plant species listed as Threatened under the *TSC* or *EPBC Act* were observed along the Gas Pipeline route.

Construction of the proposed Gas Pipeline will require the clearing of Fuzzy Box Woodland along approximately 257m of its length through the road reserve adjoining Condobolin Rd. In line with the mitigation measures outlined in **Section 6** route selection through this area will be supervised by an ecologist and low impact construction techniques will be used. This requires an approximately 7m wide strip of clearing, which amounts to the removal of 1800 m^2 of the community out of a local occurrence of 47.5ha. This impact is assessed in a 7-part test of significance presented in **Appendix B.** After construction this area will be regenerated with species representative of the community. The proposed action may indirectly affect the composition of the Fuzzy Box Woodland by opening up areas for weed invasion and by transmitting weed propagules into the area during construction.

The significance of these impacts is probably of minor importance to the long term survival of Fuzzy Box Woodland in the locality. The impact in this area of Fuzzy Box is limited by:

- the relatively small area to be modified (1800 m^2) balanced with the area remaining in the local area (47.5 ha); and
- the temporary nature of the disturbance, since the removal of habitat is restricted to the construction phase of the proposed Gas Pipeline;
- the recommended regeneration of the Site with species representative of the community; and
- the recommended monitoring and active control of weed infestation throughout the local occurrence of the community.

The Gas Pipeline will impact upon 1.87 ha of disturbed woodland, mainly in the Goldrush Rd road reserve in the eastern portion of the route. No threatened flora species were recorded in this community. Final route selection (**Section 6**) will aim to reduce the number of adult trees to be removed as far is

Section 5 Impact Assessment

practicable. It is likely that construction will result in the removal of less than 20 mature trees including *Eucalyptus microcarpa* and *Callitris glaucophylla.* This loss is significant in the context of the extent of clearing of the surrounding area. The understorey through this area is heavily grazed and depauperate. The loss of understorey species through this area is probably of low significance.

Cleared areas of the Gas Pipeline route have limited vegetation values and are well represented in the surrounding region. Disturbance of these areas is likely to be of low significance.

There will be no above ground infrastructure associated with the Gas Pipeline itself. At the eastern end of the Gas Pipeline, near the Central West Pipeline tee off, there will be a gas off-take housed in an approximately 10m x 10m compound surrounded by mesh fencing. The construction of this infrastructure will remove a dense understorey of native and exotic grasses. The significance of this loss of vegetation is likely to be low in the context of the large areas of similar open country in the surrounding region.

Fauna

The Grey-crowned Babbler, listed as Vulnerable under the *TSC Act,* was observed in Fuzzy Box Woodland along the proposed Gas Pipeline route. This habitat will be impacted upon by the construction of the proposed Gas Pipeline and so a 7-Part Test of significance was performed for this species and is included in **Appendix B**. It was determined that the habitat that will be removed is probably of minor importance to the long term survival of the Grey-crowned Babbler in the locality. Other declining woodland birds included the Rufous Whistler, Red-capped Robin, Varied Sitella and Dusky Woodswallow (Reid, 1993) were recorded along the Gas Pipeline route. The area of Fuzzy Box Woodland impacted is also likely to constitute significant habitat for these species.

The significance of impacts upon these species is likely to be minor due to:

- the relatively small area to be modified (1800 m^2) balanced with the area remaining in the local area (47.5 ha);
- the temporary nature of the disturbance, since the removal of habitat is restricted to the construction phase of the proposed Gas Pipeline; and
- the character of the extant vegetation. Due to the open structure and disturbed state of surrounding Fuzzy Box Woodland it is likely that regenerated areas will have similar habitat values to extant vegetation in the medium to long term.

Detailed final route selection, a pre-clearing survey by an ecologist and a low impact construction approach will be required through Fuzzy Box Woodland in order to minimise impacts on woodland birds as far as is practicable (**Section 6**). Final route selection should incorporate a targeted survey for Grey-crowned Babbler nests. Family groups of babblers occupy conspicuous football-sized nests that are maintained year-round and used as nocturnal roosts (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile). If any nests are observed along the proposed Gas Pipeline then the route will be diverted as far as practicable away from the nests within the available easement. An approximately 150m wide strip through the road reserve is available for route selection and so this approach may mitigate impacts upon a local family group of the Grey-crowned Babbler. There will be temporary impacts upon the species in the vicinity from construction noise and other disturbance.

Clearing for the proposed Gas Pipeline will disturb foraging habitat and potentially diurnal roost sites for micro bats and so a 7-Part Test of significance was performed for the Greater Long-eared Bat and is included in **Appendix B**. Potential foraging habitat for the Grey-headed Flying Fox occurs in the study area and will be impacted by the proposal. The species has a predominantly coastal distribution with significant concentrations around core areas of habitat. The removal of small areas of foraging habitat near the western limits of the distribution of the species is unlikely to result in significant impacts.

Section 5 Impact Assessment

Plate 5.2. Existing disturbance in Fuzzy Box Woodland in the vicinity of the Gas Pipeline route.

Food tree species listed in the draft Recovery Plan for the koala are present in Fuzzy Box Woodland in the road reserve along Condobolin Road[4]. This habitat will be impacted upon by the construction of the proposed Gas Pipeline and so a 7-Part Test of significance was performed for the Koala and is included in **Appendix B**. as previously discussed in relation to the Fuzzy Box Community, it is recommended that a low impact construction approach be adopted through this area and that an ecologist assist in final route selection to ensure that as few feed trees are removed as is practicable (**Section 6**). It is likely that the construction of the proposed Gas Pipeline will result in the removal of a minor number of koala feed trees. Given the historical nature of the Atlas records and no evidence of recent Koala activity, it was determined that this is unlikely to have a significant impact on a local population of the species.

Clearing for the proposed Gas Pipeline will impact upon potential foraging habitat, roosting and nest sites for a number of other listed threatened species that may occupy the study area on a seasonal or transitory basis. These include species previously recorded within 10km of the site for which suitable habitat is present. An additional three species the Squirrel Glider (*Petaurus norfolcensis*), Barking Owl (*Ninox connivens*) and Masked Owl *(Tyto novaehollandiae*) have previously been recorded in Parkes LGA and could potentially occur in Fuzzy Box Woodland and other habitats within the study area.

Clearing part of the Fuzzy Box Woodland may result in the removal of important habitat trees including trees with stem-hollows. These may provide shelter and roosting habitat for native owls and arboreal mammals, potentially including the Squirrel Glider (*Petaurus norfolcensis*), Barking Owl (*Ninox connivens*) and Masked Owl *(Tyto novaehollandiae*). As stated above, an ecologist will assist in final route selection and minimise the number of habitat trees removed as far as is practicable.

The Gas Pipeline will impact upon 1.87 ha of disturbed woodland. No threatened fauna species were recorded in this community. It is likely that construction will result in the removal of approximately 20

[4] http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Koala+-+draft+recovery+plan

mature trees including important hollow-bearing trees. These are likely to provide roosting habitat for open country bird species and possibly also micro bats, including the threatened Greater Large-eared Bat. This loss of habitat is not inconsiderable in the context of the extent of clearing of the surrounding area, however is unlikely to place local populations of the Greater Large-eared Bat or other arboreal species at risk of extinction.

The understorey through this area is unlikely to provide habitat for threatened mammals or reptiles due to its highly disturbed and degraded state. This section of the Gas Pipeline is unlikely to provide significant habitat for the Grey crowned Babbler or declining woodland birds due to the sparse small tree-shrub layer. The loss of habitat values associated with the understorey is probably of low significance.

Cleared areas of the Gas Pipeline route provide good quality foraging habitat for open country bird species including Galahs, Blue Bonnets and Red-rumped Parrots which were all abundant during field surveys. The construction is unlikely to have significant impacts upon these species due to:

- the temporary nature of the disturbance;
- the large areas of equivalent habitat in the surrounding region.

Cleared areas are probably used by large macropods however are unlikely to provide optimal habitat for other native mammals including arboreal species that may occur in the surrounding treed habitat. Open country places smaller mammals at risk of predation and is only likely to be of value if it represents a significant additional food resource. Only limited foraging resources are available in these areas due to their heavily grazed, degraded state.

Construction of the Central West Pipeline tee-off will effectively remove any habitat values associated with an approximately 10m x 10m area. This area contains ungrazed cleared country with a dense understorey of native and exotic grasses. The significance of this loss of habitat is likely to be low in the context of the large areas of similar open country in the surrounding region.

Plate 5.3. Gas Main tee-off site at eastern end of Gas Pipeline. Signpost to right of plate indicates existing Gas Main.

Section 5 Impact Assessment

5.3.2 Secondary and Operational Impacts

Secondary construction impacts may include increased risk of soil erosion and transmission of weed propagules. In line with the mitigation measures outlined in **Section 6** these will be addressed by the Construction and Environmental Management Plan and are unlikely to result in significant impacts.

There are unlikely to be operational impacts associated with the construction of the Gas Pipeline since the ground surface will be reinstated and revegetated and maintenance will be performed by an automated "pipe pig". There will be no above ground infrastructure associated with the Gas Pipeline itself. The gas off-take at the eastern end of Gas Pipeline, and associated 10m x 10m compound, is an automated facility. It will require no lighting and infrequent maintenance. Secondary impacts associated with its operation are likely to be minor and localised.

5.4 Alternative Section 1

5.4.1 Vegetation Clearing and Construction Impacts

Flora

Alternative Section 1 is likely to impact upon approximately 2,247m^2 of disturbed remnant woodland. No Threatened Species under the *TSC* or *EPBC Act* or habitat were recorded in the vicinity.

Final route selection (**Section 6**) will aim to reduce the number of adult trees to be removed as far is practicable. Alternative Section 1 passes through disturbed woodland along a road reserve. This is likely to have significantly lower ecological impacts than the proposed route, which passes through relatively intact Fuzzy Box Woodland. Construction along Alternative Section 1 will result in the removal of 5-10 mature trees including *Eucalyptus microcarpa* and *Callitris glaucophylla.* This loss is notable in the context of the extent of clearing of the surrounding area, however is likely to be fewer than along the proposed route.

The groundcover through this area is depauperate and infested with environmental weeds. The loss of understorey species through this area is of low ecological significance.

Fauna

Alternative Section 1 will impact upon marginal habitat for the Grey-crowned Babbler and declining woodland birds. It is continuous with significant habitat in the road reserve but has lower habitat value due to the sparse small tree-shrub layer.

Food tree species listed in the draft Recovery Plan for the Koala are present in the remnant woodland.

Adult trees may provide roosting habitat for open country bird species and possibly also micro bats, including the threatened Greater Large-eared Bat. Loss of this area of habitat is likely to be of minor significance for these species. Mitigation measures will include a detailed tree clearance protocol for significant habitat trees mapped through this area (**Section 6**).

5.4.2 Secondary and Operational Impacts

Secondary and operation impacts for Alternative Section 1 are equivalent to those for the Gas Pipeline outlined above in Section 5.2.2.

Section 6 Mitigation Measures

6.1 Assessment of Alternatives

Location of the Plant Site in cleared agricultural land avoided significant direct impacts on native flora and fauna. A number of alternative Gas Pipeline routes were assessed in order to avoid or minimise impacts. An iterative route selection process could not identify an option that completely avoided impacts on native flora and fauna. Route selection balanced potential impacts with land access, construction access and cost constraints. A February 2007 revision of the route reduced the length of the Gas Pipeline traversing the *TSC Act* listed community Fuzzy Box Woodland (**Chapter 3** URS, 2007). This revision reduced the length of Gas Pipeline intersecting the community from 600m to 257m, which may achieve a reduction in the extent of clearing during construction from 4,200m^2 to approximately 1,800m^2. Since no option was available which completely avoided impacts the following measures were identified to mitigate impacts on native flora and fauna within the Study Area.

6.2 Planning

It is recommended that a Construction Environmental Management Plan and Operational Environment Management Plan be developed and include the mitigation measures outlined below.

6.3 Final Route Selection

6.3.1 Gas Pipeline

It is recommended that an ecologist is present during final route selection as part of the Detailed Design Phase. During the final route placement flora and fauna survey and habitat assessment should specifically target sensitive receptors identified as a result of this assessment, including:

- threatened flora species that may have been dormant at the time of the preliminary investigation;
- Grey-crowned Babbler nests (refer to **Section 5** and **Appendix B**);
- diurnal roosts for Greater Long-eared Bats or other threatened micro bats;
- hollow-bearing or other important habitat trees, and
- Koalas and other arboreal fauna.

Any sensitive receptors detected during the final survey should be clearly marked along with the precise location of significant habitat trees recorded during the present study. The ecologist should influence route selection as far as is practicable in order to minimise impacts on flora, fauna and habitats. The route selected must:

- avoid any areas containing Grey-crowned Babbler nests identified;
- avoid any areas containing arboreal fauna or micro-bats if practicable;
- remain at least a crown width away from important habitat trees;
- utilise existing disturbed areas as much as practicable;
- reduce the number of adult trees to be cleared as far as is practicable; and
- avoid areas of dense undergrowth.

Section 6 Mitigation Measures

6.4 Low Impact Construction Approach

The most efficient and cost-effective construction techniques are likely to involve large excavators and other plant, and impact upon a width of approximately 25m. It is recommended that a low impact construction approach be adopted through sensitive environments, including the extant Fuzzy Box Woodland in the road reserve along Condobolin Road and the central portion of the Proposed Gas Pipeline where it passes thorough a narrow strip of Disturbed Woodland immediately to the south of extant Fuzzy Box Woodland (**Figure 5c**). It is recommended that less automation and smaller scale plant be utilised through these areas to reduce the width of construction impacts to 7 metres.

6.5 Groundcover Clearance Protocol

Groundcover substrate and especially large woody debris provides highly significant habitat for native fauna, including threatened species. It is recommended that a groundcover clearance protocol be incorporated into the CEMP. This protocol should be adopted through cleared, as well as vegetated, portions of the construction area as isolated pieces of woody debris are likely to have considerable habitat value. It is recommended that the protocol involve the following steps:

- identify significant areas of intact leaf litter or large woody debris and avoid if possible;
- remove large woody debris using excavator grabs or manual handling if practicable (racking);
- place intact large woody debris in adjacent undisturbed areas;
- scrape and stockpile leaf litter and topsoil separately from deeper fill material;
- reinstate leaf litter and topsoil following construction.

6.6 Tree Clearance Protocol

The removal of significant habitat trees (>40cms diameter breast height or any trees with hollows) should occur under a Tree Clearance Protocol (TCP). This measure is recommended to reduce direct impacts to any tree dwelling fauna species, particularly bats. The TCP involves the following stages:

1) Day 1 – Pre-clearing survey by qualified expert/s identifies “habitat” trees (those that have potential roost hollows for bats or arboreal mammals, bird nests in branches, hollows suitable for hole-nesting birds). Bird observations at potential roosts are made during the day.

2) Night 1 – Habitat trees are assessed for fauna presence (bat detectors operated for one hour after dusk, trees with large hollows are spotlighted at dusk).

3) Day 2 – Trees with fauna present are felled with a heavy bulldozer that pushes from the same side as the roost in question so that the roost entrance is uppermost when the tree is lying on the ground. The tree is “tapped” several times with the bulldozer blade to alert any resident fauna and is then pushed using the base of the blade at approximately 1 -2 metres from the ground until it starts to lean. The blade is then lowered to the base of the trunk where major roots protrude, and the tree is then held in position. The tree is then gently lowered to the ground by raising the blade and the machine operator can control the rate of fall to reduce damage. It is assumed that resident fauna will depart of its own accord.

4) Habitat trees with nesting birds are not felled until they are fledged, but if this is not possible they are taken to a WIRES wildlife carer.

Section 6 Mitigation Measures

6.7 Revegetation

It is recommended that the sections of the Gas Pipeline and Alternative Section 1 that pass through Fuzzy Box Woodland or remnant woodland be revegetated after construction. Species selected should be representative of the Fuzzy Box Woodland, and of local provenance. The health of revegetated areas should be monitored closely over subsequent summer periods and supplementary watering supplied as appropriate. Revegetated areas should be monitored for weed infestation and any infestations actively managed as stated in **Section 6.8**.

Landscaping activities are proposed to screen the site from neighbouring properties. It is recommended that these plantings also utilise species representative of Fuzzy Box Woodland and of local provenance. Plantings should incorporate shrubs and understorey species, as well as trees, in order to maximise their potential habitat value.

As stated above fnal route selection will aim to avoid habitat trees as far as is practicable. Any loss of hollow-bearing trees should be offset by providing an equivalent number of suitable nest boxes in mature trees within the vicinity of the impacted area.

6.8 Weed and Pest Management

To limit the spread of weeds into adjoining remnant vegetation during construction of the Plant Site it is recommended that intact areas be temporarily fenced. This should be done prior to construction, restricting access by construction crew and machinery to remnant vegetation. Additionally, stockpiles of fill or vegetation should not be placed in areas of adjoining remnant vegetation but instead within existing cleared areas. A similar protocol should be adopted during construction of the gas pipeline through cleared agricultural land or disturbed woodland within the vicinity of intact vegetation as illustrated in the diagram in **Section 5.2**. The Gas Pipeline route follows exisiting fence lines and so construction crew and machinery can probably be excluded from remnant vegetation without additional fencing.

It is not feasible to fence adjoining areas of intact vegetation during construction of the Gas Pipeline through the Fuzzy Box Woodland in the road reserve adjoining Condobolin Rd. Nonetheless the 7m wide construction easement should be clearly marked and access to remnant vegetation restricted. Stockpiles of fill or vegetation should not be placed in areas of adjoining remnant vegetation but instead within existing cleared areas.

A Weed and Pest management plan should be undertaken as part of the Construction Environmental Management Plan and Operation Environmental Management Plan for the Plant Site. Active control of and the four noxious weeds recorded in the study area will be required in addition to the control of all environmental weeds within the Fuzzy Box road reserve.

6.8.1 Noxious Weeds

The following mitigation measures are recommended for the proposed development:

- Perform a baseline weeds survey to assess the extent and severity of weed infestation in extant native vegetation within the study area pre and post construction;
- Incorporate control measures in the design of the proposed development to limit the spread of weed propagules downstream of the Site;
- During construction: maintenance of silt fences and other mitigation measures to isolate runoff; and immediate rehabilitation of disturbed vegetation to limit the potential for colonisation by weeds;
- During construction areas of vegetation that will not be cleared should be fenced, restricting access by construction crew and machinery to remnant vegetation. Additionally, stockpiles of fill should not be placed in areas of remnant vegetation but instead in adjacent cleared areas;

Section 6 Mitigation Measures

- Post-construction landscape any open areas with indigenous native vegetation typical of the Fuzzy Box community to limit the potential for colonisation by weeds;
- During operations monitor and control the following species in line with legislative obligations;
- Perform ongoing monitoring of weed infestation on and on and adjoining the study area utilising the baseline weeds survey of the Site and its surrounds.

6.9 Soil Erosion / Runoff

The CEMP should formulate safeguard measures to reduce soil erosion and pollutant run-off during both construction and operation phases. Of particular concern is the vicinity of the drainage line that runs through the Road reserve north of Condobolin Rd.

6.10 Site Management

The following mitigation measures are suggested to minimise operational impacts of the proposed development:

- Setting maximum speed limits during construction and operation traffic on Site to reduce fauna road fatalities;
- Limit vehicular and personnel entry into adjacent remnant vegetation during construction and operation through appropriate fencing;
- Using down-lights and motion sensor lighting in order to reduce light spill and the associated secondary impact on nocturnal fauna species potentially utilising the adjoining vegetation; and
- Safeguard measures to reduce soil erosion and pollutant run-off during both construction and operation phases.

Section 7 Conclusions

7.1 Plant Site

Development at the Plant Site for proposed Peaking Power Plant would require the removal of less than five mature trees associated with the entrance road. This loss is a minor impact in the context of extant vegetation in the surrounding area, including woodland to the north and west of the Site and other mature trees along Pat Meredith Drive that should not be disturbed. This impact will be partially offset by areas of landscape plantings around the Site.

The remainder of the Plant Site is situated on ploughed cropland and grazed cleared land with low ecological values.

TSC Act listed species and communities are likely to occur in the surrounding area however 7-part Tests of significance determined that construction and operations at the Plant Site are unlikely to have significant impacts.

7.2 Gas Pipeline and Alternative Section 1

Construction along the proposed Gas Pipeline Route will require the clearing of approximately 0.18 ha (1800m^2) of the *TSC Act* listed Endangered Ecological Community Fuzzy Box Woodland. This area assumes a low impact construction approach is adopted in line with the mitigation measures outlined in this report. A 7-part Test of significance determined that the proposal is unlikely to place the local occurrence of this community at risk of extinction due to:

- the area (approx 47.5 ha) of extant Fuzzy Box Woodland in the local area;
- the temporary nature of the impact, and the recommended revegetation of the Gas Pipeline route through this community.

Fuzzy Box Woodland in the local area is known to support the Grey-crowned Babbler and may also support the Koala and Greater Long-eared Bat, all listed as Vulnerable under the *TSC Act.* The proposal will have a negative impact on resident fauna species, and potential threatened species but these impacts are not likely to be significant given the mobility of the species, the temporary nature of the disturbance and the amount of suitable habitat remaining in the local area.

Construction of the Gas Pipeline and Alternative Section 1 will impact upon approximately 1.87 ha of disturbed remnant woodland containing significant hollow bearing trees. Final route selection will result in the removal of as few adult trees as is practicable. This loss of habitat is not inconsiderable in the context of the extent of clearing of the surrounding area, however is unlikely to place local populations of the Greater Large-eared Bat or other arboreal species at risk of extinction. Alternative Section 1 passes through an area with lower tree density, and highly disturbed undergrowth and is preferable from a flora and fauna impacts perspective.

The remainder of the Gas Pipeline route passes through ploughed cropland and cleared grazed land with low ecological values. There are unlikely to be significant impacts on flora and fauna associated with construction through these areas.

7.3 General

The majority of the areas considered in this assessment comprise cleared landscapes dominated by exotic agricultural pastures with some isolated paddock trees and clumps of exotic shrubs providing few ecological values.

Section 7 Conclusions

Mitigation measures related to construction of the Gas Pipeline and construction and operation of the Gas Plant include:

- Erosion and sediment control;
- Weed Management;
- Regeneration of native vegetation; and
- Complementary Plantings.

This assessment concludes that there is unlikely to be a significant impact on listed *EPBC* or *TSC Act* species or communities. A referral under the EPBC Act is therefore not considered necessary. The revegetation of areas of Fuzzy Box Woodland impacted in the proposal combined with complementary planting of species representative of this community in landscaped areas surrounding the Plant Site should result in no net loss of biodiversity values in the local area.

Section 8 References

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NB: Reference list is incomplete.

Section 9 Limitations

Surveys were undertaken during a period of severe and extended drought and therefore it is possible that some species utilise the Site but were not detected during the survey period. These species are likely to include threatened flora species that flower after rainfall as well as annual, ephemeral or cryptic species. Some fauna species are also mobile and transient in their use of resources and it is likely that not all species (resident or transitory) were recorded during the survey period. The habitat assessment conducted for the Site allows for identification of habitat resources for such species. As such it the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values on Site in order to predict potential impacts of the proposal.

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of GCC and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in our Proposal.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between August – September 2006 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Tables

Tables

Table 1: Threatened plant species recorded or predicted to occur in the study area

Botanical Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Diuris sheaffiana[1]	Tricolour Diuris	V	Grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris* spp.). It is found in sandy soils, either on flats or small rises.[a,b]	Low-medium	Sclerophyll forest with Callitris present in study area however soils predominantly clay-loams or heavier.
Goodenia macbarronii[1]	Narrow Goodenia	V	Narrow Goodenia is an annual which appears seasonally and opportunistically in ephemerally damp or wet sites especially after good winter-rainfall periods. Favours moist, shaded, sandy sites, soils with impeded drainage, damp muddy areas of winter inundation, spring-fed paddocks and open areas where water is more available. Tolerates recent disturbance and areas previously cleared and grazed by cattle.[a]	Medium	Suitable habitat occur along watercourse through the Condobolin Road Reserve.
Austrostipa metatoris[1]	A Spear Grass	V	Grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. Associated species include *Eucalyptus populnea, E. intertexta, Callitris glaucophylla, Casuarina cristata, Santalum acuminatum* and *Dodonaea viscosa*.[a]	Low-medium	Soils and geomorphology in the study area provide marginal habitat.
Austrostipa wakoolica[1,2]	A Spear Grass	E, E1	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans*.[a]	Medium	Suitable habitat in woodland and adjacent cleared grazing land in the study area.

Tables

Botanical Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Swainsona murrayana[1]	Slender Darling-pea, Slender Swainson, Murray Swainson-pea	V	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.[a]	Medium	Suitable habitat in woodland and adjacent cleared grazing land in the study area.

1 =Threatened species listed under TSC Act 1995 previously recorded within 10km of the site
2 = Threatened species or species habitat listed under EPBC Act 1999 predicted to occur in local area.
V= Vulnerable species listed on TSC/EPBC acts.
E1= Endangered species listed on TSC act
E = Endangered species listed on EPBC Act
a = DECC threatened species profile (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx?kingdom=community)
b= Bishop, T (1996), *Field Guide to the Orchids of NSW*, UNSW press.

Tables

Table 2: Threatened fauna species recorded or predicted to occur in the study area

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Aves					
Pomatostomus temporalis temporalis[2,3]	Grey-crowned Babbler (eastern subspecies)	V	Open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Hence birds are generally unable to cross large open areas.[a]	High.	Woodland provides suitable habitat. Observed during October and December 2006 surveys.
Stagonopleura guttata[2,3]	Diamond Firetail	V	Open woodland with understorey of native grasses and intact fallen timber and leaf litter[a]	Medium	Suitable foraging habitat in woodland in study area.
Climacteris picumnus[2,3]	Brown Treecreeper	V	Eucalypt woodland with rough-barked tree species and an open, grassy understorey. Structurally diverse vegetation and intact fallen timber. [a]	Medium	Suitable foraging habitat in woodland in study area.
Burhinus grallarius[1]	Bush Stone-curlew	E1	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.[a]	Medium	Suitable foraging habitat in woodland in study area.
Cacatua leadbeateri[1]	Major Mitchell's Cockatoo	V	A wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Nests in hollows. [a]	Medium	Suitable foraging habitat in woodland, grazing land and cropland in study area.

Tables

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Calyptorhynchus lathami[1]	Glossy Black-Cockatoo	V	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August.[a]	Low	Low concentrations of feed tree species in study area.
Falco hypoleucos[1]	Grey Falcon	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. May be extinct in areas with more than 500mm rainfall in NSW[a]	Low	Potentially suitable foraging habitat in the study area however may be extinct in the region.
Grantiella picta[1]	Painted Honeyeater	V	Migratory, occurs in low population densities. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.[a]	Medium	Woodland in the study area may provide suitable foraging habitat.

Tables

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Grus rubicunda[1]	Brolga	V	Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. They feed primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs. The nest comprises a platform of grasses and sticks, augmented with mud, on an island or in the water. Two eggs are laid from winter to autumn.[a]	Low	Marginal foraging habitat in study area. Rarely seen in southern Australia and unlikely in study area due to prolonged drought and absence of wetlands.
Lathamus discolor [1]	Swift Parrot	E	Use foraging habitat on a cyclic basis depending on food availability. Lerp infested feed trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis.* Blossom-bearing feed trees include winter flowering species such as *Eucalyptus robusta*, *Corymbia maculata*, *C. gummifera, E. sideroxylon,* and *E. albens.*[a]	Medium	Feed tree species present in woodland in the study area.
Leipoa ocellata[1]	Malleefowl	E1	Mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300-450 mm mean annual rainfall) areas. Less frequently other eucalypt woodlands and Gidgee. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy, dense and variable shrub and herb layers.[a]	Low	No mallee in study area. Not known from region in recent past..
Lophoictinia isura[1]	Square-tailed Kite	V	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km^2. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	Medium	Suitable foraging habitat and potential nesting habitat in woodland throughout study area and especially watercourse in Condobolin Road easement.

Tables

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Melanodryas cucullata[1,3]	Hooded Robin	V	Lightly wooded country, usually open eucalypt woodland, *Acacia* scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Home ranges of 10-30 ha. [a]	Medium.	Suitable foraging habitat in woodland in study area
Melithreptus gularis gularis[1]	Black-chinned Honeyeater (eastern subspecies)	V	Upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, *Eucalyptus sideroxylon*, *E. albens*, *E. microcarpa*, *E. melliodora* and *E. tereticornis*. Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. May require large patch sizes (approximately >5Ha).[a]	Medium.	Suitable foraging habitat in woodland in study area.
Ninnox connivens[3]	Barking Owl	V	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. [a]	Medium.	Suitable foraging habitat in woodland and cleared areas adjacent to woodland in study area.
Polytelis swainsonii [1]	Superb Parrot	V	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. [a]	Medium.	Suitable foraging habitat and potential nesting habitat in woodland in study area.
Rostratula australis[1]	Australian Painted Snipe	V	Fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.[a]	Low	No wetland habitats with intact fringing vegetation in the study area.

Tables

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Stictonetta naevosa[1]	Freckled Duck	V	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. [a]	Low.	No permanent freshwater with heavy growth of aquatic vegetation on site.
Tyto novaehollandiae[3]	Masked Owl	V	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.[a]	Medium.	Suitable foraging habitat in woodland and cleared areas adjacent to woodland in study area.
Xanthomyza phrygia[1]	Regent Honeyeater	E	Dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of *Allocasuarina cunninghamiana*. Favours woodlands with significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.[a]	Medium.	Suitable foraging habitat in woodland in study area.
Mammalia					
Phascolarctos cinereus[2]	Koala	V	Open forest and woodland, favouring stands of Manna Gum, Swamp Gum, Forest Red Gum and Swamp Mahogany on high nutrient soils. [a] Forests containing *SEPP 44, Schedule 2* feed tree species.	Medium-high	Feed tree species in woodland in the study area. Recent records in equivalent habitat in the study area.
Pteropus poliocephalus[2]	Grey-headed Flying-fox	V	Tall forests with blossom or fruit-bearing trees. Roosting colonies in dense stands of tall, mature trees[a]	Medium.	Suitable foraging habitat in study area.

Tables

Scientific Name	Common Name	Conservation Status	Habitat Requirements	Potential Occurrence at the Site	Notes
Petaurus norfolcensis[3]	Squirrel Glider	V	Inhabits dry sclerophyll forest and woodland. Potential habitat includes Box-Ironbark woodland and River Red Gum forests. Requires abundant hollow bearing trees and a mix of eucalypts, banksias and acacias.[a]	Medium.	Suitable foraging habitat in study area.
Nyctophilus timoriensis (South-eastern form) [1,2]	Greater Long-eared Bat	V	Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.[a]	High	Suitable foraging and roosting habitat in study area. Recent records in equivalent habitat in the study area.
Osteoycthes					
Maccullochella peelii peelii[1]	Murray Cod, Cod, Goodoo	V	Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries. Macquarie perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. [a]	Nil	No aquatic habitats in the study area.
Macquaria australasica[1]	Macquarie Perch	E	The Murray Cod is sedentary and territorial rather than free ranging, and has a distinct preference for woody debris (snags), debris piles and bank side vegetation that provides shelter from high water velocities.[b]	Nil	No aquatic habitats in the study area.

1 =Threatened species listed under TSC Act 1995 previously recorded within 10km of the site
2 = Threatened species or species habitat listed under EPBC Act 1999 predicted to occur in local area.
3 = Threatened species listed under TSC Act 1995 previously recorded within Parkes LGA
V= Vulnerable species listed on TSC/EPBC acts.
E1= Endangered species listed on TSC act
E = Endangered species listed on EPBC Act
a = DECC threatened species profile (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx?kingdom=community)
b= Bishop, T (1996), *Field Guide to the Orchids of NSW*, UNSW press.
C = Ehmann, H (1997), *Threatened frogs of NSW: Habitats, Status and Conservation,* Frog and Tadpole Study Group.

Tables

Table 3: Plant taxa recorded during the 2006 surveys

Botanical Name	Common Name
Family Name	
Asphodelaceae	
*Asphodelus fistulosus**	Onion Weed
Asteraceae	
Calotis lappulacea	
Carthamus lanatus *	Saffron Thistle
*Centaurea solstitialis**	St Barnabys Thistle
Centipeda cunninghamii	Common Sneezeweed
*Chondrilla juncea**	Skeleton Weed
*Cyrsium vulgare**	Spear Thistle
*Hypochaeris radicata**	Flatweed
*Carthamus lanatus**	Saffron Thistle
*Conyza bonariensis**	Flaxleaf Fleabane
*Onopordum acanthium***	Scotch Thistle
*Onopordum tauricum***	Taurean Thistle
Vittadenia gracilis	New Holland Daisy
Boraginaceae	
*Echium plantagineum**	Patterson's Curse
Bignoniaceae	
Pandorea pandorana "inland form"	Wonga wonga vine
Campanulaceae	
Wahlenbergia communis	Tufted Bluebell
Chenopodiaceae	
Einadia hastata	Berry Saltbush
Einadia nutans subsp, *linifolia*	Climbing Saltbush
Maireana enchylaenoides	
Maireana microphylla	Bluebush
*Sclerolaena birchii***	Galvinized Burr
Sclerolaena diacantha	Grey Copper Burr
Sclerolaena muricata	Black Roly Poly
Salsola kali var. kali	Soft Roly Poly, Prickly salt bush
Convolvulaceae	
Dichondra repens	Kidney Weed
Cupressaceae	
Callitris glaucophylla	White Cypress Pine
Fabaceae	
Subf caesalpinioideae	
Senna form taxon 'zygophylla'	Desert cassia

Tables

Botanical Name	Common Name
Fabaceae	
subf Faboides	
Glycine tabacina	
*Trifolium spp**	Clover
subf Mimosoides	
Acacia deanei	Green's Wattle/Deane's Wattle
Acacia niolotica	Prickly Acacia
Fumariaceae	
*Fumaria densiflora**	Narrow-leaved Fumitory
Juncacea	
Juncus spp	
Malvaceae	
Sida corrugata	
Sida cunninghamii	
Meliaceae	
*Melia azederach**	White Cedar (not indigenous to NSW western slopes)
Mimosaceae	
*Acacia nilotica**	Prickly acacia
Myoporaceae	
Eremophila debilis	Winter Apple
Myrtaceae	
Eucalyptus blakelyi[3]	Blakely's Red Gum
Eucalyptus conica	Fuzzy Box
Eucalyptus melliodora	Yellow Box
Eucalyptus microcarpa[3]	Western Grey Box
Nitaginaceae	
Boerhavia dominii	
Onagraceae	
Epilobium billardierianum ssp. cinereum	
Phormiaceae	
Dianella prunina	Flax Lily
Pittosporaceaea	
Bursaria spinosa	Blackthorn
Plantaginaceae	
*Plantago cunninghamii**	
Poaceae	
Aristida sp.	
Aristida behriana	
Austrostipa sp	A Speargrass

Tables

Botanical Name	Common Name
Austrostipa nodosa	A Speargrass
Austrostipa blackii	A Speargrass
Austrostipa setaceae	A Speargrass
Austrostipa verticillata	Slender Bamboo grass
*Bromus diandrus**	Great Brome
Chloris umbellata	Windmill Grass
Cynodon dactylon	Couch
Digitaria divaricatissima	Umbrella grass
*Hordeum leporinum**	Barley Grass
*Lolium perrene**	Perennial Ryegrass
*Paspalum dilatatum**	Paspalum
*Paspalum urvillei**	Vasey Grass
Poa sieberiana	Snowgrass
*Triticum aestivum**	Wheat
Polygonaceae	
*Rumex brownii**	Swamp dock
*Plantago varia**	Variable Plantain
Rubiaceae	
Psydrax odorata subsp. buxifolia	Shiny-leaved Canthium
Sapindaceae	
Alectryon oleifolius	Western Rosewood, Bonaree
Dodonea viscosa	Giant Hop Bush
Scrophulariaceae	
*Verbascum virgatum**	Twiggy Mullein
Solanaceae	
*Lycium ferocissimum**	African Boxthorn
*Datura ferox**	Ferocious Thornapple
Sterculiaceae	
Brachichyton populneus	Kurrajong

* Exotic
**Declared noxious weed for Parkes City Council
1 =Threatened species listed under TSC Act 1995
2 = Threatened species listed under EPBC Act 1999

Tables

Table 4: Fauna species recorded during the July 2006 survey

Common Name	Scientific Name
Aves	
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow Thornbill	*Acanthiza nana*
Brown Thornbill	*Acanthiza pusilla*
Thornbill sp.	*Acanthiza sp*
Dusky Woodswallow	*Artamus cyanopterus*
Galah	*Cacatua roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Australian Wood Duck	*Chenonetta jubata*
Black-faced Cuckoo Shrike	*Coracina novaehollandiae*
White-winged Chough	*Corcorax melanorhamphos*
Australian Raven	*Corvus coronoides*
Pied Butcherbird	*Craticus nigrogularis*
Grey Butcherbird	*Craticus torquatus*
Varied Sittella	*Daphoenositta chrysoptera*
Dollarbird	*Eurystomus orientalis*
Peaceful Dove	*Geopelia placida*
Crested Pigeon	*Geophaps lophotes*
Western Gerygone	*Gerygone fusca*
Australian Magpie-Lark	*Grallina cyanoleuca*
Australian Magpie	*Gymnorhina tibicen*
Welcome Swallow	*Hirundo neoxena*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
White-plumed Honeyeater	*Lichenostomus penicillatus*
Noisy Miner	*Manorina melanocephala*
Brown-headed Honeyeater	*Melithreptus brevirostris*
Blue Bonnet	*Northiella haematogaster*
Rufous Whistler	*Pachycephala rufiventris*
Red-capped Robin	*Petroica multicolor*
Rose Robin	*Petroica rosea*
Little Pied Cormorant	*Phalacrocorax fuscescens*

Tables

Common Name	Scientific Name
Eastern Rosella	*Platycercus eximius*
Grey-crowned Babbler (eastern subspecies)[2]	*Pomatostomus temporalis temporalis*[2]
Red Rumped Parrot	*Psephotus haematonotus*
Grey Fantail	*Rhipidura fuliginosa*
Willie Wagtail	*Rhipidura leucophrys*
Apostlebird	*Struthidea cinerea*
Masked Lapwing	*Vanelles miles*
Mammalia	
European Hare*	*Lepus europeaus*
Eastern Grey Kangaroo	*Macropus giganteus*
European Rabbit*	*Oryctolagus cuniculus*
European Fox*	*Vulpes vulpes*
Reptilia	
Spiny-palmed Snake-eyed Skink	*Cryptoblepharus carnabyi*

1 = Threatened species listed under EPBC Act 1999
2 = Threatened species listed under TSC Act 1995
* = exotic