



International Power



CHAPTER 12

Flora and Fauna

URS

Flora and Fauna – Summary of Outcomes

Development for the proposed Parkes Peaking Power Plant is mainly restricted to cleared agricultural land with low ecological values. Construction of the entrance road will require the clearing of some mature trees and a small area of disturbed natural vegetation. Flora and fauna within this area are generally widespread and common species. Impacts associated with this clearing will be partially offset by areas of landscape plantings around the Site. Threatened Species Conservation Act (TSC Act) listed species and communities are likely to occur in the surrounding area however construction and operations at the Peaking Power Proposed power plant site are unlikely to have significant impacts.

Construction along the proposed natural gas pipeline will require the clearing of an area of the TSC Act listed Endangered Ecological Community Fuzzy Box Woodland. Impacts were assessed on the basis of a low impact construction approach being adopted through this area, which would minimise the amount of clearing required. 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 of extant Fuzzy Box Woodland in the local area and the temporary nature of the impact.

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. A number of other TSC and EPBC Act listed species may occupy the study area on an occasional basis. 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.

A section of the natural gas pipeline route will impact upon disturbed remnant woodland requiring the clearing of adult trees. 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 remainder of the natural 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.

Chapter 12

Flora and Fauna

12.1 Introduction

URS Australia Pty Ltd (URS) was engaged by International Power (Australia) Pty Ltd 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

This assessment considers the flora and fauna impacts of the 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*. The assessment was conducted for the site for the proposed power plant (the power plant site) and the proposed natural gas pipeline route. The full flora & fauna assessment is presented in **Appendix E** of this Environmental Assessment.

12.2 Methodology

The methodology for this assessment included the following elements:

- review of previous studies;
- literature review;
- flora survey; and
- fauna survey.

These methods are discussed in more detail below.

12.3 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 power 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 natural gas pipeline);
- EPBC online Protected Matters Database Search for the power plant site (November 2006 – a Selected Polygon centred on the Site buffered at 10km).
- EPBC online Protected Matters Database Search for the natural gas pipeline (November 2006 - Selected Line tracing the Natural Gas Pipeline Route buffered at 10km);

12.4 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 natural 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 *DECC Threatened Biodiversity and Assessment; Guidelines for Developments and Activities Working Draft* (2004). All vascular taxa observed were recorded on appropriate proforma field data sheets.

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*.

12.5 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 DECC (2004) working draft survey guidelines. Methodologies employed to survey fauna included:

- Random Meander (Cropper 1993);
- Opportunistic observations;
- Diurnal bird counts;
- Active searches for reptiles;
- Fauna habitat assessment including specific targeting of known koala feed trees as per Spot Assessment methodology prescribed in Phillips and Callaghan (1995); and
- Ground debris searches, including active searches for scats.

Chapter 12

Flora and Fauna

12.6 Results of Assessment

12.6.1 Literature Review

Flora

The results of the desktop literature review identified the following:

- Five (5) threatened plant species listed under the *EPBC Act* and/or the *TSC Act*, which have been previously recorded, or are predicted to occur 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 potentially likely to occur in the study area. This list of threatened plant species, including their conservation status, is presented 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 *EPBC Act* listed Endangered Ecological Community (EEC) 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland' and the *TSC Act* listed EEC 'Fuzzy Box Woodland' predicted to occur in the study area.

Fauna

The fauna literature review identified the following:

- Approximately twenty-two (22) Threatened fauna species listed under the *TSC Act* and/or the *EPBC Act* which have been previously recorded or are predicted to occur within the region. 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. 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-threatened¹. 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.

¹ (Ried, 1999 <http://www.deh.gov.au/biodiversity/threatened/publications/action/birds2000/pubs/regions/temperate-woodlands>)

12.6.2 Field Assessment

Flora

A total of five primary vegetation communities were recorded across the study area and within the footprint of the Parkes Peaking Power Plant, one of which forms a component of the EEC Fuzzy Box Woodland which is listed as endangered under the *EPBC Act* and the *TSC Act*. 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).

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 (**Appendix E**) and, as such, it is likely that the voucher specimens are replicated in survey results. However the presence of *Austrostipa metatoris* and *A. wakoolica* cannot be discounted from the Site due to the drought conditions.

The five vegetation communities identified in the field assessment were:

- *Community No. 1 Fuzzy Box Woodland*: Open woodland (Specht, 1970) with a moderate to dense ground layer of grasses, herbs and exotic weeds. The dominant canopy species were *Eucalyptus microcarpa* (Grey Box) and *Callitris glaucophylla* with occasional *E. conica* (Fuzzy Box), *E. blakelyi*, *E. meliodora* and *Brachycton populneus*. The shrub-small tree layer was patchy and variable. The groundcover was dense and grassy outside areas dominated by juvenile *Callitris*. 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*).
- *Community No. 2 Disturbed Remnant Woodland*: Open woodland (Specht, 1970) with a sparse ground layer of grasses, herbs and exotic weeds. 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. 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. There was a patchy cover of native herbs.

Chapter 12

Flora and Fauna

- *Community No. 3 Ungrazed Cropland:* 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 Cleared Grazed Land by its moderate to dense ground cover.
- *Community No. 4 Cleared Grazed Land:* very open (tussock) grassland or dwarf open-heathland (Specht, 1970) with occasional isolated paddock trees. The groundcover was sparse, heavily grazed and severely drought affected. Species diversity was very low and dominated by escaped crops including wheat and barley; pasture grasses; and environmental weeds.
- *Community No. 5 Ploughed Cropland:* Cropland contained the occasional isolated paddock tree with the shrub-small tree layer entirely absent. The groundcover was sparse and severely drought affected with wheat crops either severely stunted, absent or converted to grazing. Species diversity was very low. 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.

Fauna

The 2006 fauna surveys recorded one species of reptile, thirty eight (38) species of bird, and four mammals. These species are listed in **Appendix E**, 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. 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. 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.

Habitat Descriptions

The following provides habitat descriptions for each of the vegetation communities surveyed for the Parkes Peaking Power Plant. These were used to assess the likelihood of threatened species occurring within the study area.

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 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.

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 ephemeral 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 which may provide habitat to woodland birds, micro bats, some local reptile species, however 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.

Chapter 12

Flora and Fauna

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 not apply to the proposed development.

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 Area². 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 vegetation³. 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.

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 ephemeral 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 mid-storey, 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.

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. Cleared cropland and pasture is unlikely to provide optimal habitat for native mammals expected to occur in the surrounding habitat including arboreal species.

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.

² <http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Koala+-+draft+recovery+plan>

³ <http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/>

12.7 Impact Assessment

12.7.1 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;
- *Pomatostomus temporalis temporalis* Grey Crowned Babbler - South-eastern population;
- *Phascolarctos cinereus* Koala; and
- *Nyctophilus timoriensis* Greater Long-eared Bat - 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 to **Appendix E**. 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 to **Appendix E**. The full list of these species and a summary of their habitat requirements and likelihood of occurrence is presented in Table 2 of **Appendix E**. The following species were assessed in the generic 7-part test:

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

Chapter 12

Flora and Fauna

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

12.7.2 Power Plant Site

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 development 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

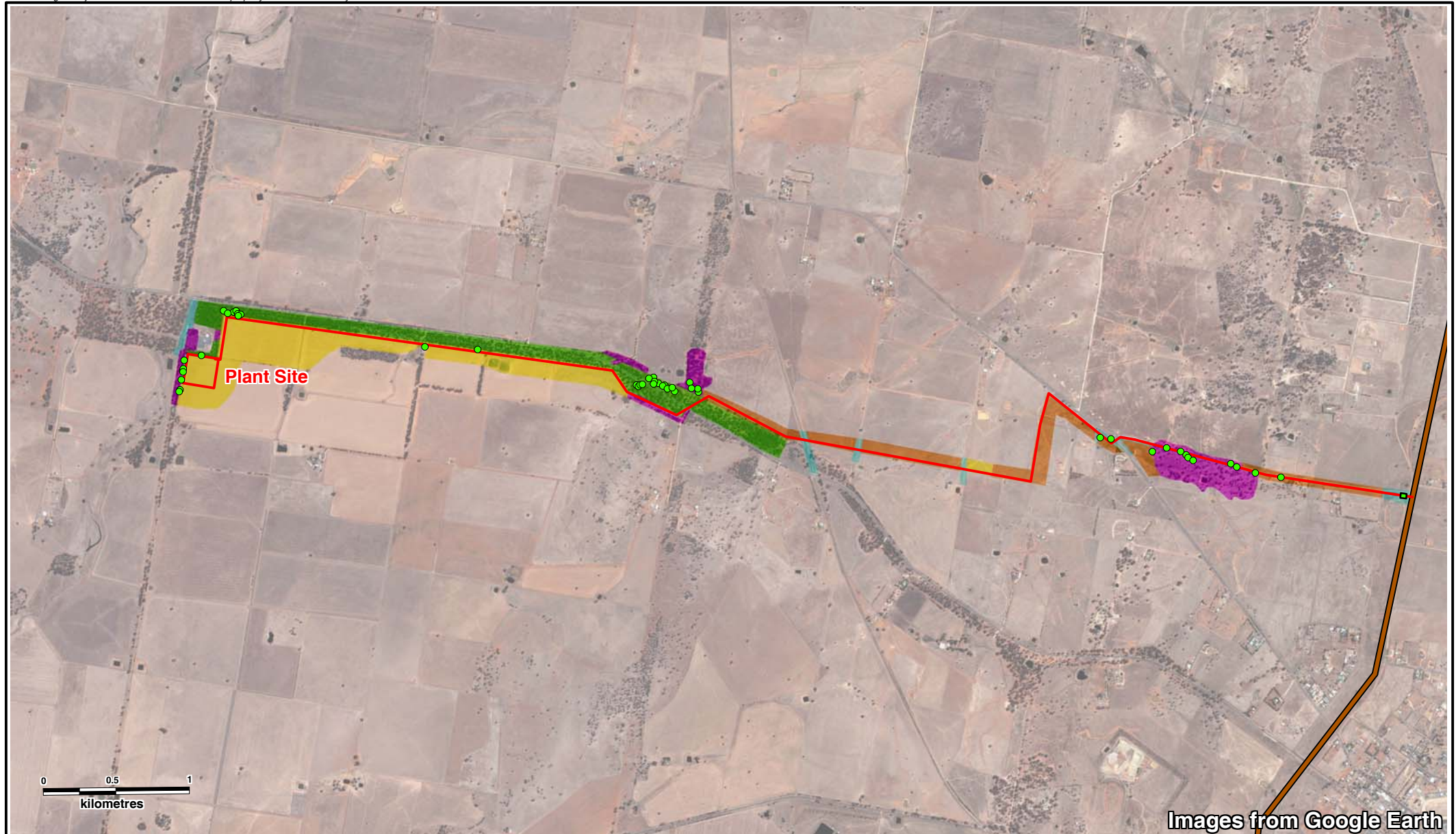
No species listed as Threatened under the *TSC* or *EPBC Act* were observed during the field surveys of the power plant site and there are no previous records of threatened flora occurring on the site.

The power 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.

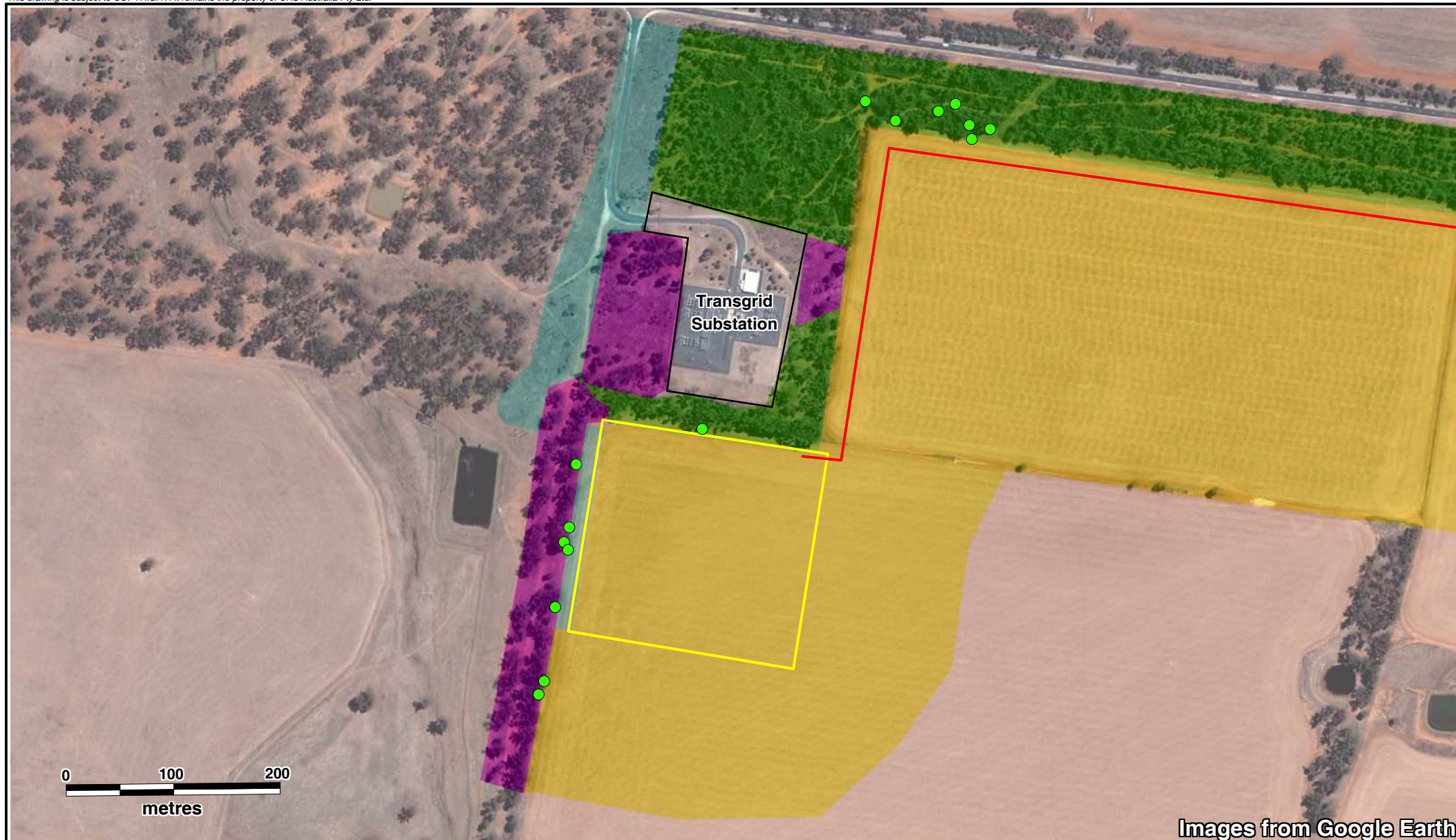
Construction of the proposed access road will impact upon up to 8,700m² of ungrazed, cleared land around the existing Pat Meredith Drive and entrance road to the Integral Substation. This area contains moderate quality regrowth of native species. Refer to **Figure 12-1** and **Figure 12-2**.

Construction of the proposed power 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. blakelyi*. The indicative plant layout places this entrance road in the northwest corner of the power plant site. This will utilise a gap created by existing fence lines and entrance gates and should result in the removal of less than ten (10) mature trees, more likely five (5) mature trees. 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 47.5ha of intact woodland in the study area and the disturbed nature of the existing vegetation.



Proposed Gas Pipeline Route Significant Habitat Tree Fuzzy Box Woodland (TSC Act Listed EEC) Existing Gas Pipeline Ungrazed Cleared Land Disturbed Remnant Woodland Grazed Cleared Land Ploughed Cropland	Client INTERNATIONAL POWER (AUSTRALIA) PTY LTD	Project ENVIRONMENTAL ASSESSMENT - PARKES PEAKING POWER PLANT	Title GAS PIPELINE VEGETATION COMMUNITIES
Source: Map compiled using Cadastral Plus, 2004 Mapinfo Australain Pty Ltd and PSMA Australia Ltd.		Drawn: AJW Approved: CJ Date: 29/06/2007 Job No: 43177456 File No: 43177456.044.wor	Figure: 12-1



- Proposed Gas Pipeline Route
- Significant Habitat Tree
- Fuzzy Box Woodland (TSC Act Listed EEC)
- Disturbed Remnant Woodland
- Ungrazed Cleared Land
- Ploughed Cropland

Client
INTERNATIONAL POWER
(AUSTRALIA) PTY LTD

URS

Project
ENVIRONMENTAL ASSESSMENT
- PARKES PEAKING POWER PLANT

Drawn: AJW Approved: CJ Date: 29/06/2007
Job No: **43177456** File No: 43177456.045.wor

Title
**PLANT SITE
VEGETATION COMMUNITIES**

Figure: **12-2**

Fauna

The Grey-crowned Babbler, listed as Vulnerable under the *TSC Act* was observed in the vicinity of the Site, whilst surveying the natural gas pipeline route and Alternative Sections. Cleared and disturbed woodland habitat in the vicinity of the power power 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).

The power 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 E**. Development at the power plant site will impact upon up to 8,700m² 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 power plant site are restricted to previously cleared land and relatively low-grade foraging habitat. It was determined that this will not have a significant impact on the long term survival of the Greater Long-eared Bat in the locality.

The 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 power plant site contains mature *E. microcarpa* and *E. blakelyii* including significant hollow bearing trees. 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 ten (10) 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 power 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 power plant site will not significantly increase the degree of disturbance.

Secondary and Operational Impacts

Sediments and runoff

A Construction and Environmental Management Plan (CEMP) should be prepared and 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 power plant site is located on ploughed cropland, which already features substantial areas of bare earth subject to erosion;

Chapter 12

Flora and Fauna

- 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 generally only occur during daylight hours and 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.

Roads and access

Access off Condobolin Road will be via the existing road, Pat Meredith Drive. Predicted traffic volumes during the construction phase include a range of light and heavy vehicle trips per day (refer **Chapter 10**). 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 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.

12.7.3 Natural Gas pipeline

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. 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 natural gas pipeline will impact upon approximately 1,800m² (or 0.18 ha) of *TSC Act* listed Fuzzy Box Woodland. Assuming a 25m strip of direct construction impacts outside this the Fuzzy Box Community, the natural 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 natural gas pipeline route.

Construction of the proposed natural 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 this report route selection through this area will be supervised by an ecologist and low impact construction techniques will be used. As noted above, this requires an approximately 7m wide strip of clearing, which amounts to the removal of 0.18 ha of the community out of a local occurrence of 47.5 ha. This impact is assessed in a 7-part test of significance presented in **Appendix E**. 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 (0.18 ha) balanced with the area remaining in the local area (47.5ha); and
- the temporary nature of the disturbance, since the removal of habitat is restricted to the construction phase of the proposed natural 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 natural 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 individual threatened flora species were recorded in this community. Final route selection will reduce the number of adult trees to be removed as far is 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.

Chapter 12

Flora and Fauna

Cleared areas of the natural 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.

Apart from mandatory warning signage, there will be no above ground infrastructure over the 10km natural gas pipeline route. At the eastern end of the natural gas pipeline, near the Central West Pipeline tee off, there will be a natural 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.

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

- the relatively small area to be modified (0.18 ha) balanced with the area remaining in the local area (47.5ha);
- the temporary nature of the disturbance, since the removal of habitat is restricted to the construction phase of the proposed natural 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 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. 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 natural 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.

Food tree species listed in the draft Recovery Plan for the koala are present in Fuzzy Box Woodland in the road reserve along Condobolin Road⁴. This habitat will be impacted upon by the construction of the proposed natural gas pipeline and so a 7-Part Test of significance was performed for the Koala and is included in **Appendix E**. 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. It is likely that the construction of the proposed natural gas pipeline will result in the removal of a minor number of koala feed trees. Given the historical nature of the NPWS 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.

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

The natural 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 less than 20 mature trees including significant 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 natural 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 natural 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.

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 below 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 natural gas pipeline since the ground surface will be reinstated and revegetated and inspection will be performed by an automated "pipe pig". The natural gas off-take at the eastern end of natural gas pipeline and associated compound, is an automated facility requiring no permanent lighting and infrequent maintenance. Secondary impacts associated with its operation are likely to be minor and localised.

Chapter 12

Flora and Fauna

12.7.4 Alternative Section 1

Vegetation Clearing and Construction Impacts

Flora

Alternative Section 1 is likely to impact upon approximately 2,247m² of disturbed remnant woodland. No Threatened Species under the *TSC* or *EPBC Act* or habitat were recorded in the vicinity.

Final route selection (**Section 12.8**) 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**).

12.7.5 Secondary and Operational Impacts

Secondary and operation impacts for Alternative Section 1 are equivalent to those for the Gas Pipeline outlined above in **Section 12.7.2**.

12.8 Mitigation Measures

A number of mitigation measures have been identified in order to minimise potential impacts to flora and fauna species on site. These measures are discussed in more detail below.

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

Final Route Selection

Natural 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;
- diurnal roosts for Greater Long-eared Bats or other threatened micro bats; 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 significant habitat trees;
- utilise existing disturbed areas as much as practicable;
- reduce the number of adult trees to cleared as far as is practicable; and
- avoid areas of dense undergrowth.

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, ie: the extant Fuzzy Box Woodland in the road reserve along Condobolin Road and in the vicinity of significant habitat trees. 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.

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);

Chapter 12

Flora and Fauna

- 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.

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.

Revegetation

It is recommended that the sections of the natural gas pipeline 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.

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 of local provenance. Plantings should incorporate shrubs and understorey species, as well as trees, in order to maximise their potential habitat value.

Weed and Pest Management

To limit the spread of weeds into adjoining remnant vegetation during construction of the proposed power 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 natural gas pipeline through cleared agricultural land or disturbed woodland within the vicinity of intact vegetation. The natural gas pipeline route follows existing 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 natural 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 proposed power 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.

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;
- 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.

Soil Erosion / Runoff

The CEMP should formulate safeguard measures to reduce soil erosion and pollutant run-off during both construction and operation phases with attention given to the drainage line that runs through the road reserve north of Condobolin Rd.

Chapter 12

Flora and Fauna

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 to reduce fauna site 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.

12.9 Summary

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.

Mitigation measures related to construction and operation of the natural gas pipeline and plant include:

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

This assessment concludes that the proposed development is not 'likely' to impose a 'significant effect' on *EPBC* or *TSC Act* species or communities. A referral under the *EPBC Act* is therefore not required.

A summary of the mitigation measure is presented in **Table 12-1**.

Table 12-1 Summary of flora and fauna mitigation measures

Mitigation Measures	Implementation of mitigation measures		
	Design	Construction	Operation
Large floodlights would generally not be used, although it is likely that some lights may be required for emergency lighting to allow emergency maintenance	✓		✓
Security lighting would be designed not to direct light outside the property boundary.	✓		✓
Development and implementation of a Groundcover Clearance Protocol to reduce impact to habitat values of area.		✓	
Development and implementation of Tree Clearance Protocol to reduce direct impacts to any tree dwelling fauna species.		✓	
Develop and implement a Weed and Pest Management Plan as part of the CEMP and OEMP for the site. The plan would include active control of Noxious weeds.		✓	✓
Implement low impact construction techniques through sensitive areas i.e. Fuzzy Box Woodland including: – Utilise small scale plant when feasible; – Reduce width of construction activities to 7 metres.		✓	
Implement site management practices such as: – Setting maximum speed limits during construction and operation traffic on site to reduce fauna fatalities; – Limit vehicular and personnel entry into adjacent remnant vegetation during construction and operation through appropriate fencing; and – 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 adjacent vegetation.		✓	✓
CEMP to include safeguard measures to reduce soil erosion and pollutant run-off during both construction and operation phases.		✓	✓
Revegetation of the affected power plant site and natural gas pipeline and Landscaping of the power plant site. Species selected to be representative of Fuzzy Box Woodland and of local provenance. Revegetated and Landscaped areas to be monitored for weed infestation and any infestations actively managed	✓	✓	✓