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Lucerna October Nominees

Dunns Road rezoning

Ecological assessment

March 2012

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

This Ecological Assessment for the Dunns Road rezoning *("Report"):*

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The services undertaken by GHD in connection with preparing this Report:

- *Were limited to those specifically detailed in section 1 of this Report;*
- *Did not include targeted threatened species surveys or any non-ecological assessment of the environmental impacts of the proposal.*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- *The impact footprint of the proposal would be as presented in this report.*
- *The safeguards and mitigation measures detailed in Section 6 would be implemented.*

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

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Report definitions

The following definitions are utilised throughout this report and should be referred to when interpreting the results in this document:

direct impacts - are those that directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat (DEC 2004).

indirect impacts - occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas (DEC 2004).

life cycle - Is the series or stages of reproduction, growth, development and aging and death of an organism (DEC 2004).

likely - taken to be a real chance or possibility (DEC 2004).

locality - means the area within a 15 kilometre radius of the subject site.

local population: the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions.

- The *local population* of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of resident fauna species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.
- The *local population* of migratory or nomadic fauna species comprises those individuals that are likely to occur in the study area from time to time.

In cases where multiple populations occur in the study area, each population should be assessed separately.

proposal – the action proposed to be undertaken. In this case this is the proposed subdivision, including housing development, driveways and lot boundaries.

region – means a biogeographical region that has been recognised and documented such as the Interim Biogeographical Regions of Australia (IBRA). The study area is located within the South West Slopes bioregion.

subject site – the area to be directly affected by the proposal (DEC 2004), in this case the area proposed for subdivision.

study area – means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all

potential impacts into account (DEC 2004). The study area incorporates the land within a 500 metre radius of the subject site.

threatened biota - those threatened species, populations or ecological communities listed under the TSC Act or the EPBC Act which are known or likely to occur in the study area.

threatened species – a species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act or listed under the EPBC Act.

viable - the capacity to successfully complete each stage of the life cycle under normal conditions.

1. Introduction

1.1 Overview

Lucerna October Nominees proposes to subdivide land on the southern edge of Wagga Wagga (Figure 1.1). The site is located north of Dunns Road and west of the planned Currawong Drive (Figure 1.2). The northern eight hectares of the proposed subdivision falls within land that is not biocertified under the *Wagga Wagga Local Environment Plan 2010* (Wagga Wagga LEP) (the subject site – see Figure 1.2). This includes part of the proposed lots 5 and 7, and all of proposed lots 8 and 9 (Figure 1.3). It is proposed to rezone this land from Primary Production (RU1) to Large Lot Residential (R5).

Because the subject site involves re-zoning from Primary Production to Large Lot Residential in the Wagga Wagga local government area (Wagga Wagga LGA), the proposal requires approval under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

As well, because the proposal is located outside the Wagga Wagga LEP biocertification area, an ecological assessment for the proposal must be reviewed by the Office of Environment and Heritage (OEH) to ensure the proposal does not conflict with the objectives of the biocertification of the Wagga Wagga LEP.

1.2 Objectives

The ecological assessment addresses the following relevant legislation:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).
- NSW *Threatened Species Conservation Act 1995* (TSC Act).

The primary objectives of the ecological assessment are to:

- Identify potential ecological constraints and opportunities, including in particular the known or likely presence of species, populations and ecological communities and their habitats listed under the NSW TSC Act and Commonwealth EPBC Act.
- Identify the potential relevance of any matters of National Environmental Significance (NES) listed under the EPBC Act.
- Identify the potential impacts of the proposal on threatened biota and their habitats and advise on potential development design options and specific mitigation/management actions to avoid or minimise impacts on the biodiversity values.
- Assess the significance of impacts on threatened biota and matters of NES and identify the likely requirement or otherwise for further approvals under the EP&A Act and EPBC Act.
- Recommend mitigation and environmental management measures to avoid, minimise or offset adverse impacts on threatened biota and biodiversity values, as appropriate to facilitate the relevant planning approvals process.

1.3 Subject site and existing environment

The subject site is defined as the area of land to be subdivided that does not fall within the Wagga Wagga LEP biocertificaton area (Figure 1.2 and coloured pink in Figure 1.3). This includes the northern eight hectares of the proposed subdivision, incorporating part of lots five and seven and the whole of lots eight and nine.

The study area is defined as the area within 500 metres of the subject site.

The terrain of the study area is flat, with undulating hills in the surrounding landscape. The surrounding landscape has generally been cleared for agriculture, including cropping and grazing. Urban residential development has occurred north and east of the study area. Patches of remnant woodland occur to the west and south of the study area.

An ephemeral drainage line forms the northern border of the subject site. A dam is located in the centre of the subject site. Vegetation corridors are shown in Figures 1.2 and 1.4. River Red Gums (*Eucalyptus camaldulensis*) have been planted along the drainage line. Non-endemic eucalypts (*Eucalyptus* spp.) and a Bottlebrush (*Melaleuca* sp.) have been planted along the eastern boundary of the subject site and through the proposed lot 9.

The subject site is completely cleared of native vegetation. A small stock yard is located in the north-eastern corner of the site. A power line runs from east to west along the southern border of the subject site.

1.4 The proposal (scope of work)

The proposed subdivision would include the construction of houses, sheds and driveways. Gardens would be established and grazing may continue at a very low stocking rate.

Services (such as electricity, gas and water) would be installed to each house.

It is likely that the dam, which primarily occurs within the proposed lot 7, would be filled in and landscaped.

Although an access road is proposed as part of the subdivision, no roads are planned within the subject site.

No trees would be removed from within the subject site.

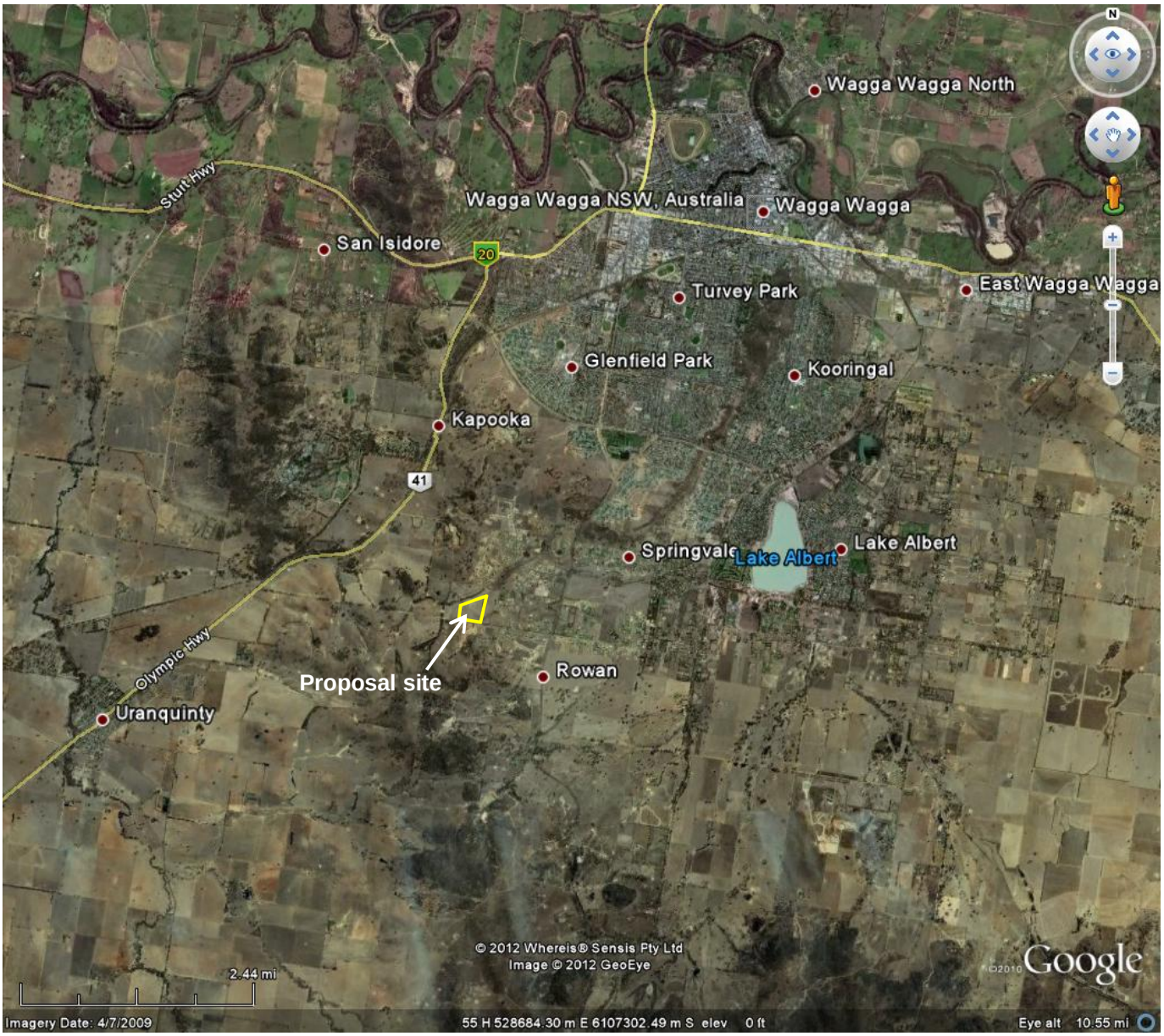

Figure 1.1: Location of proposal at Wagga Wagga

Figure 1.2: Approximate area proposed for subdivision

LEGEND:

- PRIMARY PRODUCTION (RU1) TO LARGE LOT RESIDENTIAL (R5) - 78185m²
- LARGE LOT RESIDENTIAL (R5) TO PRIMARY PRODUCTION (RU1) - 131093m²

6
40.6ha

5
2.66ha

7
2.30ha

8
2.75ha

9
2.00ha

4
2.52ha

3
2.04ha

2
2.14ha

1
2.41ha

MIRBELIA

DUNNS ROAD

967.5
604.5
479.04
148.07
109.26
90.47
100.81
165.63
411.27
144.84
24.37
116.36
219.37
69.182
150.25
207.04
51.39
A63.15
A98.12
A20.12
145.28
14.02
98.07
124.08
A10.06
187.14
130.33
45.55
7.05
A22.24
A10.36
A4.045
A27.275
A26.155
A10.44
34.655
30.735
A81.11
A92.1
18.61
62.29
149.08
182.21
213.46
221.11
148.28
125
107.1
110.22

Figure 1.3: Proposed subdivision showing portion of proposal outside biocertified area (zoned Primary Production)

NORTHPOINT

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Local Government PROCUREMENT
APPROVED CONTRACTOR

No.	DATE	AMENDMENTS	BY
A	05/05/2011	ISSUED FOR APPROVAL	CB

I HEREBY CERTIFY THAT ENGINEERING WORKS AS SHOWN ON THIS PLAN ARE WORK AS EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR. IN ACCORDANCE WITH THE GENERAL REQUIREMENTS OF THE LOCAL COUNCIL

NAME: Michael J. McFeeters

SIGNATURE .....

CAPACITY: Director

DATE:

MJM CONSULTING ENGINEERS
STRUCTURAL • CIVIL • BUILDING DESIGN

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BOWTORT P/L TRADING AS MJM CONSULTING ENGINEERS

PROJECT
PROPOSED NEW SUBDIVISION
DUNNS ROAD
WAGGA WAGGA

SHEET SUBJECT
REZONING PLAN

CLIENT
Lucerna October Nominees

DESIGNED	SCALE		
M.McFeeters	1:250(A1) 1:500(A3)		
CHECKED	DRAWN	DATE	
	C. Butt	May 2011	
COUNCIL REF.	ISSUE	PROJECT NO.	SHEET NO.
	A	110102	R1

JOB LOCATION: Z:/Jobs/110102

LEGEND:

EXISTING VEGETATION TO REMAIN

EXISTING VEGETATION TO BE REMOVED

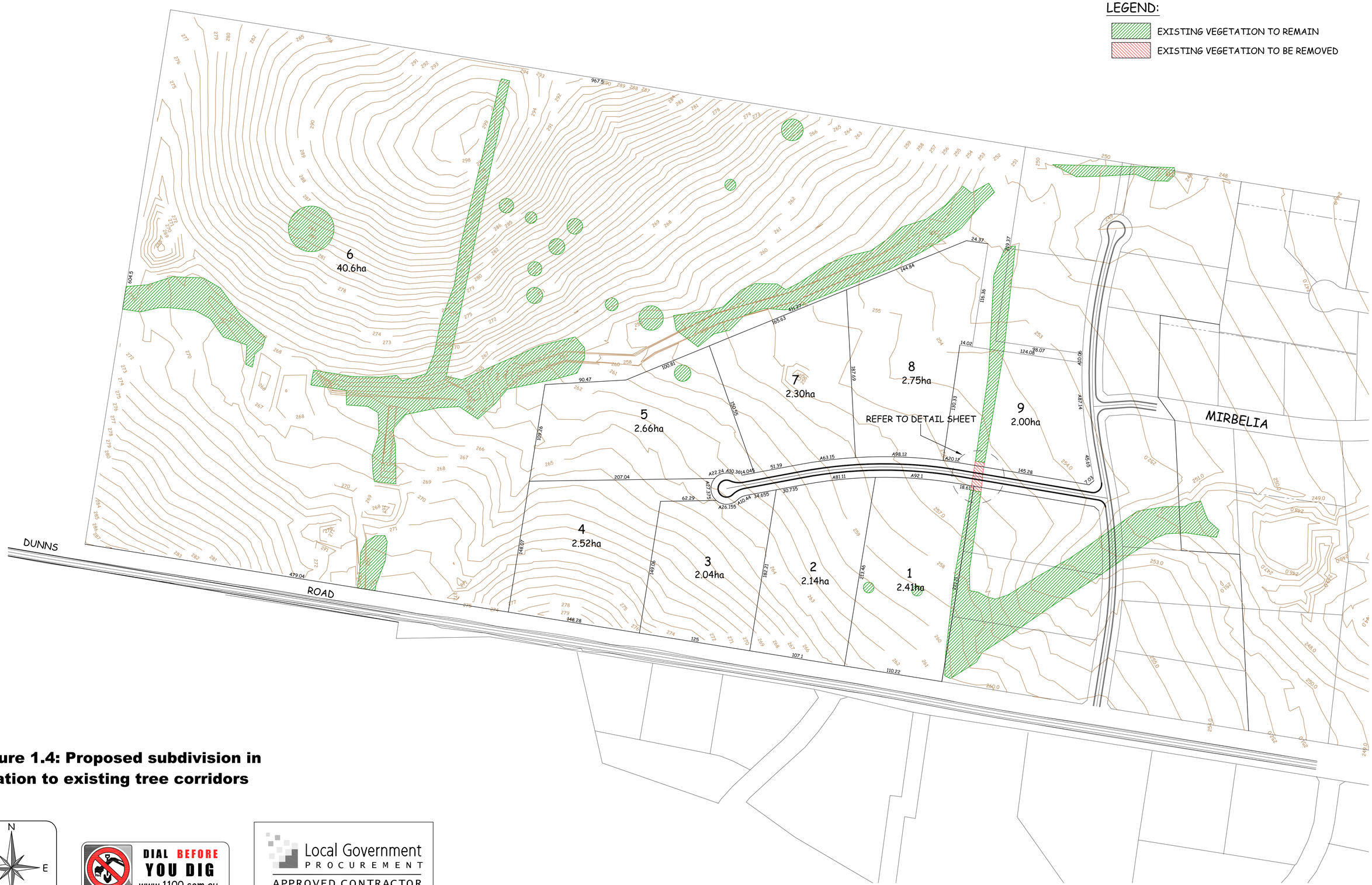

Figure 1.4: Proposed subdivision in relation to existing tree corridors

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Local Government PROCUREMENT
APPROVED CONTRACTOR

No.	DATE	AMENDMENTS	BY
A	05/05/2011	ISSUED FOR APPROVAL	CB

I HEREBY CERTIFY THAT ENGINEERING WORKS AS SHOWN ON THIS PLAN ARE WORK AS EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR. IN ACCORDANCE WITH THE GENERAL REQUIREMENTS OF THE LOCAL COUNCIL

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SIGNATURE .....

CAPACITY: Director

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PROJECT
PROPOSED NEW SUBDIVISION
DUNNS ROAD
WAGGA WAGGA

SHEET SUBJECT
TREE MANAGEMENT PLAN

CLIENT
Lucerna October Nominees

DESIGNED M.McFeeters	SCALE 1:250(A1) 1:500(A3)		
CHECKED	DRAWN C. Butt	DATE May 2011	
COUNCIL REF.	ISSUE A	PROJECT NO. 110102	SHEET NO. T1

JOB LOCATION: Z:/Jobs/110102

2. Methods

2.1 Desktop review

A search of relevant databases was conducted to obtain records of threatened and migratory species, populations and ecological communities within the region. The search included all species, populations and ecological communities listed under the NSW TSC Act and Commonwealth EPBC Act, with the potential to occur in the locality. Database searches included:

- OEH (2012) Threatened species, populations and ecological communities of NSW, online profiles.
- Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2012a) EPBC Protected Matters Search Tool – for a 10 km radius around the subject site.
- SEWPaC (2012b) Species profile and threats database, online profiles.
- NSW Department of Primary Industries – Noxious Weed Declarations – Wagga Wagga Local Government Area (LGA) Control Area (DPI 2012).

A literature review and database search assists in overcoming some of the limitations associated with a short survey period, survey timing and the types of survey methods employed.

2.2 Field survey

Flora and fauna field surveys were conducted in the study area on 16 February 2012. Field surveys were conducted with reference to *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft* (DEC 2004).

The primary objectives of the field surveys were to:

- Determine the extent of vegetation removal resulting from the proposal.
- Determine the presence and/or likely occurrence of threatened species, populations and ecological communities (and their habitats), listed under the TSC Act and EPBC Act, to occur in the study area.
- Determine the value of the habitat in the study area for flora and fauna species, particularly for threatened species and species of conservation significance, and describe potential impacts that would result from the proposed works.
- Describe the flora and fauna species, habitat, populations and ecological communities in the study area in relation to their occurrence and quality in the locality. This included reference to satellite imagery and vegetation mapping.

Survey effort for this project is summarised in Table 2.1.

Table 2.1: Survey effort for ecological assessment

Survey method	Effort
Flora – one quadrat (20m x 20m) survey in the subject site.	A flora quadrat survey was performed in the proposed lot 8. Due to the uniformity of the groundcover vegetation throughout the subject site, additional quadrat surveys were not necessary.

Survey method	Effort
Flora – random meander transect – searching for threatened species, recording incidental species in the subject site, and determining the presence of threatened ecological communities.	The entire subject site and parts of the study area were walked, including areas of potential vegetation clearing and adjacent areas.
Vegetation community mapping.	All vegetation communities within the subject site were observed and mapped.
Habitat assessment and mapping.	Potential fauna habitat identified within the study area.
Diurnal birds – random meander transect and opportunistic observations.	Random meander searches were carried out to survey bird species in the study area. All species observed opportunistically during other surveys were also recorded.
Opportunistic observations for reptiles, amphibians and mammals whilst conducting other surveys.	Any opportunistic observations recorded at other times during field surveys.

2.2.1 Vegetation communities

Surveys of vegetation communities across the site were undertaken to characterise vegetation formation, class, structure and condition. Plant community composition is especially important in relation to those areas which have the potential to be a threatened ecological community.

The completion of flora surveys enabled identification of the vegetation communities occurring in the study area. The study area was investigated by random meandering transect to identify all communities present, and to identify any areas with the potential to be classified as a threatened ecological community.

2.2.2 Flora

A flora survey was conducted within the proposed subdivision site, within lot 8, using a 20 metre x 20 metre quadrat. Due to the uniformity of the groundcover vegetation throughout the subject site, additional quadrat surveys were not necessary. All species occurring in the quadrat were recorded, and percent cover was estimated. Because the proposed lots are located on cleared sites with no trees, structural characteristics such as tree sizes and woody debris were not recorded. Vegetative and habitat characteristics that were recorded include:

- Physiography
- Fire history
- Disturbance
- Description of native vegetation
- Dominant vegetation type (canopy, understorey and groundcover)
- Ground characteristics (such as leaf litter and woody debris).

Characteristics of the study area were recorded to assist in determining if the study area may provide habitat for any threatened flora species not present or flowering at the time of the survey.

A transect was walked within and around the subject site to search likely habitat for plant species using the 'random meander' technique of Cropper (1993). As rare plants often exist in discrete populations in specific areas, a random search can increase the probability of finding rare plant populations. A random search effort also encompasses a greater portion of the landscape, as the search is not limited to specific areas (only the stratification unit), and is useful in surveying difficult terrain and irregular shaped search areas.

No other previous flora surveys are known to have been undertaken in the study area.

2.2.3 Fauna

Fauna surveys comprised a diurnal bird survey, habitat assessment for all fauna groups and observation of fauna signs. Fauna habitat resources were assessed to identify areas of potential habitat within the study area. Specific resources such as shelter, basking, roosting, nesting and foraging sites for birds, bats, arboreal mammals, ground-dwelling mammals and reptiles were noted. Particular attention was given to whether any hollow bearing trees occurred within the study area.

Habitat details recorded included:

- Presence/absence of:
  - Hollow-bearing trees (arboreal mammals, hollow-nesting birds and microchiropteran bats)
  - Feed trees (e.g. *Allocasuarina* spp. and mistletoe)
  - Roost sites
  - Waterbodies (amphibians)
  - Nests (birds)
  - Rocky outcrops and ground debris (reptiles)
  - Other features likely to provide potential habitat for threatened fauna.
- Vegetation type (including dominant canopy and shrub species)
- Topography

Searches for potential mammal, amphibian, and reptile habitat were undertaken during flora and bird surveys and recorded. Opportunistic sightings of all fauna species were also recorded.

Any indirect evidence of fauna (i.e. scats, feathers, fur, tracks, dens, nests, scratches, chew marks and owl wash) was recorded.

2.2.4 Survey timeframe and potential limitations

Surveys were undertaken outside the optimal survey period for some species. Surveys were undertaken in mid-February when many plant species have finished flowering and may be difficult to detect. For threatened flora species that were not detectable at the time of the survey, but which had the potential to occur at the site, an assessment was made of the suitability of the habitat for the species and its likelihood of occurrence.

Some fauna species are mobile and transient in their use of resources. Consequently, it is likely that not all species either resident or transitory to the site would have been recorded during the site inspections.

The disadvantage of this limitation was reduced by undertaking database searches, and by assessing the habitat value of the study area for threatened and migratory species known to occur in the wider area to determine their likelihood of occurrence.

This survey was not designed to enable all species, either resident or transitory to the study area, to be detected. Instead it was aimed at providing an overall assessment of the ecological values of the study area with particular emphasis on threatened and migratory species to allow an assessment of the potential impacts of the proposal. For those species of conservation significance that were not detected but with the potential to occur in the study area, an assessment of the likelihood of their occurrence was made based on known habitat requirements.

2.3 Assessment of likelihood of occurrence

An assessment of the likelihood of threatened species, populations and ecological communities and migratory species occurring within the study area was completed. The assessment also considered whether there is the possibility of an impact on each species or ecological community. The literature review and database search identified a number of TSC Act and EPBC Act listed threatened and migratory species, and ecological communities that may occur in the study area (Appendix C). The dates and sources of observation records were reviewed in order to assess the accuracy and relevance of each record.

Profiles were reviewed for each of the threatened biota using the information from the OEH (2012) Threatened Species Website, the SEWPaC (2012b) Species Profile and Threats Database and other sources where information was available. These profiles provide information on ecological requirements and other characteristics including; statewide, regional, and local abundance and distribution; and habitat requirements, including home range, feeding, roosting and breeding requirements.

In assessing which of these species, populations and communities are 'likely' to occur within the study area the following factors were taken into consideration:

- The presence of potential habitat within the study area
- Condition and approximate extent of potential habitat within the study area
- Species occurrence within the locality and wider area (including results of current and previous surveys and results of database searches and literature review).

3. Results

3.1 Vegetation communities

Vegetation corridors are shown in Figures 1.2 and 1.4. River Red Gums have been planted along the drainage line that forms the northern boundary of the subject site. Non-endemic eucalypts and a Bottlebrush have been planted along the eastern boundary of the subject site and through the proposed lot 9.

No remnant vegetation is present in the study area. The subject site may once have supported Yellow Box (*Eucalyptus melliodora*) or Grey Box (*Eucalyptus microcarpa*), both of which form threatened ecological communities listed under the TSC Act and EPBC Act. Neither of these species was observed during surveys. No threatened ecological communities are present in the study area.

3.2 Flora

The flora survey identified 32 flora species within the study area, of which nine species are native and 23 species are introduced (Appendix A).

No threatened flora species were identified in the study area.

The dominant tree species within the site is River Red Gum, which has been planted along the drainage line that forms the northern boundary of the subject site. Mixed non-endemic eucalypts have been planted in the eastern section of the subject site.

Two shrub species were observed in the study area; a Bottlebrush (*Callistemon* sp.) and Blackberry *Rubus* sp.).

The groundcover species in the study area are predominantly introduced and include species such as Barley Grass (*Hordeum leporinum*), Annual Ryegrass (*Lolium rigidum*) and Wild Oats (*Avena* sp.). Hairy Panic (*Panicum effusum*), which is a ready coloniser of disturbed areas, was also widespread.

3.2.1 Noxious weeds

Five species listed as noxious weeds under the *Noxious Weeds Act 1993* for the Wagga Wagga City Council control area were identified during field surveys including:

- Bathurst Burr (*Xanthium spinosum*)
- Blackberry (*Rubus* sp.)
- Paterson's Curse (*Echium plantagineum*)
- St John's Wort (*Hypericum perforatum*)
- Willow (*Salix* sp.)

Willows are classified as a Class 5 weed, meaning the requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with. The remainder of these noxious weeds are all classified as Class 4 weeds, which requires that the growth of the plant must be managed in a manner that reduces its numbers, spread and incidence, and continuously inhibits its reproduction.

The listings of Blackberry and Willow are all of NSW declarations. An additional requirement for Blackberry is that the plant must not be sold, propagated or knowingly distributed.

3.3 Fauna

The fauna survey identified 14 fauna species, of which 12 species are native and two species are introduced (Appendix B).

The River Red Gum woodland community within the study area provides habitat for a number of bird species. Thirteen bird species were identified during field surveys. Commonly observed birds included Australian Raven (*Corvus coronoides*), Australian Magpie (*Gymnorhina tibicen*), Galah (*Eolophus roseicapillus*) and Black-faced Cuckoo-shrike (*Coracina novaehollandiae*).

One mammal species was identified by scats; the introduced Rabbit (*Oryctolagus cuniculus*).

No amphibian or reptile species were observed during field surveys. Drainage lines and the dam in the study area may provide potential habitat for frogs and turtles. Reptile species are also likely to occur in the study area.

No threatened species were observed during GHD's site surveys. However, a number of threatened species have been recorded within the locality and have the potential to occur within the study area (Section 4).

4. Likelihood of occurrence - threatened biota

4.1 Observations of listed species and ecological communities in the study area

No species or ecological communities listed under the TSC Act or EPBC Act were observed in the study area.

4.2 Assessment of likelihood of threatened biota occurrence

The literature review and database search identified a number of threatened and migratory species and ecological communities that have the potential to occur in the study area including 33 bird species, seven mammal species (including three bat species), one reptile species, one frog species, one endangered mammal population, three plant species, and two ecological communities (Appendix C).

The following classifications are assigned to the likelihood of whether threatened species and ecological communities may occur in the study area:

- Unlikely: Species, population or ecological community is not likely to occur.
- Likely: Species, population or ecological community could occur and study area is likely to provide suitable habitat.
- Present: Species, population or ecological community was recorded during the field investigations, or has been previously recorded in the study area.

In addition, an assessment was made of the possibility of impact by the proposal on threatened and migratory species and ecological communities, and therefore whether an EP&A Act Assessment of Significance (seven part test) and/or EPBC Act significance assessment is required to assess the significance of the impact. This assessment was assigned as follows:

- Unlikely: The proposal would be unlikely to impact this species, population or ecological community or its habitats. No EP&A Act 7-Part Test and/or EPBC Act significance assessment is necessary for this species, population or ecological community.
- Likely: The proposal could impact this species, population or ecological community or its habitats. An EP&A Act 7-Part Test and/or EPBC Act significance assessment is required for this species, population or ecological community.

The review of habitat requirements and historical records for each of the threatened and migratory species and ecological communities (listed under the TSC Act and the EPBC Act) concluded that no species or ecological communities are likely to be impacted (directly or indirectly) by the proposal.

To demonstrate the unlikelihood of impacts to species and ecological communities listed under the EP&A Act and the EPBC Act, a generic EP&A Act assessment of significance and EPBC significance assessment was completed.

4.2.1 State Environmental Planning Policy No 44 – Koala Habitat Protection

This policy applies to each LGA listed in Schedule 1 of the SEPP, which includes the Wagga Wagga LGA. Schedule 2 of this policy lists preferred feed tree species of the Koala, including River Red Gum. Because River Red Gum constitutes at least 15 per cent of the total number of trees in the upper or

lower strata of the tree component, the habitat in the study area comprises *potential koala habitat* as defined under SEPP 44.

However, the assessment of likelihood of occurrence found that the Koala is unlikely to inhabit the study area due to a paucity of recent local records, and due to the species not being recorded during survey effort at Kapooka, west of the proposal, which included scat searches around the bases of trees and targeted searches (CSU 2003).

The study area is therefore unlikely to contain core Koala habitat, defined by SEPP 44 as *'an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.'*

The proposal is unlikely to affect the Koala.

5. Impacts of the proposed development

5.1 Direct impacts

5.1.1 Removal of groundcover vegetation

Groundcover vegetation would be removed where houses, sheds and driveways are constructed, and where gardens are established. Groundcover vegetation would also be removed where services are installed. No trees or shrubs would be removed from within the subject site.

Because the groundcover vegetation in the study area is highly modified as a result of agricultural management, the ecological impacts of the proposal would be minimal.

Due to the low quality of vegetation to be removed, the subject site would not provide significant habitat for fauna and flora species, and its removal would be unlikely to significantly affect any listed species. Threatened flora species are unlikely to occur in the study area.

5.1.2 Soil surface and drainage disturbance

The proposal would involve excavation for construction of houses, sheds and driveways, and for installation of services. Earthworks would also be required if the dam in the proposed lot 7 is filled in.

The earthworks have some potential to cause soil erosion in the subject site, although this is not a high risk due to the flat nature of the topography. Without appropriate erosion controls, there is the potential to cause sedimentation of drainage lines in the study area. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential.

However, provided an erosion and sediment control plan is developed and implemented, the proposal should not cause significant soil erosion and sedimentation.

5.2 Indirect impacts

5.2.1 Noxious weeds

Five weed species listed as noxious in the Wagga Wagga City Council control area were identified in the study area.

The proposal has the potential to facilitate the introduction and spread of weeds in the study area through:

- Disturbance of soils associated with excavation for construction of houses, sheds and driveways, and for installation of services. Earthworks would also be required if the dam in the proposed lot 7 is filled in
- Traffic movements
- Movement through the study area by work staff on foot.

As discussed in Section 3.2, the groundcover vegetation in the study area is already dominated by introduced species. Provided the safeguards in Section 6 are implemented, the proposal should not significantly increase the abundance of weeds in the study area.

5.2.2 Fauna

The proposal has the potential to temporarily affect the use of the study area by fauna in the tree plantings to the north and east as a result of increased disturbance during construction. The use of machinery may deter some fauna species from utilising potential habitat within the study area. This would only be for the duration of the works, and is unlikely to cause a long term significant impact to the fauna occurring in the study area.

An increase in human activity and associated traffic in the study area has the potential to deter some fauna species from using potential habitat in the long term. However, the house blocks and driveways would generally be located away from the tree plantings, and would be unlikely to significantly deter fauna from using these resources in the long term.

5.3 Significance of potential impacts

5.3.1 NSW Legislation

The EP&A Act includes in Section 5A, an assessment of significance which uses seven factors to assist in determining if a proposed development or activity '*is likely to have a significant effect on the threatened species, populations or ecological communities, or their habitats'.* These seven factors must be taken into account by a consent or determining authority when considering a development proposal or development application. This enables a decision to be made as to whether there is likely to be a significant effect on the species, population or ecological community, and hence if a species impact statement is required.

Species and ecological communities listed as threatened under the TSC Act

The assessment of likelihood of occurrence found that the proposed development would be unlikely to have an impact on any species or ecological communities listed as threatened under the TSC Act, or their habitats. Assessments of significance under Part 5A of the EP&A Act were not therefore completed for any threatened species.

However, to demonstrate the low likelihood of impacts to species and ecological communities listed under the TSC Act, a generic assessment of significance was completed (Appendix D).

The proposed development is therefore also unlikely to have a significant impact on any species or ecological community listed under the TSC Act and a Species Impact Statement is not required.

Relevant Key Threatening Processes in NSW

The TSC Act lists a number of Key Threatening Processes (KTP) that contribute to a loss of species, populations and communities. None of these processes are relevant to the proposal. Because the groundcover vegetation to be removed does not have greater than 50 percent cover of native species, the proposal would not result in removal of native vegetation.

5.3.2 Commonwealth legislation

The EPBC Act provides a mechanism for assessing the environmental impact of activities and developments, where 'matters of national environmental significance' may be affected by the proposed activities.

Matters of national environmental significance include:

- World heritage properties
- Migratory species protected under international agreements
- National heritage properties
- Nuclear actions
- Ramsar wetlands of international importance
- Listed threatened species and communities
- The Commonwealth marine environment.

The EPBC Act Policy Statement *Matters of National Environmental Significance: Significant impact guidelines 1.1* (DEWHA 2009) was reviewed when determining if a significant impact is likely on matters of NES.

Species and ecological communities listed under the Commonwealth EPBC Act

The assessment of likelihood of occurrence found that the proposal would be unlikely to affect any species or ecological communities listed as threatened, migratory or marine under the EPBC Act, or their habitats. Significance assessments (EPBC Act Policy Statement *Matters of National Environmental Significance: Significant impact guidelines 1.1*) were therefore not required.

However, to demonstrate the low likelihood of impacts to species and ecological communities listed under the EPBC Act, a generic significance assessment was completed (Appendix E).

The proposal is unlikely to have a significant impact on any species or ecological community listed under the EPBC Act and therefore the preparation of a referral to the Australian Government Minister for the Environment is not considered necessary.

6. Safeguards and mitigation measures

The safeguards and mitigation measures detailed in Table 6.1 would be implemented to minimise the impacts of the proposal on the ecology of the study area.

Table 6.1: Safeguards and mitigation measures to be implemented for proposal

Potential impact	Measures to reduce impacts
Disturbance of habitat outside the subject site	◗ All vehicles and equipment used for operations would remain within the subject site. Vehicles would not impact on areas outside the subject site. ◗ All staff would be inducted and informed of the limits of vegetation clearing and the areas of vegetation to be retained.
Indirect damage to trees through damage to their roots	◗ A reasonable distance would be maintained between the tree plantings and building locations. ◗ Where damage to the drip-zones of trees appears unavoidable, advice from an arborist should be obtained to (a) understand the implications of the likely root damage to individual trees, and (b) develop and implement measures to minimise damage to tree roots during the construction phase. ◗ Avoid placing stockpiles of soils and other materials below the drip-zones of remnant native trees during the construction phase.
Weed spread and establishment	◗ Vehicles, machinery, and operatives' footwear would be cleaned prior to entering and exiting the study area to reduce the incidence of weed spread and establishment. ◗ Declared noxious weeds would be managed according to the requirements of the *Noxious Weeds Act 1993*.
Soil disturbance and erosion	◗ Soil disturbance would be avoided as much as possible to minimise the potential for spreading weeds. ◗ Earthmoving operations would not be undertaken during or immediately after heavy rainfall events.
Indirect environmental impacts during construction[1]	◗ An EMP would be developed by the proponent prior to development of any part of the subdivision that appropriately provides measures to minimise and avoid potential impacts, and provides contingency measures should they occur. This EMP must be implemented during the construction of buildings and infrastructure. Measures would include sediment controls, emergency clean-up equipment and threatened species management.

1 Indirect environment impacts includes impacts to the physical environment such as erosion, sedimentation, chemical spills

7. Conclusion

The proposed subdivision at Dunns Road, Wagga Wagga would require the removal of groundcover vegetation for the construction of houses, sheds and driveways, establishment of gardens and installation of services. The proposal also has the potential to cause impacts relating to soil erosion and sedimentation, and weed invasion. No trees or shrubs would be removed within the subject site.

Due to the highly modified nature of the study area, and dominance of introduced groundcover species, the ecological impacts of the proposal are unlikely to be substantial.

A number of safeguards and mitigation measures are proposed to minimise the impacts of the proposal.

With the implementation of these safeguards and mitigation measures, the proposal would be unlikely to have a significant impact on any species, population or ecological community listed as threatened, migratory or marine under the TSC Act or EPBC Act.

Based on the conclusions of the assessment of significance under Section 5A of the EP&A Act, the preparation of a Species Impact Statement is not required (to support a determination of the proposal under Part 5 of the EP&A Act).

Based on the conclusions of the assessments of significance, referral of the proposal to the Australian Government Minister for the Environment under the EPBC Act is not considered necessary.

8. References

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Appendix A

Flora species list

** Introduced species*

✓ Recorded as incidental species

r *<1% cover, few individuals*
+ <1% cover, numerous individuals

Numbers are percent cover abundance

Scientific name	Common name	Quadrat (% cover abundance)	Incidentals
Agapanthus sp.*	African Lily		✓
*Amaranthus retroflexus**	Redroot Amaranth		✓
Austrodanthonia sp.	A Wallaby Grass		✓
Avena sp.*	Wild Oats	5	
*Bromus diandrus**	Great Brome	1	
Callistemon sp.	A Bottlebrush		✓
Conyza sp.*	Fleabane		✓
Cucumis myriocarpus subsp. *leptodermis**	Paddy Melon	5	
*Cynosurus echinatus**	Rough Dog's Tail	r	
Dysphania pumilio	Small Crumbweed	+	
*Echium plantagineum**	Paterson's Curse	+	
*Eragrostis cilianensis**	Stinkgrass	+	
Eragrostis parviflora	Weeping Lovegrass	1	
Eucalyptus camaldulensis	River Red Gum		✓
Eucalyptus sp.			✓
*Heliotropium europaeum**	Common Heliotrope	+	
*Hordeum leporinum**	Barley Grass	10	
*Hypericum perforatum**	St John's Wort		✓
*Lolium rigidum**	Annual Ryegrass	10	
*Medicago sativa**	Lucerne		✓
Melaleuca sp.			✓

Panicum effusum	Hairy Panic	40	
Paspalum sp.*	Paspalum		✓
*Persicaria maculosa**	Redshank	1	
Poaceae sp.*		10	
Portulaca oleracea	Pigweed	r	
Rubus sp.*	Blackberry		✓
Salix sp.*	Willow		✓
*Solanum nigrum**	Black-berry Nightshade	r	
*Sonchus oleraceus**	Common Sowthistle	r	
*Tribulus terrestris**	Cat-head	r	
*Xanthium spinosum**	Bathurst Burr	+	

Appendix B

Fauna species list

** Introduced species*

Common name	Scientific name
Birds	
Australian Magpie	*Gymnorhina tibicen*
Australian Raven	*Corvus coronoides*
Australian Wood Duck	*Chenonetta jubata*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Common Starling	*Sturnus vulgaris**
Crested Pigeon	*Ocyphaps lophotes*
Eastern Rosella	*Platycercus eximius*
Galah	*Eolophus roseicapillus*
Magpie-lark	*Grallina cyanoleuca*
Sulphur-crested Cockatoo	*Cacatua galerita*
Superb Fairy-wren	*Malurus cyaneus*
A Thornbill	*Acanthiza* sp.
Willie Wagtail	*Rhipidura leucophrys*
Mammals	
Rabbit	*Oryctolagus cuniculus**

Appendix C

Assessment of likelihood of occurrence

An evaluation of the likelihood and extent of impact to threatened and migratory species recorded from or predicted to occur within a 20 km radius of the subject site (TSC Act threatened species); and within a 10 km radius of the subject site (EPBC Act threatened and migratory species). Records and predictions are from a search of the Office of Environment and Heritage (OEH) Wildlife Atlas, OEH Biobanking Credit Calculator, and the EPBC Environmental Reporting Tool available from the Department of Sustainability, Environment, Water, Population and Community (SEWPaC) website. Ecology information has been obtained from the Threatened Species Profiles and scientific committee determinations on the NSW OEH website (www.threatenedspecies.environment.nsw.gov.au) and from the Species Profiles and Threats Database and determinations on the Commonwealth SEWPaC website (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl).

Likelihood of Occurrence in Study Area

Unlikely:	Species, population or ecological community is not likely to occur.
Likely:	Species, population or ecological community could occur and study area is likely to provide suitable habitat.
Present:	Species, population or ecological community was recorded in the study area.

Possibility of Impact

Unlikely:	The proposal would be unlikely to impact this species or its habitats. No EP&A Act 7-Part Test or EPBC Act significance assessment is necessary for this species.
Likely:	The proposal could impact this species, population or ecological community or its habitats. An EP&A Act 7-Part Test and/or EPBC Act significance assessment is required for this species, population or ecological community.

Status

National	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
NSW	NSW *Threatened Species Conservation Act 1995*
E:	Endangered
CE:	Critically Endangered
V:	Vulnerable
Mi:	Migratory
M:	Marine

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
ECOLOGICAL COMMUNITIES				
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grassland of South-eastern Australia	E	E	**Unlikely -** The community occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 mm pa and the mean maximum annual temperature is 22- 26°C. There is a correlation between the distribution of *Eucalyptus microcarpa* communities and soils of Tertiary and Quaternary alluvial origin, largely corresponding with the Red Brown Earths. The majority of remnant patches survive with trees largely intact but with the shrub or ground layers degraded to varying degrees through grazing or pasture modification. Some species that are part of the community appear intolerant to heavy grazing by domestic stock and are confined to the least disturbed remnants. The ecological community does not occur in the study area as there are no Grey Box trees present.	**Unlikely –** The community is not present within the study area.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box-Gum Woodland)	CE	E	**Unlikely -** Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include *Eucalyptus bridgesiana*, *E. polyanthemos*, *E. rubida*, *E. pauciflora*, *E. cinerea*, *E. mannifera*, *E. macrorhyncha*, *E. microcarpa* and others. The ecological community does not occur in the study area as there are no White Box, Yellow Box or Blakely's Red Gum trees present.	**Unlikely –** The community is not present within the study area.
BIRDS				
Australasian Bittern *Botaurus poiciloptilus*	-	V	**Unlikely -** Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). The species has not been recorded within the locality. The dam in the study area does not contain tall, dense vegetation required as habitat by the species.	**Unlikely –** The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Australian Painted Snipe *Rostratula australis* *Rostratula benghalensis s. lat.*	V, M, Mi	E	**Unlikely** - Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Forages nocturnally on mud-flats and in shallow water. The species has not been recorded within the locality. The dam in the study area is unlikely to provide habitat for the species due to lack of suitable surrounding vegetation.	**Unlikely** – The species is unlikely to inhabit the study area.
Barking Owl *Ninox connivens*	-	V	**Likely** - Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as *Acacia* and *Casuarina* species, or the dense clumps of canopy leaves in large *Eucalypts*. Nests in hollows of large, old eucalypts including River Red Gum (*Eucalyptus camaldulensis*). Hollows are greater than 20 cm in diameter and at least four metres above the ground. The most recent recording of the species was 8 km north of the subject site in 2000 on the Murrumbidgee River. The River Red Gum planting in the study area may provide habitat for the species. The species may use the trees in the study area for roosting and foraging.	**Unlikely** – The proposal would not remove trees the species may use for roosting and foraging.
Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*	-	V	**Likely** - Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*) and Forest Red Gum (*Eucalyptus tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. The species has been recorded 7.5 km north of the subject site. The River Red Gum planting in the study area may provide potential habitat for the species.	**Unlikely** – The proposal would not remove woodland the species may use as habitat.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Brolga *Grus rubicunda*	-	V	**Unlikely -** 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 using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, 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. The species has been recorded 8 km west of the subject site. Suitable wetland habitat does not occur in the study area.	**Unlikely –** The species is unlikely to inhabit the study area.
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	-	V	**Likely -** Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging. The species has been recorded 7.5 km north of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not remove woodland the species may use as habitat.
Bush Stone-curlew *Burhinus grallarius*	-	E	**Unlikely -** The species inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights and feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. The species has been recorded 4.5 km east of the subject site. The study area does not contain suitable areas with a grassy groundlayer and woody debris for the species to be present.	**Unlikely –** The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Cattle Egret *Ardea ibis*	M, Mi	-	**Unlikely** - The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps, and is often seen with cattle and other stock. The species has been recorded 7 km north-east of the subject site. Suitable habitat with poor drainage is not present in the study area.	**Unlikely –** The species is unlikely to inhabit the study area.
Diamond Firetail *Stagonopleura guttata*	-	V	**Likely** - Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects. The species has been recorded 7.5 km north of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not remove woodland that the species may use as habitat.
Flame Robin *Petroica phoenicea*	M	V	**Likely** - The Flame Robin prefers forest and woodland habitats up to about 1800 m above sea level. In winter, birds move to lower and more open areas, including gardens. In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. The species has been recorded 7 km north of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not remove woodland that the species may use as habitat.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Fork-tailed Swift *Apus pacificus*	M, Mi	-	**Likely** - Migratory marine visitor to eastern Australia. The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. It is a highly nomadic and dispersive species which feeds on insects in the air. The species occurs over inland plains, and settled areas, including towns, urban areas and cities. The species mostly occurs over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. The species is also found in treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The species has been recorded 5 km east of the subject site. The species could potentially forage above the study area but would be unlikely to occur in the study area.	**Unlikely –** The species is unlikely to inhabit the study area.
Freckled Duck *Stictonetta naevosa*	-	V	**Unlikely -** 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. The species has been recorded 8 km north-east of the subject site. The dam in the study area does not contain heavy growth to provide suitable habitat for the species to occur.	**Unlikely** – The species is unlikely to inhabit the study area.
Gang-gang Cockatoo *Callocephalon fimbriatum*	-	V	**Unlikely** - In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Move to lower altitudes in winter, preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages. Favours old growth attributes for nesting and roosting. Often found in urban areas. The species has been recorded 7 km north-east of the subject site, however the record was from 1979 and the species rarely occurs this far east.	**Unlikely** – The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Gilbert's Whistler *Pachycephala inornata*	-	V	**Unlikely -** The species occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. In woodland habitats, the understorey comprises dense patches of shrubs, particularly thickets of regrowth Callitris pine. Parasitic 'cherries' (Exocarpus species) appear to be an important habitat component in Belah and Red Gum communities, though in the latter case other dense shrubs, such as Lignum and wattles, are also utilised. Forages on or near the ground in shrub thickets and in tops of small trees. Its food consists mainly of spiders and insects such as caterpillars, beetles and ants, and occasionally, seeds and fruits are eaten. Nests are usually built below about two and a half metres (but up to six metres) above the ground in the fork of dense foliage of plants such as wattles or cypress pines. The species has been recorded 7 km north of the subject site. The study area does not contain a dense shrub layer that would provide suitable habitat for the species to occur.	**Unlikely** – The species is unlikely to inhabit the study area.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	-	V	**Unlikely -** This species 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. 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. The species has been recorded 6.5 km north of the subject site. The River Red Gum planting in the study area does not contain preferred feed tree species and it is unlikely that the species would occur.	**Unlikely** – The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Great Egret *Ardea alba*	M, Mi	-	**Unlikely** - Reported in a wide range of wetland habitats including swamps and marshes, margins of rivers and lakes, damp or flooded grasslands, pastures or agricultural lands, reservoirs, sewage treatment ponds, and drainage channels. The species has been recorded 7.5 km north-east of the subject site. The small dam in the subject site would be unlikely to provide suitable habitat for the species.	**Unlikely** – The species is unlikely to inhabit the study area.
Hooded Robin *Melanodryas cucullata*	-	V	**Unlikely** - Prefers 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. The species has been recorded 7.5 km north of the subject site. Due to the relatively young age of the trees, the River Red Gum planting does not contain structurally diverse habitat for the species.	**Unlikely** – The species is unlikely to inhabit the study area.
Latham's Snipe *Gallinago hardwickii*	M, Mi	-	**Unlikely -** Occurs in permanent and ephemeral wetlands. The species usually inhabits open, freshwater wetlands with low, dense vegetation. The species has been recorded 5.5 km east of the subject site. Although there is a dam present in the study area, this is unlikely to provide suitable habitat and the species is unlikely to occur.	**Unlikely** – The species is unlikely to inhabit the study area.
Little Eagle *Hieraaetus morphnoides*	-	V	**Likely** - Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. The species has been recorded 2 km east of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not remove woodland that the species may use as habitat.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Little Lorikeet *Glossopsitta pusilla*	-	V	**Unlikely** - Mostly occurs in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. On the western slopes and tablelands White Box and Yellow Box are particularly important food sources for pollen and nectar and mistletoe is also a common habitat feature. The species has been recorded 7 km north of the subject site. Suitable feed trees and mistletoe are not available to provide habitat for the species to occur.	**Unlikely** – The species is unlikely to inhabit the study area.
Malleefowl Leipoa ocellata	V	E	**Unlikely -** The species predominantly inhabits mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers. The species has not been recorded in the locality. The study area does not contain suitable habitat in the form of dense and diverse shrub and herb layers for the species to occur.	**Unlikely** – The species is unlikely to inhabit the study area.
Rainbow Bee-eater *Merops ornatus*	M, Mi	-	**Likely** - The species occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent water. The species has been recorded in roadside vegetation. The species has been recorded 5.5 km north-east of the subject site. The species may use the River Red Gum planting as habitat.	**Unlikely** – The proposal would not remove woodland that the species may use as habitat.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Regent Honeyeater *Anthochaera phrygia*	E	E	**Unlikely** - The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. The species has been recorded 8 km north-east of the subject site; however the record is from 1980. The species is unlikely to inhabit the study area due to lack of mature trees and mistletoes and minimal canopy cover as required for suitable habitat.	**Unlikely** – The species is unlikely to inhabit the study area.
Scarlet Robin *Petroica boodang*	-	V	**Likely** - In NSW the species occupies open forests and woodlands from the coast to the inland slopes. Breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. The species has been recorded most recently 7.5 km north of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.
Speckled Warbler *Pyrrholaemus saggitatus*	-	V	**Unlikely** - The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The species has been recorded 8 km south of the subject site. The species is unlikely to utilise the study area as habitat due to minimal native grass cover, the small size of the plantings and the disturbed nature of the study area.	**Unlikely** – The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Spotted Harrier *Circus assimilis*	-	V	**Likely -** The species occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The species has been recorded 8 km south of the subject site. The River Red Gum planting in the study area may provide habitat for the species.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.
Superb Parrot *Polytelis swainsonii*	V	V	**Likely** - The species inhabits 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. May forage up to 10 km from nesting sites, primarily in grassy box woodland. The species has been recorded 3.5 km north of the subject site. The species may utilise the River Red Gum planting within the study area as habitat.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.
Swift Parrot *Lathamus discolor*	E, Mi, M	E	**Unlikely** - The species occurs in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. The species has been recorded 3 km north of the subject site. The study area does not contain the preferred eucalypt species to provide suitable habitat for the species.	**Unlikely** – The study area does not contain habitat for the species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Turquoise Parrot *Neophema pulchella*	-	V	**Unlikely** - Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. The most recent record of the species is 13.5 km north-east of the subject site. The River Red Gum planting would be unlikely to provide habitat for the species, as it prefers mature woodland habitats.	**Unlikely** –The species is unlikely to inhabit the study area.
Varied Sittella *Daphoenositta chrysoptera*	-	V	**Unlikely** - Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. The species has been recorded twice within the locality; the most recent record is 7 km north of the subject site in 1994. The River Red Gum planting in the study area would be unlikely to provide suitable habitat for the species to occur due to minimal presence of mature gums.	**Unlikely** –The species is unlikely to inhabit the study area.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	M, Mi	-	**Unlikely** – Habitat is characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The species was recorded 12 km west of the subject site in 1979 and is unlikely to occur within the study areas due to lack of large areas of open water.	**Unlikely** – The species is unlikely to occur within the study area and suitable habitat for the species is not available.
White-fronted Chat *Epthianura albifrons*	-	V	**Unlikely -** The White-fronted Chat lives in salt marsh and other damp areas with low vegetation such as swampy farmland and roadside verges. Sometimes occurs on beaches and the edges of lakes. The species was recorded most recently 14 km north-east of the subject site in 1992 and is unlikely to occur within the study area due to lack of suitable damp habitat for the species.	**Unlikely** –The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
White-throated Needletail *Hirundapus caudacutus*	M, Mi	-	**Likely** - The species is highly nomadic and dispersive, following low pressure atmospheric pockets where it feeds on insects. In Australia, White-throated Needletails almost always forage aerially, at heights up to 'cloud level', above a wide variety of habitats. The species is generally found in eastern NSW and occasionally in inland NSW. Although the species occurs over most types of habitat, it is probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but is less commonly recorded flying above woodland. The species also commonly occurs over heathland, but less often over treeless areas, such as grassland or swamps. The species has been recorded roosting in trees in forests and woodlands, among dense foliage in the canopy or in hollows. The species has been recorded once within the locality, 5.5 km north-east of the subject site in 1994. The River Red Gum planting in the study area could provide habitat for the species.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.
BATS				
Greater Long-eared Bat (south-eastern form) *Nyctophilus corbeni*	V	V	**Likely -** The species 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. The species has not been recorded in the locality. The River Red Gum planting could provide habitat for the species.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Inland Forest Bat *Vespadelus baverstocki*	-	V	**Unlikely -** The species roosts in tree hollows and abandoned buildings and is known to roost in very small hollows in stunted trees only a few metres high. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including mallee, mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited. However, other habitats may be used for foraging and/or drinking. These bats fly rapidly and cover an extensive foraging area and are presumed to feed on flying insects. The species has been recorded 9.5 km north of the subject site. Unlikely to occur because this record has not been reviewed. Low confidence in the reliability of the record.	**Unlikely** –The species is unlikely to inhabit the study area.
Southern Myotis *Myotis macropus*	-	V	**Unlikely -** The species generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools catching insects and small fish by raking its feet across the water surface. The species has been recorded 9.5 km north-east of the subject site. The species is unlikely to occur within the study area due to lack of suitable roosting habitat for a group of the species.	**Unlikely** –The species is unlikely to inhabit the study area.
MAMMALS				
Brush-tailed Rock-wallaby *Petrogale penicillata*	V	E	**Unlikely -** The species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. The species has not been recorded within the locality and is unlikely to occur within the study area due to absence of rocky areas to provide suitable habitat.	**Unlikely** –The species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Koala *Phascolarctos cinereus*	-	V	**Unlikely** – The species inhabits eucalypt woodlands and forests. Feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species. The species has been recorded 4 km north-east of the subject site. The species is unlikely to occur due to a paucity of recent local records, and due to the species not being recorded during survey effort at Kapooka, west of the proposal, which included scat searches around the bases of trees and targeted searches (CSU 2003).	**Unlikely** –The species is unlikely to inhabit the study area.
Spotted-tailed Quoll *Dasyurus maculatus maculatus* (SE mainland population)	E	V	**Unlikely** - Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. The species has been recorded 7.5 km east of the subject site. The species is unlikely to inhabit the study area due to the highly fragmented nature of the study area.	**Unlikely** –The species is unlikely to inhabit the study area.
Squirrel Glider (population in the Wagga Wagga LGA) *Petaurus norfolcensis*	-	EP	**Likely -** Inhabits a wide range of open forest, woodland and riverine forest habitats. Utilise remnants of various sizes, including small remnants and even small stands of trees within Travelling Stock Reserves, roadside reserves or private land. Often utilise linear remnant vegetation along roadsides or rivers and streams. Eucalypt species known to provide suitable denning and foraging resources include (but are not restricted to): Blakely's Red Gum (*E. blakelyi*), Grey Box (*E. microcarpa*), Red Box (*E. polyanthemos*), Mugga Ironbark (*E. sideroxylon*), River Red Gum (*E. camaldulensis*), White Box (*E. albens*) and Yellow Box (*E. melliodora*). The species has been recorded at Kapooka, north of the subject site. Although the River Red Gum planting has minimal hollow-bearing trees available for denning, it is likely that the species could use the habitat for foraging due to its connectivity with woodland remnants in the locality that are known to provide habitat.	**Unlikely** – The proposal would not impact on woodland that the species may use as habitat.
REPTILES				

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Striped Legless Lizard *Delmar impar*	V	V	**Unlikely -** The species is found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Grassland habitat is dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda australis*, spear-grasses *Austrostipa* spp. and Poa tussocks *Poa* spp., and occasionally wallaby grasses *Austrodanthonia* spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter. The species has not been recorded in the locality. The study area does not contain grassland habitat with preferred habitat.	**Unlikely** – the species is unlikely to inhabit the study area.
AMPHIBIANS				
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog *Litoria raniformis*	V	E	**Unlikely** – This species is found mostly amongst emergent vegetation, including *Typha* spp. (bullrush), *Phragmites* spp. (reeds) and *Eleocharis* spp. (sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The species has been recorded over 17 km south-east of the subject site. The study area does not contain water bodies with emergent vegetation that would provide habitat.	**Unlikely** – The study area does not contain suitable habitat for the species.
PLANTS				
Claypan Daisy *Brachyscome muelleroides*	V	V	**Unlikely -** The species grows in damp areas on the margins of claypans in moist grassland with *Pycnosorus globosus, Agrostis avenacea* and *Austrodanthonia duttoniana*. Also recorded from the margins of lagoons in mud or water, and in association with *Calotis anthemoides*. The species has been recorded 6.5 km north-east of the subject site. The species is unlikely to occur within the study area due to lack of damp areas and associated species.	**Unlikely** – the species is unlikely to inhabit the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Small Purple-pea *Swainsona recta*	E	E	**Unlikely -** Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *E. melliodora*, Candlebark Gum *E. rubida* and Long-leaf Box *E. goniocalyx*. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. The species has been recorded 6.5 km north-east of the study area; however the record is from 1900. The study area does not contain suitable habitat or associated species.	**Unlikely** – the species is unlikely to inhabit the study area.
Woolly Ragwort *Senecio garlandii*	V	V	**Unlikely -** The species occurs on sheltered slopes of rocky outcrops and flowering occurs in spring. The species has been recorded 8 km north-east of the subject site. The species is unlikely to occur within the study area due to absence of rocky outcrops required as habitat.	**Unlikely** – the species is unlikely to inhabit the study area.

Appendix D

EP&A Act assessment of significance

Threatened species that may potentially occur in the study area include:

- Barking Owl (*Ninox connivens*) - Vulnerable
- Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*) - Vulnerable
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*) - Vulnerable
- Diamond Firetail (*Stagonopleura guttata*) - Vulnerable
- Flame Robin (*Petroica phoenicea*) – Vulnerable
- Little Eagle (*Hieraaetus morphnoides*) - Vulnerable
- Scarlet Robin (*Petroica boodang*) – Vulnerable
- Spotted Harrier (*Circus assimilis*) - Vulnerable
- Superb Parrot (*Polytelis swainsonii*) – Vulnerable
- Greater Long-eared Bat *(south-eastern form) (Nyctophilus corbeni)* - Vulnerable
- Squirrel Glider (population in the Wagga Wagga LGA) *Petaurus norfolcensis* – Endangered Population

a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

These species are likely to utilise the woodland habitat along the north-western border of the proposal site as habitat. The woodland provides potential foraging, roosting and nesting habitat for these species. This area would not be impacted by the proposal. Vegetation to be impacted by the proposal would be specifically groundcover vegetation that comprises predominantly introduced species and is not considered valuable or significant habitat for these species.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

The Squirrel Glider could potentially use the River Red Gum planting in the study area. This area would not be impacted by the proposal. Vegetation to be impacted by the proposal would be specifically groundcover vegetation that comprises predominantly introduced species and is not considered valuable or significant habitat for the species.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

The study area does not contain any endangered ecological communities due to the absence of Grey Box which forms Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grassland of South-eastern Australia; and the absence of White Box (*E. albens*), Yellow Box (*E. melliodora*) and

Blakely's Red Gum (*E. Blakelyi*) which forms White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box-Gum Woodland).

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

There are no endangered ecological communities within the study area.

d) in relation to the habitat of a threatened species, population or ecological community:

i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The proposal would remove only groundcover vegetation that comprises predominantly introduced species and is not considered valuable or preferred habitat for these species. No woodland habitat that the species are likely to utilise for foraging, roosting and nesting would be impacted by the proposal.

ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The study area is situated within an agricultural landscape that has previously been extensively fragmented. The proposal would specifically remove only groundcover vegetation that is not considered likely to provide suitable or preferred habitat for any threatened species that may occur in the study area. The removal of groundcover vegetation for the proposal would not significantly fragment habitat for any threatened species in the study area.

iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

As described above the vegetation to be removed is unlikely to provide habitat for threatened species due to its degraded nature and therefore would not impact upon their long-term survival within the locality.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

The proposal would not affect any habitat listed on the critical habitat register.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

A recovery plan exists for the Barking Owl. One of the objectives of this recovery plan is *Action 3.1 Protect known Barking Owl nest sites and surrounding habitat*. The proposal would not remove woodland used by the species as foraging and movement habitat and is therefore consistent with this objective.

Recovery plans have not been prepared for any of the other threatened bird species. However, the OEH (2011) Threatened Species website identifies a number of actions that need to occur to recover these species. One action that is listed for a number of species is the prevention of clearing of habitat. The

proposal would not remove potential habitat for any of the threatened bird species and therefore an impact would be unlikely to occur.

A preliminary draft recovery plan has been prepared for the Squirrel Glider population in the Wagga Wagga LGA (NPWS 2004). The plan outlines 22 recovery actions under five objectives for the population. Because habitat for the Squirrel Glider would not be removed by the proposal, the proposal is consistent with the draft recovery plan.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

None of the key threatening processes are relevant to the proposal. Because the groundcover vegetation to be removed does not have greater than 50 percent cover of native species, the proposal would not result in removal of native vegetation.

Conclusion

The proposal would be unlikely to cause a significant effect on any threatened species.

Appendix E

EPBC Act significance assessment

Environment Protection and Biodiversity Conservation Act 1999 Significant Impact Guidelines – Matters of National Environmental Significance

1) Are there any matters of national environmental significance located in the area of the proposed action?

The following matters of national environmental significance are likely to occur in the area of the proposed action:

- Flame Robin (*Petroica phoenicea*) (Marine)
- Rainbow Bee-eater (*Merops ornatus*) (Marine, Migratory)
- Superb Parrot (*Polytelis swainsonii*) (Vulnerable)
- White-throated Needletail (*Hirundapus caudacutus*) (Marine, Migratory)
- Greater Long-eared Bat *(south-eastern form) (Nyctophilus corbeni)* (Vulnerable)

2) Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?

These species are likely to utilise the woodland habitat along the north-western border of the proposal site as suitable and preferred habitat. The River Red Gum planting provides potential foraging and roosting habitat for these species. This area would not be impacted by the proposal. Vegetation to be impacted by the proposal would be specifically groundcover vegetation that comprises predominantly introduced species and is not considered valuable or significant habitat for these species, therefore impacts on matters of national environmental significance are unlikely.

3) Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?

A number of measures are proposed to avoid or reduce impacts on matters of national environmental significance. These are detailed in Section 6 of this ecological assessment.

4) Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?

The proposal is considered unlikely to cause impacts on matters of national environmental significance as outlined in 2) above.

Vulnerable Species – Superb Parrot, Greater Long-eared Bat

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- **Lead to a long-term decrease in the size of an important population of a species;**

The Superb Parrot and Greater Long-eared Bat could potentially use the woodland in the study area for foraging and movement. The Superb Parrot generally breeds in River Red Gums along the Murrumbidgee River but would be unlikely to breed in the study area due to the lack of hollow-bearing trees and the distance from the Murrumbidgee River.

Habitat for these species would not be removed as described in 2) above and therefore the proposal would be unlikely to lead to a long-term decrease in the size of an important population.

- **Reduce the area of occupancy of an important population;**

The proposal would not remove areas of habitat that the species may use for foraging, movement or nesting but remove groundcover vegetation as described in 2) above. The proposal would not therefore reduce the area of occupancy of an important population of the species.

- **Fragment an existing important population into two or more populations;**

The study area is situated within an agricultural landscape that has previously been extensively fragmented. The proposal would specifically remove only groundcover vegetation that is not considered likely to provide suitable or preferred habitat for any threatened species that may occur in the study area. The removal of groundcover for the proposal would not further fragment the study area.

It is therefore considered unlikely the proposal would create a barrier to movement for the Superb Parrot or Greater Long-eared Bat. The species is sufficiently mobile, and its movement through the study area would be unlikely to be significantly affected by the proposal.

The proposal would therefore be unlikely to fragment an important population into two or more populations.

- **Adversely affect habitat critical to the survival of a species;**

The woodland within the study area may be used by the two species for foraging and movement. The proposal would not impact upon any of the habitat in the study area that may be used by the species, as described in 2) above, and would therefore not adversely affect habitat critical to the survival of the species.

- **Disrupt the breeding cycle of an important population;**

Superb Parrots generally breed in River Red Gums along the Murrumbidgee River where sufficient hollow bearing trees are available as nesting sites. Greater Long-eared Bats also breed in tree hollows, crevices and under loose bark. Core breeding habitat is not present in the study area due to the lack of hollow-bearing trees. The proposal would be unlikely therefore to disrupt the breeding cycle of an important population of either of the species.

- **Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**

Habitat for the Superb Parrot and Greater Long-eared Bat would not be removed as described in 2) above. The proposal would therefore be unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- **Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;**

The study area is already highly degraded with an abundance of weed species present. The proposal has the potential to further spread weed species through the disturbance of soil during construction, however with the implementation of the safeguards and mitigation measured described in Section 6 the proposal is unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

- **Introduce disease that may cause the species to decline; or**

All machinery and equipment would be cleaned prior to conducting the proposed works. The proposal would therefore be unlikely to introduce disease that may cause the Superb Parrot and Greater Long-eared Bat to decline.

- **Interfere with the recovery of the species.**

The proposal would not interfere with the recovery of the Superb Parrot as it would not involve the removal of any hollow bearing trees or woodland remnants important to the species.

Migratory Species – Rainbow Bee-eater, White-throated Needletail

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- **Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;**

The study area would be likely to provide foraging, movement and perching habitat for the Rainbow Bee-eater and White-throated Needletail.

The woodland in the study area is however unlikely to be important to the species above because:

- The habitat does not occur within a region that supports an ecologically significant proportion of the population of the species. The species has large distributions and the region of the proposal is not recognised as having a large proportion of the species
- The study area does not occur at the limit of the range of the species

- The species is not documented as declining in the locality of the proposal.

Woodland habitat would not be affected, as described in 2) above.

The study area is already significantly fragmented due to clearing for agricultural purposes and the proposal would not cause additional fragmentation.

Nutrient cycles or hydrological cycles would not be altered by the proposal. The proposal would not cause a long-term increase in risk of fire.

The proposal would therefore be unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.

- **Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or**

The study area would be likely to provide foraging, movement and perching habitat for the Rainbow Bee-eater and White-throated Needletail. The woodland in the study area is unlikely however to be important to the migratory species for the reasons listed above.

The study area is already highly degraded with an abundance of weed species present. The proposal has the potential to further spread weed species through the disturbance of soil during construction, however with the implementation of the safeguards and mitigation measured described in Section 6 the proposal is unlikely to result in invasive species that are harmful to a migratory species becoming established in the migratory species' habitat.

- **Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.**

The study area would be likely to provide foraging, movement and perching habitat for the Rainbow Bee-eater and White-throated Needletail. However, the habitat does not occur within a region that supports an ecologically significant proportion of the population of the species. The species have large distributions and the region of the proposal is not recognised as having a large proportion of the species.

Habitat for the species would not be affected, as described in 2) above and it is unlikely that the proposal would seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

Marine Species – Flame Robin, Rainbow Bee-eater, White-throated Needletail

An action is likely to have a significant impact on the environment in a Commonwealth marine area if there is a real chance or possibility that the action will (only one of the criteria is relevant to the proposal):

- **Have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution.**

The study area would be likely to provide foraging, movement and perching habitat for the Flame Robin, Rainbow Bee-eater and White-throated Needletail.

Habitat for these species would not be removed as described in 2) above and it is unlikely that the proposal would have a substantial adverse effect on a population of any of the species, including life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution.

Conclusion

The proposal would be unlikely to cause a significant ecological impact on a matter of national environmental significance.

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