Appendix J

Biodiversity Assessment (NGH Environmental)

Biodiversity Assessment

FLYERS CREEK WIND FARM PLANNING MODIFICATION 4

JULY 2018

ngh environmental

Document Verification

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ACRONYMS AND ABBREVIATIONS

BA	Biodiversity Assessment
BC Act	*Biodiversity Conservation Act 2016* (NSW)
Biosecurity Act	*Biosecurity Act 2015* (NSW)
Cwth	Commonwealth
CEEC	Critically Endangered Ecological Community
DEE	Department of Environment and Energy (Cwth)
DECC or DECCW	Refer to OEH
DGR	Director-General's Requirements
DoE	Department of Energy (Cwth) (refer to DEE)
DPI	Department of Planning and Infrastructure (NSW)
EEC	Endangered ecological community
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cwth)
FM Act	*Fisheries Management Act 1994* (NSW)
ha	hectares
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometres
KTP	Key Threatening Process
LGA	Local Government Area
m	metres
NES	Matters of National environmental significance under the EPBC Act (*c.f.*)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	Office of Environment and Heritage (NSW)
PCT	Plant Community Type
SEPP	State Environmental Planning Policy (NSW)
sp/spp	Species/multiple species
SPRAT	Species Profile and Threats Database (DEE)
TEC	Threatened Ecological Community
VIS	Vegetation Information System

1 EXECUTIVE SUMMARY

Flyers Creek Wind Farm (Pty Ltd) is planning for the construction and operation of the Flyers Creek Wind Farm, 21km South of Orange. Planning Modification 4 includes the reinstatement of a 132 kilovolt (kV) transmission line from the on-site substation to connection point on the Orange North to Cadia transmission line to the north of the site. The proposed 132 kV transmission line will be approximately 14 kilometres (km) in length and have a total expected easement width of 45metres (m).

A biodiversity assessment was undertaken by NGH Environment on behalf of Flyers Creek Wind Farm Pty Ltd (Proponent). The aim of the biodiversity assessment was to determine the vegetation communities present, undertake flora and fauna surveys and assess the likely impacts of the proposal.

Field Surveys of the study area identified two plant community types (PCTs). Yellow Box – Blakley's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (PCT 1330) and Long-leaved Box – Red Box – Red stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion (PCT 287). PCT1330 forms part of the Endangered Ecological Community (EEC), White Box, Yellow Box Blakely's Red Gum Woodland listed under the NSW Biodiversity Conservation Act (BC Act). Sections of the community along Cadia Road meet the criteria for the EEC listed under the federal Environment Protection and Biodiversity Conservation Act (EPBC Act).

An assessment of threatened flora under the BC Act and EPBC Act was undertaken. One threatened tree – Silver-leaf Candlebark (*Eucalyptus canobolensis*) is known to occur within 10km of the study area. Two trees within the study area were suspected to be the threatened tree but were unable to be confirmed by the National Herbarium of NSW due to the timing of the survey. These trees would be avoided by the proposal. Two other threatened flora species, Small Purple-pea (*Swainsona recta*) and Silky Swainson-pea (*Swainsona sericea*) are considered to have the potential to occur within the study area. These plants lie dormant over Autumn and early winter and would not have been visible during the site surveys. No other threatened flora were considered to occur within the study area.

An assessment of threatened fauna under the BC Act and EPBC Act was undertaken. One threatened mammal carcus, the Grey headed flying fox (*Pteropus poliocephalus*) was recorded within the study area. 24 birds species, 12 mammals, one amphibian and two reptiles were also considered to have the potential to occur within the study area. Assessments of significance were carried out for these threatened entities. No significant impact is considered likely for any of these BC or EPBC listed species.

Consideration has been given to avoid and minimise impacts to native vegetation and threatened species where possible. Where impacts are unavoidable, up to 6.8ha of native vegetation and 1.4ha of planted native vegetation would be removed by the proposal, however the final amount will be determined following detailed design. Mitigation and management measures will be put in place to adequately address direct and indirect impacts associated with the proposal. Broadly, these would include but are not limited to, clearly marking and protecting hollow bearing trees and the suspected *Eucalyptus canobolensis* trees, Pre-clearance surveys for the threatened flora species (*Swainsona recta* and *Swainsona sericea*), implement a hollow bearing tree clearing protocol and incorporate the control of priority weeds into a weed management plan.

Prior to the commencement of construction, the proponent will update the baseline mapping of the vegetation within the final disturbance area, and calculate the biodiversity offset credit liability in accordance with the *NSW Biodiversity Offset Policy for Major Projects.*

2 INTRODUCTION AND BACKGROUND

This Biodiversity Assessment (BA) has been prepared to provide a specialist assessment of the construction of a 132 kV transmission line as part of the Flyers Creek Wind Farm planning modification 4.

2.1 PROJECT DESCRIPTION

2.1.1 Location of the activity

The proposal site is described as the area around Flyers Creek, along Cadia Road and Panuara Road, 21 kilometres (km) south of Orange and 15 km west of Millthorpe (Figure 1-1).

The following terms are used for the different spatial scales in this assessment:

- Project footprint: 45m wide cleared easement required for the construction and operation of the transmission line. This is wholly contained within the study area.
- Study area: 100m wide corridor including project footprint and immediate surrounds
- Locality: proposal area and 10 km radius

The study area is within the South-Eastern Highlands IBRA bioregion, in the Orange subregion. The bioregion is dominated by a temperate climate with warm summers and no dry season. The geology of the bioregion is part of the Lachlan fold belt, comprising a complex series of metamorphosed Ordovician to Devonian sandstones, shales, and volcanic rocks with granite intrusions. The dominant topographical features are plateau remnants, granite basins with prominent ridges, and the western ramp, with deeply entrenched streams and narrow valleys with little Quaternary sediment. Diverse vegetation communities occur across the bioregion, including those consisting of Yellow Box *Eucalyptus melliodora*, Red Box *Eucalyptus polyanthemos*, and Blakely's Red Gum *Eucalyptus blakelyi*, with areas of White Box *Eucalyptus albens* in lower areas.

2.2 SCOPE OF THE REPORT

The scope of this assessment includes:

- Desktop assessment of local biodiversity and vegetation communities;
- Detailed flora and fauna survey and general habitat assessment; and
- Assessment of likely impacts of the proposal.

This assessment forms part of a planning modification for Flyers Creek Wind Farm. This planning modification that is being prepared by Flyers Creek Wind Farm Pty Ltd (Proponent) considers the following key items:

1. Reinstatement of the 132 kilovolt (kV) transmission line from the on-site substation to connection point on the Orange North to Cadia transmission line to the north of the site; and
2. An increase in the wind turbine envelope so as to accommodate the newer, more efficient turbine models now available. This assessment only assesses the ecological impacts associated with the reinstatement of the transmission line. The bird and bat impacts of the proposed increase of the turbine envelope have been separately assessed by Brett Lane and Associates and are reported on in a separate report.

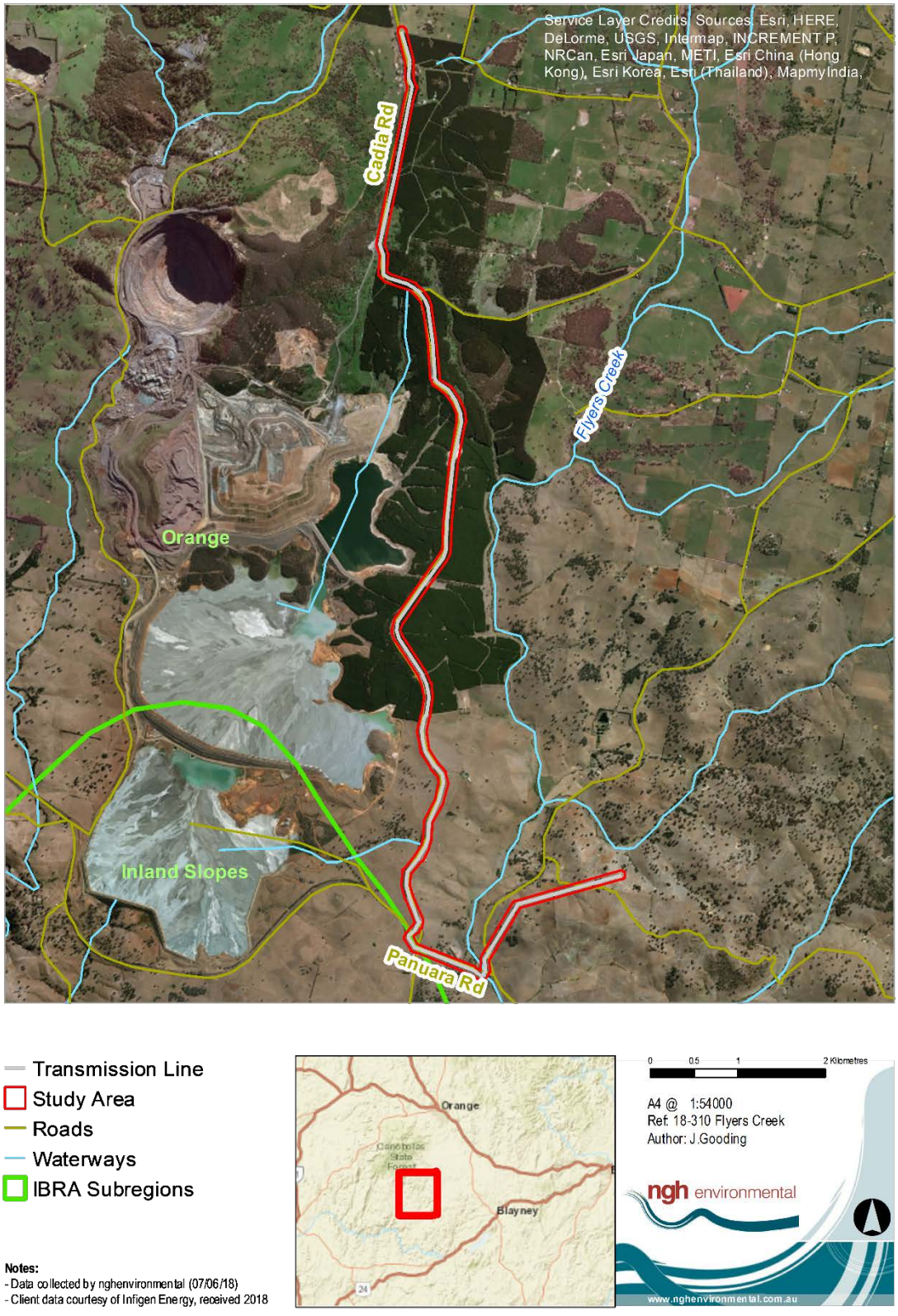

Figure 1-1 Proposal Location.

2.3 THE TRANSMISSION LINE

The proposed 132 kV transmission line;

- Will be approximately 14km in length
- Have poles approximately 24 metres in height
- Have a total expected easement width of 45 metres

The route of the transmission line will travel across farmland from the proposed substation westwards, traverse Errowanbang Rd and then travel along Panuara Rd reserve before heading north along Cadia Rd reserve before travelling alongside the road in NSW Forestry Corporation state forest.

It should be noted that a transmission line was previously approved as part of the original project approval and then removed at Modification 2 due to land access issues. The approved route is slightly different to that being proposed in this Modification.

2.4 PROJECT APPROVAL CONDITIONS

The Project Approval, as currently modified, contains a number of conditions regulating biodiversity matters. These include conditions D1, D2, D3, D4, D5, D6 and F21(f). These are summarised below.

- D1. The proponent must ensure that:
    a. No EEC is cleared for the project unless the Secretary agrees otherwise,
    b. Minimise the clearing of native woodland vegetation, scattered paddock trees and fauna habitat (Including rocky outcrops) within the approved disturbance footprint.
- D2. Tree trunks and major branches from cleared trees should be used to the fullest extent practicable, to enhance habitat in rehabilitated areas or derived native grasslands and details included in the Construction Flora and Fauna Management Plan.
- D3. No more than 10 hollow bearing trees should be removed unless the secretary agrees otherwise
- D4. Prior to the commencement of construction, the proponent shall prepare and submit for the approval of the secretary a Bird and Bat Adaptive Management Plan.
- D5. Prior to the commencement of construction, the proponent must
    a. Update the baseline mapping of the vegetation and key habitat within the final disturbance area, and
    b. Calculate the biodiversity offset credit liability in accordance with the *NSW Biodiversity Offset Policy for Major Projects*
- D6. Within two years of the commencement of construction, the proponent must retire the required biodiversity credits to the satisfaction of OEH. The retirement of the credits must be carried out in accordance with the NSW Biodiversity Offsets policy for Major Projects.
- F21(f): A construction flora and fauna management plant to detail how construction impacts on ecology will be minimised and managed.

2.5 STUDY AREA

The assessment focussed on the transmission line study area that includes an easement 100 metre wide.

The project footprint would be 45 metres wide (22.5 metres either side of the centre of the transmission line), and this would be the maximum width of clearing. The project footprint would occur within the overall 100m wide study area that was assessed. The final disturbance footprint would be identified prior to construction and assessment of the biodiversity offset credit liability. The extent of clearing would be less in sections of the route pass through treeless areas.

The biodiversity assessment was only undertaken within the transmission line project area. The area of the windfarm and wind turbines has previously been assessed for biodiversity impacts and the location of the wind turbines has not changed with this modification to the Flyers Creek Wind Farm.

3 STATUTORY CONSIDERATIONS

3.1 NSW BIODIVERSITY CONSERVATION ACT 2016

The *Biodiversity Conservation Act 2016 (NSW)* (BC Act) aims to maintain a healthy, productive and resilient environment for the greatest wellbeing of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act includes listing of Key Threatening Processes (KTPs), threatened species and threatened ecological communities. The BC Act also includes a five-part test of significance, which is used to determine if a proposed development is likely to have a significant impact on threatened species, ecological communities or their habitats.

In addition, Division 4 of Part 7 of the BC Act requires that consent authorities take into consideration the likely impact of the proposed development on biodiversity values protected by the BC Act as assessed in a biodiversity development assessment report when determining certain planning applications under the EP&A Act. In particular, section 4.17 of the BC Act requires consideration of a biodiversity development assessment report for modification applications under the EP&A Act where Division 4 of Part 7 "applies in relation to the original development as proposed to be modified". However, as the Flyers Creek Wind Farm was originally approved under Part 3A of the EP&A Act and Division 4 of Part 7 of the BC Act does not apply to Part 3A projects, a biodiversity development assessment report is not required for Modification 4.

This assessment considers the potential for the proposal to impact on threatened species and ecological communities listed under the BC Act.

3.2 NSW BIOSECURITY ACT 2015

The *Biosecurity Act 2015* (BA Act) guides the management of weeds at the regional level throughout NSW. Under the BA Act, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant who knows or ought to know of any biosecurity risk has a duty to ensure the risk is prevented, eliminated or minimised, as far as it reasonably practicable. Individuals landholders and managers are required under the BA Act to control priority weeds for their area according to the relevant biosecurity toolset (Table 2-1).

Table 2-1 *Biosecurity Act 2015* toolset for weed management (Department of Primary Industries, 2016).

Outcome category	Biosecurity toolset
Weeds excluded from entering state	***Prohibited Matter:*** Declaration and management of significant weeds not present I NSW or part of NSW.
Weeds to be eradicated	***Control Order:*** Management of weeds that are the targets of approved eradication programs. Although a Control Order is for a five-year period, this can be renewed for longer eradication programs.
Weeds to be effectively managed to reduce spread on regional basis	***Biosecurity Zone:*** Weeds subject to ongoing 'strategic' regional management.
All Weeds	***General Biosecurity Duty:*** Requires any person dealing with biosecurity matter or a carrier of biosecurity matter and who knows or ought to know of the biosecurity risks associated with that activity to take measures to prevent, minimise or eliminate the risk as far as is reasonably practicable. Specific measures to reduce the risk will be detailed in regional weeds plans for priority weeds. **Note however, that the General Biosecurity Duty exists for all weeds that present a biosecurity risk.**
Other Biosecurity tools	***Mandatory Measures Regulation:*** May require persons to take specific actions with respect to weeds or carriers of weeds. ***Emergency Order:*** To respond to a current or imminent biosecurity risk that may have a significant impact. ***Biosecurity Direction:*** An enforceable instruction to a person or class of persons to take action to: - Prevent, eliminate or minimise a biosecurity risk - Prevent, manage or control a biosecurity impact - Enforce any instrument under the Act. ***Biosecurity Undertaking:*** An authorised officer may accept in writing an undertaking by a person that sets out the measures a person has agreed to implement to remedy a contravention, a likely contravention, or suspected contravention of the Act.

A vegetation assessment was undertaken at the proposal area. One priority weeds listed under the Biosecurity Act were present. Weed control measures are discussed in Section 4.1.2.

3.3 NSW FISHERIES MANAGEMENT (FM) ACT 1994

This Act provides for conservation of fishes and their habitats and outlines approval processes for activities that may impact on threatened species and habitats. No work in aquatic habitat will be undertaken, and fish passage would not be affected. No permits or licences are required under the FM Act.

3.4 STATE ENVIRONMENTAL PLANNING POLICY NO. 44 – KOALA HABITAT PROTECTION

SEPP 44 encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure that permanent, free-living populations will be maintained over their present range.

The study area is within Blayney Local Government Area (LGA) and Cabonne LGA. These are listed as LGAs to which SEPP 44 applies. SEPP 44 aims to identify areas of potential and core Koala Habitat. These are described as follows:

- *Core Koala Habitat* is defined as an area of land with a resident population of Koalas, evidenced by attributes such as breeding females, and recent and historical records of a population.
- *Potential Koala Habitat* is defined as areas of native vegetation where the trees listed in Schedule 2 of SEPP 44 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

In Schedule 2 of the SEPP 44, Ribbon Gum *Eucalyptus viminalis* is listed as a feed tree species. Under the NSW Koala Recovery Plan (DECC 2008) under the section *Koala Management Area 5: Central and Southern Tablelands*, eucalypt species are prescribed as Koala feed trees. Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi* are secondary feed trees, and Red Stringybark *E. macrorhyncha* is a supplementary species. The survey looked for and this assessment considers the presence of core and potential Koala habitat at the site.

3.5 ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION (EPBC) ACT 1999 (CWTH)

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of National Environmental Significance (NES).

Matters of NES relevant to biodiversity are:

- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas

Significance of impacts is determined in accordance with the *Significance impact guidelines 1.1 – matters of national environmental significance* (DoE 2013).

Where a proposal is likely to have a significant impact on a matter of NES, the proposal is referred to the Commonwealth Environment Minister via the Department of the Environment (DoE). The Minister then determines whether the proposal is a 'controlled action'. If a proposal is declared a controlled action, an assessment of the action is carried out and the Minister decides to approve, approve with conditions, or not approve the proposed action.

This assessment considers the potential for the proposal to impact on matters of NES relevant to biodiversity.

4 METHODS

4.1 BACKGROUND REVIEW

4.1.1 Database searches

Database searches done for this assessment included threatened species databases and weed databases (Table 3-1). The results of the database searches for threatened species, populations and ecological communities are provided in Table 3-1. These results informed the focus for the field surveys.

Table 3-1 Databases searches for the Biodiversity Assessment.

Resource	Target	Search Area	Date
Office of Environment and Heritage (OEH) BioNet	Threatened flora, fauna and populations	10 km radius of proposal site	5 June 2018
OEH	Threatened flora, fauna and populations	Inland slopes IBRA subregion and Western Slopes Grassy Woodland	12 June 2018
OEH VIS Mapping	Vegetation Mapping	Proposal site	5 June 2018
EPBC Protected Matters Search Tool	Threatened flora and fauna, endangered populations and ecological communities, and migratory species	10 km radius of proposal site	12 June 2018
NSW WeedWise	Priority weeds	Central Tablelands Region	5 June 2018

4.1.2 Literature review

Documentation and literature relevant to this assessment was reviewed, including:

- NSW OEH Threatened Species Profiles
- Department of Environment and Energy (DEE) EPBC Act Species Profiles and Threats Database (SPRAT)
- Construction Methodology and concept designs from Proponent
- NSW OEH Vegetation Information System (VIS) Map Catalogue
- BioNet Vegetation Classification Database
- Threatened Species Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (DEC 2004)
- NSW WeedWise database (NSW DPI)
- Satellite imagery

4.2 FIELD SURVEYS

A field survey was completed by ecologists Julie Gooding (BAM Assessor Accreditation No. BAAS18074) and Jess Murphy on 6 and 7 June 2018. A survey area of a 50 m radius surrounding the transmission line route was assessed for this report. Survey conditions are documented in Table 3-2.

Table 3-2 Weather conditions during field survey at nearest Bureau of Meteorology weather station, Orange NSW (063303).

Dates	Temperature (minimum °C)	Temperature (maximum °C)	Rainfall (mm)	Windspeed (9:00am km/hr)	Cloud (9:00 am)
6 June 2018	5.0	13.8	0	19	0
7 June 2018	5.4	14.1	2.2	17	1

4.2.1 Flora survey methods

The aims of the flora surveys were to:

- Determine all vegetation communities present within the study area, their condition and extent.
- Identify potential Endangered Ecological Communities (EECs) within the study area and determine their condition and extent.
- Identify whether threatened flora species are present within the study area, and whether it is likely that any have the potential to occur within the habitats present.

Species and vegetation communities identified from the background research as potentially occurring in the study area were targeted during the surveys.

The entire length of the study area was surveyed using a random meander method (informal transects) in accordance with Cropper (1993). All observed vascular plant species were identified to species level or otherwise as accurately as possible. The random meander method provides comprehensiveness in terms of the number of species recorded and variation within vegetation types. It is used to maximise the coverage of threatened species habitat and the encounter rate of different species (SoQ, 2014). During the random meander dominant species, physical structure of the vegetation, and species composition were also recorded and used to identify vegetation types. A comprehensive species list is provided in Appendix B.1.

Vegetation communities in the study area have been categorised on the basis of their structure and formation with reference to PCTs from the OEH VIS Classification Database (OEH, 2017).

4.2.2 Fauna survey methods

The aims of the terrestrial fauna surveys were to:

- Assess the fauna habitat types available and their quality and suitability as threatened species habitat (e.g. hollow-bearing trees (HBTs), important foraging resources, vegetation structural complexity)
- Determine which fauna are present or likely to be present within the study area using appropriate survey techniques

- Collect data on the habitat usage and abundance of threatened fauna observed in the study area, in order to determine the potential impacts of the proposal on these species

An assessment of habitat types available and their quality and suitability as threatened species habitat was conducted across the study area. Factors such as hollow-bearing trees (HBTs), coarse woody debris (CWD), leaf litter, vegetation structure, connectivity and disturbance were noted.

Ten bird surveys of at least 20-minute duration were done across the proposal area, targeting impact areas and different vegetation types. Incidental sightings of fauna and their traces (e.g. scats, tracks, scratches) made while present on the site were also recorded.

4.2.3 Limitations

Fauna surveys were conducted over brief periods of time to obtain an indicative assessment of the proposal area. Survey results may vary during different seasons and if conducted over longer periods of time.

There is some potential for some flora species to not be recorded during the survey due to the timing of the survey in early winter. Some ephemeral or short-lived species such as grasses, orchids and lilies, have a limited growing season and would only be identifiable during spring and early summer.

The calculation of HBTs, in particular the size and number of hollows, is as accurate as could be determined from ground level. There is potential for some hollows to be present that were not visible from ground level, which may result in underestimates of the number of hollows (Gibbons and Lindenmayer, 2000). Where it was deemed likely for hollows to be present but not visible from ground level, these were noted.

5 RESULTS

5.1 FLORA

5.1.1 Existing environment

The vegetation within the study area is a mix of remnant native woodlands, forestry plantations, exotic pastures with scattered paddock trees. The extent of each of these areas is shown in Table 4-1.

A large proportion of the transmission line corridor is owned by State Forest and is comprised of Radiata Pine plantations. Remnant native woodlands occur along the road reserve of Cadia Road and Panuara Road and small sections within the pine plantation This native woodland vegetation is comprised of a mix of Eucalypts such as Apple Box (*Eucalyptus bridgsesiana*), Broad-leaved Peppermint (*Eucalyptus dives*), Long-leaf Box (*Eucalyptus goniocalyx*), Red Stringybark (*Eucalyptus macrorhyncha*) and Yellow Box (*Eucalyptus melliodora*). Along the road reserves, where no overstory canopy of Eucalypts occur, the groundcover is dominated by exotic grasses and forbs such as Phalaris (**Phalaris aquatica*), Fleabane (**Conyza* sp.), Vervain (**Salvia verbenacea*) and saffron thistle (**Carthamus lanatus*).

The majority of the Southern section of the transmission line runs through private property. This area has been extensively cleared for grazing of sheep and cattle. Some scattered trees of Yellow Box and Blakely's Red Gum remain within the paddocks as isolated paddock trees or small patches within the paddock. Planted corridors of native vegetation, comprising local trees and shrubs such as Yellow Box, Long-leaf Box and Acacia species occur alongside Cadia Road in the Southern sections of the transmission line route.

Flyers Creek runs through the study area in the Southern End. The riparian vegetation along the banks of Flyers Creek is dominated by exotic vegetation such as Willows (**Salix sp.*), Blackberry (**Rubus fruticosus*) and exotic annuals.

A total of 65 flora species were recorded during the site surveys, comprising 33 native species and 32 exotic species. One threatened species, Silver-leaf Candlebark (*Eucalyptus canobolensis*) was assumed to occur within the study area (refer to Section 4.3.2) A complete list of all species recorded is provided in Appendix B.

Table 4-1 Vegetation extent within the study area.

Vegetation Type	Area (ha) In Study Area)
Native Woodland	17.4
Pine Plantation	58.5
Planted Native Vegetation	7.2
Exotic Vegetation	47.4
Bare Earth	1.8

5.1.2 Priority Weeds

One priority weed, was detected within the study area, Blackberry (*Rubus fruticosus*). Blackberry was observed in patches along the transmission line route, such as along Flyers Creek in the South of the Transmission Line and smaller drainage lines within the study area.

Blackberry is a scrambling shrub with prickly stems that spreads vegetatively and by seed. Blackberry has a General Biosecurity Duty for NSW, which means any person who deals with this plant has a duty to ensure the biosecurity risk is prevented, eliminated or minimised so far as reasonably practicable. Within the Central Tablelands Local Landservices Area, Blackberry has a regional recommended measure that land managers should mitigate spread from their land to protect conservation areas, natural environments and primary production lands that are free of Blackberry (DPI, 2018).

The locations of the priority weeds are shown in Figure 4-11 to Figure 4-16.

Figure 4-1 Blackberry (priority weed) along the roadside within the study area.

5.2 PLANT COMMUNITY TYPES

Two plant community types were detected within the study area.

- PCT 1330: Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
- PCT 287: Long-leaved Box – Red Box – Red stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion.

These PCTs are described in Table 4-2 and Table 4-3.

A large proportion of the native vegetation along Cadia Rd did not align closely with any listed PCT in the IBRA region. The mapping of native vegetation in the Central West Catchment (DEC, 2006) showed patches of remnant vegetation along Cadia Rd and surrounds as Yellow Box – Blakley's Red Gum Grassy woodland on the tablelands. Mature Yellow Box and Blakely's Red Gum were absent from most of the patches of native vegetation along Cadia Rd, with the dominant species being Apple Box, Broad-leafed Peppermint, Long Leaf Box and occasional Red Stringybark, Ribbon Gum (*Eucalyptus viminalis*) and juvenile Yellow Box. Although Yellow Box and Blakely's Red Gum were not dominant species in these patches of native vegetation, PCT 1330 was identified as the most suitable vegetation community, based on the Eucalypt species present also being associated in this community, the landscape position and existing vegetation mapping (DEC, 2006). The native vegetation in the southern portion of the transmission line route, was dominated by Yellow Box and Blakely's Red Gum and clearly aligned with PCT 1330.

Plant community types were categorised into two condition classes based on the framework for biodiversity assessment. Under the methodology, native woody vegetation is in low condition if:

- The over-storey per cent foliage is <25% of the lower value of the over-storey per cent foliage cover benchmark for that vegetation type, AND
- <50% of vegetation in the ground layer is indigenous species or >90% ploughed or fallow.

Native grassland or herbfield is in low condition if:

- <50% of vegetation in the ground layer is indigenous species or >90% ploughed or fallow.

If native vegetation is not in low condition, then it is considered to be in moderate to good condition.

Three NGH Environmental condition classes were applied to provide greater detail regarding the condition of the vegetation across the study area. These were assigned according to the definitions below.

Good	Native overstorey present greater than 25% of the benchmark overstory foliage cover for the particular vegetation type. Numerous native species present in the midstorey and/or ground cover.
Moderate	Native overstorey present greater than 25% of the benchmark overstory foliage cover for the particular vegetation type). Understory dominated by exotic species.
Low	Native overstorey present less than 25% of the benchmark overstory foliage cover (mostly cleared). Numerous exotic species present and low diversity of natives and/or large areas of bare ground with no vegetative cover. Disturbance generally moderate to high.

Table 4-2 Yellow Box - Blakely's Red Gum Grassy Woodland on the tablelands, South Eastern Highlands bioregion.

Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (1330)		
Vegetation formation	Grassy Woodlands	
Vegetation class	Southern Tablelands Grassy Woodlands	
Vegetation type	**Plant Community Type (PCT) ID**	1330
	Common Community Name	Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (1330)
Approximate extent within study area	14.7 ha	
Condition	1.7 ha Good Condition 10.4 ha Moderate Condition 2.6 ha Low Condition	
Conservation Status	This vegetation community forms part of the TEC – White Box – Yellow Box – Blakely's Red Gum Woodland listed under the BC Act. The vegetation community is listed as Critically Endangered under the EPBC Act.	
Estimate of percent cleared	94%	
Threatened plant species habitat	This community can provide potential habitat for the Small Purple-pea (*Swainsona recta*) and Silky Swainson-Pea (*Swainsona sericea*).	
Fauna Habitat	Woodland can provide foraging and nesting habitat for arboreal birds and mammals. Hollow bearing trees provide nesting resources for threatened fauna such as Superb Parrot, Gang-Gang Cockatoo, Squirrel Glider and microbats.	

Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (1330)	
Examples	 Figure 4-2 Example of Yellow Box - Blakely's Red Gum Grassy Woodland in good condition along Panuara Road.  Figure 4-3 Example of Yellow Box - Blakely's Red Gum Grassy Woodland in moderate condition in private property.

Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (1330)

Figure 4-4 Example of Yellow Box - Blakely's Red Gum Grassy Woodland in good condition along Cadia Road.

Figure 4-5 Example of Yellow Box - Blakely's Red Gum Grassy Woodland in low condition along Cadia Road.

Table 4-3 Long-leaved Box - Red Box - Red Stringybark mixed open forests on hills and hillslopes in the NSW South Western Slopes bioregion.

Long-leaved Box – Red Box – Red stringybark mixed open forests on hills and hillslopes in the NSW South Western Slopes Bioregion (287).		
Vegetation formation	Dry Sclerophyll forest (shrubby sub-formation)	
Vegetation class	Western Slopes dry sclerophyll forests	
Vegetation type	**Plant Community Type (PCT) ID**	287
	Common Community Name	Long-leaved Box – Red Box – Red Stringybark mixed open forest on hills and hillslopes.
Approximate extent within study area	2.7 ha	
Condition	2.7 ha Moderate to Good Condition	
Conservation Status	This community does not form part of a TEC.	
Estimate of percent cleared	67%	
Threatened plant species habitat	This community can provide potential habitat for the Small Purple-pea (*Swainsona recta*) and Silky Swainson-Pea (*Swainsona sericea*).	
Fauna Habitat	Woodland can provide foraging and nesting habitat for arboreal birds and mammals. Hollow bearing trees provide nesting resources for threatened fauna such as Superb Parrot, Gang-Gang Cockatoo, Squirrel Glider and microbats.	

Long-leaved Box – Red Box – Red stringybark mixed open forests on hills and hillslopes in the NSW South Western Slopes Bioregion (287).	
Examples	 Figure 4-6 Example of Long-leaved Box – Red Box – Red Stringybark mixed open forest along Cadia Road.

Planted Native Vegetation

7.6 ha of planted native vegetation occurred in linear strips within the study area (Figure 4-7). These areas are comprised of planted native species local to the area such as Mixed Eucalypts (Yellow Box, Long Leaf Box, Large-leaf Peppermint) and mixed Acacia shrubs (*Acacia paradoxa, Acacia implexa* and *Acacia dealbata*).

Figure 4-7 Example of planted vegetation along Cadia Road.

Exotic Vegetation

The majority of the study area is comprised of exotic vegetation. 106 ha of the study area was considered to be comprised of non-native vegetation. The majority of the Northern section of the transmission line route is a Pine Plantation, comprised of dense plantings of Radiata Pine (**Pinus radiata*) (Figure 4-8). The understory is mostly covered by pine needles, however there are some patches of Blackberry (**Rubus fruticosus*) occurring throughout the plantation.

The majority of the Southern section of the transmission line, runs through grazing pastures (Figure 4-9). These areas were heavily grazed at the time of survey. The paddocks are dominated by exotic pasture species such as Phalaris, Clover (**Trifolium* sp) and Medics (**Medicago* sp.) and exotic weeds such as Sheep Sorrel (**Acetosa vulgaris*), Variegated Thistle (**Silybum marianum*) and Lambs Tongue (**Plantago lanceolata*). Along the road reserves in the South of Cadia Road, the groundcover is dominated by exotic grasses and forbs such as Phalaris (**Phalaris aquatica*), Fleabane (**Conyza* sp.), Vervain (**Salvia verbenacea*) and Saffron Thistle (**Carthamus lanatus*) (Figure 4-10).

Figure 4-8 Example of exotic pine plantation along Cadia Road.

Figure 4-9 Example of exotic vegetation in grazed paddocks.

Figure 4-10 Example of exotic vegetation along Cadia Road.

5.3 PLANT SPECIES AND COMMUNITIES OF CONSERVATION SIGNIFICANCE

5.3.1 Endangered ecological communities

Background searches identified six EECs that could occur within the study area (Appendix A).

Of these, one EEC occurred within the study area – White Box – Yellow Box – Blakely's Rd Gum Woodland (Box-Gum Woodland). This community is listed as Endangered under the Biodiversity Conservation Act and also listed as a Critically Endangered ecological community under the EPBC Act.

This community is identified by the presence of Yellow Box (*Eucalyptus melliodora*), White Box (*Eucalyptus albens*) or Blakely's Red Gum (*Eucalyptus blakelyi*). Yellow Box and Blakely's Red Gum are the dominant tree species along Panuara Road, remnant paddock trees in the private property and some sections along Cadia Road.

Although a large proportion of the vegetation along Cadia Road is mapped as Yellow Box - Blakely's Red Gum Woodland, these areas were dominated by the presence of Apple Box (*Eucalyptus bridgesiana*) and large leaf Peppermint (*Eucalyptus dives*). Very few of the characteristic trees species of this EEC were present within this vegetation and it is not considered to meet the criteria of the listed Box-Gum Woodland EEC.

The location of the Box-Gum Woodland EEC is shown in Figure 4-12 to Figure 4-17.

5.3.2 Threatened species

Background searches, identified twelve threatened plants that could occur in the study area (Appendix A)

One threatened tree – Silver-leaf Candlebark (*Eucalyptus canobolensis*) is known to occur within 10km of the study area. This tree is predominantly found on Mount Canobolas – 8 km to the north of the study area but a few isolated Silver-leaf Candlebark trees have been located in the surrounding pine plantations.

Two Eucalyptus trees, located in a drainage line within the pine plantation are suspected to be the threatened tree, Silver-leaf Candlebark (Figure 4-11). A sample was sent to the National Herbarium of New South Wales for confirmation. The herbarium was unable to confirm the species as being *E. canobolensis* without juvenile leaves. No juvenile leaves were present on the tree at the time of survey. For the purposes of this assessment, the trees are assumed to be *E. canobolensis.* The location of these trees is shown in Figure 4-12.

Based on the results of the initial field survey and habitat evaluation in Appendix C.1, two additional threatened flora species are considered to have the potential to occur within the study area that may not have been identified during the surveys:

- Small Purple-pea (*Swainsona recta*) – E BC
- Silky Swainson-pea (*Swainsona sericea*) – V BC

These two forbs could occur within the good condition woodland with a native understory. These plants lie dormant over Autumn and early winter and would not have been visible during the site surveys.

Figure 4-11 Suspected Silver-leaf Candlebark (*E. canobolensis*) in pine plantation.

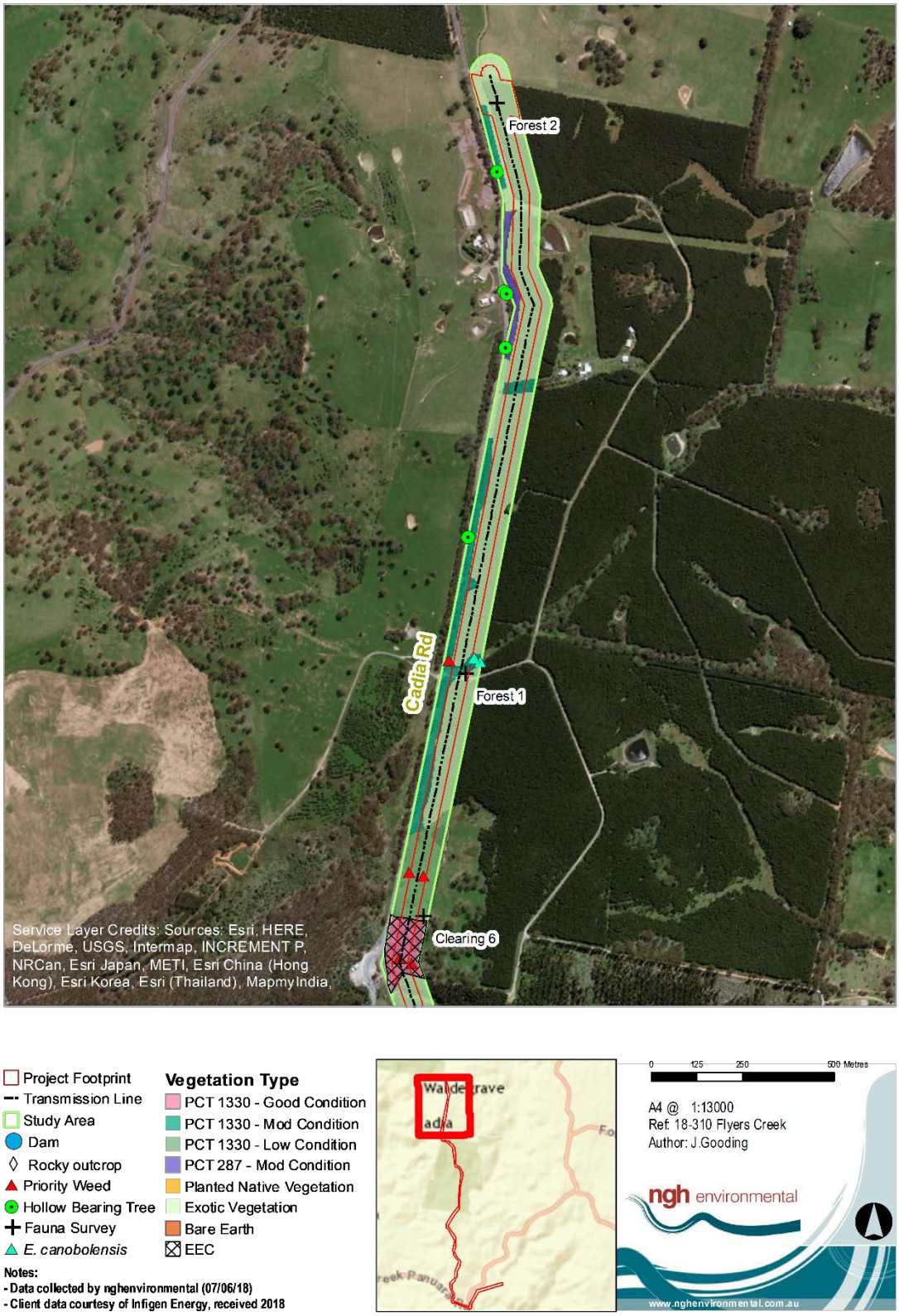

Figure 4-12 Vegetation Map - Map 1.

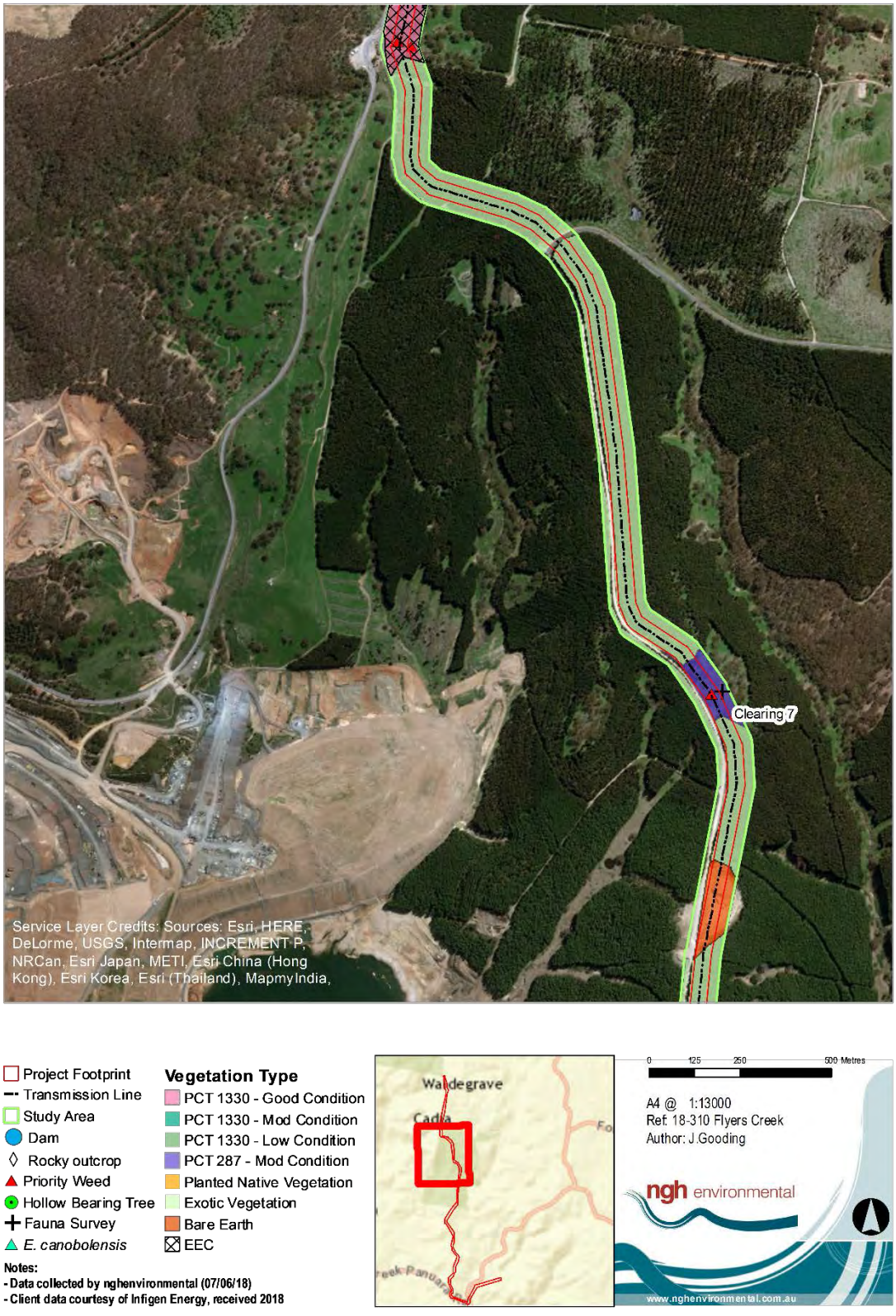

Figure 4-13 Vegetation Map - Map 2.

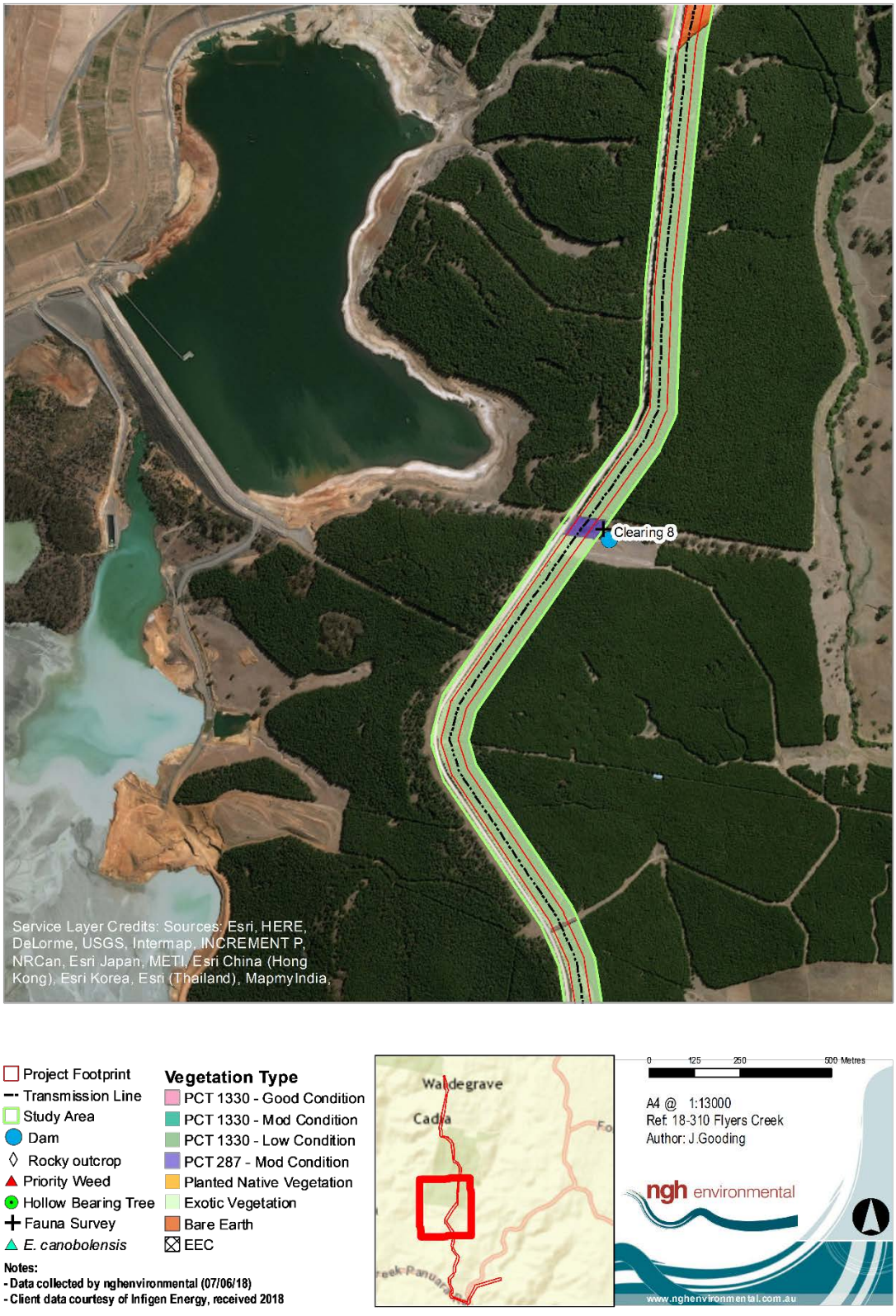

Figure 4-14 Vegetation Map - Map 3.

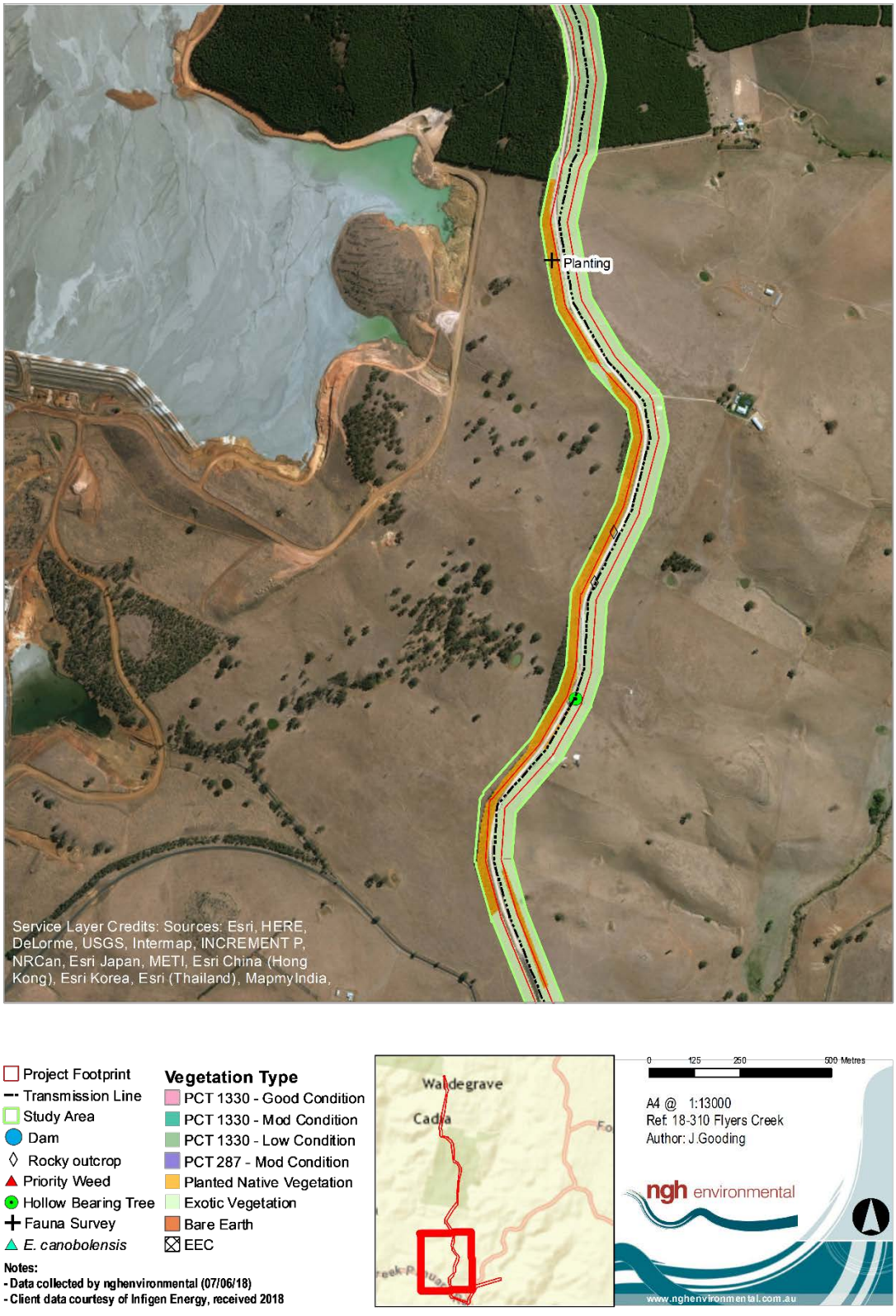

Figure 4-15 Vegetation Map - Map 4.

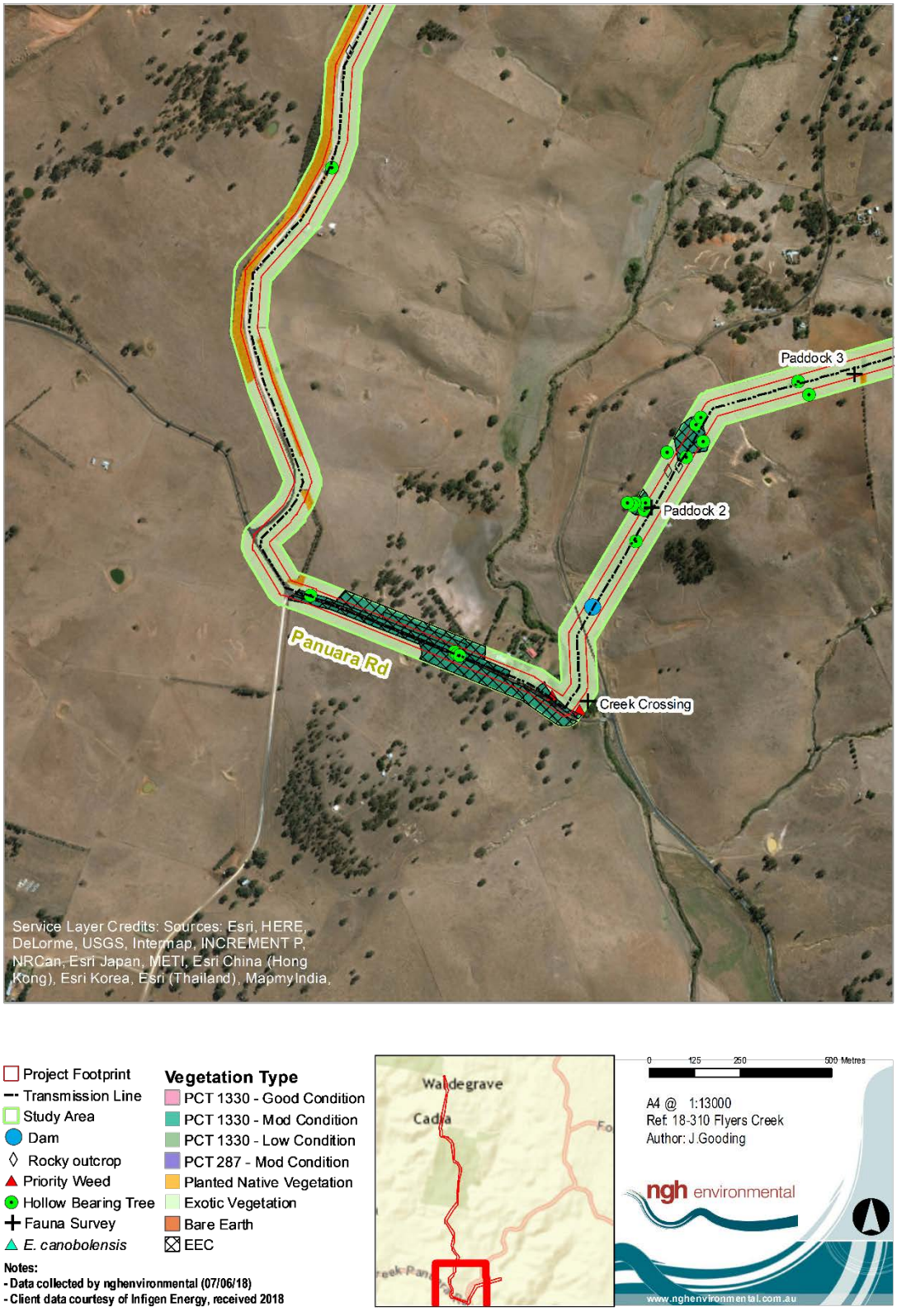

Figure 4-16 Vegetation Map - Map 5.

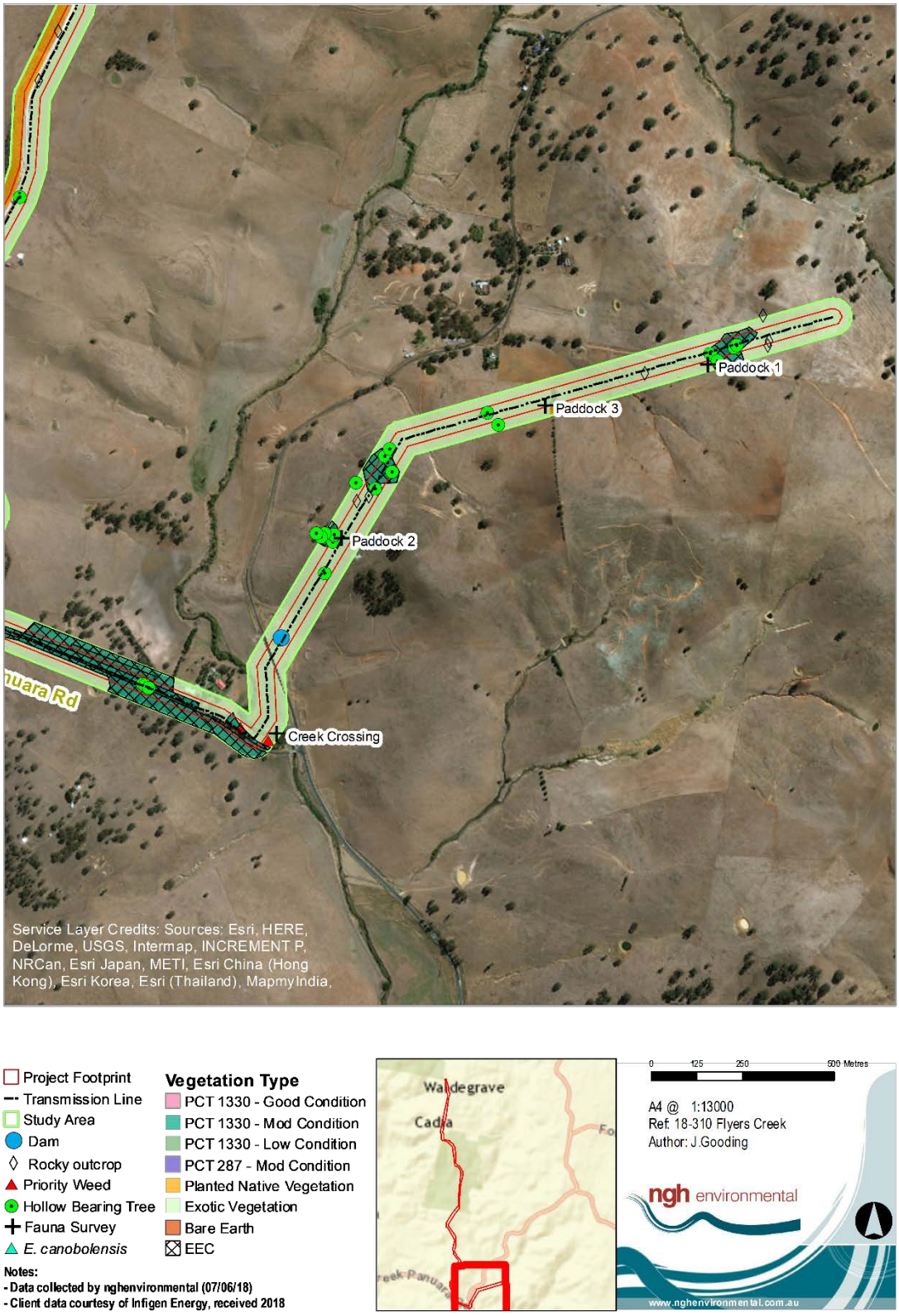

Figure 4-17 Vegetation Map - Map 6.

5.4 FAUNA

A complete list of all species recorded during the field survey is provided in Appendix B.2.

5.4.1 Fauna habitat

In addition to the vegetation types described in Section 4.2, the following habitat features were recorded in the study area:

- 28 hollow-bearing trees
- 8 rock outcrops (Figure 4-18)
- Scattered fallen timber

Figure 4-18 Example of rocky outcrop.

5.4.2 Threatened species

One threatened species of fauna was recorded during the field survey, Grey-headed Flying-fox *Pteropus poliocephalus* (V BC, V EPBC).

Database searches identified threatened fauna species that have been recorded or are predicted to occur within 10 km of the study area, including 24 birds, 14 mammals including 6 bats, 3 reptiles, 4 amphibians, and 2 fishes. Based on the habitats present at the site and the proximity of nearest records, threatened fauna species that are most likely to occur within the study area and use the habitats on site include:

Ground/understorey birds:

- Diamond Firetail *Stagonopleura guttata* – V BC
- Scarlet Robin *Petroica boodang* – V BC
- Flame Robin *Petroica phoenicea* – V BC
- Hooded Robin *Melanodryas cucullata* – V BC
- White-fronted Chat *Epthianura albifrons* – V BC
- Grey-crowned Babbler *Pomatostomus temporalis* – V BC
- Bush Stone-curlew *Burhinus grallarius* – E BC

Canopy/aerial birds:

- Raptors
    - Little Eagle *Hieraaetus morphnoides* – V BC
    - Spotted Harrier *Circus assimilis* – V BC
    - Square-tailed Kite *Lophoictinia isura* – V BC
- Owls
    - Barking Owl *Ninox connivens* – V BC
    - Powerful Owl *Ninox strenua* – V BC
- Small passerines
    - Varied Sittella *Daphoenositta chrysoptera* – V BC
    - Dusky Woodswallow *Artamus cyanopterus* – V BC
    - Regent Honeyeater *Anthochaera phrygia* – CE BC, CE EPBC
    - Painted Honeyeater *Grantiella picta* – V BC, V EPBC
    - Pied Honeyeater *Certhionyx variegatus* – V BC
    - Black-chinned Honeyeater *Melithreptus gularis gularis* – V BC
    - Brown Treecreeper *Climacteris picumnus victoriae* – V BC
- Parrots
    - Swift Parrot *Lathamus discolor* – E BC, CE EPBC
    - Superb Parrot *Polytelis swainsonii* – V BC, V EPBC
    - Turquoise Parrot *Neophema pulchella* – V BC
    - Gang-gang Cockatoo *Callocephalon fimbriatum* – V BC
    - Little Lorikeet *Glossopsitta pusilla* – V BC

Arboreal mammals:

- Spotted-tailed Quoll *Dasyurus maculatus* – V BC, E EPBC
- Squirrel Glider *Petaurus norfolcensis* – V BC
- Eastern Pygmy-possum *Cercartetus nanus* – V BC
- Brush-tailed Phascogale *Phascogale tapoatafa* – V BC
- Koala *Phascolarctos cinereus* – V BC, V EPBC
- Greater Glider *Petaurus volans* – V EPBC

Bats:

- Large-eared Pied Bat *Chalinolobus dwyeri* – V BC, V EPBC
- Corben's Long-eared Bat *Nytophilus corbeni* – V BC, V EPBC
- Eastern Bentwing-bat *Miniopterus schriebersii oceanensis* – V BC
- Southern Myotis *Myotis macropus* – V BC
- Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* – V BC

- Grey-headed Flying-fox *Pteropus poliocephalus* – V BC, V EPBC

Amphibians:

- Booroolong Frog *Litoria booroolongensis* – E BC, E EPBC

Reptiles:

- Pink-tailed Legless Lizard *Aprasia parapulchella* – V BC, V EPBC
- Striped Legless Lizard *Delma impar* – V BC, V EPBC

Open woodland and exotic-dominated grassland with scattered fallen timber occurs in the study area. This provides potential foraging and roosting habitat for the ground/understorey birds Diamond Firetail, Scarlet Robin, Flame Robin, Hooded Robin, White-fronted Chat, Grey-crowned Babbler and Bush Stone-curlew, and would be removed by the proposal. None of these ground/understorey birds were detected during the field survey, but Varied Sittella, Dusky Woodswallow, Diamond Firetail and Scarlet Robin have been recorded in the locality.

Potential foraging habitat for Little Eagle and Square-tailed Kite (open woodland) and potential foraging and breeding habitat for Spotted Harrier (grassland and open woodland with mature trees) occur in the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as nests.

Potential foraging habitat (open woodland) with HBTs providing potential roosting habitat for Barking Owl and Powerful Owl occur in the proposal area and would be removed by the proposal. Surveys did not detect any sign such as pellets.

Small woodland passerines including Varied Sittella, Dusky Woodswallow, Regent Honeyeater, Painted Honeyeater, Pied Honeyeater, Black-chinned Honeyeater and Brown Treecreeper were not detected during the field survey. Potential foraging habitat (open woodland) and breeding habitat including HBTs occurs in the proposal area and would be removed by the proposal.

Potential foraging habitat for Swift Parrot, Superb Parrot, Turquoise Parrot, Gang-gang Cockatoo and Little Lorikeet and HBTs providing potential breeding habitat for Superb Parrot, Turquoise Parrot, Gang-gang Cockatoo and Little Lorikeet occur in the proposal area and would be removed by the proposal. Swift Parrot breeds only in Tasmania, and the proposal would therefore not impact on any potential breeding habitat. Surveys did not detect these species or any signs that they have recently used the study area, but Superb Parrot has been recorded in the locality.

Potential foraging habitat for Koala including preferred feed trees and potential foraging and breeding habitat for Spotted-tailed Quoll, Squirrel Glider, Greater Glider, Eastern Pygmy-possum and Brush-tailed Phascogale occur in the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as scats or scratches on trees that would indicate that the site has been recently used by these species, but Squirrel Glider has been recorded in the locality.

Potential foraging habitat for Large-eared Pied Bat, Eastern Bentwing-bat and Grey-headed Flying-fox and HBTs providing roosting and breeding habitat for Corben's Long-eared Bat, Southern Myotis and Yellow-bellied Sheathtail-bat occurs in the proposal area and would be removed by the proposal. Surveys were not completed for these species, so it is assumed that they could occur in the study area.

A permanent stream (Flyers Creek) and several farm dams providing potential foraging and breeding habitat for Booroolong Frog occurs in the study area and would be impacted by the proposal. Targeted surveys were not completed for this species, so it is assumed that it could occur in the study area. However, there will be only minimal indirect impacts on this habitat.

Grassland and rocky outcrops that provide potential foraging and breeding habitat for these species occur in the study area and would be removed by the proposal. Surveys did not detect these species or any signs that would indicate that the site has recently been used by these species.

5.5 EPBC MATTERS OF NATIONAL SIGNIFICANCE

An EPBC Protected Matters Search found that three EECs, 8 threatened plants, 9 threatened birds, two threatened fishes, two threatened frogs, 7 threatened mammals including three bats, two threatened reptiles, and 11 migratory birds listed under the EPBC Act could occur in the study area (Appendix A.2). A habitat assessment was completed for these species (Appendix C).

Endangered Ecological Communities

Based on the presence of Yellow Box and Blakely's Red Gum in the south of the study area, one EEC, *White Box – Yellow Box – Blakely's Red Gum woodland and Derived Native Grassland* (Box-Gum Grassy Woodland) could occur in the study area. Box-Gum Grassy Woodland is listed as a Critically Endangered ecological community under the EPBC Act.

An assessment of the condition thresholds (DEH, 2006) for the EPBC listed community was undertaken. The Box-Gum Grassy woodlands in the private property in the South of the transmission line route and along Panuara Rd, were not considered to form part of the EPBC listed community, based on the predominantly exotic understory of exotic perennial species such as Phalaris.

The patch of good condition Yellow-Box-Blakely's Red Gum Woodland along Cadia Rd has a predominantly native understory. It meets the condition threshold for the EPBC listed community as the patch size is greater than 2ha and there is natural regeneration of the overstorey eucalypts.

The remaining vegetation along Cadia Rd was not considered to form part of the EPBC listed community as Yellow Box, White Box or Blakely's Red Gum were not the dominant overstory species.

Threatened Flora

One Eucalypt species observed during the field survey was suspected to be the threatened tree – Silver leaf Candlebark (E. canobolenis). Silver leaf Candlebark is listed as Endangered under the EPBC Act. Its distribution is limited to the high altitudes of Mount Canobolas.

Two suspected trees were located within the study area, in a drainage line within the pine plantation (Figure 4-12) Samples were sent to the National herbarium of NSW for identification. The samples were unable to be confirmed however were considered that they could be the threatened species (Botanic Garden communication). These trees are presumed to be *E. canobolensis* for the purposes of this assessment.

Based on the habitats present at the site and the results of the field surveys, one additional threatened flora species is considered to have the potential to occur within the study area that may not have been identified during the surveys:

- Small Purple-pea (*Swainsona recta*) - E

This forb could occur within the good condition woodland with a native understory. This species lies dormant over Autumn and early winter and would not have been visible during the site surveys.

Threatened Fauna

Based on the habitats present at the site and the proximity of nearest records, threatened fauna species that are most likely to occur within the study area and use the habitats on site include:

Birds:

- Swift Parrot *Lathamus discolor* – CE
- Painted Honeyeater *Grantilla picta* – V
- Superb Parrot *Polytelis swainsonii* – V
- Fork-tailed Swift *Apus pacificus* – M
- White-throated Needletail *Hirundapus caudacutus* – M
- Yellow Wagtail *Motacilla flava* – M
- Satin Flycatcher *Myiagra cyanoleuca* – V

Mammals:

- Spotted-tailed Quoll *Dasyurus maculatus* – E
- Large-eared Pied Bat *Chalinolobus dwyeri* - V
- Corben's Long-eared Bat *Nyctophilus corbeni* – V
- Grey-headed Flying-fox *Pteropus poliocephalus* – V
- Greater Glider *Petaurus volans* – V
- Koala *Phascolarctos cinereus* – V

Amphibians:

- Booroolong Frog *Litoria booroolongensis* – E

Reptiles:

- Pink-tailed Legless Lizard *Aprasia parapulchella* – V
- Striped Legless-lizard *Delma impar* – V

Open grassland provides potential foraging habitat for Fork-tailed Swift, and open woodland provides potential foraging habitat for White-throated Needletail. These would be impacted by the proposal. Surveys did not detect these species, but given their wide-ranging life habits, it is possible that they use the habitat in the study are on occasion.

Grassland near a permanent stream and dams provide potential foraging habitat for Yellow Wagtail, and open woodland provides potential foraging and roosting habitat for Satin Flycatcher. These would be impacted by the proposal. Surveys did not detect these species, but it is possible that they could use the study area on occasion.

Threatened species habitats are discussed in Section 4.4.2.

6 ASSESSMENT OF IMPACTS

6.1 NATIVE VEGETATION

The proposal would have a direct impact on vegetation within the study area through removal for construction. Based on a 45 metre wide power line easement up to 6.8 ha of remnant native woodland vegetation and 1.4 ha of planted native vegetation would be removed by the proposal within the Project Footprint. This is considered a worse-case scenario and includes the maximum potential impact. Native vegetation and threatened species would be avoided wherever possible. The quantity of each vegetation type to be impacted is provided in Table 5-1. These values will be finalised based on the final design of the power line within the corridor.

Table 5-1 Impacts to vegetation

Vegetation Type	Condition	EEC	Area (Ha) In Study Area)	Assessed Area of impact (Ha)
Yellow Box – Blakely's Red Gum Yellow Box – Blakely's Red Gum grassy woodland on the tablelands (PCT 1330)	Moderate - Good	Yes: White Box – Yellow Box – Blakely's Red Gum woodland	8.2	4.0
Yellow Box – Blakely's Red Gum Yellow Box – Blakely's Red Gum grassy woodland on the tablelands (PCT 1330)	Moderate - Good	No (Characteristic tree species not dominant).	3.8	0.5
Yellow Box – Blakely's Red Gum Yellow Box – Blakely's Red Gum grassy woodland on the tablelands (PCT 1330)	Low	No	2.6	1.2
Long-leaved Box – Red Box – Red stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion (PCT 287)	Moderate – Good	No	2.7	1.1
Planted Native Vegetation	-	No	7.2	1.4
Non-native Vegetation	-	No	107.7	52.8

6.2 THREATENEDENTITIES

Threatened Ecological Communities

Approximately 4.0ha of White Box – Yellow Box – Blakely's Red Gum woodland (Box-gum woodland) listed under the BC Act would be impacted by the proposal. An Assessment of Significance under the BC Act was carried out for this community (Appendix D) and concluded there is unlikely to be a significant impact on the EEC due to the following reasons.

1. The amount of habitat to be removed or disturbed by the proposal is relatively small in the local context

2. The majority of the Box-Gum woodland within the proposal area has a degraded understory.
3. No fragmentation or isolation of habitat would occur.

A small section of the Box-Gum woodland EEC along Cadia Rd has a higher quality groundcover and is considered to meet the condition threshold of the CEEC under the EPBC Act. 0.8ha of the EPBC listed community would be impacted by the proposal. An EPBC assessment of significance was undertaken for this community and concluded there is unlikely to be a significant impact on this CEEC.

The proposal is not likely to have a significant impact on any TEC's protected by the BC or EPBC Act

Threatened Flora

The threatened tree, *Eucalyptus canobolensis* is considered to occur within the study area. Two suspected trees are present within a small drainage line in the pine plantation (Figure 4-11). These trees fall outside the 45 m wide clearing easement and would not be removed by the proposal. None were recorded within the project footprint (impact zone), but any identified during detailed surveys or suspected would be clearly marked prior to construction to ensure they would not be impacted.

Two other threatened flora species have the potential to occur within the good condition woodland, Small Purple-Pea and Silky Swainson-pea. These forbs are associated with Yellow Box – Blakley's Red Gum Woodland. 1.6 ha of good condition woodland would be impacted by the proposal.

These species lie dormant over the Autumn and early winter months and would not have been visible during the site surveys. As it is not known if the species occur within the development footprint, mitigation measures would be implemented to conduct pre-clearance surveys in Spring for the Small Purple-pea and Silky Swainson-pea to determine if they are present on site. If these species are detected, further assessment would be undertaken and any subsequent requirements implemented before work commenced.

Threatened Fauna

Assessments of significance under the BC Act and EPBC Act were undertaken for the threatened fauna species considered likely to use the habitats in the study area that would be impacted by the proposal (Appendix D). It was concluded that a significant impact would be unlikely, based on the following:

4. The amount of habitat to be removed or disturbed by the proposal is relatively small in the local context and is relatively disturbed and fragmented.
5. No fragmentation or isolation of habitat would occur.
6. No substantial contribution to any key threatening process would be expected.
7. Mitigation measures would be implemented to prevent disruptions to the life cycle or harm to individual animals of these species.

Biodiversity impacts can be adequately managed under the controls contained in the existing conditions of the Project Approval. The proposal is not likely to have a significant impact on any fauna species protected by the BC or EPBC Act.

6.3 WEEDS, PESTS AND PATHOGENS

The proposal has the potential to spread weeds, pests and pathogens during vegetation removal and through the movement of vehicles and machinery into or out of the site. These are easily transported via seeds, propagules, or soil on machinery brought to the site. Equally, they can be carried away to other

areas from the site or spread within it. If not controlled prior to work commencing, then there is the potential for spread throughout the site during and following construction.

The cleared transmission line easement created through the pine plantation could result in the establishment of priority weeds such as Blackberry, that is found growing in nearby areas. Mitigation measures to maintain the easement for priority weeds would limit the establishment of weeds within the easement.

Rehabilitation of disturbed areas and ongoing control after the completion of construction activities would limit the establishment and spread of weeds, pests and pathogens during operation.

6.4 CONSTRUCTION DISTURBANCE

There may be some short-term noise, light, and vibration disturbance during construction, which could temporary impact on fauna around the proposal area. However, the proposed work would be in an area which is already disturbed. Any impact is likely to be temporary and limited in extent.

6.5 REGIONAL AND CUMULATIVE IMPACTS

The clearing of native vegetation, which is a key threatening process at both State and Commonwealth level, is considered a major factor in the loss of biological diversity. Cumulative impacts are considered best addressed by avoiding and minimising vegetation and habitat loss. The proposal largely avoids impacts to native vegetation and threatened species habitat and the cumulative contribution of the proposal to biodiversity impacts is considered to be low.

7 MITIGATION MEASURES

The following measures are recommended to minimise impacts to biodiversity;

Prior to construction

- Incorporate the following safeguards into the Construction Flora and Fauna Management Plan:
  - Clearly mark and protect hollow-bearing trees and other habitat features that are to be avoided. Exclusion areas would extend to the dripline of the trees to be retained (the area directly under the tree branches) or as far from the trunk as possible.
  - Clearly mark the limit of works prior to commencing works.
  - Where suspected Silver-leaf Candlebark (*E. canobolensis*) trees occur within the development easement, or potential impact zone clearly mark and protect these trees to ensure impact to them is avoided.
- Carry out Spring Flora surveys to confirm vegetation mapping and determine the presence of Small Purple-pea (*Swainsona recta*) and Silky Swainson Pea (*Swainsona sericea*)
- Prior to commencement of construction Calculate the biodiversity offset credit liability in accordance with the *NSW Biodiversity Offset Policy for Major Projects*

During construction

The following mitigation measures would be incorporated into the Construction Fauna and Flora Management Plan.

- Works would be confined to within the defined clearing limit.
- Clearing of hollow-bearing trees would not be undertaken during the breeding season of threatened hollow-dependent species.
- A hollow-bearing tree clearing protocol would be developed
- Large native trees with hollows and surface rock would be relocated to the edge of the easement. Replaced items would not be placed on top of existing habitat features.
- Declared priority weeds such as Blackberry would be managed according to the requirements stipulated by the local control authority.

After construction

- Post-construction management of priority weeds such as Blackberry would be incorporated into a weed management plan.

8 CONCLUSION

NGH Environmental has prepared this biodiversity assessment for the construction of a 132kv transmission line as part of Flyers Creek Wind Farm planning Modification 4. Biodiversity impacts have been assessed and concluded that;

- The proposal would result in the removal of up to 6.8ha of native vegetation and 1.4ha of planted native vegetation.
- The proposal would not have a significant impact on any threatened species of ecological communities in the study area
- Mitigation measures have been recommended to avoid or minimise any potential impacts.
- Spring flora surveys have been recommended to determine the presence of threatened flora, (*Swainsona recta* and *Swainsona Sericea*)
- Prior to the commencement of construction, the proponent will calculate the biodiversity offset credit liability in accordance with the *NSW Biodiversity Offset Policy for Major Projects.*

9 REFERENCES

DEC (2006) 'Reconstructed and extant distribution of native vegetation in the Central West Catchment.' NSW Department of Environment and Conservation, Dubbo. (VIS_3815)

DECC (2008) Recovery Plan for the Koala (*Phascolarctos cinereus*). Accessed at http://www.environment.nsw.gov.au/research-and-publications/publications-search/recovery-plan-for-the-koala-phascolarctos-cinereus

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APPENDIX A BACKGROUND SEARCHES

A.1 BIONET

Result of all threatened or commonwealth listed Entities within 10km radius of proposal area. (55H 688482 6295165 UTM)

Kingdom	Class Name	Family Name	Scientific Name	Common Name	NSW Status	C'wealth Status	DateLast	Accuracy
Fauna	Aves	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V,P		1/02/2018	20
Fauna	Aves	Psittacidae	*Polytelis swainsonii*	Superb Parrot	V,P,3	V	13/12/2002	1000
Fauna	Aves	Psittacidae	*Polytelis swainsonii*	Superb Parrot	V,P,3	V	1/02/2018	20
Fauna	Aves	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P		6/12/2002	1000
Fauna	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		11/03/1999	10000
Fauna	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		16/03/1999	10000
Fauna	Aves	Petroicidae	*Petroica boodang*	Scarlet Robin	V,P		25/08/2013	10
Fauna	Aves	Estrildidae	*Stagonopleura guttata*	Diamond Firetail	V,P		1/02/2018	20
Fauna	Mammalia	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P		6/12/2002	1000
Flora	Flora	Myrtaceae	*Eucalyptus canobolensis*	Silver-Leaf Candlebark	V,P	E	8/03/2017	5
Flora	Flora	Myrtaceae	*Eucalyptus canobolensis*	Silver-Leaf Candlebark	V,P	E	8/03/2017	5
Flora	Flora	Myrtaceae	*Eucalyptus canobolensis*	Silver-Leaf Candlebark	V,P	E	8/03/2017	10
Flora	Flora	Myrtaceae	*Eucalyptus canobolensis*	Silver-Leaf Candlebark	V,P	E	8/03/2017	10

A.2 PROTECTED MATTERS SEARCH TOOL

Australian Government
Department of the Environment and Energy

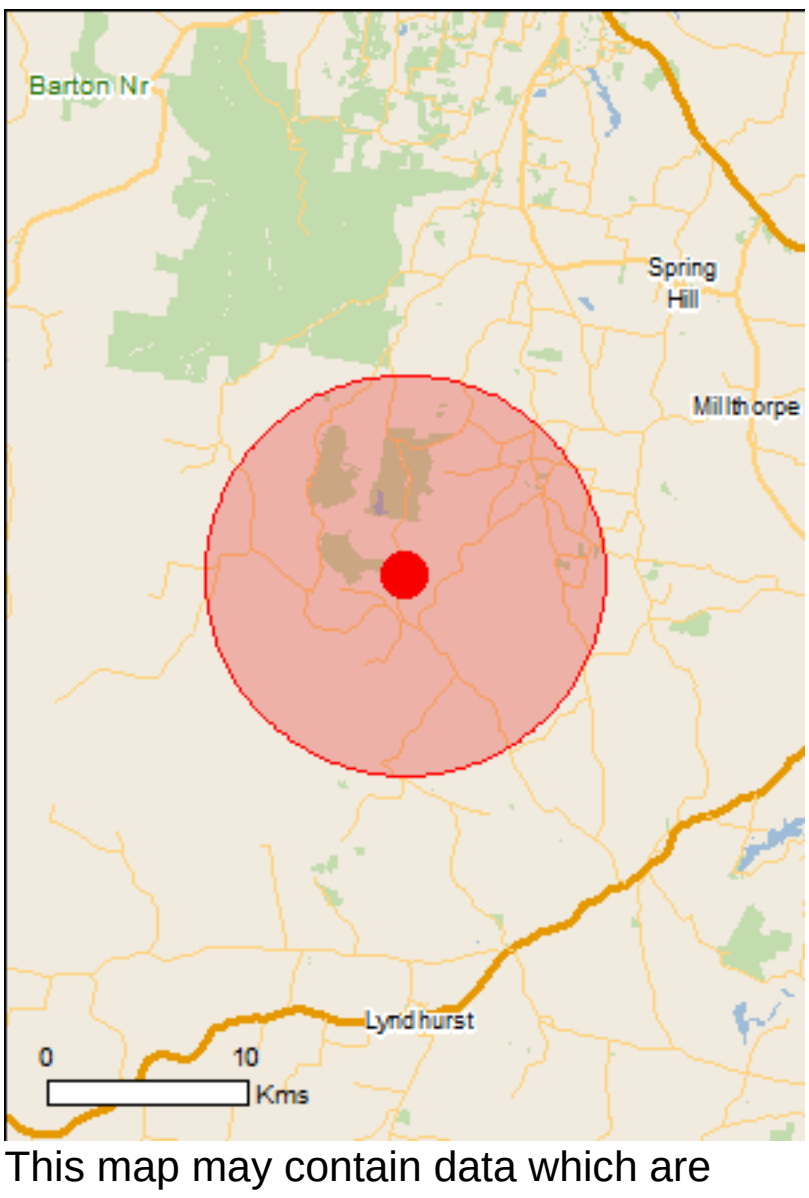
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

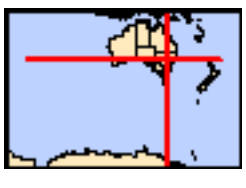
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 12/06/18 13:14:21



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	30
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	31
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	700 - 800km upstream
Hattah-kulkyne lakes	600 - 700km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Ammobium craspedioides Yass Daisy [20758]	Vulnerable	Species or species habitat may occur within area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus canobolensis Silver-leaf Candlebark, Mt Canobolas Candlebark [64896]	Endangered	Species or species habitat may occur within area
Eucalyptus pulverulenta Silver-leaved Mountain Gum, Silver-leaved Gum [21537]	Vulnerable	Species or species habitat likely to occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
[Prasophyllum petilum](#) Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
[Swainsona recta](#) Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
[Aprasia parapulchella](#) Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
[Delma impar](#) Striped Legless Lizard [1649]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat likely to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis		
Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus		
Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.50845 149.02897

Acknowledgements

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

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX B FIELD SURVEY RESULTS

B.1 FLORA

The relative cover/abundance of species is based on visual estimates of foliage cover (Carnahan 1976), and is scored using a six level Braun-Blanquet scale:

Braun-Blanquet cover-abundance scale	
1	Few (0-15), <5% cover
2	Numerous/scattered, <5% cover
3	5 - 25% cover
4	25- 50% cover
5	50 - 75% cover
6	75 - 100% cover

Cover/abundance scores relate to general abundance over this site, not to representative quadrats.

Where uncertainty exists due to the unavailability of reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Species of conservation significance are bolded. Introduced species are denoted by an asterisk. Priority or significant environmental weeds are indicated with a 'Δ' symbol. Scientific nomenclature follows Harden (1990-2002) and the Sydney Royal Botanic Gardens PlantNet website

Family		Scientific Name	Common Name	PCT 1330					PCT 287	Planted	Exotic		
				Good Cadia Rd	Mod McKenzie	Mod Panuara Rd	Mod Cadia Rd	Low Cadia Rd	Mod Cadia Rd	Native Vegetation	Pine Plantation	Paddock/ Roadside	Flyers Creek
TREES													
Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum	3	2	3							
Myrtaceae		*Eucalyptus bridgesiana*	Apple Box	3		1	3	1					
Myrtaceae		*Eucalyptus dives*	Broad-leaved Peppermint				2			3			
Myrtaceae		*Eucalyptus goniocalyx*	Long-leaf Box	2			3		3	3			
Myrtaceae		*Eucalyptus macrorhyncha*	Red Stringybark						3				
Myrtaceae		*Eucalyptus melliodora*	Yellow Box	3	3	3	1	1	3	3			
Myrtaceae		*Eucalyptus (canobolensis?)*	Silver leaf Candlebark				1						
Myrtaceae		*Eucalyptus viminalis*	Ribbon Gum				1						
Pinaceae	*	*Pinus radiata*	Radiata Pine				2				6		
Salicaceae	*	*Salix spp.*											4
SHRUBS													
Fabaceae (Mimosoideae)		*Acacia cultriformis*	Knife-leaved Wattle							3			
Fabaceae (Mimosoideae)		*Acacia dealbata*	Silver Wattle				1			3			
Fabaceae (Mimosoideae)		*Acacia implexa*	Hickory Wattle	1				1		3			
Fabaceae (Mimosoideae)		*Acacia paradoxa*	Kangaroo Thorn							3			
Asteraceae		*Cassinia arcuata*	Sifton Bush	4			4	4	3			1	
Fabaceae (Faboideae)	*	*Genista spp.*					1						
Rosaceae	*	*Rosa rubiginosa*	Sweet Briar					2					2

Family		Scientific Name	Common Name	PCT 1330					PCT 287	Planted	Exotic		
				Good	Mod	Mod	Mod	Low	Mod	Native	Pine	Paddock/	Flyers Creek
Rosaceae	*Δ	*Rubus fruticosus sp. agg.*	Blackberry complex	2			3	3	2		2		3
FORBS													
Rosaceae		*Acaena novae-zelandiae*	Bidgee-widgee	2		2	2		2				
Polygonaceae	*	*Acetosella vulgaris*	Sheep Sorrel	3	2		2					3	
Rubiaceae		*Asperula spp.*	Woodruff				1						
Asteraceae	*	*Carthamus lanatus*	Saffron Thistle		1							2	2
Asteraceae	*	*Chondrilla juncea*	Skeleton Weed									2	
Asteraceae	*	*Cirsium vulgare*	Spear Thistle	2	1		2	2				2	3
Asteraceae	*	*Conyza spp.*	A Fleabane				2	2				2	
Chenopodiaceae		*Dysphania pumilio*	Small Crumbweed		1								
Chenopodiaceae		*Einadia nutans*	Climbing Saltbush		1								
Onagraceae		*Epilobium billardierianum*		2									
Geraniaceae	*	*Geranium molle subsp. molle*	Cranesbill Geranium	2	2			2					
Haloragaceae		*Gonocarpus spp.*	Raspwort				1						
Asteraceae	*	*Helminthotheca echioides*	Ox-tongue					2					
Clusiaceae		*Hypericum gramineum*	Small St John's Wort	2					2				
Asteraceae	*	*Hypochaeris radicata*	Catsear			2	2						
Asteraceae	*	*Lactuca serriola*	Prickly Lettuce									2	
Malvaceae	*	*Malva parviflora*	Small-flowered Mallow		3		2					2	
Fabaceae (Faboideae)	*	*Medicago spp.*	A Medic	2	3							3	
Oxalidaceae		*Oxalis perennans*				2	2						
Plantaginaceae	*	*Plantago lanceolata*	Lamb's Tongues			3		2				3	3

Family		Scientific Name	Common Name	PCT 1330					PCT 287	Planted	Exotic		
				Good	Mod	Mod	Mod	Low	Mod	Native	Pine	Paddock/	Flyers Creek
Polygonaceae	*	*Rumex crispus*	Curled Dock										1
Lamiaceae	*	*Salvia verbenaca*	Vervain									3	
Rosaceae	*	*Sanguisorba minor subsp. muricata*	Sheep's Burnet					2	1				
Asteraceae		*Senecio quadridentatus*	Cotton Fireweed				2						
Asteraceae	*	*Senecio spp.*	Groundsel, Fireweed					2	2				
Asteraceae	*	*Silybum marianum*	Variegated Thistle		2				2			2	
Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle						2				
Caryophyllaceae	*	*Stellaria media*	Common Chickweed						2				
Asteraceae	*	*Taraxacum officinale*	Dandelion						2				
Fabaceae (Faboideae)	*	*Trifolium spp.*	A Clover		3	3	2					4	3
Urticaceae		*Urtica incisa*	Stinging Nettle						2				
Campanulaceae		*Wahlenbergia spp.*	Bluebell			1							
Cucurbitaceae	*	*Citrullus lanatus var. lanatus*	Wild Melon, Camel Melon, Bitter		1								
Echi plan	*	*Echium plantagineum*	Patterson's Curse								1		
GRASSES													
Poaceae		*Austrostipa sp*	Spear Grass	2		3							
Poaceae		*Bothriochloa macra*	Red Grass				2						
Poaceae	*	*Briza maxima*	Quaking Grass					2					
Poaceae	*	*Cynosurus echinatus*	Rough Dog's Tail				2						
Poaceae	*	*Lolium perenne*	Perennial Ryegrass				2					3	
Poaceae		*Microlaena stipoides*	Weeping Grass	3			2	2	3		1		
Poaceae	*	*Phalaris aquatica*	Phalaris	2	3	3	4	4	1	4		5	4
Poaceae		*Themeda triandra*	Kangaroo Grass				1						
GRAMINOIDS													
Cyperaceae		*Carex spp.*											

Family	Scientific Name	Common Name	PCT 1330					PCT 287	Planted	Exotic		
			Good	Mod	Mod	Mod	Low	Mod	Native	Pine	Paddock/	Flyers Creek
Juncaceae	*Juncus spp.*	A Rush					2					
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush				1						
Lomandraceae	*Lomandra spp.*	Mat-rush			1							
OTHER												
Loranthaceae	*Amyema miquelii*	Box Mistletoe		2	2	2						

B.2 FAUNA

Common Name	Scientific Name	Status (BC/EPBC)	Paddock 1	Paddock 2	Paddock 3	Forest 1	Forest 2	Clearing 6	Clearing 7	Clearing 8	Planting	Creek Crossing	Opportunistic
BIRDS													
Egretta novaehollandiae	White-faced Heron	Not listed											X
Anas superciliosa	Pacific Black Duck	Not listed					X						
Anas castandea	Chestnut Teal	Not listed					X						
Vanellus miles	Spur-winged Plover	Not listed		X									
Falco cenchroides	Nankeen Kestrel	Not listed											X
Ocyphaps lophotes	Crested Pigeon	Not listed			X							X	
Cacatua galerita	Sulphur-crested Cockatoo	Not listed		X	X								
Cacatua sp.	Corella sp.	Not listed											X
Eolophus roseicapilla	Galah	Not listed	X	X	X			X			X	X	
Platycercus eximius	Eastern Rosella	Not listed	X										
Platycercus elegans	Crimson Rosella	Not listed		X		X	X	X	X	X		X	
Psephotus haemotonotus	Red-rumped Parrot	Not listed	X	X									
Dacelo novaeguineae	Laughing Kookaburra	Not listed											X
Hirundo neoxena	Welcome Swallow	Not listed		X								X	
Rhipidura leucophris	Willy Wagtail	Not listed		X		X				X			
Malurus sp.	Blue Wren sp.	Not listed				X	X	X				X	
Sericornis frontalis	White-browed Scrubwren	Not listed				X		X		X			
Pardalotus striatus	Striated Pardalote	Not listed	X	X								X	
Anthochaera carunculata	Red Wattlebird	Not listed		X			X						
Lichenostomus penicillatus	White-plumed Honeyeater	Not listed		X								X	

Common Name	Scientific Name	Status (BC/EPBC)	Paddock 1	Paddock 2	Paddock 3	Forest 1	Forest 2	Clearing 6	Clearing 7	Clearing 8	Planting	Creek Crossing	Opportunistic
Manorina melanocephala	Noisy Miner	Not listed											X
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Not listed			X								
Acanthiza lineata	Striated Thornbill	Not listed					X			X			
Grallina cyanoleuca	Peewee	Not listed				X	X						
Cracticus tibicen	Australian Magpie	Not listed	X			X	X	X		X	X	X	
Cracticus nigrogularis	Pied Butcherbird	Not listed											X
Corvus coronoides	Australian Raven	Not listed	X		X	X	X				X		
Strepera graculina	Pied Currawong	Not listed				X		X	X				
Corcorax melanorhamphos	White-winged Chough	Not listed											X
Coracina novaeholandiae	Black-faced Cuckoo-shrike	Not listed		X									
Colluricincla harmonica	Grey Shrike-thrush	Not listed				X	X	X	X				
Pachycephala rufiventris	Rufous Whistler	Not listed				X							
Cormobates leucophaea	White-throated Treecreeper	Not listed				X	X						
Eopsaltria australis	Eastern Yellow Robin	Not listed				X							
Sternus vulgaris	Starling	Not listed	X				X						
Turdis merula	Blackbird	Not listed				X			X				
MAMMALS													
Pteropus poliocephalus	Grey-headed Flying-fox Dead animal tangled in barbed wire fence.	V BC V EPBC											X - E688458.829 N 6290501.318 GDA94 Z55
Macropus giganteus	Eastern Grey Kangaroo	Not listed					X	X					
Oryctolagus cuniculus	Rabbit	Not listed		X									
AMPHIBIANS													
Crinia signifera	Common Froglet	Not listed										X	

APPENDIX C THREATENED SPECIES EVALUATIONS

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations listed in the locality of Flyers Creek in the *Atlas of NSW Wildlife*[1] and those identified as potentially occurring in the area according to the Commonwealth EPBC *Protected Matters Search Tool*[2].

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat:

Present: Potential or known habitat is present within the study area

Absent: No potential or known habitat is present within the study area

Likelihood of occurrence

Unlikely: Species known or predicted within the locality but unlikely to occur in the study area

Possible: Species could occur in the study area

Present: Species was recorded during the field investigations

Possible to be impacted

No: The proposal would not impact this species or its habitats. No Assessment of Significance (AoS) is necessary for this species

Yes: The proposal could impact this species or its habitats. An AoS has been applied to these entities.

[1] The *Atlas of NSW Wildlife* is administered by NSW OEH and is an online database of fauna and flora records that contains over four million recorded sightings.

[2] This online tool is designed for the public to search for matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is managed by the Commonwealth Department of the Environment and Energy.

C.1 EVALUATION OF THE LIKELIHOOD AND EXTENT OF IMPACT ON THREATENED FLORA SPECIES

Species	Description of habitat3	Presence of habitat	Likelihood of occurrence	Possible impact?
Trees				
Silver-leaf Candlebark *Eucalyptus canobolensis* E EPBC V BC	Undulating low to steep hills; soils shallow skeletal sands and loams on steep slopes; vegetation sub-alpine woodland.	**Present** Sub-alpine woodland on relatively steep hills in study area.	**Likely** Recorded in locality (BioNet). Plant sample sent to NSW Herbarium for identification thought to be *E. canobolensis*.	**Yes** Assessment of Significance (AoS) completed.
Black Gum *Eucalyptus aggregata* V EPBC V BC	Lowest parts of the landscape on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts, in an open woodland formation with a grassy groundlayer but few shrubs. Also occurs as isolated paddock trees in modified native or exotic pastures.	**Present** Open woodland with grassy groundlayer and few shrubs.	**Unlikely** Known in subregion. Conspicuous tree not detected in site survey.	**No** Not detected in study area.
Silver-leafed Mountain Gum *Eucalyptus pulverulenta* V EPBC V BC	Shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum, Red Stringybark, Broad-leafed Peppermint, Silvertop Ash and Apple Box.	**Present** Apple Box, Broad-leafed Peppermint and Red Stringybark in study area.	**Unlikely** Conspicuous tree not detected in site survey.	**No** Not detected in study area.

[3] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species	Description of habitat3	Presence of habitat	Likelihood of occurrence	Possible impact?
Robertson's Peppermint *Eucalyptus robertsonii* subsp. *hemisphaerica* V BC	Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and often on granite. Usually found in closed grassy woodlands in locally sheltered sites. Habitats include quartzite ridges, upper slopes and a slight rise of shallow clay over volcanics.	**Present** Open eucalypt woodland.	**Unlikely** Known in subregion. Conspicuous tree not detected in site survey.	**No** Not detected in study area.
Shrubs				
Acacia meiantha E BC	Found in three populations: Clarence, Mullions Range, and Aaron's Pass.	**Absent** No associated vegetation types in study area.	**Unlikely** Study area not in known population. Conspicuous shrub not detected in site survey.	**No** Not detected in study area.
Prostanthera gilesii CE BC	Only known from Mt Canobolas State Conservation Area.	**Absent** Study area outside Mount Canobolas SCA.	**Unlikely** Study area not within known population. Conspicuous shrub not detected in site survey.	**No** Not detected in study area.
Herbs & Forbs				
Small Purple-pea *Swainsona recta* E EPBC E BC	Grassy woodlands, and sometimes grassy open forest, usually with tree cover including Blakely's Red Gum, Yellow Box, and White Box.	**Present** Associated vegetation types in study area.	**Possible** Would not have been visible during site surveys. Native understory present in remnant woodland. Nearest known record over 100 km in Wellington.	Surveys for this species to be undertaken in spring in remnant woodland.

Species	Description of habitat3	Presence of habitat	Likelihood of occurrence	Possible impact?
Silky Swainson-pea *Swainsona sericea* V BC	Natural temperate grassland and snowgum woodland on the Monaro. Box-Gum woodland in the southern tablelands and South West slopes.	**Present** Associated vegetation types in study area.	**Possible** Would not have been visible during site surveys. Native understory present in remnant woodland. Nearest recent record in 35 km away in roadside reserve in Cudal.	Surveys for this species to be undertaken in spring in remnant woodland.
Yass Daisy *Ammobium craspediodes* V EPBC	Moist or dry forest communities, Box-Gum Woodland and grasslands derived from clearing of these communities. Grows in association with a large range of eucalypts.	**Present** Associated vegetation types in study area.	**Unlikely** Not known to occur in subregion.	**No** Unlikely to occur in study area.
Hoary Sunray *Leucochrysum albicans* var. *tricolor* E EPBC	Wide variety of grassland, woodland and forest habitat generally on relatively heavy soils. Can occur in modified habitats such as roadsides and semi-urban areas. Highly dependent on the presence of bare ground for germination.	**Present** Associated vegetation types in study area.	**Unlikely** Not known to occur in subregion.	**No** Unlikely to occur in study area.
Austral Toadflax *Thesium C-IVagitta* V EPBC	Grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass.	**Present** Grassy woodland present in study area.	**Absent** Not known to occur in subregion.	**No** Unlikely to occur in study area.
Orchids				
Tarengo Leek Orchid *Prasophyllum petilum* E EPBC	Relatively fertile soils in grassy woodland or natural grassland. Flat or gently sloping sites on plains and rolling hills. Soils usually loams, clay loams, or sandy clays. Often relatively moist areas.	**Present** Grassy woodland present in study area.	**Absent** Not known to occur in subregion.	**No** Unlikely to occur in study area.

Species	Description of habitat3	Presence of habitat	Likelihood of occurrence	Possible impact?
EECs				
White Box – Yellow Box – Blakely's Red Gum Woodland EEC BC CE EPBC	Tablelands and western slopes of NSW, usually on lower fertile parts of the landscape where resources such as water and nutrients are abundant.	**Present** Tablelands of NSW in fertile landscape.	**Present** Yellow Box and Blakely's Red Gum in study area.	**Yes** AoS completed.
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC BC	Drier edge of temperate grassy woodland belt (375 – 700 mm rainfall) ranging from central NSW through northern and central Victoria into South Australia. Flat to undulating landscapes, such as plains, low slopes and rises, or occasionally in drainage depressions. Patches tend to occur on relatively productive soils.	**Present** Open woodland in central NSW.	**Unlikely** No Grey Box in study area.	**No** No areas of EEC in proposal area.
Mt Canobolas Xanthoparmelia Lichen Community EEC BC	Rock faces and soils of the Mt Canobolas Tertiary volcanic complex.	**Absent** Outside distribution of EEC.	**Unlikely** Known in subregion at site outside locality.	**No** No areas of EEC in proposal area.
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions EEC BC	Loam or clay soils associated with basalt or, less commonly, alluvium, fine-grained sedimentary rocks, granites, and similar substrates that produce relatively fertile soils. Altitudes from approximately 600 m to 900 m above sea level, usually on undulating or hilly terrain.	**Present** Hilly terrain 600 - 900 m above sea level.	**Unlikely** *E. radiata, E. viminalis, E. dalrympleana, E. pauciflora* not dominant in study area.	**No** No areas of EEC in proposal area.
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions EEC BC	Characterised by presence of Snow Gum, Candlebark, Ribbon Gum and/or Black Sallee trees. Remnants may occur on lower, more fertile parts of the landscape where resources such as water and nutrients are abundant; sites on midslope situations where resources are scarcer are more common.	**Absent** No Snow Gum, Ribbon Gum or Black Sallee trees in study area.	**Unlikely** Snow Gum, Ribbon Gum, Candlebark or Black Sallee trees not dominant in study area.	**No** No areas of EEC in proposal area.

Species	Description of habitat3	Presence of habitat	Likelihood of occurrence	Possible impact?
Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia E EPBC	Low-relief landscapes, often on productive soils derived from alluvial or colluvial materials. Drier sites within belt of grassy woodlands in south-eastern Australia, in rainfall range of 375 – 700 mm per year.	**Present** Open woodlands in south-eastern Australia.	**Unlikely** No Grey Box in study area.	**No** No areas of EEC in proposal area.
Natural Temperate Grassland of the South Eastern Highlands CE EPBC	Range of topographic positions from 250 m to 1200 m on soils derived from variety of substrates, including granites, basalts, sediments, colluvium and alluvium.	**Absent** Study area not in distribution of EEC.	**Unlikely** Study area not in distribution of EEC.	**No** No areas of EEC in proposal area.

E BC = listed as Endangered under Schedule 1 of the NSW *Biodiversity Conservation Act 2016.*

E EPBC = listed as Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

V BC = listed as Vulnerable under Schedule 1 of the NSW *BC Act 2016.*

V EPBC = listed as Vulnerable under the Commonwealth *EPBC Act 1999.*

EEC BC = Endangered Ecological Community listed under Schedule 2 of the NSW *BC Act 2016.*

CE EPBC = listed as Critically Endangered under the Commonwealth *EPBC Act 1999.*

C.2 EVALUATION OF THE LIKELIHOOD AND EXTENT OF IMPACT ON THREATENED FAUNA

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Aves				
Little Eagle *Hieraaetus morphnoides* V BC	Open eucalypt forest, woodland, or open woodland, and Sheoak or Acacia woodlands and riparian woodlands in interior NSW, where they nest in tall living trees within a remnant patch.	**Present** Open eucalypt woodland in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Spotted Harrier *Circus assimilis* V BC	Grassy open woodland including acacia and Mallee remnants, inland riparian woodland, grassland and shrub steppe. Most commonly found in native grassland, but also in agricultural land, foraging over open habitats including edges of inland wetlands.	**Present** Grassy open woodland with acacias and agricultural land in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Square-tailed Kite *Lophoictinia isura* V BC	Timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.	**Present** Timbered habitat in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Barking Owl *Ninox connivens* V BC	Woodland and open forest, including fragmented remnants and partly cleared farmland.	**Present** Woodland and partly cleared farmland in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.

[4] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's *Species Profiles and Threats* database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Powerful Owl *Ninox strenua* V BC	Range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well.	**Present** Fragmented woodland in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Varied Sittella *Daphoenositta chrysoptera* V BC	Eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, Mallee and Acacia woodland.	**Present** Eucalypt woodland in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Dusky Woodswallow *Artamus cyanopterus* V BC	Woodlands and dry open sclerophyll forests, usually dominated by eucalypts including Mallee. Understorey typically open with sparse eucalypt saplings, acacias, and other shrubs. Ground cover may consist of grasses, sedges, or open ground, often with coarse woody debris. Also observed in farmland, usually at the edges of forest or woodland or in roadside remnants or wind breaks with dead timber.	**Present** Dry eucalypt woodland and farmland in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Diamond Firetail *Stagonopleura guttata* V BC	Grassy eucalypt woodlands, including box-gum woodlands and Snow Gum *Eucalyptus pauciflora* woodlands. Also occur in open forest, Mallee, Natural Temperate Grassland, in secondary grassland derived from other communities, in riparian areas, and in lightly wooded farmland.	**Present** Grassy eucalypt woodland in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Scarlet Robin *Petroica boodang* V BC	Dry eucalypt forests and woodlands. Understorey usually open and grassy with a few scattered shrubs. Both mature and regrowth vegetation, usually with abundant logs and fallen timber. In autumn and winter, many live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	**Present** Dry eucalypt woodland and grassland with fallen timber in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Flame Robin *Petroica phoenicea* V BC	Breed in upland tall moist eucalypt forests and woodlands, often on ridges and slopes, where they prefer clearings or areas with open understoreys. Groundlayer dominated by native grasses and shrubs. Occasionally occur in temperate rainforest, herbfields, healthlands, shrublands, and sedgelands at high altitudes. In winter, drier and more open habitats in lowlands, including dry forests, open woodlands, and pastures and native grasslands with or without scattered trees.	**Present** Upland eucalypt woodland with open understorey in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Hooded Robin *Melanodryas cucullata cucullata* V BC	Lightly wooded country, usually open eucalypt woodland, Acacia scrub and Mallee, often in or near clearings or open areas. Structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs, and ground layer of tall native grasses.	**Present** Open eucalypt woodland and lightly wooded farmland in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Regent Honeyeater *Anthochaera phrygia* CE EPBC CE BC	Temperate woodlands and open forests of the inland slopes of south-east Australia. Dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak, particularly those with mature trees, high canopy cover, abundant mistletoe, and a shrubby understorey.	**Present** Dry temperate woodland with HBTs in study area.	**Possible** Known to occur in subregion and considered likely to occur in locality.	**Yes** AoS completed.
Painted Honeyeater *Grantiella picta* V EPBC V BC	Boree/Weeping Myall, Brigalow, and Box-Gum Woodlands and Box-Ironbark Forests.	**Present** Box-Gum woodland in study area.	**Possible** Known to occur in subregion and considered likely to occur in locality.	**Yes** AoS completed.
Pied Honeyeater *Certhionyx variegatus* V BC	Wattle shrub, primarily mulga, mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering. Feeds on nectar, predominantly from various species of emu-bushes, also from mistletoes and other shrubs.	**Present** Eucalypt woodland in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Black-chinned Honeyeater *Melithreptus gularis gularis* V BC	Upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark *Eucalyptus sideroxylon*, White Box *E. albens*, Inland Grey Box *E. microcarpa*, Yellow Box *E. melliodora*, Blakely's Red Gum *E. blakelyi*, and Forest Red Gum *E. tereticornis*, and open forests of smooth-barked gums, Stringybarks, ironbarks, tea trees, and river sheoaks (nesting habitat).	**Present** Dry open woodland with 17.1ha in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Brown Treecreeper *Climacteris picumnus victoriae* V BC	Eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains west of the Great Dividing Range, mainly in woodlands dominated by Stringybarks or other rough-barked eucalypts, usually with an open grassy understorey and sometimes with one or more shrub species. Also, Mallee and River Red Gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Fallen timber important for foraging, and hollows in standing dead or live trees and tree stumps essential for nesting.	**Present** Eucalypt woodland with fallen timber and HBTs in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
White-fronted Chat *Epthianura albifrons* V BC	Bare or grassy ground in wetland areas, samphire flats, damp paddocks, low shrublands, and grasslands.	**Present** Grassland in study area.	**Possible** Predicted to occur in subregion.	**Yes** AoS completed.
Grey-crowned Babbler *Pomatostomus temporalis temporalis* V BC	Open box-gum woodlands on the slopes, and box-cypress and open box woodlands on alluvial plains. Generally unable to cross large open areas.	**Present** Open box-gum woodland in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Bush Stone-curlew *Burhinus grallarius* E BC	Open forests and woodlands with sparse grassy ground layer and fallen timber.	**Present** Open grassy woodland with fallen timber in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Swift Parrot *Lathamus discolour* CE EPBC E BC	Areas where eucalypts are flowering profusely or where there are abundant infestations of lerp (from sap-sucking bugs). Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood, Mugga Ironbark, and White Box. Commonly used lerp infested trees include Grey Box and Blackbutt.	**Present** Box-Gum woodland with 17.1ha in study area.	**Possible** Predicted to occur in subregion and considered likely to occur in locality.	**Yes** AoS completed.
Superb Parrot *Polytelis swainsonii* V EPBC V BC	Box-Gum, Box-Cypress, and Boree Woodlands and River Red Gum Forests. Nest in hollows of large trees in tall open forest or woodland.	**Present** Box-Gum woodland with HBTs in study area.	**Likely** Recorded in locality (BioNet; PMST).	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Turquoise Parrot *Neophema pulchella* V BC	Edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Nests in tree hollows, logs or posts.	**Present** Eucalypt woodland in farmland with creek in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Gang-gang Cockatoo *Callocephalon fimbriatum* V BC	In spring and summer, tall mountain forests and woodland, particularly heavily timbered and mature wet sclerophyll forests. In autumn and winter, lower altitudes in drier, more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages. Favours old growth forest and woodland attributes for nesting and roosting.	**Present** Highland eucalypt woodland with HBTs in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Little Lorikeet *Glossopsitta pusilla* V BC	Open *Eucalyptus* forest and woodland, finding food in *Angophora, Melaleuca* and other tree species. Riparian habitats particularly used due to greater productivity. Isolated flowering trees in open country, including paddocks, roadside remnants, and urban trees also used. Nesting hollows in the limbs and trunks of smooth-barked eucalypts, often in riparian areas.	**Present** Open eucalypt woodland and isolated flowering trees in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Fork-tailed Swift *Apus pacificus* M EPBC	Open habitat including semi-arid areas, coasts, islands, and occasionally forests and cities.	**Present** Open agricultural and woodland habitat in study area.	**Possible** Considered likely to occur in locality.	**Yes** AoS completed.
White-throated Needletail *Hirundapus caudacutus* M EPBC	Wooded areas including open forest and rainforest, and less commonly above woodland.	**Present** Open woodland habitat in study area.	**Possible** Considered likely to occur in locality.	**Yes** AoS completed.
Yellow Wagtail *Motacilla flava* M EPBC	Flat, open, grassy area near water, which may include grasslands, air strips, pastures, sports fields, and edges of wetlands, rivers, and dams.	**Present** Grassy agricultural land along stream in study area.	**Possible** May occur in locality.	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Satin Flycatcher *Myiagra cyanoleuca* M EPBC	Eucalypt forest and woodland, especially tall, wet sclerophyll forests along gullies and water courses, and open, grassy areas of woodland.	**Present** Open grassy woodland in study area.	**Possible** Known to occur in locality.	**Yes** AoS completed.
Speckled Warbler *Chthonicola sagittata* V BC	Wide range of eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants required for species to persist.	**Absent** No large remnants of eucalypt communities in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Australasian Bittern *Botaurus poiciloptilus* E EPBC	Along coast and in Murray-Darling Basin, notably in floodplain wetlands of Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. Occurs in permanent freshwater wetlands with tall, dense vegetation. Favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds or cutting grass growing over muddy or peaty substrate.	**Absent** No permanent wetlands in study area.	**Possible** Predicted to occur in subregion and may occur in locality.	**No** No suitable habitat in study area.
Australian Painted Snipe *Rostratula australis* E EPBC	Fringes of swamps, dams and nearby marshy areas with cover of grasses, low scrub or open timber. Permanent and ephemeral shallow (<50 cm) wetlands and waterbodies or inundated grassland and paddocks.	**Absent** No wetlands in study area.	**Possible** Predicted to occur in subregion and may occur in locality.	**No** No suitable habitat in study area.
Curlew Sandpiper *Calidris ferruginea* CE M EPBC	Littoral and estuarine habitats, and intertidal mudflats of sheltered coasts. Forages on edge of shallow water, exposed algal mats or banks of beach cast seagrass or seaweed.	**Absent** No littoral or estuarine habitat in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Eastern Curlew *Numenius madagascariensis* CE M EPBC	Large intertidal mudflats often with seagrass beds along sheltered coasts including in estuaries, bays, harbours, inlets, lagoons, and among saltmarshes and mangroves.	**Absent** No mudflats or coastal habitat in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Blue-billed Duck *Oxyura australis* V BC	Deep water in large permanent wetlands and swamps with dense aquatic vegetation.	**Absent** No permanent wetlands in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Freckled Duck *Stictonetta naevosa* V BC	Permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum, or Tea Tree. During drier times, move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams, and sewage ponds.	**Absent** No permanent wetlands in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Glossy Black-Cockatoo *Calyptiorhynchus lathami* V BC	Open forest and woodland of the coast and Great Dividing Range where stands of Sheoak occur. Inland populations feed on wide range of sheoaks, including Drooping Sheoak *Allocasuarina diminuta*, *A. gymnathera*, and Belah *Casuarina cristata.* In the Riverina, associated with hills and rocky rises supporting Drooping Sheoak, and open woodlands dominated by Belah. Dependent on large hollow-bearing eucalypts for nesting.	**Absent** No sheaok in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Black Falcon *Falco subniger* V BC	Tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas.	**Absent** No tree-lined watercourses or isolated woodlands in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
White-bellied Sea-eagle *Haliaeetus leucogaster* V BC	Coastal habitats and around terrestrial wetlands in tropical and temperate regions of Australia. Habitat characterised by large open areas of water. Has been recorded in or over a variety of terrestrial habitats.	**Absent** No large open areas of water in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Malleefowl *Leipoa cuminat* V EPBC	Semi-arid to arid shrublands and low woodlands, especially dominated by Mallee and/or Acacia which are tall, dense, and floristically rich. May use Mallee with spinifex understorey, but usually at lower densities than areas with shrub understorey. Sandy to sandy-loam substrate and abundance of leaf litter are required for breeding.	**Absent** No arid or semi-arid shrublands or low woodlands in study area.	**Possible** Known to occur in locality.	**No** No suitable habitat in study area.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Rufous Fantail *Rhipidura rufifrons* M EPBC	In east and south-east Australia, wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood, Mountain Grey Gum, Narrow-leaved Peppermint, Mountain Ash, Alpine Ash, Blackbutt or Red Mahogany; usually with a dense shrubby understorey often including ferns. Also subtropical and temperate rainforests. Occasionally secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, sometimes drier sclerophyll forests and woodlands, including Spotted Gum, Yellow Box, ironbarks or stringybarks, often with a shrubby or heath understorey.	**Absent** No wet sclerophyll forest or rainforest in study area.	**Possible** Considered likely to occur in locality.	**No** No suitable habitat in study area.
Common Sandpiper *Actitis hypoleucos* M EPBC	Coastal wetland and some inland wetlands, mostly around muddy margins or rocky shores and rarely on mudflats. Also, estuaries, deltas, banks further upstream, around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	**Absent** No wetlands in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Sharp-tailed Sandpiper *Calidris acuminata* M EPBC	Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. Includes dams, waterholes, soaks, bore drains and bore swamps, saltpans, and hypersaline salt lakes inland. Will use ephemeral wetlands when filled.	**Absent** No wetlands in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Pectoral Sandpiper *Calidris melanotos* M EPBC	Shallow fresh to saline wetlands with open fringing mudflats and low emergent or fringing vegetation. Usually coastal or near-coastal habitat, but occasionally inland.	**Absent** No wetlands in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Latham's Snipe *Gallinago hardwickii* M EPBC	Permanent and ephemeral wetlands, usually open freshwater wetlands with low, dense vegetation such as swamps, flooded grasslands or heathlands, and bogs, but also in saline or brackish water bodies, and in both modified and artificial habitats.	**Absent** No wetlands in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Black-tailed Godwit *Limosa limosa* V BC	Primarily coastal. Sheltered bays, estuaries and lagoons with large intertidal flats and/or sandflats. Further inland, mudflats and water less than 10 cm deep, around muddy lakes and swamps.	**Absent** No coastal or mudflat habitat in study area.	**Possible** Predicted to occur in subregion.	**No** No suitable habitat in study area.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Fishes				
Murray Cod *Maccullochella peelii* V EPBC	Slow flowing, turbid water in streams and rivers, favouring deeper water around boulders, undercut banks, overhanging vegetation and logs.	**Absent** No deep rivers or streams in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Macquarie Perch *Macquaria australasica* E EPBC	Rivers, in clear, deep, rocky holes with plenty of cover including aquatic vegetation, large boulders, large woody debris, and overhanging banks.	**Absent** No deep rivers in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Mammals				
Large-eared Pied Bat *Chalinolobus dwyeri* V EPBC V BC	Roosts in caves, crevices in cliffs, old mine workings and disused bottle-shaped mudnests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to those features.	**Present** Dry open woodland in study area.	**Possible** Predicted to occur in subregion and considered likely to occur in locality.	**Yes** AoS completed.
Corben's Long-eared Bat *Nyctophilus corbeni* V EPBC V BC	Variety of vegetation types, most commonly Mallee, Bulloke, and Box-dominated communities, but are most common in vegetation which has a distinct canopy and dense understorey. They roost in tree hollows, crevices, and under loose bark.	**Present** Woodland with Box species and HBTs in study area.	**Possible** Considered likely to occur in locality.	**Yes** AoS completed.
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis* V BC	Caves are primary roosting habitat, also derelict mines, stormwater tunnels, buildings, and other man-made structures.	**Present** Roosting habitat present in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Southern Myotis *Myotis macropus* V BC	Often roost close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges, and in dense foliage. Forage over streams and pools.	**Present** Roosting habitat including HBTs and small stream in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* V BC	Most forested and cleared habitats, roosting in tree hollows and buildings, or in mammal burrows in cleared areas.	**Present** Roosting habitat including HBTs present in study area.	**Possible** Known to occur in subregion.	**Yes** AoS completed.
Grey-headed Flying-fox *Pteropus poliocephalus* V EPBC V BC	Roost and forage in a range of vegetation communities including rainforest, open forest, and closed and open woodland. Roost sites are usually near water, including lakes, rivers, and coastlines.	**Present** Open woodland in study area.	**Known** Recorded during field survey.	**Yes** AoS completed.
Spotted-tailed Quoll *Dasyurus maculatus* E EPBC V BC	Range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from sub-alpine zone to coastline. Hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky cliff faces as den sites.	**Present** Woodland with HBTs and fallen timber in study area.	**Possible** Known to occur in subregion and may occur in locality.	**Yes** AoS completed.
Squirrel Glider *Petaurus norfolcensis* V BC	Old growth box, box-ironbark woodlands, and River Red Gum forests west of the Great Dividing Range, and prefer mixed species stands with a shrubby or Acacia understorey. Abundant tree hollows are required for refuge and nesting.	**Present** Box woodland with HBTs in study area.	**Likely** Recorded in locality (BioNet).	**Yes** AoS completed.
Greater Glider *Petauroides volans* V EPBC	Eucalypt forests and woodlands. Taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Diversity of eucalypt species.	**Present** Eucalypt woodland with HBTs in study area.	**Possible** May occur in locality.	**Yes** AoS completed.
Eastern Pygmy-possum *Cercartetus nanus* V BC	Broad range of habitat from rainforest through sclerophyll (including box-ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned nests, Ringtail Possum dreys or thickets of vegetation.	**Present** Sclerophyll woodland with HBTs in study area.	**Possible** Predicted to occur in subregion.	**Yes** AoS completed.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Brush-tailed Phascogale *Phascogale tapoatafa* V BC	Dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows.	**Present** Sclerophyll woodland with HBTs in study area.	**Possible** Predicted to occur in subregion.	**Yes** AoS completed.
Koala *Phascolarctos cinereus* V EPBC V BC	Range of eucalypt forest and woodland communities, including coastal forests, the woodlands of the tablelands and western slopes, and the riparian communities of the western plains.	**Present** Eucalypt woodland in study area.	**Possible** Known to occur in subregion and may occur in locality.	**Yes** AoS completed.
Yellow-bellied Glider *Petaurus australis* V BC	Tall mature eucalypt forest generally in areas with high rainfall and nutrient-rich soils. Mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	**Absent** No high-rainfall tall mature eucalypt forest in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Brush-tailed Rock-wallaby *Petrogale penicillata* V EPBC	Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	**Absent** No complex rock features in study area.	**Possible** May occur in locality.	**No** No suitable habitat in study area.
Amphibians				
Booroolong Frog *Litoria booroolongensis* E EPBC E BC	Along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses.	**Present** Small permanent stream with fringing vegetation in study area.	**Possible** Predicted to occur in subregion and may occur in locality.	**Yes** AoS completed.
Yellow-spotted Tree Frog *Litoria castanea* E EPBC CE EPBC	Only known population near Yass. Large permanent ponds or slow-flowing chain-of-ponds streams with abundant emergent vegetation such as bulrushes and aquatic vegetation.	**Absent** No large permanent ponds or chain-of-ponds in study area.	**Unlikely** Study area outside known population distribution.	**No** No suitable habitat in study area.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Green and Golden Bell Frog *Litoria aurea* E BC	Marshes, dams and stream-sides, particularly those containing bulrushes or spikerushes. Optimally, water bodies that are unshaded, free of predatory fishes such as Plague Minnow, have a grassy area nearby and diurnal sheltering sites available.	**Absent** No unshaded marshes, dams or streams with bulrushes or spikerushes in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Southern Bell Frog *Litoria raniformis* E BC	Only known to occur in isolated populations in Coleambally Irrigation Area, Lowbidgee floodplain, and around Lake Victoria. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps or billabongs along floodplains and river valleys, and in irrigated rice crops where there is no available natural habitat.	**Absent** No swamps, billabongs, or irrigated crops in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.
Reptiles				
Pink-tailed Legless Lizard *Aprasia parapulchella* V EPBC V BC	Sloping open woodland areas with groundcover dominated by native grasses, typically those which are well-drained with rocky outcrops or scattered, partly-buried rocks.	**Present** Sloping open woodland with native grasses and scattered rocks in study area.	**Possible** Predicted to occur in subregion and may occur in locality.	**Yes** AoS completed.
Striped Legless Lizard *Delma impar* V EPBC V BC	Mainly Natural Temperate Grasslands, but also grasslands with high exotic component, in secondary grassland near Temperate Natural Grassland, and open Box-Gum Woodland. Grassland dominated by perennial, tussock-forming grasses such as Kangaroo Grass Themeda australis, spear-grasses Austrostipa spp., poa tussocks Poa spp., and occasionally wallaby grasses Austrodanthonia spp. Sometimes found in grasslands with significant amounts of surface rocks, used for shelter.	**Present** Woodland with native grasses and scattered rocks in study area.	**Possible** May occur in locality.	**Yes** AoS completed.
Rosenberg's Goanna *Varanus rosenbergi* V BC	Heath, open forest and woodland. Associated with termites, the mounds of which this species nests in. Termite mounds and a critical habitat component. Individuals require large areas of habitat.	**Absent** No large areas of habitat with termite mounds in study area.	**Possible** Known to occur in subregion.	**No** No suitable habitat in study area.

Species and Status	Description of habitat[4]	Presence of habitat	Likelihood of occurrence	Potential for impact?

E TSC = listed as Endangered under Schedule 1 of the NSW *Biodiversity Conservation Act 2016.*

E EPBC = listed as Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

V TSC = listed as Vulnerable under Schedule 1 of the NSW *BC Act 2016.*

V EPBC = listed as Vulnerable under the Commonwealth *EPBC Act 1999.*

M EPBC = listed as Migratory under the Commonwealth *EPBC Act 1999.*

CE BC = listed as Critically Endagered under the NSW *BC Act 2016.*

CE EPBC = listed as Critically Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

APPENDIX D THREATENED SPECIES ASSESSMENTS OF SIGNIFICANCE

D.1 BIODIVERSITY CONSERVATION ACT FIVE-PART TEST

Section 7.3 of the BC Act specifies five factors to be taken into account in deciding whether a development is likely to significantly affect threatened species or ecological communities, or their habitats, listed at the state level under the BC Act.

This *Five-part Test* characterises the significance of likely impacts associated with the proposal on the following species:

- FLORA
  - Silver-leaf Candlebark (*Eucalyptus canobolensis*) - V
- EECs:
  - White Box -Yellow Box – Blakely's Red Gum Woodland (Box Gum Woodland) – EEC
- Ground/Understorey Birds:
  - Diamond Firetail *Stagonopleura guttata* – V, Scarlet Robin *Petroica boodang* – V, Flame Robin *Petroica phoenicea* – V, Hooded Robin *Melanodryas cucullata cucullata* – V, White-fronted Chat *Epthianura albifrons* – V, Grey-crowned Babbler *Pomatostomus temporalis temporalis* – V, Bush Stone-curlew *Burhinus grallarius* – E
- Canopy/Aerial Birds:
  - Raptors: Little Eagle *Hieraaetus morphnoides* – V, Spotted Harrier *Circus assimilis* – V, Square-tailed Kite *Lophoictinia isura* – V
  - Owls: Barking Owl *Ninox connivens* – V, Powerful Owl *Ninox strenua* – V
  - Small passerines: Varied Sittella *Daphoenositta chrysoptera* – V, Dusky Woodswallow *Artamus cyanopterus cyanopterus* – V, Regent Honeyeater *Anthochaera phrygia* – CE, Painted Honeyeater *Grantiella picta* – V, Pied Honeyeater *Certhionyx variegatus* – V, Black-chinned Honeyeater *Melithreptus gularis gularis* – V, Brown Treecreeper *Climacteris picumnus victoriae* – V
  - Parrots: Swift Parrot *Lathamus discolor* – E, Superb Parrot *Polytelis swainsonii* – V, Turquoise Parrot *Neophema pulchella* – V, Gang-gang Cockatoo *Callocephalon fimbriatum* – V, Little Lorikeet *Glossopsitta pusilla* – V
- Arboreal Mammals:
  - Spotted-tailed Quoll *Dasyurus maculatus* – V, Squirrel Glider *Petaurus norfolcensis* – V, Eastern Pygmy-possum *Cercartetus nanus* – V, Brush-tailed Phascogale *Phascogale tapoatafa* – V, Koala *Phascolarctos cinereus* - V
- Bats:
  - Large-eared Pied Bat *Chalinolobus dwyeri* – V, Corben's Long-eared Bat *Nytophilus corbeni* – V, Eastern Bentwing-bat *Miniopterus schriebersii oceanensis* – V, Southern Myotis *Myotis macropus* – V, Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* – V, Grey-headed Flying-fox *Pteropus poliocephalus* – V
- Amphibians:
  - Booroolong Frog *Litoria booroolongensis* – E
- Reptiles:

- Pink-tailed Legless Lizard *Aprasia parapulchella* – V, Striped Legless Lizard *Delma impar* - V

a) In the case of a threatened species, whether the proposed development or activity 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.

Flora

Two suspected *E. canobolensis* were present within the study area. These trees fall outside the 45m clearing easement and would not be impacted by the proposal. No impacts to the lifecycle of these species would occur. Mitigation measures to clearing mark these trees prior to construction would avoid any impacts to the life cycle of the species. The local population is unlikely to be placed at risk of extinction.

EECs

Not applicable.

Ground/understorey birds

Potential foraging and roosting habitat for Diamond Firetail, Scarlet Robin, Flame Robin, Hooded Robin, White-fronted Chat, Grey-crowned Babbler and Bush Stone-curlew occurs within the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as nests that would indicate that the site has recently been used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of around 61 ha of highly modified, relatively disturbed and fragmented habitat. This would include 18.1 ha of exotic grassland, 31.6 ha of pine plantation, 6.8 ha of native remnant woodland, 1.4 ha of planted vegetation, 2.0 ha of other exotic habitat, and 1.1 ha of bare ground. The habitat to be removed is similar to the habitat in the rest of the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction.

Raptors

Potential foraging habitat for Little Eagle and Square-tailed Kite and potential foraging and breeding habitat for Spotted Harrier occur in the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as nests that would indicate that the site has been recently used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of around 29 ha of relatively disturbed and fragmented habitat. This would include 18.1 ha of exotic grassland, 6.8 ha of native remnant woodland, 1.4 ha of planted vegetation, 2.0 ha of other exotic habitat, and 1.1 ha of bare ground. The habitat to be removed is similar to the habitat in the rest of the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction.

Owls

Potential foraging habitat and HBTs which provide potential roosting habitat for Barking Owl and Powerful Owl occur in the proposal area and would be removed by the proposal. Surveys did not detect any sign such as pellets that would indicate that the site has been recently used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable

local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for injury or mortality to breeding owls.

Small passerines

Potential foraging and breeding habitat for these species occurs in the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as nests that would indicate that the site has recently been used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of around 61 ha of highly modified, relatively disturbed and fragmented habitat. This would include 6.8 ha of native remnant woodland including 14 HBTs, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. The habitat to be removed is similar to the habitat in the rest of the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-nesting birds.

Parrots

Potential foraging habitat for these species and HBTs which provide potential breeding habitat for Superb Parrot, Turquoise Parrot, Gang-gang Cockatoo and Little Lorikeet occur in the proposal area and would be removed by the proposal. Swift Parrot breeds only in Tasmania, and the proposal would therefore not impact on any potential breeding habitat. Surveys did not detect these species or any signs that they have recently used the study area, and so the study area is not considered known habitat.

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for injury or mortality to breeding parrots.

Arboreal mammals

Potential foraging habitat for Koala including preferred feed trees and potential foraging and breeding habitat for Spotted-tailed Quoll, Squirrel Glider, Eastern Pygmy-possum and Brush-tailed Phascogale occur in the proposal area and would be removed by the proposal. Surveys did not detect these species or signs such as scats or scratches on trees that would indicate that the site has been recently used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-breeding mammals.

Bats

Potential foraging and roosting habitat for these species occurs in the proposal area and would be removed by the proposal. Surveys were not completed for these species, so it is assumed that they could occur in the study area.

The proposal would involve the removal of around 29 ha of relatively disturbed and fragmented habitat. This would include 6.8 ha of native remnant woodland which contains 14 HBTs and 1.4 ha of planted vegetation. The habitat to be removed is similar to the habitat in the rest of the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to

have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-roosting bats.

Amphibians

Potential foraging and breeding habitat for Booroolong Frog occurs in the study area and would be impacted by the proposal. Targeted surveys were not completed for this species, so it is assumed that it could occur in the study area.

The proposal would involve indirect construction impacts on the relatively disturbed Flyer's Creek and several farm dams. The indirect disturbance of a small area of low quality habitat is considered unlikely to have an adverse effect on the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

Reptiles

Grassland and rocky outcrops that provide potential foraging and breeding habitat for these species occur in the study area and would be removed by the proposal. Surveys did not detect these species or any signs that would indicate that the site has recently been used by these species, and so the study area is not considered known habitat.

The proposal would involve the removal of a small amounts of surface rocks and an area of around 43 ha of exotic-dominated grassland. The habitat to be removed is similar to the habitat in the rest of the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect of the life cycle of the species such that a viable local population is likely to be placed at risk of extinction. Mitigation measures have been recommended to mitigate the potential for habitat loss for these species.

b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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.

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.

Flora

Not applicable.

EECs

Four patches of Box Gum woodland occur within the study area. The proposal would reduce the extent of the community by around 4 ha. OEH VIS mapping estimates 180 ha of Yellow Box – Blakely's Red Gum woodland community within 1 km of the study area. Most of these areas are connected to the community in the proposal area and are considered part of the local occurrence. The total reduction of the local occurrence by 4 ha is unlikely to place it at risk of extinction.

The composition and structure of the vegetation within the study area is already substantially and adversely modified. Areas surrounding the proposal area are actively utilised for agricultural purposes and have been subject to varying levels of degradation. In this context, further modification is expected to be minimal and is unlikely to place the local occurrence of the community at risk of extinction.

Ground/understorey birds

Not applicable.

Raptors
Not applicable.
Owls
Not applicable.
Small passerines
Not applicable.
Parrots
Not applicable.
Arboreal mammals
Not applicable.
Bats
Not applicable.
Amphibians
Not applicable.
Reptiles
Not applicable.

c) In relation to the habitat of a threatened species or ecological community:

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

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

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.

Flora

Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification.

I. The two trees fall outside the clearing easement and would not be removed by the proposal. Habitat for these trees species would remain. No known habitat is likely to be removed or modified.

II. The two trees are isolated from other known records of this species. The nearest known recording occurs 1km away on the same drainage line. The majority of the population of this species, occur on Mount Canobolas, 8km North of the study area. The two trees are already isolated from other known populations and the proposal would not cause further fragmentation or isolation of habitat.

III. As the trees would be avoided by the proposal, no known habitat for this species is to be removed or modified. Thus, no impacts to the long term survival of the species is considered to occur.

EEC

I. The proposal would result in the removal of 4.0 ha of Box-Gum Woodland.

II. The proposal would result in the clearing of a narrow, linear strip 45 m wide. The proposal area occurs near an existing roadway that has already contributed to fragmentation of the community to a minor degree relative to the surrounding highly cleared agricultural landscape. The proposal would

	marginally increase this fragmentation; however, it would not result in isolation of the community from adjacent areas of habitat.
III.	The majority of the Box-Gum woodland within the proposal area has a degraded understory. The groundlayer degradation is due to the invasion of exotic species. These degraded areas are not likely to contain any important habitat for the long-term survival of the community in the locality, although it does assist with connectivity in the landscape. The area of good condition Box-Gum woodland has a diverse structure and is showing signs of natural recruitment and regeneration of overstory species. This area is considered important for maintaining the species composition of community. This patch comprises an area of about 6 ha on the Eastern side of Cadia Rd. 0.8 ha of this patch would be impacted, so 4.4 ha would remain to provide a seed supply and contribute to the long-term survival of the species. Further, given the large extent of the community estimated to occur in the locality (180 ha), it is unlikely that the habitat to be removed is important to the long-term survival of the community.
Ground/understorey birds	
IV.	The proposal would result in the removal of around 61 ha of habitat for these species. This would include around 18 ha of exotic grassland, 31.6 ha of pine plantation, 1.4 ha of native remnant woodland, 1.4 ha of planted vegetation, 2 ha of other exotic vegetation, and 1.1 ha of bare ground.
V.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
VI.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Raptors	
I.	The proposal would result in the removal of around 61 ha of habitat for these species. This would include around 18 ha of exotic grassland, 31.6 ha of pine plantation, 1.4 ha of native remnant woodland with 14 HBTs, 1.4 ha of planted vegetation, 2 ha of other exotic vegetation, and 1.1 ha of bare ground.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Owls	
I.	The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for these species.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Small passerines	
I.	The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for these species.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat

	to be removed is not considered to be important to the long-term survival of these species in the locality.
Parrots	
I.	The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for these species.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Arboreal mammals	
I.	The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for hollow-roosting species and preferred feed trees.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Bats	
I.	The proposal would result in the removal of around 61 ha of habitat for these species. This would include around 18 ha of exotic grassland, 31.6 ha of pine plantation, 1.4 ha of native remnant woodland with 14 HBTs, 1.4 ha of planted vegetation, 2 ha of other exotic vegetation, and 1.1 ha of bare ground.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Amphibians	
I.	The proposal would result in the indirect disturbance of a small area of aquatic habitat where the transmission line would cross Flyer's Creek and near farm dams.
II.	The proposal would not disrupt movement along the stream, and so would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the surrounding aquatic habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.
Reptiles	
I.	The proposal would result in the removal of small amounts of surface rocks and an area of around 43 ha of exotic-dominated grassland.
II.	The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal would not result in the fragmentation or isolation of any of this habitat.
III.	The habitat within the study area is not known habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the habitat in the rest of the locality. The habitat to be removed is not considered to be important to the long-term survival of these species in the locality.

d) Whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value occur within the proposal area. There will be no direct or indirect adverse effects on any declared areas of outstanding biodiversity value.

e) Whether the action constitutes or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key Threatening Processes (KTPs) relevant to the proposal include the following:

i. Clearing of native vegetation

The clearing of native vegetation is considered a major contributor to the loss of biodiversity. In the Scientific Committee's determination, it was found that 'clearing of any area of native vegetation, including areas less than two hectares in extent, may have significant impacts on biological diversity.' Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation and off-site impacts such as downstream sedimentation. Around 6.8 ha of remnant native woodland including 14 HBTs and around 1.4 ha of planted native vegetation would be cleared as a result of the proposal. The proposal has the potential to increase the impact of this KTP. However, the contribution of this proposal would be relatively minor given the minimal amount of habitat to be removed and the extent of habitat that would remain in the study area.

ii. Loss of hollow-bearing trees

The proposal would result in the removal of 14 HBTs. The removal of these trees would contribute to this KTP, but only at a relatively small scale given the amount of habitat that would remain.

iii. Invasion and establishment of exotic vines and scramblers

The proposal has the potential to contribute to the spread of exotic species in the proposal area through the transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal is likely to make only a minor contribution to this KTP.

iv. Invasion of native plant communities by exotic perennial grasses

The proposal has the potential to contribute to the introduction or spread of exotic perennial grasses to the proposal area through the transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal is likely to make only a minor contribution to this KTP.

v. Removal of dead wood and dead trees

Dead trees and dead wood that occur in the proposal area in the form of stags and fallen timber could be relocated as part of the proposal. This would have the potential to impact species through the loss of roosting, perching, hunting, and breeding habitat. As part of the mitigation measures, it has been recommended that dead wood is retained and placed in adjacent areas instead of being taken off site. With the implementation of this measure, the proposal is unlikely to contribute to this KTP.

Conclusion

The impacts of the proposal on the assessed threatened species and ecological community listed under the BC Act are considered to be manageable. A significant impact is considered unlikely based on the following conclusions:

1. The amount of habitat to be removed or disturbed by the proposal is relatively small in the local context and is relatively disturbed and fragmented.
2. No fragmentation or isolation of habitat would occur.
3. No substantial contribution to any key threatening process would be expected.

4. Mitigation measures would be implemented to prevent disruptions to the life cycle or harm to individual animals of these species (Section 6).

D.2 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT PRINCIPAL SIGNIFICANT IMPACT ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act* 1999 specifies factors to be taken into account in deciding whether a development is likely to significantly affect Endangered Ecological Communities, threatened species and migratory species, listed at the Commonwealth level.

The following assessment assesses the significance of the likely impacts associated with the proposed works on the following endangered and critically endangered species:

- Arboreal species:
    - Swift Parrot *Lathamus discolor* – CE, Spotted-tailed Quoll *Dasyurus maculatus* – E
- Booroolong Frog *Litoria booroolongensis* – E
- Silver-leaf Candlebark *Eucalyptus canobolensis* - E

a) Will the action lead to a long-term decrease in the size of a population of a species?
Arboreal species
Potential foraging habitat for Swift Parrot and potential foraging and breeding habitat for the Spotted-tailed Quoll occurs within the proposal area and would be removed by the proposal, including HBTs. The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the species such that it would lead to a long-term decrease in the size of a population. Mitigation measures have been recommended to mitigate the potential for injury or mortality to breeding or roosting animals.
Booroolong Frog
Potential foraging and breeding habitat for Booroolong Frog occurs in the study area and would be impacted by the proposal. The proposal would involve indirect construction impacts on the relatively disturbed Flyer's Creek and farm dams. The indirect disturbance of a small area of low quality habitat is considered unlikely to have an adverse effect on the life cycle of this species such that it would lead to a long-term decrease in the size of a population.
Silver-leaf Candlebark
Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification. The two trees fall outside the clearing easement and would be avoided by the proposal. The action would not lead to a long-term decrease to the size of the population of this species.

b) Will the action reduce the area of occupancy of the species?

Arboreal species

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of these species.

Booroolong Frog

The proposal would result in the indirect disturbance of a small area of aquatic habitat where the transmission line would cross Flyer's Creek and near farm dams. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the rest of the aquatic habitat in the rest of the locality. In this context, the disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of this species.

Silver-leaf Candlebark

Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification.

The two trees fall outside the clearing easement and would be avoided by the proposal. No juvenile trees were present. The action would not reduce the area of occupancy of this species.

c) Will the action fragment and existing population into two or more populations?

Arboreal species

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for these species. The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat, so the proposal would not fragment an existing population into two or more populations.

Booroolong Frog

The proposal would result in the indirect disturbance of a small area of aquatic habitat where the transmission line would cross Flyer's Creek and near farm dams. The proposal would not disrupt movement along the stream or within dams, and so the proposal would not fragment an existing population into two or more populations.

Silver-leaf Candlebark

Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification.

The two trees fall outside the clearing easement and would be avoided by the proposal. The two trees are isolated from other known records of this species. The nearest known recording occurs 1km away on the same drainage line. The two trees are already isolated from other known populations, the action would not cause further fragmentation of the population.

d) Will the action adversely affect habitat critical to the survival of a species?

Arboreal species

No areas of critical habitat have been declared for these species.

Booroolong Frog

No areas of critical habitat have been declared for this species.

Silver-leaf Candlebark

No areas of critical habitat have been declared for this species.

e) Will the action disrupt the breeding cycle of a population?

Arboreal species

Swift Parrots breed in Tasmania during spring and summer. Given that the proposal area is not in Tasmania, it is not likely that the action will disrupt the breeding cycle of a population of this species.

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential breeding sites for the Spotted-tailed Quoll. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, it is not likely that the action will disrupt the breeding cycle of a population of this species.

Booroolong Frog

The proposal would result in the indirect disturbance of a small area of aquatic habitat where the transmission line would cross Flyer's Creek and near farm dams. The habitat within the study area is not known habitat and is relatively disturbed. In this context, it is not likely that the action will disrupt the breeding cycle of a population of this species.

Silver-leaf Candlebark

Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification.

The two trees fall outside the clearing easement and would be avoided by the proposal. Flowering and pollination of this species would continue in its current state. The action would not disrupt the breeding cycle of the population.

f) Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

Arboreal species

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. In this context, the removal and disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Booroolong Frog

The proposal would result in the indirect disturbance of a small area of aquatic habitat where the transmission line would cross Flyer's Creek and near farm dams which could decrease the quality of some habitat. The habitat to be removed is a relatively small area of disturbed habitat, and is similar to the rest of the aquatic habitat in the rest of the locality. In this context, the removal and disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Silver-leaf Candlebark

Two suspected *E. canobolensis* trees are present within the study area. Samples sent to the herbarium were unable to be confirmed and these trees are presumed to be *E. canobolensis* until juvenile leaves are present for identification.

The two trees fall outside the clearing easement and would be avoided by the proposal. The action is considered unlikely to destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

g) Will the action result in invasive species that are harmful to a critically endangered or endangered/vulnerable species becoming established in the endangered / critically endangered /vulnerable species habitat?

The proposal has the potential to contribute to the spread of invasive species in the proposal area through the transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal is therefore unlikely to result in invasive species that are harmful to these species becoming established in their potential habitat.

h) Will the action introduce disease that may cause the species to decline?

There is a risk that pathogens could be established or spread in the proposal area via machinery during construction. However, with the recommended mitigation measures, the action is unlikely to introduce any disease which may cause the species to decline.

i) Will the action interfere with the recovery of the species?

Swift Parrot

The National Recovery Plan for the Swift Parrot lists the following objectives:

1. To identify and prioritise habitats and sites used by the species across its range, on all land tenures.
2. To implement management strategies to protect and improve habitats and sites on all land tenures.
3. To monitor and manage the incidence of collisions, competition and Beak and Feather Disease (BFD).
4. To monitor population trends and distribution throughout the range.

The proposal would not interfere with any of these objectives.

Spotted-tailed Quoll

The National Recovery Plan for the Spotted-tailed Quoll lists the following objectives:

1. Determine the distribution and status of Spotted-tailed Quoll populations throughout the range and identify key threats and implement threat abatement management practices.
2. Investigate key aspects of the biology and ecology of the Spotted-tailed Quoll to acquire targeted information to aid recovery.
3. Reduce the rate of habitat loss and fragmentation on private land.
4. Evaluate and manage the risk posed by silvicultural practices.
5. Determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations.
6. Determine and manage the impact of fire regimes on Spotted-tailed Quoll populations.
7. Reduce deliberate killings of Spotted-tailed Quolls.
8. Reduce the frequency of Spotted-tailed Quoll road mortality.
9. Assess the threat Cane Toads pose to Spotted-tailed Quolls and develop threat abatement actions if necessary.
10. Determine the likely impact of climate change on Spotted-tailed Quoll populations.
11. Increase community awareness of the Spotted-tailed Quoll and involvement in the Recovery Program.

Booroolong Frog

The National Recovery Plan for the Booroolong Frog lists the following objectives:

1. Determine the species distribution in areas that have not been the focus of targeted surveys.
2. Determine the taxonomic status of northern and southern Booroolong Frog populations, and identify further genetic sub-division within these populations.
3. Reduce the impact of known or perceived threats contributing to the ongoing decline of the Booroolong Frog.
4. Determine population trends across the species range, and in areas subject to different management regimes.
5. Identify the potential impacts of climate change, and determine management responses to reduce these impacts.

6. Identify other potentially threatening processes.
7. Increase community awareness and involvement in the Booroolong Frog recovery program.
8. Achieve the effective implementation of the recovery plan.

Silver-leaf Candlebark

No recovery plan has been adopted or made for this species.

The *Environment Protection and Biodiversity Conservation Act* 1999 specifies factors to be taken into account in deciding whether a development is likely to significantly affect Endangered Ecological Communities, threatened species and migratory species, listed at the Commonwealth level. The following assessment assesses the significance of the likely impacts associated with the proposed works on the following vulnerable species:

- Canopy birds: Painted Honeyeater *Grantilla picta*, Superb Parrot *Polytelis swainsonii*
- Bats: Large-eared Pied Bat *Chalinolobus dwyeri*, Corben's Long-eared Bat *Nyctophilus corbeni*, Grey-headed Flying-fox *Pteropus poliocephalus*
- Arboreal mammals: Greater Glider *Petaurus volans*, Koala *Phascolarctos cinereus*
- Reptiles: Pink-tailed Legless Lizard *Aprasia parapulchella*, Striped Legless-lizard *Delma impar*

a) Will the action lead to a long-term decrease in the size of an important population of a species?

Canopy birds

Potential foraging and breeding habitat for Painted Honeyeater and Superb Parrot occurs in the proposal area and would be removed by the proposal, including HBTs.

The proposal would involve the removal of around 6.8 ha of native remnant woodland including 14 HBTs. The habitat to be removed is similar to the habitat in the rest of the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the species such that it would lead to a long-term decrease in the size of an important population. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-nesting birds.

Bats

Potential foraging and roosting habitat for these species occurs in the proposal area and would be removed by the proposal, including HBTs.

The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat. This would include 6.8 ha of native remnant woodland including 14 HBTs, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. The habitat to be removed is similar to the habitat in the rest of the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the species such that it would lead to a long-term decrease in the size of an important population. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-roosting bats.

Arboreal mammals

Potential foraging habitat for Koala including preferred feed trees and potential foraging and breeding habitat for Greater Glider occur in the proposal area and would be removed by the proposal.

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the species such that it would lead to a long-term decrease in the size of an important population. Mitigation measures have been recommended to mitigate the potential for injury or mortality to hollow-breeding Greater Gliders.

Reptiles

Potential foraging and breeding habitat for these species occur in the study area and would be removed by the proposal.

The proposal would involve the removal of a small amounts of surface rocks and an area of around 18.1 ha of exotic-dominated grassland. The habitat to be removed is similar to the habitat in the rest of the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of potential habitat as a result of the proposal is considered unlikely to have an adverse effect on the species such that it would lead to a long-term decrease in the size of an important population. Mitigation measures have been recommended to mitigate the potential for habitat loss for these species.

b) Will the action reduce the area of occupancy of an important population of a species?

Canopy birds

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of an important population of these species.

Bats

The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat. This would include 6.8 ha of native remnant woodland including 14 HBTs, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. The habitat to be removed is similar to the habitat in the rest of the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of an important population of these species.

Arboreal mammals

The proposal would involve the removal of an area of around 6.8 ha of native remnant woodland, including 14 HBTs. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of an important population of these species.

Reptiles

The proposal would involve the removal of a small amounts of surface rocks and an area of around 18.1 ha of exotic-dominated grassland. The habitat to be removed is similar to the habitat in the rest of the locality. The proposal area is not located in a known important population of these species. In this context, the removal of a relatively small area of habitat as a result of the proposal is considered unlikely to reduce the area of occupancy of an important population of these species.

c) Will the action fragment an existing important population into two or more populations?
Canopy birds
The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential roosting sites for these species. The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal area is not located in a known important population of these species. The proposal would not fragment an existing important population into two or more populations.
Bats
The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat, including 6.8 ha of native remnant woodland including 14 HBTs, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal area is not located in a known important population of these species. The proposal would not fragment an existing important population into two or more populations.
Arboreal mammals
The proposal would result in the removal of around 6.8 ha of remnant native woodland, including preferred feed trees for Koala and HBTs which provide potential roosting sites for Greater Glider. The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal area is not located in a known important population of these species. The proposal would not fragment an existing important population into two or more populations.
Reptiles
The proposal would involve the removal of a small amounts of surface rocks and an area of around 18.1 ha of exotic-dominated grassland. The proposal would result in the clearing of a narrow, linear strip of relatively disturbed habitat. The proposal area is not located in a known important population of these species. The proposal would not fragment an existing important population into two or more populations.
d) Will the action adversely affect habitat critical to the survival of a species?
Canopy birds
No areas of critical habitat have been declared for these species.
Bats
No areas of critical habitat have been declared for these species.
Arboreal mammals
No areas of critical habitat have been declared for these species.
Reptiles
No areas of critical habitat have been declared for these species.
e) Will the action disrupt the breeding cycle of an important population?
Canopy birds
6.8 ha of native remnant woodland including 14 HBTs providing potential breeding habitat for Regent Honeyeater and Superb Parrot occur in the proposal area and would be removed by the proposal. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, it is not likely that the action will disrupt the breeding cycle of an important population of these species. Mitigation measures have been recommended to mitigate the potential for injury or mortality to breeding birds.
Bats
The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat, including 6.8 ha of native remnant woodland including 14 HBTs that provide potential breeding habitat, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. This habitat is relatively disturbed and fragmented,

and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, it is not likely that the action will disrupt the breeding cycle of an important population of these species. Mitigation measures have been recommended to mitigate the potential for injury or mortality to breeding bats.

Arboreal mammals

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs which provide potential breeding sites for these species. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, it is not likely that the action will disrupt the breeding cycle of a population of these species.

Reptiles

The proposal would involve the removal of a small amounts of surface rocks and an area of around 18.1 ha of exotic-dominated grassland. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, it is not likely that the action will disrupt the breeding cycle of a population of these species.

f) Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

Canopy birds

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal and disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Bats

The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat, including 6.8 ha of native remnant woodland including 14 HBTs, 1.4 ha of planted vegetation and 31.6 ha of pine plantation. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal and disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Arboreal mammals

The proposal would result in the removal of around 6.8 ha of remnant native woodland, including 14 HBTs. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal and disturbance of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Reptiles

The proposal would involve the removal of a small amounts of surface rocks and an area of around 18.1 ha of exotic-dominated grassland. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in a known important population of these species. In this context, the removal and disturbance

of a relatively small area of habitat as a result of the proposal is considered unlikely to modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

g) Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

The proposal has the potential to contribute to the spread of invasive species in the proposal area through the transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal is therefore unlikely to result in invasive species that are harmful to these species becoming established in their potential habitat.

h) Will the action introduce disease that may cause the species to decline?

There is a risk that pathogens could be established or spread in the proposal area via machinery during construction. However, with the recommended mitigation measures, the action is unlikely to introduce any disease which may cause the species to decline.

i) Will the action interfere substantially with the recovery of the species?

Canopy birds

The National Recovery Plan for Superb Parrot lists the following specific objectives:

1. Determine population trends in the Superb Parrot.
2. Increase the level of knowledge of the Superb Parrot's ecological requirements.
3. Develop and implement threat abatement strategies.
4. Increase community involvement in and awareness of the Superb Parrot recovery program.

The proposal would not interfere with any of these objectives.

No recovery plan has been prepared for Painted Honeyeater.

Bats

The National Recovery Plan for the Large-eared Pied Bat lists the following objectives:

1. Identify priority roost and maternity sites for protection
2. Implement conservation and management strategies for priority sites
3. Educate the community and industry to understand and participate in the conservation of the large-eared pied bat

The proposal would not interfere with any of these objectives.

The draft National Recovery Plan for Grey-headed Flying Fox lists the following overall objectives:

1. Improve the Grey-headed Flying Foxes national population trend by reducing the impact of threatening processes on Grey-headed Flying Foxes through habitat identification, protection, restoration, and monitoring.
2. Assist communities and Grey-headed Flying Foxes to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers.

The proposal would not interfere with any of these objectives.

No recovery plan has been prepared for Corben's Long-eared Bat.

Arboreal mammals

No recovery plan has been prepared for Greater Glider.

The overall objective of the National Recovery Plan for the Koala is to reverse the decline of the koala in NSW, to ensure adequate protection, management and restoration or koala habitat, and to maintain healthy breeding populations of koalas throughout their current range. The proposal would not interfere with any of these objectives.

Reptiles

The National Recovery Plan for Striped Legless Lizard lists the following specific objectives:

1. Establish and maintain national forums for the discussion and organisation of the conservation of *D. impar* across its natural distribution.

2. Determine the distribution of potential *D. impar* habitat.
3. Determine the current distribution and abundance of D*. impar* in Victoria, NSW, the ACT and South Australia.
4. Establish a series of reserves and other managed areas across the natural distribution of the species.
5. Determine the habitat use and ecological requirements of *D. impar.*
6. Identify the nature and extent of threatening processes affecting *D. impar.*
7. Undertake a program of monitoring to provide a basis for adaptive management of *D. impar.*
8. Increase community awareness and involve the community in aspects of the recovery program.
9. Assess the need for salvage and translocation, determine their feasibilities, develop protocols and undertake a trial translocation if appropriate.
10. Ensure that captive population(s) are used to support education and research elements of the Recovery Plan.

The proposal would not interfere with any of these objectives.

No recovery plan has been prepared for Pink-tailed Legless Lizard.

The following assessment assesses the significance of the likely impacts associated with the proposed works on these migratory species:

- Aerial birds:
  - Fork-tailed Swift *Apus pacificus*, White-throated Needletail *Hirundapus caudacutus*
- Ground/Understorey birds:
  - Yellow Wagtail *Motacilla flava*, Satin Flycatcher *Myiagra cyanoleuca*

a) Will the action substantially modify (including by fragmenting, alerting fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?
Aerial birds
The proposal would involve the removal of around 31.6 ha of pine plantation, 6.8 ha of native remnant woodland and 1.4 ha of planted vegetation that form part of the above-canopy habitat for these species. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in an area of known important habitat for these species. In this context, the action is not likely to substantially modify, destroy, or isolate any area of important habitat for these migratory species.
Ground/understorey birds
The proposal would involve the removal of around 61 ha of relatively disturbed and fragmented habitat foraging. This would include 18.1 ha of exotic grassland, 31.6 ha of pine plantation, 6.8 ha of native remnant woodland, 1.4 ha of planted vegetation, 2 ha of other exotic habitat, and 1.1 ha of bare ground. There would also be some disturbance associated with construction and operation of the proposal which could decrease the quality of some habitat. This habitat is relatively disturbed and fragmented, and is similar to the habitat that would remain in the locality. The proposal area is not located in an area of known important habitat for these species. In this context, the action is not likely to substantially modify, destroy, or isolate any area of important habitat for these migratory species.

b) Will the action result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?
Aerial birds
The proposal has the potential to contribute to the spread of invasive species in the proposal site through the transfer and introduction of plant material and soil on machinery. However, they are not likely to be harmful to these species as they are only likely to use the proposal area for foraging above the canopy on occasion. Mitigation measures have also been recommended to prevent the spread of weeds on site. The proposal area is not located in a known area of important habitat for these species. The proposal is therefore unlikely to result in invasive species that are harmful to these species becoming established in an area of important habitat.
Ground/understorey birds
The proposal has the potential to contribute to the spread of invasive species in the proposal site through the transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal area is not located in a known area of important habitat for these species. The proposal is therefore unlikely to result in harmful invasive species becoming established in an area of important habitat.
c) Will the action seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?
Aerial birds
These species occur in the region and could potentially occur in the vicinity of the proposed action. However, given the low number of records of these species in the region, and the minimal footprint of the proposal which is unlikely to be an ecologically significant proportion of habitat for these wide-ranging species, the proposal is not likely to seriously disrupt the life cycle of an ecologically significant proportion of the populations of these migratory species.
Ground/understorey birds
These species occur in the region and could potentially occur in the vicinity of the proposed action. However, given the low number of records, and the minimal footprint of the proposal which is unlikely to be an ecologically significant proportion of habitat for these wide-ranging species, the proposal is not likely to seriously disrupt the life cycle of an ecologically significant proportion of these populations.

ENDANGERED ECOLOGICAL COMMUNITY

The following assesses the significance of the likely impacts associated with the proposed works on the Endangered Ecological Community (EEC);

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and derived native grasslands (Box-Gum Grassy Woodlands) - CEEC

a) Will the action lead to a reduction in the extent of an ecological community?
Box-Gum Grassy Woodland
One 6 ha patch of EPBC listed Box-Gum Grassy Woodland occurs along Cadia Rd. The action would impact 0.8 ha of this community through the construction of a transmission line. This is unlikely to substantially reduce the extent of this EEC.

b) Will the action fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines?

Box-Gum Grassy Woodland

The proposal would result in the removal of 0.8 ha of Box-Gum Woodland. The proposal would result in the clearing of a narrow, linear strip 45 m wide for a transmission line. The proposal area occurs near an existing roadway that has already contributed to fragmentation of the community to a minor degree relative to the surrounding highly cleared agricultural landscape. The proposal would marginally increase this fragmentation; however, it would not result in isolation of the community from adjacent areas of habitat.

c) Will the action adversely affect habitat critical to the survival of an ecological community?

Box-Gum Grassy Woodland

The majority of the Box-Gum woodland within the proposal area has a degraded understory. The groundlayer degradation is due to the invasion of exotic species. These degraded areas are not likely to contain any important habitat for the long-term survival of the community in the locality, although it does assist with connectivity in the landscape. The area of good condition Box-Gum woodland has a diverse structure and is showing signs of natural recruitment and regeneration of overstory species. This area is considered important for maintaining the species composition of community. This patch comprises an area of about 6 ha on the Eastern side of Cadia Rd. 0.8 ha of this patch would be impacted, so 4.4 ha would remain to provide a seed supply and contribute to the long-term survival of the species. Further, given the large extent of the community estimated to occur in the locality (180 ha), it is unlikely that the habitat to be removed is important to the long-term survival of the community.

d) Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels or substantial alteration of surface water drainage patterns?

Box-Gum Grassy Woodland

During construction, the proposal would have a short-term impact upon soils and possibly surface water flow, within discrete areas. These impacts are manageable with the implementation of erosion and sediment controls and would be unlikely to further degrade the community in the long-term. The actions associated with the proposal are not considered likely to substantially alter hydrological patterns necessary for the community's survival.

e) Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?

Box-Gum Grassy Woodland

The composition and structure of the vegetation within the study area is already substantially and adversely modified. Areas surrounding the proposal area are actively utilised for agricultural purposes and have been subject to varying levels of degradation. In this context, further modification is expected to be minimal and is unlikely to place the local occurrence of the community at risk of extinction.

f) Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to:

a. Assisting invasive species, that are harmful to the listed ecological community, to become established; or

b. Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community?

Box-Gum Grassy Woodland

There is a risk that invasive weeds could be established in the proposal area via seeds or plant parts on machinery during construction. These impacts can be readily managed and minimised with the implementation of a weed management procedure.

The proposal does not involve the introduction of any fertilisers, herbicides or other chemicals or pollutants.

With the recommended hygiene measures implemented, the likelihood of the proposal resulting in invasive species or introduction of pollutants that are harmful to the EEC is minimal.

g) Will the action interfere with the recovery of an ecological community?

Box-Gum Grassy Woodland

The objective of the

The National Recovery Plan for this EEC lists the objective of minimising the risk of extinction of the ecological community through:

1. Achieving no net loss in extent and condition of the ecological community throughout its geographic distribution;
2. Increasing protection of sites with high recovery potential;
3. Increasing landscape functionality of the ecological community through management and restoration of degraded sites;
4. Increasing transitional areas around remnants and linkages between remnants; and
5. Bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland.

The proposal would not interfere with any of these objectives.

Conclusion

The impacts of the proposal on the assessed threatened and migratory species and EECs listed under the EPBC Act are considered to be manageable. A significant impact is considered unlikely based on the following conclusions:

1. The amount of habitat to be removed or disturbed by the proposal is relatively small in the local context and is already relatively disturbed and fragmented.
2. No fragmentation or isolation of habitat would occur.
3. No substantial contribution to any key threatening process would be expected.
4. Mitigation measures would be implemented to prevent disruptions to the life cycle or harm to individual animals of these species.

APPENDIX E HOLLOW BEARING TREE INVENTORY

Hollow bearing trees that would be impacted are highlighted in Grey.

ID	Latitude	Longitude	Species	DBH (cm)	Small Limb	Small Trunk	Med Liimb	Med Trunk	Large Limb	Large Trunk	Fissure	Other
1	149.048311	-33.518579	Stag	80	1	0	0	0	0	0	0	
2	149.048547	-33.518776	Blakelys Red Gum	40	0	0	0	1	0	0	0	
3	149.049041	-33.518421	Blakelys Red Gum	65	0	0	1	0	0	0	0	
4	149.049085	-33.518378	Yellow Box	75	0	1	0	0	0	0	0	
5	149.037076	-33.524188	Stag	100	1	1	2	1	0	0	0	
6	149.03731	-33.523404	Yellow Box	100	1	0	0	0	0	0	0	
7	149.037323	-33.523256	Yellow Box	90	0	0	2	0	0	0	0	
8	149.037333	-33.523235	Yellow Box	90	3	0	0	0	0	0	0	
9	149.037034	-33.523222	Yellow Box	100	2	0	0	0	0	0	0	
10	149.03694	-33.523298	Yellow Box	100	2	0	0	0	0	0	0	
11	149.036801	-33.523224	Yellow Box	100	2	0	1	0	0	0	0	
12	149.038507	-33.522083	Yellow Box	200	2	0	0	0	0	0	0	
13	149.039016	-33.521671	Yellow Box	100	0	0	0	2	0	0	0	
14	149.038786	-33.521265	Yellow Box	80	3	0	0	0	0	0	0	Galah scar
15	149.038923	-33.521088	Yellow Box	75	2	0	0	0	0	0	0	
16	149.037948	-33.521955	Stag	80	0	0	0	1	0	0	0	
17	149.041786	-33.520151	Blakelys Red Gum	89	2	0	2	0	0	0	0	Galah scar - two Galahs
18	149.042098	-33.52046	Stag	100	5	0	0	1	0	0	0	
19	149.023227	-33.433654	Apple Box	0	2	0	0	0	0	0	0	
20	149.023523	-33.436594	Stag	0	1	0	0	1	0	0	0	
21	149.023574	-33.436664	Stag	10	0	0	0	0	0	0	0	
22	149.023562	-33.438013	Apple Box	0	0	0	0	0	0	0	1	
23	149.022577	-33.442706	Long-leaved Box	60	2	0	0	0	0	0	0	
24	149.027856	-33.515056	Blakelys Red Gum	100	0	0	0	0	0	0	0	
25	149.027465	-33.525676	Yellow Box	100	0	1	1	0	0	0	0	
26	149.031776	-33.527023	Yellow Box	80	0	0	1	0	0	0	0	
27	149.031838	-33.527054	Yellow Box	70	0	0	1	0	0	0	0	
28	149.031927	-33.527097	Yellow Box	60	0	0	0	1	0	0	0	

APPENDIX F NSW HERBARIUM CORRESPONDENCE

The Royal
BOTANIC GARDENS
& Domain Trust
National Herbarium of New South Wales

Julie GOODING
nghenvironmental
Suite 1
39 Fitzmaurince Street
Wagga Wagga, NSW 2650
AUSTRALIA

Enquiry No: 20639
Botanical.Is@rbgsyd.nsw.gov.au
Fax No: (02) 9251 1952
Ph. No: (02) 9231 8111
Date: 13 June 2018

Dear Julie GOODING,

Thank you for your enquiry of 13-Jun-18. We are happy to provide the following information:

"I think this is *Eucalytpus canobolensis* although it did not key out using EUCLID as the valves should be exserted in this species." Det S.F. McCune 12 June 2018. This species is listed as NSW BCA: Vulnerable.
We will be showing your specimen to other eucalypt experts in the herbarium for confirmation (and a second opinion).

Thank you for your enquiry.

Yours sincerely

Barbara Wiecek
Identification Botanist
Botanical Information Service