APPENDIX D BIODIVERSITY ASSESSMENT REPORT

Biodiversity Assessment Report

WELLINGTON SOLAR FARM

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ACRONYMS AND ABBREVIATIONS

BBAM	BioBanking Assessment Methodology
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCC	BioBanking Credit Calculator
BOS	Biodiversity Offset Strategy
BTBD	BioNet Threatened Biodiversity Database
CEEC	Critically Endangered Ecological Community
CMA	Catchment Management Authority
DECC	NSW Department of Environment and Climate Change (now OEH)
DoEE	Commonwealth Department of Environment and Energy
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
FBA	Framework for Biodiversity Assessment
ha	Hectares
km	Kilometres
m	Metres
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage (formerly DECC, DECCW)
PCTs	Plant Community Types
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy (NSW)
SSD	State Significant Development
sp/spp	Species/multiple species

EXECUTIVE SUMMARY

First Solar proposes to develop approximately 315ha of the 490ha proposal site for a 174 megawatt solar photovoltaic array and associated infrastructure within the Dubbo Local Government Area, NSW. This Biodiversity Assessment Report (BAR) has been prepared by NGH Environmental on behalf of First Solar.

The aim of this BAR is to address the biodiversity matters raised in the Secretary's Environmental Assessment Requirements (SEARs) and to address the requirements of the Framework for Biodiversity Assessment (FBA), developed for Major Projects as part of the Biodiversity Offsets Policy for Major Projects. This BAR forms part of an Environmental Impact Statement (EIS) for a State Significant Development (SSD), prepared under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The FBA has now been superseded by the Biodiversity Assessment Methodology. This is the current assessment methodology for SSD under the NSW Biodiversity Offsets Scheme prescribed by the NSW *Biodiversity Conservation Act 2016.* However, as this proposal is transitional under the *Biodiversity Conservation (Savings and Transitional) Regulation 2017,* the FBA is still applicable.

The FBA underpins the Biodiversity Offsets Policy for Major Projects. It contains the assessment methodology that is adopted by the policy to assess impacts and provide offset guidance for major projects. This report follows the BAR format required by the FBA. Specifically, this assessment uses the *site-based* landscape assessment methodology, in accordance with Appendix 4 of the FBA for major proposals.

Comprehensive mapping and field surveys were completed in accordance with the requirements of the FBA. The clearing of a total of approximately 143.90ha of White Box Grassy tall woodland and derived grasslands in the Upper Slopes sub region of the NSW South Western Slopes and 0.32ha of Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion resulted in the generation of 203 Ecosystem Credits. A further 165ha of vegetation within the development site had site value scores of <17 or was not native vegetation and as such, did not generate ecosystem credits.

One species credit species, the Masked Owl was observed within the development site during the site surveys. This species generates species credits based on the presence of breeding habitat. The development site does not provide breeding habitat for this species and as such, no species credits have been generated.

Consideration has been given to avoiding and minimising impacts to biodiversity throughout each phase of the proposal to date. Site selection options have been assessed against key environmental, social and economic criteria. Mitigation and management measures will be put in place to adequately address impacts associated with the proposal, both direct and indirect.

A Biodiversity Offset Strategy (BOS) will be prepared in accordance with the FBA to offset the residual impacts of the proposal. It is proposed that an offset will be established subject to consent conditions within 2 years of the commencement of construction, which would be adequate for the retirement of the biodiversity credits required for the proposal.

1 INTRODUCTION

The Wellington Solar Farm proposal is classified as State Significant Development (SSD) under the State and Regional Development State Environmental Planning Policy (SEPP) and therefore a 'major project'. This Biodiversity Assessment Report (BAR) assesses the impacts of the proposed Wellington Solar Farm (the proposal) according to the NSW Framework for Biodiversity Assessment (FBA) as required by the Secretary's Environmental Assessment Requirements (SEARs) for the proposal. The FBA has now been superseded by the Biodiversity Assessment Methodology. This is the current assessment methodology for SSD under the NSW Biodiversity Offsets Scheme prescribed by the NSW *Biodiversity Conservation Act 2016.* However, as this proposal is transitional under the *Biodiversity Conservation (Savings and Transitional) Regulation 2017,* the FBA is still applicable.

As stipulated in Section 1.3 of the FBA, proponents must identify and assess the impacts of the proposal on all nationally listed threatened species and threatened ecological communities that may be on the development site. This is addressed in Section 5. The following sections present the detail required to adequately assess the impacts on biodiversity for the Wellington Solar Farm proposal according to the FBA.

1.1 THE PROPOSAL

1.1.1 Site location

The Wellington Solar Farm proposal site is located approximately 2km north east of the town of Wellington within the Dubbo Local Government Area (LGA). The power to be generated at the solar farm would be fed into the national grid via an existing substation on the southern side of Goolma Rd (Figure 1-1).

1.1.2 Site description

The Wellington Solar Farm proposal site consists of 12 Lots. Lot 89 – 92 DP 2987; Lot 99 DP 2987; Lot 102 - 104 DP 2987; Lot 1 DP34690; Lot 1 DP520396; Lot 2 DP807187 and Lot1 DP1226751. The site is approximately 490ha, the majority of which has been cleared of native vegetation and is cultivated.

Goolma road runs through the centre of the site. Access to the Wellington Solar Farm proposal site would be off Goolma Road.

North of Goolma Road, the site is currently grazed and cropped. Hillslopes consist of scattered White Box (*Eucalyptus albens*), Kurrajong (*Brachychiton populneus*) and White Cypress Pine (*Callitris glaucophylla*) trees with the understory a mix of native and exotic grasses and forbs. Flats are grazed or cropped with Lucerne (*Medicago sativa*) comprising a largely exotic groundcover but some native grasses remain. Scattered trees are mostly White Box and Yellow Box (*E. melliodora*) in the west. Planted tree lots consisting of mostly exotic or native non-indigenous mature trees occur throughout the site in various locations.

South of Goolma Road, a derived native grassland surrounds the TransGrid substation. To the west of the substation the site is grazed and understory condition is exotic dominated. Some scattered White Box occurs through the site. A planted tree lot of mature White Box, Yellow Box, White Cypress Pine and Mugga Ironbark (*Eucalyptus sideroxylon*) with a predominately native groundcover runs alongside Goolma Road.

Two watercourses run through the proposal site. One creek, Wuuluman Creek, runs though the centre of the site. An overland flow path, traverses east to west in the northern and central areas of the site and joins up with Wuuluman Creek on the western side of the proposal site. This overland flow path is man made and has been managed for stock water supply. It was predominantly dry during the site inspection.

1.1.3 Proposal description

The proposed Wellington Solar Farm would comprise of the installation of a solar plant with an upper capacity up to 174MW that would supply electricity to the national electricity grid. First Solar (Australia) Pty Ltd proposes to develop around 315ha of the 490ha proposal site, retaining where possible, existing patches of viable native vegetation that occur on the array site. An indicative development area is illustrated in Figure 1-1.

The key infrastructure for the proposal would include:

- PV modules (solar panels).
- Single Axis horizontal tracking (likely) or fixed mounting frames.
- 30-50 inverter stations with an associated transformer.
- An onsite substation or substation within the existing Transgrid substation containing one transformer and associated switchgear.
- A 33kV or 132kV or 330kV transmission line to the adjacent existing Wellington Substation (100m).
- Underground or aboveground electrical conduits and cabling to connect the inverters to the onsite substation or substation within the existing Transgrid substation.
- An access track off Goolma Road, approximately 4.6km north east of Mitchell Highway junction.
- Permanent site office and maintenance building with associated vehicle parking.
- Internal access tracks to allow for site maintenance.
- Perimeter security fencing up to 2.3m high.
- Energy storage.
- Native vegetation screening, where required to break up views of infrastructure to specific receivers, will be planted prior to the commencement of operations.

During the construction period, some additional temporary facilities would be located within the site boundary and may include:

- Material laydown areas.
- Temporary construction site offices.
- Temporary car and bus parking areas for construction worker's transportation. Once the plant has been commissioned, a small car park would remain for the minimal staff required and occasional visitors during operation.

The construction and commissioning phase is expected to last approximately 12 months. The main construction activities would include:

- Site establishment and preparation for construction (fencing, ground preparation, preliminary civil works and drainage).
- Installation of steel post and rail foundation system for the solar panels.
- Installation of underground cabling (trenching) and installation of inverter stations.
- Construction of the 132kV or 330kV overhead transmission line, onsite substation and equipment, and interconnection to the existing Wellington substation.

Removal of temporary construction facilities and rehabilitation of disturbed areas.

It is anticipated that approximately 200 construction personnel would be required on site during the peak construction period. Construction supervisors and the construction labour force, made up of construction labourers and technicians are intended to be hired locally, where possible.

The operational phase of the proposal is anticipated to commence in the fourth quarter of 2019.

1.2 STUDY AIMS

This BAR has been prepared by NGH Environmental on behalf of First Solar.

The aim of this BAR is to address the requirements of the FBA, developed for Major Proposals, as required in the Secretary's Environmental Assessment Requirements (SEARs) and summarised below.

Secretary's Environmental Assessment Requirement	Where addressed
The EIS must address the following specific issues: • **Biodiversity** – including an assessment of the likely biodiversity impacts of the development having regard to the *NSW Biodiversity Offsets Policy Major Proposals*, and in accordance with the *Framework for Biodiversity Assessment*, unless otherwise agreed by the Department.	**Sections 3 -8.**

The NSW Office of Environment and Heritage (OEH) provided input on the preparation of SEARs to the NSW Department of Planning and Environment on the 14th July 2017. This input identified one species, the Regent Honeyeater (*Anthochaera phrygia*) that required further consideration in accordance with Section 9.2 of the Framework for Biodiversity Assessment (FBA). Two threatened entities were specifically excluded from requiring further consideration. These were the Swift Parrot (*Lathamus discolor*) and White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (EEC). However, assessment of impacts and offset requirement are still included in this BAR.

The NSW DPI also provided input on the preparation of the SEARS to the NSW Department of Primary Industries on the 13th July 2017. This input requested an aquatic ecological assessment on the aquatic ecology of Wuuluman Creek.

This BAR includes an assessment of impacts to protected matters listed under the federal *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). This assessment includes use of the Protected Matters Search Tool to determine potential species and communities occurring within the locality, and targeted surveys across the site to detect the presence of these entities or their habitats. Entities known or considered likely to occur have been included in the impact assessment, and Assessments of Significance have been prepared to determine the significance of impacts to these entities.

1.3 REPORT STRUCTURE

This BAR follows the reporting requirements of Sections 1, 2 & 3 of the FBA, including the following:

Section 1

- Identification of biodiversity values subject to the proposed major development (The Proposal) – Chapter 2 (Landscape Features), Chapter 3 (Native Vegetation), Chapter 4 (Threatened Species).

Section 2

- Impacts of the proposal on biodiversity as part of an application for approval to undertake a major proposal under the NSW planning legislation - Chapter 6 (Avoid and Minimise Impacts), Chapter 7 (Impact Summary).

1.4 DEFINITIONS

Wellington Solar Farm ('the proposal')

This refers to all infrastructure and activities required to construct, operate and decommission the proposed solar farm.

The proposal is contained within the Dubbo Regional Council LGA. The broader area within which development would occur such as lot boundaries, road reserves, fence lines etc.

The development site ('development site')

This refers to the area within which infrastructure would be located. This includes the solar array, temporary construction facilities, the access track and cabling and the easement for the transmission line, south of the main site.

The development site is the area assessed in this BAR. The development site is approximately 315ha (Figure 1-1 &

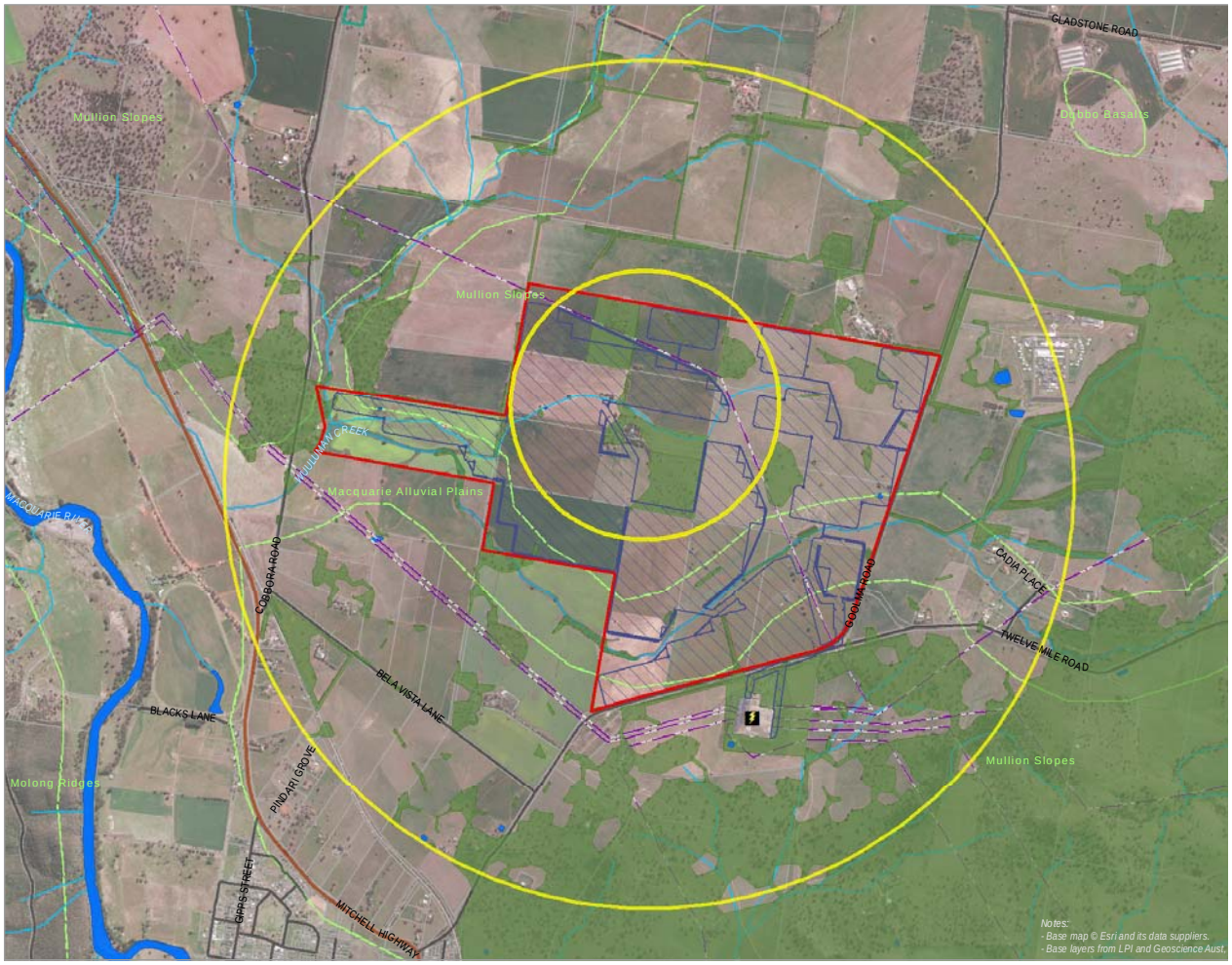

Figure 1-2).

1.5 SOURCES OF INFORMATION USED

The following information sources were used in the preparation of this report:

- Aerial Maps and Proposal layers provided by First Solar.
- Commonwealth Department of Environment and Energy (DoEE) Species Profiles and Threats database (SPRAT) http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.
- Department of Environment and Climate Change NSW (DECC) (2002). Descriptions for NSW (Mitchell) Landscapes, Version 2.
- \NSW OEH's BioBanking credit calculator (http://www.environment.nsw.gov.au/bbccapp/ui/mynews.aspx).
- NSW OEH's BioNet threatened biodiversity database

  Accessed online via login at http://www.bionet.nsw.gov.au/.

- OEH Threatened Biodiversity Profiles

  http://www.environment.nsw.gov.au/threatenedSpeciesApp/.

- Office of Environment and Heritage (OEH) (2007). Mitchell Landscapes with per cent cleared estimates.

- OEH BioNet Vegetation Classification Database (OEH 2017)

  Accessed online via login at http://www.environment.nsw.gov.au/research/Visclassification.htm.

- Office of Environment and Heritage (OEH) (2014). Framework for Biodiversity Assessment: NSW Biodiversity Offsets Policy for Major Proposals. Published by Office of Environment and Heritage for the NSW Government.

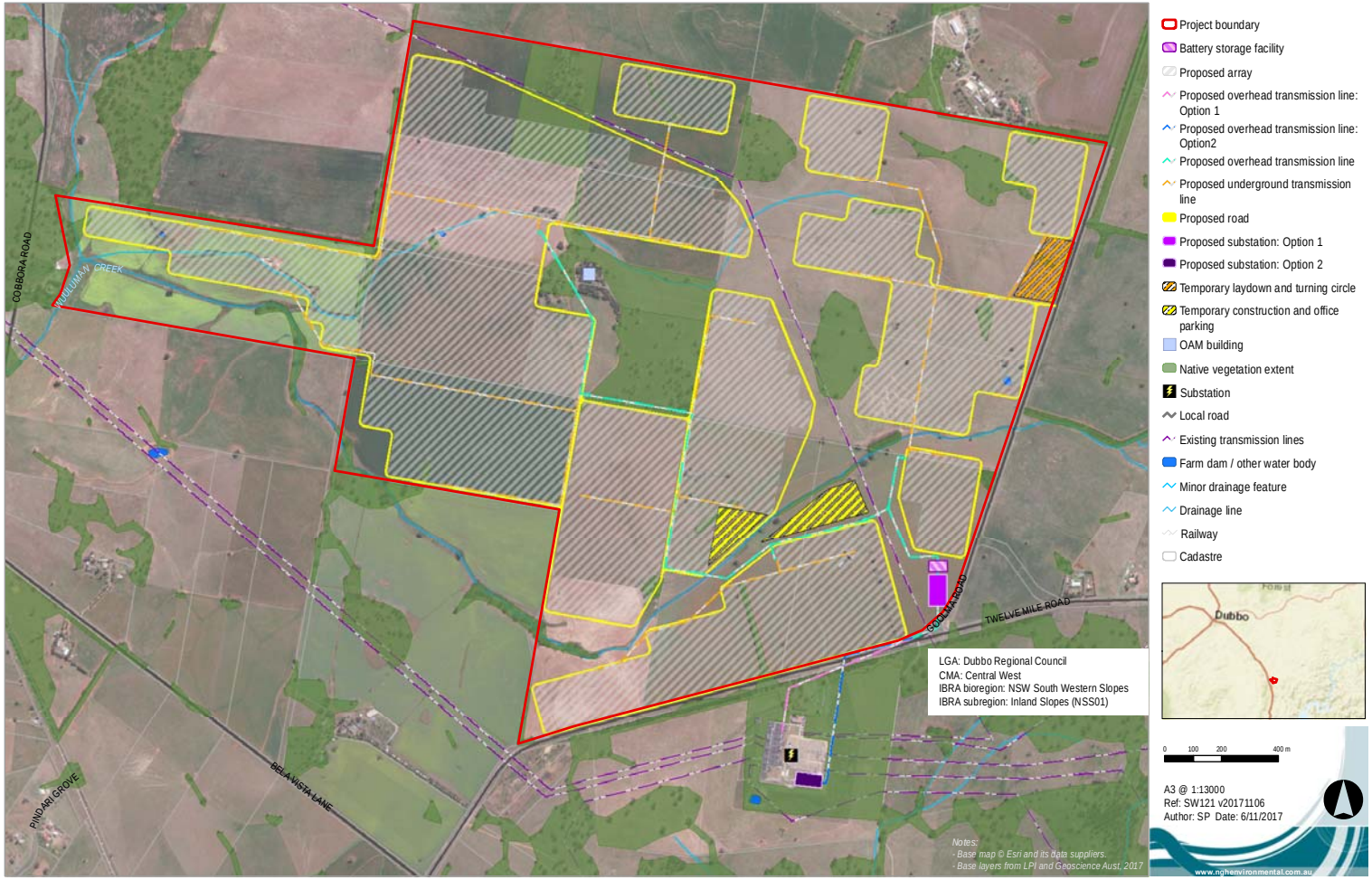

Figure 1-1 Site Map

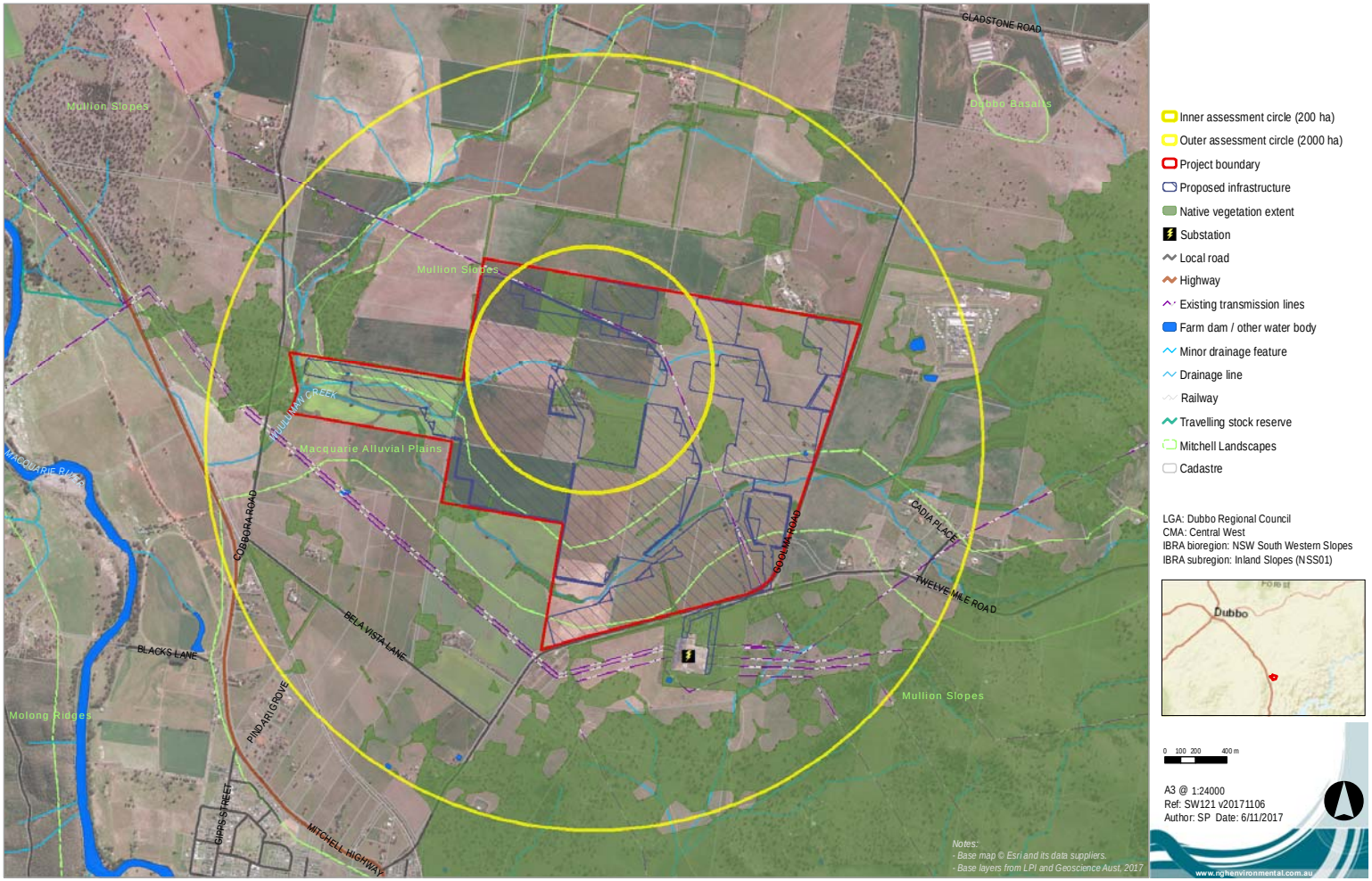

Figure 1-2 Location Map

2 LANDSCAPE FEATURES

2.1 IBRA BIOREGIONS AND SUBREGIONS

Bioregions are large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The proposal is located within NSW South Western Slopes Bioregion and the Inland Slopes Subregion (IBRA v.7 2012). The geology of the region is Ordovician to Early Carboniferous, with typical landforms a mixture of Mountain Ranges, dissected plateaus, hills and ridges and plains. The dominant pre-European vegetation type is considered to be Eucalypt Dry Grassy woodland dominated by Yellow Box (*Eucalyptus melliodora*) and White Box (*Eucalyptus albens*)(ASRIS accessed 15/05/17).

The dominant IBRA subregion affected by the proposal is the Inland Slopes Subregion. This was entered in the BioBanking Credit Calculator (BCC) for the proposal.

2.2 NSW LANDSCAPE REGIONS (MITCHELL LANDSCAPES)

Two Mitchell Landscapes occur within the development site; Mullion Slopes and Macquarie Alluvial Plains (Table 2-1 & Figure 1-1).

- Macquarie Alluvial Plains occurs surrounding Wuuluman Creek through the centre of the development site.
- Mullion Slopes occurs on the rest of the development site, 200m north and south of Wuuluman Creek.

The Mitchell Landscape descriptions (DECC 2002), percentage cleared within the Central West CMA (OEH 2016) and the area of each within the development site are provided in Table 2-1 below.

Table 2-1 Description of the Mitchell Landscape relevant to the proposal (DECC 2002)

Mitchell Landscape (DECC 2002)	Percent cleared in the CMA	Area within development site (ha)
Mullion Slopes		
Steep hills and strike ridges on tightly folded Ordovician andesite, conglomerate and tuff, Silurian rhyolite and shale, Devonian quartz sandstones, slate and minor limestone, general elevation 500 to 830m, local relief 200m. Stony uniform sand and loam in extensive rock outcrop along crests, stony red and brown texture-contrast soil on slopes, yellow harsh texture-contrast soil in valleys with some evidence of salinity. Gravel and sand in streambeds. Open forest to woodland of; White Gum (*Eucalyptus rossii*), Brittle Gum (*Eucalyptus mannifera*), Broad-leaved Peppermint (*Eucalyptus dives*), Red Box (*Eucalyptus polyanthemos*), Mountain Grey Gum (*Eucalyptus cypellocarpa*), White Box (*Eucalyptus albens*) with Yellow Box (*Eucalyptus melliodora*) on lower slopes and River Oak (*Casuarina cunninghamiana*) along the streams.	92%	370ha
Macquarie Alluvial Plains		
Holocene fluvial sediments of backplain facies of the Marra Creek Formation associated with the Macquarie River main alluvial fan and distributary stream system, relief 1 to 3m. Dark yellow-brown silty clay with patches of sand and carbonate nodules deposited from suspended sediments in floodwater, often with gilgai. Slightly elevated areas with red-brown texture-contrast soils. Open grasslands with scattered Coolibah (*Eucalyptus microthec*a), Black Box (*Eucalyptus largiflorens*), River Cooba (*Acacia stenophylla*), Bimble Box (*Eucalyptus populnea*), Belah (*Casuarina cristata*), Lignum (*Muehlenbeckia cunninghamii*) and Myall (*Acacia pendula*).	78%	120ha

The dominant Mitchell Landscape affected by the proposal is Mullion Slopes and this was entered into the BCC for the proposal.

2.3 NATIVE VEGETATION EXTENT

Using GIS, an inner and outer assessment circle with the ratio of 1:10 was established. A 200ha inner assessment circle and 2,000ha outer assessment circle was established over the proposal site and centred over the area of native vegetation that is impacted most by the proposal.

As the natural vegetation that would have occurred at the site was woodland, native vegetation mapping used over-storey as a surrogate for native vegetation cover, and is considered conservative as this would include non-native vegetation that may still provide some habitat value. The local area's native vegetation is derived from woodland and as such, no natural grasslands are relevant to the study area.

The total area of native vegetation mapped within the outer assessment circle is 401.38ha. Refer to

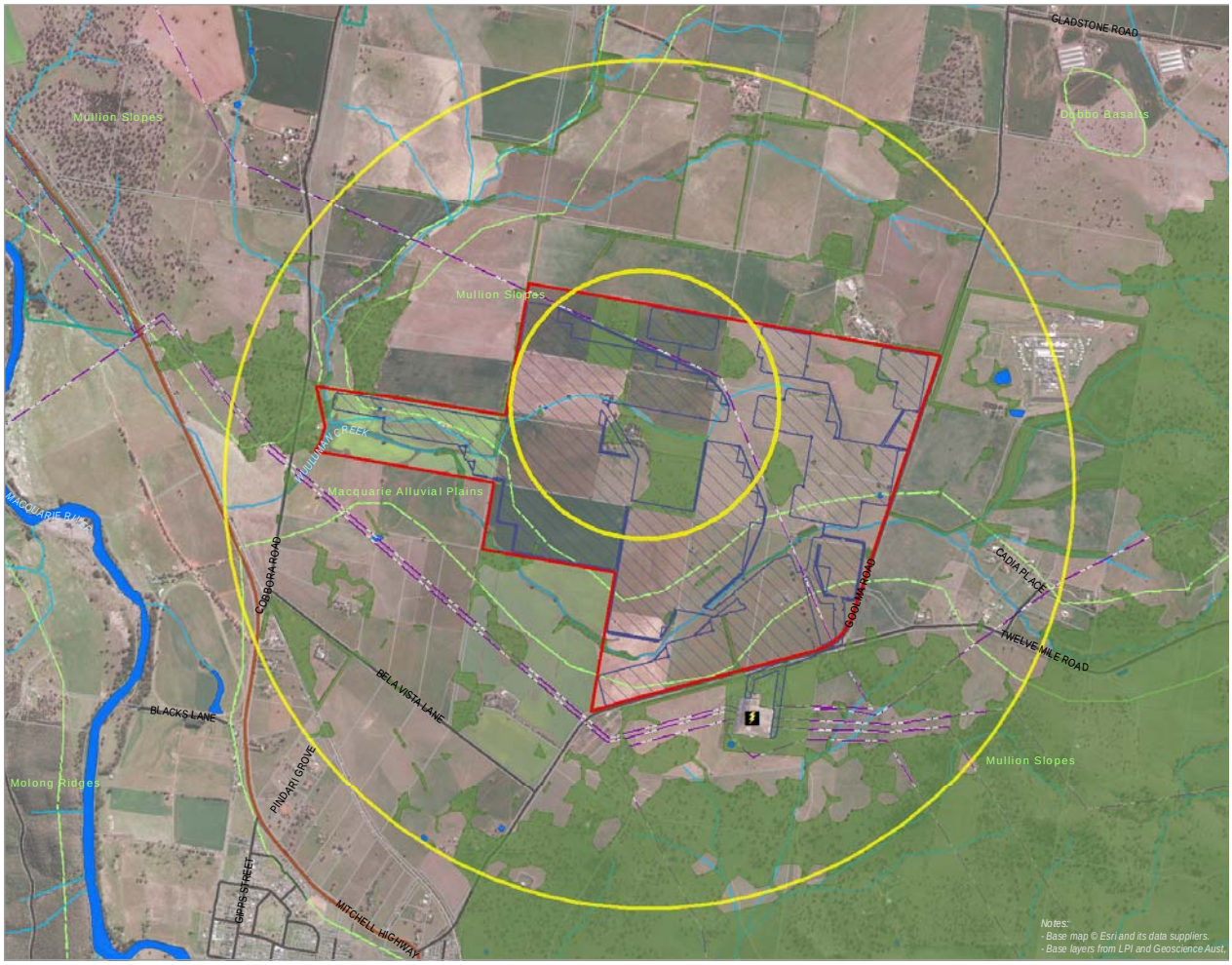

Figure 1-2.

2.4 CLEARED AREAS

Cleared areas in the development site are primarily used for cropping and grazing and provide very little in terms of native fauna habitat. These areas provide suitable foraging habitat for raptors, parrots, cockatoos and macropods, and introduced species such as cats, foxes and rabbits. Approximately 250ha (47%) within the site boundary is cleared (non-native vegetation) land.

2.5 RIVERS AND STREAMS

Two watercourses run through the development site. Wuuluman Creek, a 3rd order stream, runs though the centre of the development site (Figure 2-1). In the east of the development site Wuuluman Creek is a slow flowing shallow creek with steep banks. Streamside vegetation is degraded consisting mostly of exotic grasses grazed by stock and some scattered Boxthorn (**Lycium ferocissimum*). As the creek flows towards the west, river banks become shallow and the water deeper. The stream banks are well vegetated and

consist of plants such as Couch (*Cynodon dactylon*) and Bulrush (*Typha* sp.). Some scattered White Box (*Eucalyptus albens*) occurs along the length of the stream. Under the DPI's Policy and Guidelines for Fish Habitat Conservation and Management, Wuuluman Creek comprises both Class 2 and Class 3 Key Fish Habitat. In the east of the development site, Wuuluman Creek would be classed as Type 3, Minimal Sensitive Key Fish Habitat, with no native aquatic vegetation present. Towards the west of the site, with native aquatic vegetation becoming established the Creek would be classed as Type 2, Moderately Sensitive Key Fish Habitat. The waterway class is defined as Class 3 Minimal Key Fish Habitat, having intermittent flow and semi-permanent pools within the waterway.

An Overland Flow Path traverses east to west in the northern and central areas of the site and joins up with Wuuluman Creek on the western edge of the site. This overland flow path has been man made for stock water supply. This flowpath is a dry gully, flowing only after rain events (Figure 2-2). Vegetation in these gullies is degraded and dominated by exotic grasses that have been grazed by stock.

These watercourses flow into the Macquarie River, approximately 2.5km downstream.

Figure 2-1 Wuuluman Creek in the a) East of the Development Site and b) Centre of the Development Site

Figure 2-2 Overland Flow Path on the a) East of the development site and b) West of the development site

2.6 WETLANDS WITHIN, ADJACENT TO AND DOWNSTREAM OF THE DEVELOPMENT SITE

No wetlands occur within or adjacent to the development site. The closest Nationally Important Wetland downstream from the development site is the Macquarie Marshes, located over 150km downstream.

2.7 STATE OR REGIONALLY SIGNIFICANT BIODIVERSITY LINKS

State significant biodiversity links, regionally significant biodiversity links, very large area biodiversity links, large area biodiversity links or local area biodiversity links are defined in the FBA. To date, no biodiversity corridor plans have been approved by the Chief Executive of the OEH.

No state or regionally significant biodiversity links occur within the development site nor within the inner and outer assessment circles.

2.8 OTHER LANDSCAPE FEATURES REQUIRED BY THE SEARS

No other landscape features were identified within the SEARS as requiring inclusion.

2.9 LANDSCAPE VALUE SCORE COMPONENTS

A BioBanking Credit Calculator (BCC) assessment was completed for this proposal. The proposal ID for the assessment is 144/2017/4350MP Version 2 and the assessment type was selected as 'major project'. This section summarises the values entered into the Landscape values section of the BCC assessment.

2.9.1 Method applied

The proposal conforms to the definition of a *site-based development* according to the FBA; a development other than a linear-shaped development, or a multiple fragmentation impact development. As a result, the site-based landscape assessment methodology has been used in the assessment, in accordance with Appendix 4 of the FBA for major projects. Key information entered into the BCC is detailed below.

2.9.2 Percent native vegetation cover in the landscape

Table 2-2 below details the percent native vegetation cover within the inner and outer assessment circles before and after development, as calculated in a GIS.

Table 2-2 Percent native vegetation cover before and after development

Assessment circle	Percent cover before development	Percent cover after development
Outer (2,000ha)	20.07%	19.47%
Inner (200ha)	17.32%	13.93%

2.9.3 Connectivity value

A connecting link is when native vegetation on the site adjoins native vegetation surrounding the site and the native vegetation:

- is in moderate to good condition, and
- has a patch size >1ha, and
- is separated by a distance of <100m (or <30m for non-woody ecosystems), and
- is not separated by a large water body, dual carriageway, wider highway or similar hostile link.

The moderate to good vegetation on the site is not connected to adjacent vegetation. No connecting links occur at the development site.

State or regional biodiversity links may also occur as defined in the criteria from Table 10 of the FBA. There are no state or regional significant biodiversity links within the outer assessment circle and as such, none would be impacted by the proposal.

The development would not impact on any connecting links or state or regional biodiversity links. A connectivity value class width of 30-100m was entered into the BCC for both before and after development. A projected foliage cover >25% of the lower benchmark was entered for overstorey condition and >50% of the lower benchmark for mid-storey/groundcover condition.

2.9.4 Patch size

The moderate to good vegetation at the site is not connected to adjacent vegetation. As such, the patch sizes entered for each vegetation zone were equal to the areas of each zone. A maximum patch size of 12 was entered into the BCC landscape assessment.

2.9.5 Area to perimeter ratio

As the proposal is a site-based development and not a linear-shaped development or a multiple fragmentation development, the area to perimeter ratio for the proposal is not required to be assessed.

2.9.6 Landscape value score

Entering the data documented above into the BCC returned a landscape value score of 12.80.

3 NATIVE VEGETATION

3.1 PLANT COMMUNITY TYPES

3.1.1 Vegetation communities

Two Plant Community Types (PCT) were identified in the development site;

- White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes (PCT 266).
- Blakely's Red Gum – Yellow Box grassy tall woodland (PCT 277).

Cleared areas that were dominated by non-indigenous vegetation were not considered to provide habitat for threatened species or communities and thus have not been included in the BCC calculations.

White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes (PCT 266)

Within the development site, PCT 266 occurred as:

- 1.81ha of woodland vegetation in moderate to good condition.
- 0.90ha of woodland vegetation in moderate to good condition comprised from a previous tree planting.
- 1.75ha of woodland vegetation in low condition.
- 5.86ha of derived grassland in moderate to good condition.
- 133.59ha of derived grassland in low condition.

The distribution of this vegetation type at the development site is shown on Figure 3-1 and a summary of the key details provided in Table 3-1.

This PCT was determined during the survey on the basis of plot data collected within the development envelope and on surveys conducted in adjacent less disturbed vegetation. Within the woodland vegetation the overstorey is characteristically dominated by White Box (*Eucalyptus albens*) with occasional Kurrajong (*Brachychiton populneus subsp. populneus*). Understory vegetation is comprised of native grasses and herbs such as Cotton Panic Grass (*Digitaria brownii*), Red Grass (*Bothriochloa macra*), Windmill Grass (*Chloris truncata*), Twining Glycine (*Glycine clandestina*) and Oxalis (*Oxalis perennans*). Exotic species present include Perennial Rye Grass (**Lolium perenne*), Brome (**Bromus sp.*), Saffron Thistle (**Carthamus lanatus*), Spear Thistle (**Cirsium vulgare*), Variegated Thistle (**Silybum marianum*), White Clover (**Trifolium repens*) and Hop Clover (**Trifolium campestre*).

A planted tree lot occurred alongside Goolma Road near the substation. This tree lot comprised mature White Box (*Eucalyptus albens*), White Cypress Pine (*Callitris glaucophylla*), Mugga Ironbark (*Eucalyptus sideroxylon*) and Kurrajong (*Brachychiton populneus*) in rows. Understory vegetation is comprised of native grasses such as Spear Grasses (Austrostipa species), Wallaby Grass (*Rytidosperma caespitosum*), Nineawn Grass (*Enneapogon nigricans*) and exotic annual grasses such as Ryegrass (**Lolium sp.)* and Brome (**Bromus catharticus*). Some native shrubs Creeping Saltbush (*Atriplex semibaccata*), Climbing Saltbush (*Einadia nutans*) and Black Rolypoly (*Sclerolaena muricata*) also occur in the understory. This planted tree lot is included as part of the White Box Grassy Woodland Vegetation community as it contains similar

overstorey species, has a native understorey derived from this community and provides similar habitat to the surrounding White Box Grassy Woodland community.

Within the derived grassland in moderate to good condition, the native groundcover is comprised of species such as Red Grass (*Bothriochloa macra*), Nineawn Grass (*Enneapogon* sp.), Yellow Burr-daisy (*Calotis lappulacea*), Spear Grass (*Austrostipa scabra*), Umbrella Grass (*Digitaria divaricatissima*) and Bluebells (*Wahlenbergia luteola*) in greater than 50% cover. Exotic species are common and include Burr Medic (**Medicago polymorpha*), Hop Clover (**Trifolium campestre*), Clustered Clover (**Trifolium glomeratum*), Saffron Thistle (**Carthamus lanatus*) and St Barnaby's Thistle (**Centaurea solstitialis*). The low condition derived grassland consists of similar native grasses and forbs but with less than 50% native species cover and is dominated by exotic species such as Lucerne (**Medicago sativa*), Hop Clover (**T.* campestre) Capeweed (**Arctotheca calendula*), Brome (**Bromus sp.*) and Heliotrope (**Heliotropium* sp.)

A range of other native shrub, grass and forb species were also recorded during the plot surveys. All species recorded, percentage cover and estimated numbers of individuals within each plot is included in Appendix A.

Table 3-1 Summary of White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

White Box Grassy Woodland in the Uppers slopes sub-region of the NSW South Western Slopes Bioregion		
Vegetation formation	Grassy Woodlands	
Vegetation class	Western Slopes Grassy Woodland	
Vegetation type	**Plant Community Type (PCT) ID**	266
	Biometric Vegetation Type ID	CW216
	Common Community Name	White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion
Approximate extent within the development site	186ha (Figure 3-1).	
Condition	Grassy Woodland in Moderate to Good Condition Grassy Woodland in Low Condition Derived Grassland in Moderate to Good Condition Derived Grassland in Low Condition	
Survey Effort	4 BioBanking plots in Grassy Woodland 8 BioBanking plots in Derived Grassland as mapped on Figure 3-9	
Conservation Status	This PCT is listed as an EEC under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the EPBC Act.	
Estimate of percent cleared	95%	

White Box Grassy Woodland in the Uppers slopes sub-region of the NSW South Western Slopes Bioregion	
Threatened plant species habitat	Within the development site, this community provides potential habitat for the Small purple pea (*Swainsona recta*), Silky Swainson-Pea (*S. sericea*) and Bluegrass (*Dichanthium setosum*).
Fauna Habitat	This vegetation community provides numerous habitat types for fauna. Canopy trees provide foraging and nesting/resting habitat for birds and arboreal fauna. Ground cover plants, logs and fallen leaves also provide shelter and foraging habitat for terrestrial fauna. Where hollow-bearing trees are present, they may provide daytime resting habitat for bats and mammals, roosting habitat for birds and potential breeding resources.
Examples	 Figure 3-1 Example of moderate to good condition White Box Grassy woodland in the development site.

Figure 3-2 Example of low condition White Box grassy woodland in the development site.

Figure 3-3 Example of White Box grassy woodland planted vegetation within the development site.

White Box Grassy Woodland in the Uppers slopes sub-region of the NSW South Western Slopes Bioregion

Figure 3-4 Example of moderate to good condition White Box grassy woodland derived grassland in the development site.

Figure 3-5 Example of low condition White Box grassy woodland derived grassland in the development site.

Blakely's Red Gum – Yellow Box grassy tall woodland (PCT 277)

Within the development site, PCT 277 occurred as two small patches (totalling 0.32ha) of low condition woodland vegetation.

The distribution of this vegetation type at the development site is shown on Figure 3-6and a summary of the key details provided in Table 3-2.

This PCT was determined during the survey on the basis of plot data collected within the development site. The overstorey was dominated by Yellow Box (*Eucalyptus melliodora*) with some Fuzzy Box (*Eucalyptus conica*). The groundcover was heavily disturbed having been heavily impacted on by stock. Exotic species such as Soft Brome (**Bromus hordeaceus*), Lucerne (**Medicago sativa*), Rye Grass (**Lolium perenne*) and small flowered Mallow (**Malva parviflora*) dominated the groundcover. Only one native species, Hogweed (*Zaleya galericulata*) was recorded during plot surveys.

All species recorded, percentage cover and estimated numbers of individuals within each plot is included in Appendix A.

Table 3-2 Summary of Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion in the development site.

Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion		
Vegetation formation	Grassy Woodlands	
Vegetation class	Western Slopes Grassy Woodland	
Vegetation type	**Plant Community Type (PCT) ID**	277
	Biometric Vegetation Type ID	CW112
	Common Community Name	Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Approximate extent within the development site	0.32ha	
Condition	Low Condition	
Survey Effort	1 BioBanking plot as mapped on Figure 3-9.	
Conservation Status	This PCT is listed as an EEC under the NSW BC Act and the EPBC Act.	
Estimate of percent cleared	94%	
Threatened plant species habitat	Within the development site, this community does not provide any threatened flora habitat due to the high levels of disturbance and degradation.	
Fauna Habitat	This vegetation community provides numerous habitat types for fauna. Canopy trees provide foraging and nesting/resting habitat for birds and arboreal fauna. Ground cover	

Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	
	plants, logs and fallen leaves also provide shelter and foraging habitat for terrestrial fauna. Where hollow-bearing trees are present, they may provide daytime resting habitat for bats and mammals, roosting habitat for birds and potential breeding resources. A Masked Owl (listed as Vulnerable under the BC Act) was observed in a hollow-bearing tree in this vegetation zone.
Examples	 Figure 3-6 Example of low condition Blakely's Red Gum – Yellow Box grassy tall woodland in the development site.

Cleared areas (exotic dominated and cropped land)

Disturbed and modified vegetation occupies approximately 250ha of the development site with a prevalence of exotic or planted exotic flora species that make up the groundcover (Figure 3-7). Within the proposed array area, the groundcover is mainly comprised of the crop species Lucerne (**Medicago sativa*) with various other common agricultural weeds. As this vegetation was either cleared or had virtually no native component in any strata, then in accordance with the FBA, this vegetation is not considered to be native vegetation and as such, does not need to be assessed further.

Scattered planted tree lots were also present within the development area. These tree lots were mostly comprised of non-endemic species such as Chinaberry tree (*Melia azedarach*) or Shining Gum (*Eucalyptus nitens*) (Figure 3-8). These planted areas had no other native components in the mid-storey or groundcover and were not representative of any naturally occurring PCT. As these trees also did not provided threatened species habitat they were not assessed further in the BAR.

Figure 3-7 An example of exotic-dominated (cropped) vegetation within the development site.

Figure 3-8 Planted non-indigenous vegetation within the development site.

3.1.2 Endangered Ecological Communities

Both PCTs occurring within the development site form part of the **White Box – Yellow Box – Blakely's Red Gum Woodland EEC** listed under the NSW BC Act.

This vegetation community is also listed under the Commonwealth EPBC Act as **White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands**, a Critically Endangered Ecological community (CEEC). One patch of White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion meets the condition threshold for the EPBC listed community. This patch occurs on the hillslope at Biometric Plot WSFP6 (Figure 3-9). This patch had a predominantly native understory with more than 12 native understory species (excluding grasses) and contains important species. The majority of this patch has been avoided by the development.

The remaining patches of White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion and Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion within the development site do not meet the criteria for the EPBC listed community due to less than 12 native understory species (excluding grasses) occurring in the groundlayer and less than 20 mature trees per hectare with no natural regeneration.

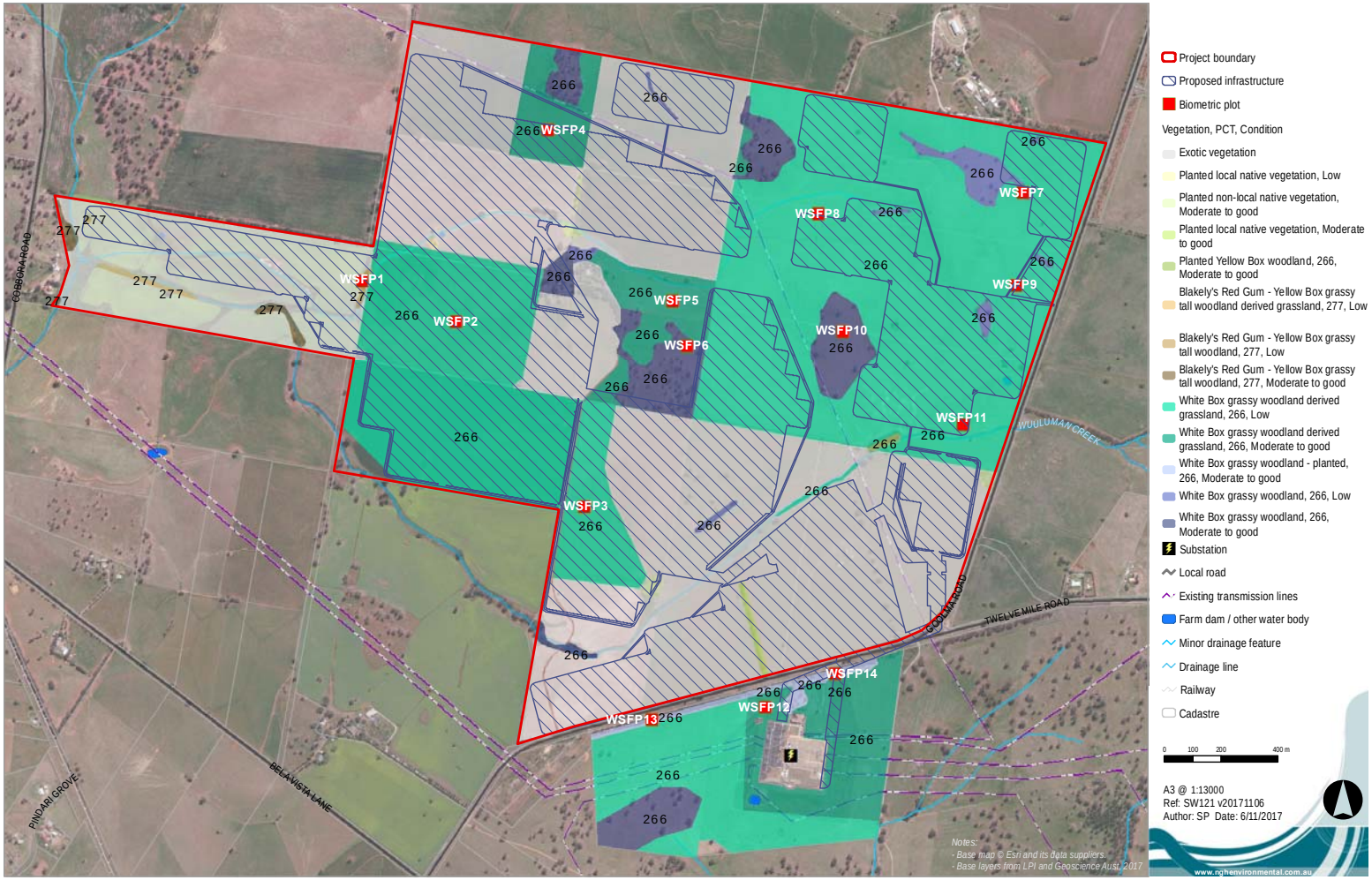

Figure 3-9 PCTs and survey locations within the development site.

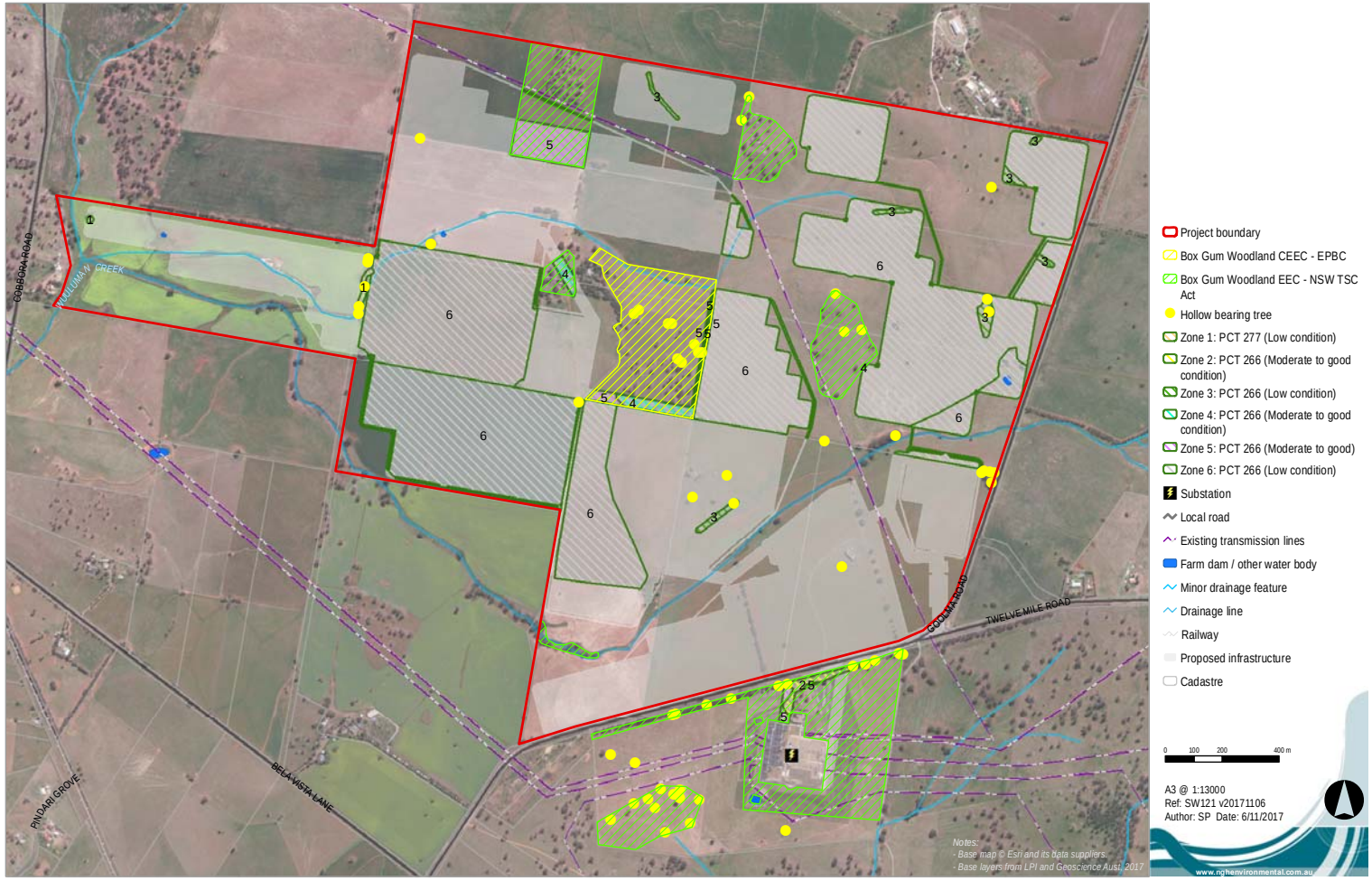

Figure 3-10 Vegetation Zones within the development site.

3.1.3 Vegetation zones in the BCC

The vegetation zones that would be impacted by the proposal, as entered into the BCC, their condition class, number of BioBanking plots undertaken within them and their current site value score, as determined by the BCC, are listed in Table 3-3 below.

Table 3-3 Vegetation zones for the development site

Zone ID	Vegetation zones	Condition class	Area (ha) within development site	Survey effort (number of plots)	Site value score (current)
1.	PCT #277 BVT CW112 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Low	0.32	1	14.00
2.	PCT #266 BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion	Moderate/Good Other (Planted Vegetation)	0.90	2	34.67
3.	PCT #266 BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion	Low	1.75	1	8.67
4.	PCT #266 BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion	Moderate – good	1.81	3	36.67
5.	PCT #266 BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion	Derived Grassland – Moderate to Good	5.86	3	23.33
6.	PCT #266 BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion	[1]Derived Grassland - Low	133.59	5	10.67
Total			**144.22**	**15**	

[1] As the BCC cannot have two zones of the same PCT in the same condition, this zone had to be entered into the calculator as 'moderate to good – poor'. Being moderate to good, the area of this zone required 6 plots where only 5 should have been required for a low condition zone. An additional plot was entered into the BCC which was the average of the 5 actual plots to overcome this limitation.

3.1.4 Site values (plot data entered into the BCC)

The following plot data was collected in May 2017 for vegetation zones 1- 6 (Table 3-4).

Table 3-4 Plot data for all zone (collected May 2017)

Zone 1: PCT #277 - BVT CW112 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF1	3	7	0	0	0	6	88	2	0	3	682869	6401109	55

Zone 2: PCT #266- BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. Moderate/Good_Other (Planted Vegetation)

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF13	17	33	0	22	0	0	64	1	0	15	683893	6399554	55
WSF14	20	21	0	36	2	14	28	0	0	2	684531	6399722	55

Zone 3: PCT #266-BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. Low Condition

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF7	3	0	0	2	0	2	80	0	0	0	685195	6401412	55

Zone 4: PCT #266-BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. Moderate to Good Condition

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF6	26	4.5	0	70	0	2	26	1	0	5	684007	6400855	55
WSF10	8	5	0	2	0	2	84	1	0	12	684570	6400926	55

WSF15	5	12.5	0	0	0	0	94	1	0	14	683971	6399286	55

Zone 5: PCT #266-BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. Derived Grassland Moderate to Good Condition

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF4	17	0	0	30	0	6	62	0	0	0	683514	6401632	55
WSF5	11	0	0	70	0	0	30	0	0	0	683976	6401037	55
WSF12	21	6	0	50	0	2	44	0	0	0	684287	6399601	55

Zone 6: PCT #266-BVT CW216 White Box Grassy Woodland in the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. Derived Grassland Low Condition

Plot name	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Overstorey regeneration	Total length of fallen logs	Easting	Northing	Zone
WSF2	11	0	0	30	0	0	70	0	0	0	683203	6400966	55
WSF3	14	0	0	8	0	10	82	0	0	0	683647	6400306	55
WSF8	5	0	0	34	0	0	68	0	0	0	684465	6401345	55
WSF9	4	0	0	18	0	6	76	0	0	0	685169	6401086	55
WSF11	7	0	0	16	0	6	78	0	0	0	684983	6400595	55

4 THREATENED SPECIES

4.1 GEOGRAPHIC/HABITAT FEATURES

Five geographic/habitat features for species credit species were generated by the BCC. These features and whether they would be impacted by the proposal is shown in Table 4-1 below.

Table 4-1 Geographic / habitat features.

Impact	Common name	Scientific name	Feature
No	Large-eared Pied Bat	*Chalinolobus dwyeri*	Land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels
No	Brush-tailed Rock Wallaby	*Petrogale penicillata*	Land within 1km of rock outcrops or clifflines
Yes	Small Purple Pea	*Swainsona recta*	Land containing a forb-rich grassy groundlayer
Yes	Booroolong Frog	*Litoria booroolongensis*	Land within 100m of stream or creek banks
No	Pink-tailed Legless Lizard	*Aprasia parapulchella*	Land containing surface rocks (embedded or loose)
No	Zieria obcordata	*Zieria obcordata*	Land containing granite boulders on rocky outcrops

4.2 ECOSYSTEM CREDIT SPECIES

The following species are all species predicted by the BCC to occur, based on the data entered for the landscape assessment and vegetation zones in the assessment. These constitute all species which will generate ecosystem credits in the credit calculations.

Table 4-2 Ecosystem credit species predicted to occur.

Common name	Scientific name	TS offset multiplier
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis subsp. gularis*	1.3
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus subsp. victoriae*	2.0
Bush Stone-curlew	*Burhinus grallarius*	2.6
Corben's Long-eared Bat	*Nyctophilus corbeni*	2.1
Diamond Firetail	*Stagonopleura guttata*	1.3
Flame Robin	*Petroica phoenicea*	1.3
Gang-gang Cockatoo	*Callocephalon fimbriatum*	2.0
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	1.8
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis subsp. temporalis*	1.3

Common name	Scientific name	TS offset multiplier
Hooded Robin (south-eastern form)	*Melanodryas cucullata subsp. cucullata*	1.7
Little Eagle	*Hieraaetus morphnoides*	1.4
Little Lorikeet	*Glossopsitta pusilla*	1.8
Masked Owl	*Tyto novaehollandiae*	3.0
Painted Honeyeater	*Grantiella picta*	1.3
Powerful Owl	*Ninox strenua*	3.0
Scarlet Robin	*Petroica boodang*	1.3
Speckled Warbler	*Chthonicola sagittata*	2.6
Spotted Harrier	*Circus assimilis*	1.4
Spotted-tailed Quoll	*Dasyurus maculatus*	2.6
Square-tailed Kite	*Lophoictinia isura*	1.4
Swift Parrot	*Lathamus discolor*	1.3
Turquoise Parrot	*Neophema pulchella*	1.8
Varied Sittella	*Daphoenositta chrysoptera*	1.3
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	2.2

4.3 SPECIES CREDIT SPECIES PRESENT

4.3.1 Candidate species

The following species were returned by the BCC as requiring survey. Table 4-3 summarises whether each species was detected during surveys and if they are expected to be impacted by the proposal and therefore are required to be offset. Details regarding the targeted surveys undertaken are provided below.

Table 4-3 Threatened species requiring survey

Common name	Scientific name	Surveys	Present/presumed present	Affected by the proposal
Ausfeld's Wattle	*Acacia ausfeldii*	Conspicuous species targeted during all flora surveys	Absent	Unlikely – Not detected during targeted surveys
Bluegrass	*Dichanthium setosum*	Targeted transect surveys in suitable habitat	Absent	Unlikely - Not detected during targeted surveys
Booroolong frog	*Litoria booroolongensis*	No	Absent	Unlikely – No suitable habitat present
Brush-tailed Phascogale	*Phascogale tapoatafa*	2 Nights of Nocturnal Surveys	Absent	Unlikely – No suitable habitat present

Common name	Scientific name	Surveys	Present/presumed present	Affected by the proposal
Eastern Pygmy Possum	*Cercartetus nanus*	2 Nights of Nocturnal Surveys	Absent	Unlikely – No suitable habitat present and not detected during surveys
Euphrasia arguta	*Euphrasia arguta*	Targeted transect surveys in suitable habitat	Absent	Unlikely – No suitable habitat present
Koala	*Phascolarctos cinereus*	2 Nights nocturnal Surveys + Searches around trees for scratches or scats	Absent	Unlikely - Not detected during targeted surveys
Narrow Goodenia	*Goodenia macbarronii*	No longer a threatened species	Absent	Unlikely – Not detected during surveys
Prasophyllum sp wybong	*Prasophyllum sp. wybong*	No – Survey timing not appropriate	Absent	Unlikely – No suitable habitat present
Regent Honeyeater	*Anthochaera phrygia*	Six 20minute bird surveys conducted over 2 days	Presumed present	Yes – Not detected during surveys but presumed to occur from time to time, impacts to foraging habitat only
Scant Pomaderris	*Pomaderris queenslandica*	Conspicuous species targeted during all flora surveys	Absent	Unlikely – No suitable moist woodland habitat present and not detected during surveys
Silky Swainsona Pea	*Swainsona sericea*	Targeted transect surveys in suitable habitat	Absent	Unlikely – Not detected during targeted surveys
Small Purple-Pea	*Swainsona recta*	Targeted transect surveys in suitable habitat	Absent	Unlikely – Not detected during targeted surveys
Squirrel Glider	*Petaurus norfolcensis*	2 nights nocturnal surveys	Absent	Unlikely – Not detected during targeted surveys
Tylophora linearis	*Tylophora linearis*	Targeted transect surveys in suitable habitat	Absent	Unlikely – No suitable habitat and not detected during targeted surveys

4.3.2 Species identified in SEARs

One threatened fauna species was identified in the Secretary's Environmental Assessment Requirements for the project as requiring additional consideration under section 9.2 of the FBA. This species, the Regent Honeyeater (*Anthochaera phrygia*) was incorporated into the survey design for the proposal and is assessed further in Chapter 10 of this report.

4.3.3 Targeted survey methodologies

Comprehensive and targeted survey methods and results are included below. The following section sets out the surveys undertaken that underpin the knowledge of the development site. This information is used in the BCC assessment and particularly, to support the decisions regarding candidate species that would be affected by the proposal. Section 6.2.2 also addresses this issue.

Flora and fauna field surveys were undertaken from the 8th to 10th May 2017. Further targeted surveys were undertaken on the 4th October 2017.

The aims of the targeted surveys were as follows:

1. Assess the availability and extent of flora and fauna habitat, particularly threatened species habitat, such as hollow-bearing trees.
2. Conduct searches for threatened flora and fauna species predicted to occur in the proposal area.

Fauna habitat assessment

An assessment of habitat types available and their quality and suitability as threatened species habitat was conducted across the development site. Factors such as arboreal resources, ground-layer resources, vegetation structure, connectivity and disturbance were noted.

A number of trees occurring within the development site were considered to be potentially hollow-bearing. An assessment was undertaken of all accessible trees within the development site to record the species, presence of hollows, tree height, diameter and the number, size and location of hollows. Photographs were taken of each tree surveyed. The hollow-bearing tree data is presented in Appendix B.

Waterbodies and ephemeral waterways were assessed for their fauna habitat potential and their likely utilisation by candidate species within the locality.

Incidental sightings of fauna and their traces (e.g. scats, tracks, scratches) made while present on the site were also recorded.

Approximately 20 hours were spent assessing fauna habitat within the development site.

An opportunistic record of fauna species observed during the fauna assessments was taken (Appendix A).

Diurnal birds including Regent Honeyeater

Six bird monitoring plots were undertaken within the development site using the area search method. These consisted of 20 minute searches within a 2ha area in the early morning over two days. Area searches were conducted in areas of remnant woodland. One full day of opportunistic searches also occurred in areas of suitable habitat.

Nocturnal birds

Numerous trees containing hollows of a suitable size for nesting were identified within the project area. Two nights of nocturnal spotlighting surveys and call playback were undertaken within woodland areas and areas containing hollow-bearing trees (refer Figure 4-1).

Koala

The dominant overstorey species in the small woodland areas is White Box (*Eucalyptus albens*). White Box is listed as a secondary food tree species for the Koala in the Central and Southern Tablelands (OEH, 2016). Surveys of the woodland areas were undertaken for the Koala by actively searching each of the trees for

scratchings and scats. Two nights of nocturnal spotlighting surveys were also undertaken within the woodland areas containing hollow bearing trees (refer Figure 3-10). One Bionet record for the Koala occurred within 10km of the project in the town of Wellington.

Squirrel Glider, Brush-tailed Phascogale and Eastern Pygmy Possum

Numerous trees containing hollows of a suitable size for nesting were identified within the project area. Two nights of nocturnal spotlighting surveys and call playback were undertaken within the woodland areas (refer Figure 3-10). No records of these species exist within 10km of the development site. The nearest recorded sighting for the Brush-tailed Phascogale is over 200km away.

Threatened Bats

Two ANABAT recorders were placed in woodland areas as shown in Figure 3-10 over a period of two nights.

Ausfeld's Wattle, Scant Pomaderris

Suitable habitat for these species could occur in areas of woodland vegetation. Surveys were undertaken for these species in woodland areas. Within the woodland area, midstory species were sparse and any shrubs would have been easily detected. Surveys were undertaken within the appropriate detection period for these species between the 8th and 10th of May 2017 and 4 October 2017.

Bluegrass

Surveys were undertaken for these species within areas of native grassland, roadsides and woodland areas. Surveys for this species was undertaken within an appropriate detection period between the 8th and 10th of May 2017.

Silky Swainson-Pea, Small Purple Pea, *Tylophora linearis, Euphrasia arguta, Prasophyllum* sp. Wybong

Targeted surveys were undertaken for these species on the 4th October 2016 by an ecologist from NGH environmental. This is within the optimal detection period for these species as recommended by the OEH Biobanking calculator. Areas of suitable habitat were surveyed using the parallel field traverse survey technique in accordance with the NSW Guide to Surveying Threatened Plants (OEH, 2016). Parallel field traverses were 10 metres apart in areas of open woodland and derived native grassland. Approximately 4 hours were spent surveying for these species.

4.3.4 Previous surveys conducted in the local area

It is unclear whether dedicated biodiversity surveys have been undertaken within the locality, however evidence from the NSW Bionet Search and Atlas of Living Australia indicated that previous occasional opportunistic surveys have been undertaken.

One threatened bird, the Little Eagle (*Hieraaetus morphnoides*) listed as vulnerable, has been recorded opposite the TransGrid substation on Goolma Road in 2003. This species is predicted to occur in this assessment as an ecosystem credit species (refer Table 4-2).

4.3.5 Survey results

118 flora and 23 fauna species were recorded throughout the site surveys. The results of these surveys are provided in Appendix A.

A total of 60 hollow-bearing trees were identified during surveys of the proposal area. 17 of these trees occur within the development site and would be impacted on by the proposal. The main species detected were White Box (*Eucalyptus albens*) with some Blakely's Red Gum (*Eucalyptus blakelyi*), Mugga Ironbark (*Eucalyptus sideroxylon*) and Yellow Box (*Eucalyptus melliodora*). The majority of these contain small and medium hollows located on limbs and on the trunk.

One threatened species, a Masked Owl (*Tyto novaehollandiae*) was observed during spotlighting surveys on a branch of a large Yellow Box (*E. melliodora*) tree. This tree contained two large hollows (greater than 20cm) in the trunk of the tree. The Masked Owl is listed as vulnerable under the NSW BC Act. It is a dual credit species being an ecosystem credit species predicted to occur in this assessment and also a species credit species where breeding habitat is impacted. Breeding habitat is defined in the OEH BioNet Threatened Biodiversity Database (BTBD) as; *Living or dead trees with hollows greater than 20cm diameter*. As such this species has been included as a candidate species and is included in the discussion of targeted survey results below.

A Nyctophilus species was detected through the ANABAT recordings on the 9th of May 2017 however the calls for Nyctophilus can not be distinguished between species. One threatened Bat – Corbens Long Eared Bat (*Nyctophilus corbeni*) could potentially occur within the proposal site. This species is highly mobile and may move over distances of 10km or more.

Masked Owl

As stated above, a single Masked Owl was recorded during spotlighting surveys. Although habitat is present on site that meets the breeding habitat constraint for this species, it is considered unlikely that the Masked Owl would use these habitat features given the context in which theses habitat features occur.

The Masked Owl is a large forest owl, it prefers uncleared or lightly cleared areas with high densities of old hollow-bearing trees (DEC 2006). Studies of woodland fragments on privately-owned and unprotected lands in south-eastern New South Wales showed that virtually all records of the Masked Owl were associated with extensively forested areas or occurred within one kilometre of the boundary of these areas (Kavanagh and Stanton, 2002). The development site is highly cleared and fragmented with the nearest densely forested area over two kilometres to the south-west. As such, the development site is unlikely to be preferred habitat for this species. Further, breeding usually occurs in close proximity to foraging areas. Common Ringtail Possum, Greater Glider and the Sugar Glider are important prey species for large forest owls (Kavanagh and Stanton, 2002), none of which were recorded at the development site during nocturnal surveys. The development site is therefore unlikely to provide foraging habitat for the Masked Owl. The NSW Recovery Plan for large forest owls (DEC 2006) states that the Masked Owl requires old hollow eucalypts with hollows greater than 40cm wide and greater than 100cm deep for nesting. None of the hollows within the development site are greater than 40cm wide and none are likely to be 100cm deep. Based on the above it is considered unlikely that the Masked Owl would utilise the hollows within the development site for nesting. It is likely that the individual observed was resting within the development site while travelling through. As such, no breeding resources would be impacted by the proposal and species credits are not considered to be generated for this species.

Regent Honeyeater

The Regent Honeyeater was not detected during surveys. White Box is a key foraging species for the Regent Honey Eater (OEH, 2016), however the White Box was not in flower during the time of the surveys. The regent Honeyeater is nomadic over large distances and unlikely to be detected if food sources are scarce

in the area at the time of surveys. There are records of the species in the Wellington area and as such it is assumed to occur on the site from time to time when foraging resources are present.

The BTBD clarifies the Regent Honeyeater is a species credit species only in mapped important areas. Mapped Important areas have been requested from OEH, but as yet have not been received. The BTBD indicates the mapped areas align with breeding habitat. The Regent Honeyeater has three key breeding areas in NSW; the Capertee Valley, Bundarra-Barraba region and the Lower Hunter (OEH 2017). The development site is not near any of the known key breeding areas. It is therefore assumed that the development site is unlikely to be a mapped important area and that species credits are not generated for this species.

Koala

No Koala's or signs of Koala's were detected during the targeted surveys of the small woodland areas within the development site. As such, the area is not considered to currently support a Koala population and it would not comprise *Core Koala Habitat* under SEPP44. As White Box is a feed species under Schedule 2 of SEPP44 and it comprises more than 15% of the total number of trees in the tree component, the area is defined as *Potential Koala Habitat* under SEPP44. The White Box Woodlands within the proposal area are sparsely vegetated, fragmented and lack connectivity to vegetation within the surrounding landscape. It is considered unlikely that the White Box trees would be utilised by the Koala on a regular basis and the development site is not considered to provide habitat for this species.

Squirrel Glider, Brush-tailed Phascogale and Eastern Pygmy Possum

The Squirrel Glider, Brush-tailed Phascogale and Eastern Pygmy Possum were not detected during nocturnal surveys. No records of these species occur within 10km of the development site. The woodland vegetation within the proposal area supports hollow-bearing trees that could provide breeding habitat for these species. However, there are no flowering shrubs in the understory that would provide a food source for these species. The White Box Woodlands within the proposal area are sparsely vegetated, fragmented and lack connectivity to vegetation within the surrounding landscape. It is considered unlikely that the White Box trees would be utilised by these species and the development site is not considered to provide habitat for these species.

Booroolong Frog

The Booroolong Frog inhabits rocky permanent streams with some fringing vegetation cover and requires exposed rocks and rock crevices for breeding near and within shallow pools. No rocky permanent streams occurred within the development site and there is little to no fringing vegetation. Wuuluman Creek which runs through the development site is degraded from grazing and has no rocks or crevices present within the stream that would provide breeding habitat for this species. As no suitable habitat is present within the proposal area, it is not considered to occur within the development site**.**

Ausfeld's Wattle

Ausfeld's Wattle (*Acacia ausfeldii*) was not detected during the surveys. It is a conspicuous shrub 2-4m tall. Very few understory shrubs were detected within the development site. It is considered unlikely that the species would have been overlooked if present and as such it is not considered to occur at the development site

Bluegrass

Bluegrass (*Dichanthium setosum*) is an upright grass up to 1m tall. Appropriate survey timing was not specified in the BCC. This species flowers mostly in summer (OEH 2017) which is generally the optimal survey timing for this species however, the OEH BioNet Threatened Biodiversity Database specifies a survey period of December through May. Further, a known population 20km from the development site was observed flowering at the time of the May 2017 surveys. This species was not detected within the development site during the targeted surveys. A similar but common species, Queensland Bluegrass (*Dichanthium sericeum*) was detected surrounding the TransGrid substation.

Euphrasia arguta

Euphrasia arguta is an erect annual herb up to 35cm tall. This species is semi-parasitic and it is found in Eucalypt forests with a mixed grass and shrub understory. The nearest known current population of this species is in Nundle, over 300km north east of the development site. Suitable habitat for this species could occur within the woodland habitat. Surveys for this species was undertaken within the optimal survey time in October. This species was not detected during the targeted surveys and as such is not considered to occur within the development site.

Prasophyllum sp. Wybong.

Prasophyllum sp. Wybong is a terrestrial perennial orchid up to 30cm tall. It occurs in open eucalypt woodlands and grasslands. This species is semi-parasitic and it is found in Eucalypt forests with a mixed grass and shrub understory. Suitable habitat for this species could occur within the woodland habitat. The nearest known population of this species is near Denman, approximately 170km east of the development site. Surveys for this species was undertaken within the optimal survey time in October. This species was not detected during the targeted surveys and as such is not considered to occur within the development site.

Scant Pomaderris

Scant Pomaderris (*Pomaderris queenslandica*) is a medium shrub 2-3 metres tall, found in moist eucalypt forests or sheltered woodlands with a shrubby understory (OEH, 2017). Woodlands within the development were open with very few shrubs in the understory. No moist eucalypt forests or sheltered woodland were present within the study area. It is considered unlikely that the species would have been overlooked if present and as such it is not considered to occur at the development site

Silky Swainson-Pea and Small Purple Pea

Silky Swainson-Pea (*Swainsona sericea*) is a prostrate or erect perennial up to 10cm tall (OEH, 2016). It is found in Box Gum Woodland in the Southern Tablelands and the South West Slopes. Small Purple Pea (*Swainsona recta*) is an erect perennial herb growing to 30cm tall. It occurs in the grassy understory of woodland and open forests (OEH, 2017). Suitable habitat exists for these species within the areas of White Box grassy woodland with a native understory. Surveys for these species were undertaken within the optimal survey time. These species were not detected during the targeted surveys and as such are not considered to occur within the development site.

Tylophora linearis

Tylophora linearis is a small twiner that flowers between September and May (OEH, 2017). It grows in dry woodlands. Appropriate survey timing was not specified in the BCC. This species flowers mostly in spring (OEH 2017) which is generally the optimal survey timing for this species however, the OEH BioNet

Threatened Biodiversity Database specifies all months as being appropriate for survey. This species was not detected during the targeted spring surveys of White Box grassy woodland with a native understory and as such, it is not considered to occur at the development site**.**

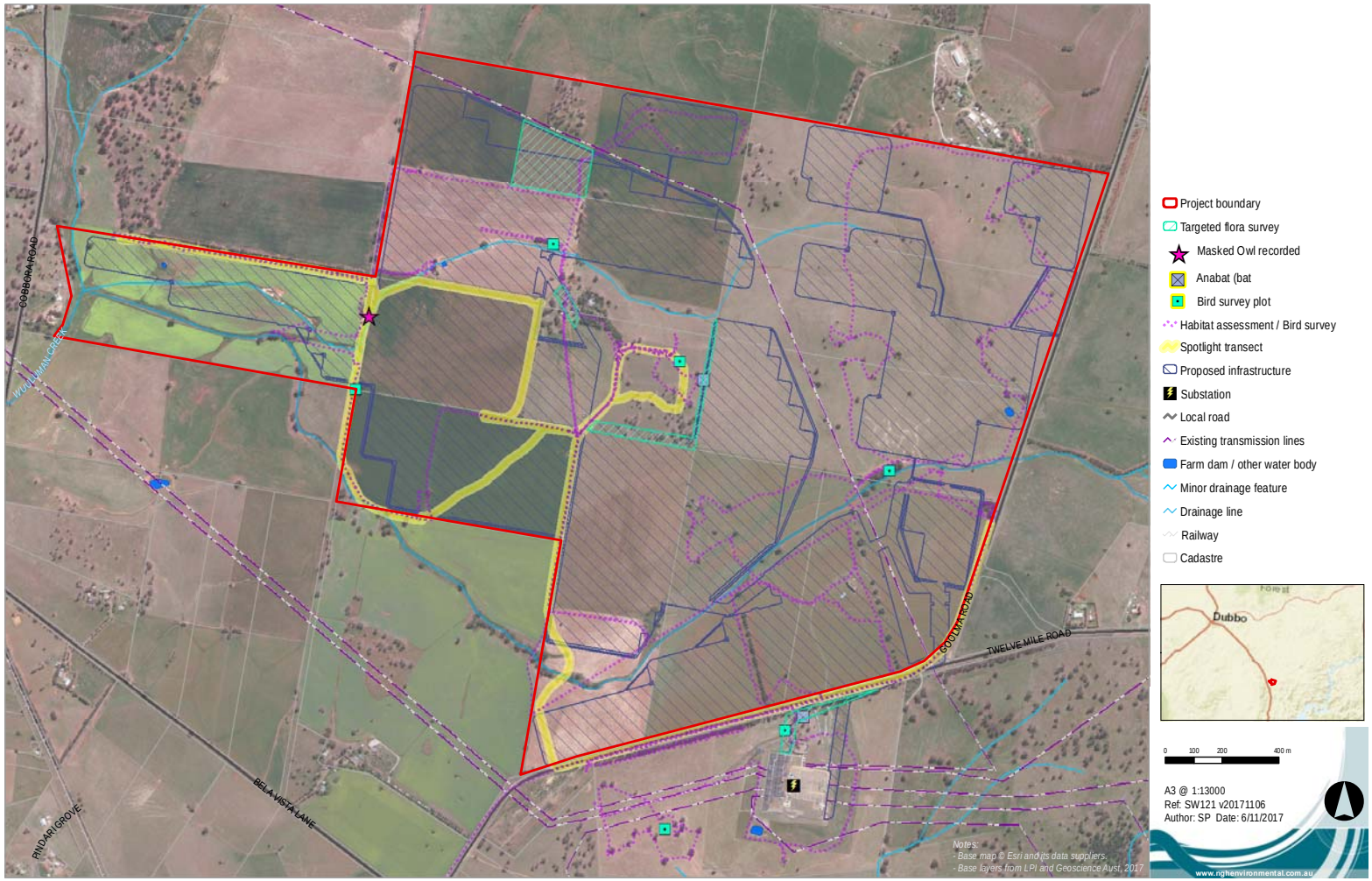

Figure 4-1 Fauna survey effort and results

Weather conditions during the field surveys

Weather conditions during the surveys were fine with mild night time and warm daytime temperatures. There was no rain. Table 4-4 lists the weather conditions as recorded at Wellington over the survey period.

Table 4-4 Weather conditions during the field surveys, recorded at Wellington.

Date	Temperature min (°C)	Temperature max (°C)	Rain (mm)	Wind speed @ 9am (km/h)
08/05/17	0.6	19.6	0.6	Not available
09/05/17	4.2	22.1	0	Not available
10/05/17	4.4	21.1	0	Not available
04/10/17	Not available	Not available	Not available	Not available

4.3.6 Summary of species credit species

In summary, applying the above information to the BCC assessment, the following data was entered into the BCC.

Common name	Scientific name	Impacted by development?	ID method	Loss (ha)	Survey date
Ausfeld's Wattle	*Acacia ausfeldii*	No	Survey	0.00	08/05/17
Blue Grass	*Dichanthium setosum*	No	Survey	0.00	08/05/17
Booroolong Frog	*Litoria booroolongensis*	No		0.00	
Brush-tailed Phascogale	*Phascogale tapoatafa*	No	Survey	0.00	08/05/17
Eastern Pygmy Possum	*Cercartetus nanus*	No	Survey	0.00	08/05/17
Euphrasia arguta	*Euphrasia arguta*	No		0.00	
Koala	*Phascolarctos cinereus*	No	Survey	0.00	08/05/17
Narrow Goodenia	*Goodenia macbarronii*	No		0.00	
Prasophyllum sp. Wybong	*Prasophyllum* sp. Wybong	No		0.00	
Regent Honeyeater	*Anthochaera Phrygia*	No		0.00	
Scant Pomaderris	*Pomaderris queenslandica*	No	Survey	0.00	08/05/17
Silky Swainson-Pea	*Swainsona sericea*	No	Survey	50.00	04/10/17

Common name	Scientific name	Impacted by development?	ID method	Loss (ha)	Survey date
Small Purple Pea	*Swainsona recta*	No	Survey	50.00	04/10/17
Squirrel Glider	*Petaurus norfolcensis*	No	Survey	0.00	08/05/17
Tylophora linearis	*Tylophora linearis*	No	Survey	0.00	08/05/17

5 EPBC MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

An EPBC protected matters report was undertaken on the 6th April 2017 (10km buffer of the development site) to identify Matters of National Environmental Significance (MNES) that have the potential to occur within the development site (refer to Appendix C). Relevant to Biodiversity these include:

- Wetlands of International Importance
- Threatened Ecological Communities
- Threatened species
- Migratory species

The potential for these MNES to occur at the site are discussed below.

5.1 WETLANDS OF INTERNATIONAL IMPORTANCE

Four wetlands of international importance were returned from the protected matters report. The nearest of these (within 200km of the development site) is the Macquarie Marshes. All other wetlands returned from the search are over 500km away. The Macquarie Marshes occurs approximately 150km north west of the development site. It is fed by the Macquarie River. There is no apparent connectivity between the development site and the Macquarie River.

5.2 THREATENED ECOLOGICAL COMMUNITIES

Two threatened ecological communities were returned from the protected matters report. One of these, the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland occurs on the development site. One 9ha patch of this community occurs on the hill slope in the centre of the development site where more than 12 native forb species and important species are present in the understory. This patch meets the condition threshold for listing under the EPBC Act. The majority of this patch has been avoided by the proposal.

5.3 THREATENED SPECIES

Nine threatened birds, six mammals, two reptiles and four fish were returned from the protected matters report. Of these, six species were considered to have the potential to utilise the habitats within the development site:

- Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered EPBC Act
- Swift Parrot (*Lathamus discolor*) – Critically Endangered EPBC Act
- Superb Parrot (*Polytelis swainsonii*) – Vulnerable EPBC Act
- Koala (*Phascolarctos cinereus*) – Vulnerable EPBC Act
- Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable EPBC Act
- Small Purple Pea (*Swainsona recta*) – Endangered EPBC Act.

Surveys have demonstrated that the Koala and Small Purple-pea are unlikely to occur at the development site. The remaining species are assessed further in section 10.1.4

5.4 MIGRATORY SPECIES

Twelve listed migratory species were returned from the protected matters report. A habitat assessment was conducted for these species (Table 5-1). Two of these species could occur on the site on occasion. – the Fork-tailed Swift, White-throated Needletail. However, as these species are almost exclusively aerial (DoE, 2015) impacts to these species are considered unlikely.

Table 5-1 Habitat assessment for migratory species

Name	Scientific Name	Habitat Present	Impact
Fork-tailed Swift	*Apus pacificus*	Present	Unlikely – almost exclusively aerial species.
White-throated Needletail	*Hirundapus caudacutus*	Present	Unlikely – almost exclusively aerial species
Yellow Wagtail	*Motacilla flava*	Absent – No wetlands, mangroves or dense vegetation within the development site.	Unlikely – No suitable habitat
Satin Flycatcher	*Myiagra cyanoleuca*	Absent – No wet forests within development site	Unlikely – No suitable habitat
Rufous Fantail	*Rhipidura rufifrons*	Absent – No wet forests/mangroves within development site	Unlikely – No suitable habitat
Common Sandpiper	*Actitis hypoleucos*	Absent – No wetlands or mudflats within development site	Unlikely – No suitable habitat
Sharp-tailed Sandpiper	*Calidris acuminate*	Absent -No wetlands or mudflats within development site	Unlikely – No suitable habitat
Pectoral Sandpiper	*Calidris melanotos*	Absent – No mudflats within development site	Unlikely – No suitable habitat
Curlew Sandpiper	*Calidris ferruginea*	Absent – No mudflats within development site	Unlikely – No suitable habitat
Latham's Snipe	*Gallinago hardwickii*	Absent – No wetlands within development site	Unlikely – No suitable habitat
Eastern Curlew	*Numenius madagascariensis*	Absent – No mudflats within development site	Unlikely – No suitable habitat

6 SUMMARY OF BIODIVERSITY VALUES

6.1 AREAS NOT REQUIRING ASSESSMENT

Areas without native vegetation or aquatic features do not need to be assessed further. Within the development site, these include treeless paddock areas with an understory of exotic agricultural crop species or previously disturbed sites that have been colonised by exotic species with little to no native component. The total area of land within the development site not requiring further assessment is approximately 250ha.

6.2 AREAS NOT REQUIRING AN OFFSET

6.2.1 Impacts on native vegetation

Offsets are not required where the proposal would impact on PCTs that:

a) Have a site value score of <17; or
b) Are not identified as a Critically Endangered Ecological Community (CEEC) or EEC

Impacts are also not required for PCTs that are not associated with threatened species habitat and are not identified as CEECs/EECs.

Three zones had site value scores of less than 17. These were:

- PCT277 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes bioregion in Low condition (Site value score 14.00)
- PCT266 White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Low Condition Derived Grassland (Site value score 10.67)
- PCT266 White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes in low condition. (Site value score 8.67)

As such, these three zones do not require offsetting.

6.2.2 Impacts on species and populations

Offsets are not required where the proposal:

a) Impacts on non-threatened species and populations that do not form part of a CEEC or EEC
b) Impacts on threatened species habitat associated with a PCT within a vegetation zone with a site value score of <17

As for native vegetation, the habitat provided by the zones listed in Section 6.2.1 do not require an offset as the site value scores are <17.

Species credit species

As discussed in Section 4.3.5, the following species credit species are considered unlikely to occur within the habitats within the development site:

- Ausfeld's Wattle
- Bluegrass

- Booroolong Frog
- Brush-tailed Phascogale
- Eastern Pygmy Possum
- Euphrasia arguta
- Koala
- Narrow Goodenia
- Prasophyllum sp. Wybong
- Scant Pomaderris
- Squirrel Glider
- Silky Swainson-Pea
- Small Purple Pea
- Tylophora linearis

Impacts to these species are unlikely and offsets are not required.

Hollow-bearing trees

Seventeen hollow-bearing trees would be removed within the development site (Figure 3-10). Hollows potentially provide roosting habitat for some species of microbats, parrots, owls and arboreal mammals. Hollow-dependant fauna species are likely to be impacted due to the proposal. However, the majority of the hollow-bearing trees will remain on site and still provide fauna habitat. Mitigation measures have been recommended to address the clearing risks to resident species (Section 5).

The number of hollows to be impacted is assessed within the BCC, via the plot data collected for each vegetation zone. This data adds to the value of the habitat to be removed, thereby requiring a greater number of credits to be retired. No specific requirement to offset hollows has been identified.

6.3 AREAS REQUIRING FURTHER IMPACT ASSESSMENT

Further assessment is required where the proposal would impact on any native vegetation that:

a) is identified as a CEEC that is specifically nominated in the SEARs for the major project as a CEEC for which an impact does not require further consideration;
b) is identified as an EEC that has a site value score ≥17, unless it is an EEC that is specifically nominated in the SEARs for the proposal as an EEC for which an impact requires further consideration; or
c) is associated with threatened species habitat and in a vegetation zone that has a site value score ≥17.

Further assessment is also required where the proposal would impact on:

a) Any critically endangered species;
b) A threatened species or population that was not specifically nominated in the SEARs as a species or population for which an impact requires further consideration; or
c) Threatened species habitat associated with a PCT in a vegetation zone with a site value score of ≥17.

These impact areas are shown in Figure 6-1 and are assessed further in the sections below

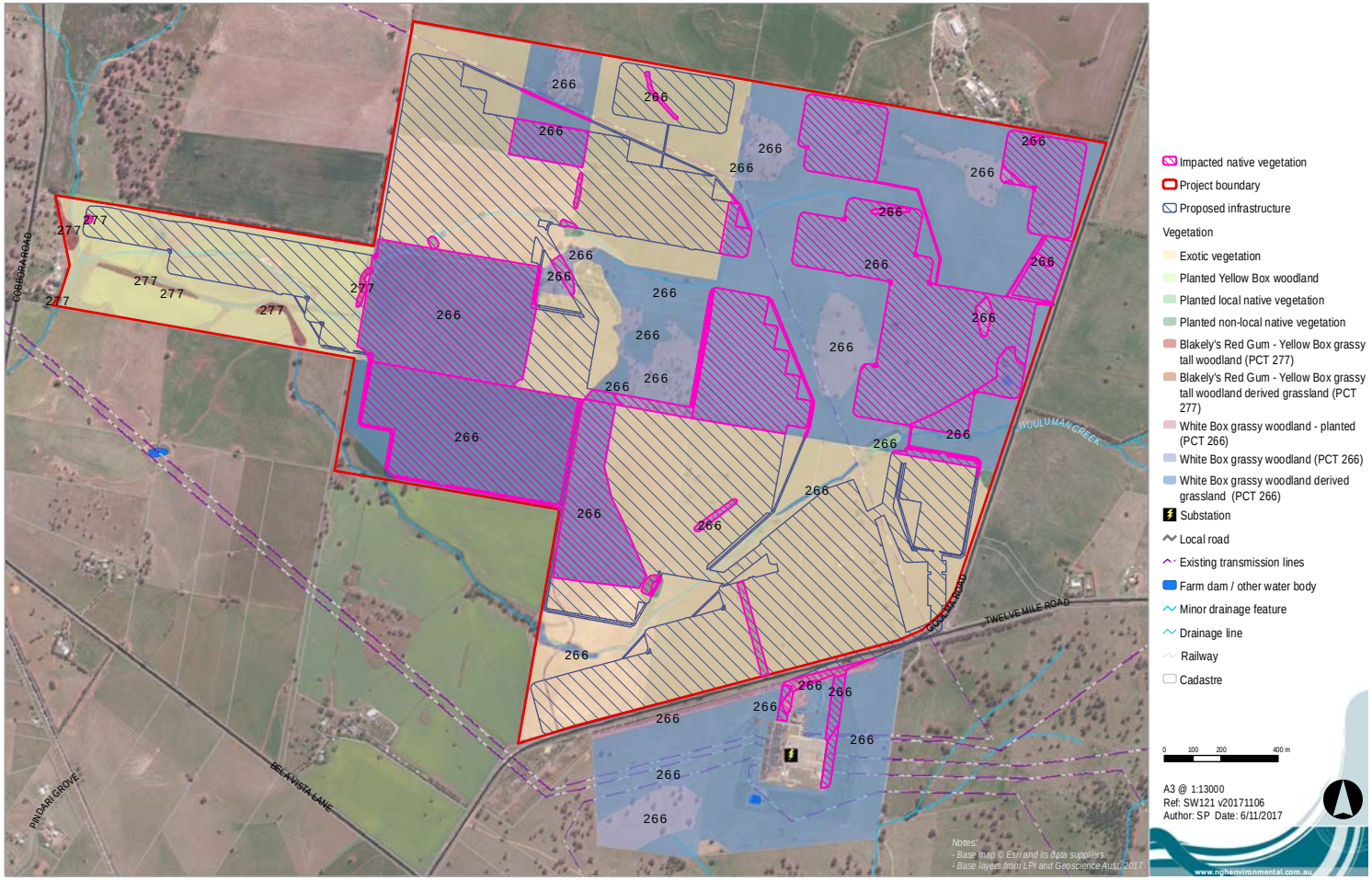

Figure 6-1 Areas requiring further impact assessment

7 IMPACT ASSESSMENT

7.1 AVOIDANCE OF IMPACTS

7.1.1 Site selection and planning phase

A preliminary constraints analysis was conducted by NGH Environmental (2017) which informed the site layout design. Vegetation constituting the highest ecological constraints such as forming components of EECs and providing threatened flora and fauna habitat were avoided as far as practical. Key changes to the proposal design included the avoidance of areas of White Box grassy woodland in moderate to good condition, streams and rocky outcrops.

7.2 DIRECT AND INDIRECT IMPACTS UNABLE TO BE AVOIDED

The construction and operational phases of the proposal has the potential to impact biodiversity values at the site that cannot be avoided. This would occur through direct impacts such as habitat clearance and installation and existence of infrastructure. In assessing the impacts of the proposal, it is noted that the solar array panels will modify not remove vegetation through shading, however for the purpose of this assessment, 100% vegetation removal within the solar arrays has been assumed.

Indirect impacts could also occur, and include soil and water contamination, creation of barriers to fauna movement, or the generation of excessive dust, light or noise. Table 7-1 below details the type, frequency, intensity, duration and consequence of the direct and indirect impacts of the proposal.

Table 7-1 Potential impacts to biodiversity during the construction and operational phases

Impact	Frequency	Intensity	Duration	Consequence
Direct impacts				
Habitat clearance for permanent and temporary construction facilities (e.g. solar infrastructure, transmission lines, compound sites, stockpile sites, access tracks)	Regular	High	Construction phase	• Direct loss of native flora and fauna habitat including hollow-bearing trees • Injury and mortality to fauna during clearing of fauna habitat • Introduction and spread of noxious weeds and pathogens • Disturbance to fallen timber, dead wood and bush rock
Impacts to Wuuluman Creek and Riparian Vegetation.	Rare	Moderate	Construction Phase	• Loss of Riparian Vegetation • Bed and Bank Erosion
Shading by solar array infrastructure	Constant	Moderate	Operational phase	• Potential loss of groundcover resulting in unstable ground surfaces and sedimentation of adjacent waterways
Existence of permanent solar infrastructure	Constant	Moderate	Operational phase	• Collision risk to birds and microbats (fencing, array infrastructure)

Impact	Frequency	Intensity	Duration	Consequence
Indirect impacts				
Accidental spills and contamination from construction activities (including compound sites)	Rare	Moderate	Construction phase	• Pollution of soils and dams
Earthworks	Regular	Moderate	Construction phase	• Erosion and sedimentation and/or pollution of soils, dams and downstream habitats
Noise	Regular	Low	Construction phase	• Construction machinery and activities may disturb local fauna
Dust generation	Regular	Low	Construction phase	• Inhibit the function of plant species and communities, soils and dams
Light spills during night works	Rare	Low	Construction phase	• May alter fauna activities and/or movements
Light spill during operation	Regular	Low	Operational phase	
Introduction/ encouragement of feral pests, weeds or pathogens	Regular	Moderate	Construction phase	• Feral pest, weed and/or pathogen encroachment
Increased Vehicle Traffic	Regular	Low	Operational phase	• Increase potential for fauna mortality through vehicle strike
Mobilisation of sediments	Irregular	Moderate	Operational phase	• Sedimentation of adjacent waterways (Wuuluman Creek)

7.3 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. At least 61 per cent of the native vegetation in NSW has been cleared or highly modified since European settlement (NSW Scientific Committee 2001), and the removal of native vegetation for this proposal is contributing to this process.

Cumulative impacts are considered best addressed by avoiding and minimising. 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.

8 MITIGATION MEASURES PROPOSED

8.1.1 Construction phase

A range of mitigation measures will be implemented to ensure that impacts on biodiversity during the construction phase are avoided where possible, and minimised where they cannot be avoided. The mitigation measures that would be employed during the construction phase are provided in Table 8-1. Mitigation measures have considered methods of clearing, clearing operations, timing of construction and other measures that would minimise impacts of the proposal on biodiversity values.

8.1.2 Operational phase

Maintaining vegetation beneath the panels will be important to arrest erosion that would occur if bare areas develop. It is a commitment of the proposal to prepare a ground cover management plan.

Visual screening is part of the project description and is understood that some sections of the site's periphery would be planted with small trees or shrubs. This represents an opportunity to provide additional habitat as part of the project, if suitable native species are selected.

Where practical, measures to avoid other impacts on biodiversity during operation have been identified, including potential enhancement of habitat. These mitigation measures are provided in Table 8-1.

Table 8-1 Mitigation measures proposed to avoid and minimise direct and indirect impacts of the proposal

Impact	Direct, indirect, cumulative	Consequence	Measures to be implemented	Timing	Outcome
Removal or degradation of threatened and/or migratory species habitat	• Direct	• Impacts to hollow dependant fauna	• Hollow-bearing trees within the development site would not be cleared between June and January, to avoid the breeding season of Superb Parrot and Corben's Long-eared Bat and the core hibernation period for Corben's Long-eared Bat. • If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure these species do not occur.	Construction phase	Impacts to threatened hollow dependent species are minimised
Habitat clearance	• Direct	• Direct loss of native flora and fauna habitat	• Preparation of a Flora and Fauna Management Plan (FFMP) that would incorporate protocols for: o Protection of native vegetation to be retained o Best practice removal and disposal of vegetation o Staged removal of hollow-bearing trees and other habitat features such as fallen logs with attendance by an ecologist o Weed management o Unexpected threatened species finds o Rehabilitation of disturbed areas The FFMP would form part of the Wellington Solar Farm Construction Environmental Management Plan (CEMP).	Pre-construction phase Construction phase	Minimise the impacts of habitat removal on native flora and fauna

Impact	Direct, indirect, cumulative	Consequence	Measures to be implemented	Timing	Outcome
	• Direct	• Potential over clearing and/or damage of habitat outside of the development site.	• Stockpiling materials and equipment and parking vehicles will be avoided within the dripline (extent of foliage cover) of any native tree. • Prior to the commencement of work, a physical vegetation clearing boundary at the approved clearing limit is to be clearly demarcated and implemented. The delineation of such a boundary may include the use of temporary fencing, flagging tape, parawebbing or similar.	Construction phase	Prevention of over-clearing.
	• Direct	• Potential over clearing of Wuuluman Creek and Riparian Vegetation.	• A riparian buffer zone of 10-50m along Wuuluman Creek should be clearly delineated prior to works commencing. Works should be avoided within the riparian buffer zone. • Existing native riparian vegetation is retained to the greatest extent possible in an undamaged and unaltered condition. • Works occurring around the Wuuluman Creek should be in accordance with the DPI Fisheries Policy and Guideline document *Policies and Guidelines for Fish Habitat Conservation and Management.*	Construction Phase	Prevention of loss of Riparian Vegetation.
Shading by solar array infrastructure	• Direct	• Potential loss of groundcover resulting in unstable ground surfaces and sedimentation of adjacent waterways.	• A groundcover management plan would be developed and implemented to ensure an appropriate perennial ground cover is established and maintained beneath the arrays during operation of the solar farm. This will require consideration of existing	Construction phase	Prevent/minimise erosion and sedimentation of waterways and sensitive adjacent habitat.

Impact	Direct, indirect, cumulative	Consequence	Measures to be implemented	Timing	Outcome
			groundcover and may require expert input and trials to achieve the objective.		
Appropriate landscaping	• Direct	• Increase the quality of habitat for native flora and fauna species.	• Where possible, landscape plantings will be comprised of local indigenous species with the objective of increasing the diversity of the existing vegetation. Planting locations would be designed to improve the connectivity between patches in the landscape where consistent with landscaping outcomes.	Operational phase	Increase/improve native species diversity and connectivity.
Accidental spills and contamination from construction activities (including compound sites)	• Indirect	• Pollution of soils and dams.	• Carry out refuelling of plant and equipment, chemical storage and decanting off site or at least 50m away from farm dams in impervious bunds. • Ensure that dry and wet spill kits are readily available.	Construction phase	Prevent/minimise pollution of ephemeral waterways and dams, and sensitive adjacent habitat.
Earthworks	• Indirect	• Erosion and sedimentation and/or pollution of soils, dams and downstream habitats.	• An Erosion and Sediment Control Plan would be prepared in conjunction with the final design and implemented.	Construction phase	Prevent/minimise erosion and sedimentation of ephemeral waterways and dams, and sensitive adjacent habitat.
Noise	• Indirect	• Construction machinery and activities may disturb local fauna.	• The Construction Environmental Management Plan will include measures to avoid noise encroachment on adjacent habitats such as avoiding night works as much as possible.	Construction phase	Prevent/minimise noise impacts and disturbance to adjacent fauna.

Impact	Direct, indirect, cumulative	Consequence	Measures to be implemented	Timing	Outcome
Dust generation	• Indirect	• Inhibit the function of plant species and communities, soils and dams.	• The Construction Environmental Management Plan will include measures to prevent dust spreading to nearby habitats.	Construction phase	Prevent dust inhibiting the function of plant species and communities, ephemeral waterways and dams.
Light spills during night works	• Indirect	• May alter fauna activities and/or movements.	• Avoid night works. • Direct Lights away from vegetation.	Construction/Operational Phase	Minimise impacts to fauna movements and activity.
Introduction/ encouragement of feral pests, weeds or pathogens	• Indirect	• Feral pest, weed and/or pathogen encroachment.	• Weed, hygiene and pest management protocols will be prepared and implemented as part of the Flora and Fauna Management Plan for the proposal.	Operational Phase	Minimise invasion of pest species.
Increased Vehicle Traffic	• Indirect	• Increase potential for fauna mortality through vehicle strike.	• Awareness training during site inductions regarding enforcing site speed limits. • Site speed limits to be enforced.	Operational Phase	Minimise fauna strikes.
Mobilisation of sediments	• Indirect	• Sedimentation of adjacent waterways (Wuuluman Creek).	• An Erosion and Sediment Control Plan would be prepared in conjunction with the final design and implemented.	Construction Phase	Prevent sedimentation and impacts to adjacent waterways.

9 REQUIREMENT TO OFFSET

9.1 PCTS AND SPECIES POLYGONS REQUIRING AN OFFSET

9.1.1 Impacts on native vegetation

Offsets are required where the proposal would impact on any native vegetation that:

d) is identified as a CEEC that is specifically nominated in the SEARs for the Major Project as a CEEC for which an impact does not require further consideration;
e) is identified as an EEC that has a site value score ≥17, unless it is an EEC that is specifically nominated in the SEARs for the proposal as an EEC for which an impact requires further consideration; or
f) is associated with threatened species habitat and in a vegetation zone that has a site value score ≥17.

The proposal would have a direct impact on three vegetation zones that are identified as an EEC with a site value >17. These vegetation zones area summarised is Table 9-1

Table 9-1 Extent of vegetation communities within the development site and their impact areas

PCT	Threatened Ecological Community (BC Act or EPBC Act)?	PCT Id	Biometric vegetation condition	Site value score	Extent of vegetation (ha) impacted in development site
PCT #266 BVT CW216 White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Yes	266	Moderate – good (other)	34.67	0.85
PCT #266 BVT CW216 White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Yes	266	Moderate - good	36.67	1.81
PCT #266 BVT CW216 White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Yes	266	Moderate - good (Derived Grassland)	23.33	4.46
Total Vegetation	-	-	-		**7.12**

9.1.2 Impacts on species and populations

Offsets are required where the proposal would impact on:

d) Any critically endangered species;
e) A threatened species or population that was not specifically nominated in the SEARs as a species or population for which an impact requires further consideration; or
f) Threatened species habitat associated with a PCT in a vegetation zone with a site value score of ≥17.

Ecosystem credit species

The BCC found that 24 threatened ecosystem credit fauna species were predicted to occur within the White Box grassy woodland PCT and thus require offsets, including:

Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis subsp. gularis*
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus subsp. victoriae*
Bush Stone-curlew	*Burhinus grallarius*
Corben's Long-eared Bat	*Nyctophilus corbeni*
Diamond Firetail	*Stagonopleura guttata*
Flame Robin	*Petroica phoenicea*
Gang-gang Cockatoo	*Callocephalon fimbriatum*
Glossy Black-Cockatoo	*Calyptorhynchus lathami*
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis subsp. temporalis*
Hooded Robin (south-eastern form)	*Melanodryas cucullata subsp. cucullata*
Little Eagle	*Hieraaetus morphnoides*
Little Lorikeet	*Glossopsitta pusilla*
Masked Owl	*Tyto novaehollandiae*
Painted Honeyeater	*Grantiella picta*
Powerful Owl	*Ninox strenua*
Scarlet Robin	*Petroica boodang*
Speckled Warbler	*Chthonicola sagittata*
Spotted Harrier	*Circus assimilis*
Spotted-tailed Quoll	*Dasyurus maculatus*
Square-tailed Kite	*Lophoictinia isura*
Swift Parrot	*Lathamus discolor*
Turquoise Parrot	*Neophema pulchella*
Varied Sittella	*Daphoenositta chrysoptera*
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*

The offsets for these species are incorporated in the ecosystem credits for White Box Grassy Woodland (PCT 266).

Species credit species

No species credit species would be impacted by the proposal and as such no species credit species require offsets.

10 IMPACTS REQUIRING FURTHER CONSIDERATION

10.1.1 Impacts on landscape features

Impacts reducing width of riparian buffer of important rivers, streams and estuaries

Further consideration is required where the proposal would impact on areas of native vegetation within:

a) 20 m either side of a 4th and 5th order stream;
b) 50 m either side of a 6th order stream;
c) 50 m around an estuarine area.

No 4th, 5th or 6th order streams, or estuarine areas will be impacted by the proposal. Impacts on important wetlands

Further consideration is required where the proposal would impact on an important wetland and/or its buffer distance of 50m. Important wetlands are those identified as SEPP 14 Coastal wetlands or those listed in the Directory of Important Wetlands of Australia (DIWA). The Macquarie Marshes occurs approximately 150km north west of the development site. It is fed by the Macquarie River of which Wuuluman Creek is a tributary. Given the distance from the development site, the potential for the proposal to indirectly impact on this wetland is low. Further, mitigation measures have been recommended in Section 6 to ensure that the potential for the mobilisation of sediments and pollutants is minimised.

The proposal would not impact on any important wetlands, nor on the buffer area of any important wetland, therefore further consideration is not required.

Impacts on species movements along corridors

No state significant biodiversity links as defined by the FBA are known to occur within the development site, therefore the proposal does not trigger the requirement for further consideration to impacts on species movement along corridors.

10.1.2 Impacts on native vegetation

Further consideration is required where there will be impacts to native vegetation that are likely to cause the extinction of an EEC/CEEC from an IBRA subregion or significantly reduce its viability unless the EEC is specifically excluded by the SEARs. White Box Yellow Box Blakely's Red Gum Grassy Woodland was identified in the SEARS as being specifically excluded from requiring further consideration.

10.1.3 Impacts on threatened species

Further consideration is required where the proposal would impact:

a) Any critically endangered species;
b) A threatened species or population that is specifically nominated in the SEARS as a species or population that is likely to become extinct or have its viability significantly reduced in the IBRA subregion if it is impacted on by the development; or
c) A threatened species that has not previously been recorded in the IBRA subregion according to records in the NSW Wildlife Atlas.

One critically endangered species the Regent Honeyeater was nominated for further consideration by the SEARs. In accordance with section 9.2.5.2 the following information is provided to assess the nature of impacts to this species.

Size of the local Population

The Regent Honeyeater is highly mobile and comprises a single population across South East Australia. The total population size is estimated at 350-400 mature individuals. (Commonwealth of Australia, 2016). No sightings of this species have been recorded within the study area. The nearest recorded sighting of the Regent Honeyeater occurs approximately 10km south of the development site from 1996 (OEH Atlas Data, 2017). A further 14 records have been identified near Lake Burrendong, 20km south of the development site from the 1970's to late 1990s indicating a population may have frequented this area in the past. The nearest currently listed critical breeding habitat for the Regent Honeyeater occurs in the Mudgee district approximately 56km west of the development site.

The likely impact that the development will have on the local population

The Regent Honeyeater inhabits Box-Ironbark Eucalypt Woodlands and Dry Sclerophyll Forest (Commonwealth of Australia, 2016). It is a canopy bird, reliant on large flowering mature eucalypts and mistletoes as a food source. The majority of the 315ha development site is cleared of trees but some patches of remnant woodland remain. These are comprised of mature White Box (*Eucalyptus albens*) and the occasional Yellow Box (*Eucalyptus melliodora*). It is proposed 17 mature hollow-bearing trees would be removed in the development site. The majority of these trees are scattered paddock trees that would provide minimal foraging habitat for the Regent Honeyeater. Larger patches of remnant White Box Woodland have been avoided by the development and these woodlands could still be utilised by the Regent Honeyeater for foraging when flowering.

The likely impact on the ecology of the local population

There are three known key breeding areas in NSW where the Regent Honeyeater is regularly recorded; the Capertee Valley, Bundarra-Barraba region and the Lower Hunter (OEH 2017). The Regent Honeyeater nests in the canopy of mature trees with rough bark. The development site is not within a known breeding area and as such, the proposal would be unlikely to impact on the breeding cycle of the Regent Honeyeater.

The Regent Honeyeater forages on flowering eucalypts and mistletoes and moves to areas with large abundance of nectar. White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*) and Mugga Ironbark (*Eucalyptus sideroxylon*) are some of the key foraging species for the Regent Honeyeater and these Eucalypt species are found within the development site. Some of these mature eucalypts would be removed through the proposal, however these trees are highly fragmented and do not provide an abundant food source. Larger remnant woodland patches have been largely avoided and would still provide a foraging source for the Regent Honeyeater should this species occur in the area.

The Regent Honeyeater roosts communally in small groups in mature trees with dense foliage (Commonwealth of Australia, 2016). Habitat fragmentation has reduced the areas that Regent Honeyeater will roost or forage in due to the colonisation of aggressive honeyeaters such as the Noisy Miner. Noisy Miners and other honeyeaters were present within the development site. The trees that are to be removed are highly fragmented from previous clearing and mostly scattered paddock trees. These areas are unlikely to provide suitable roosting habitat for the Regent Honeyeater.

The Regent Honeyeater moves across the landscape to areas with high nectar resources. Some paddock trees would be removed that would reduce the nectar source although this reduction is relatively small.

Small areas of remnant eucalypt woodland would remain that would still provide a resource for the Regent Honeyeater should it occur in the area.

The extent to which the local populations will become fragmented or isolated as a result of the proposed development

The Regent Honeyeater is nomadic and can undertake large scale movements of up to hundreds of kilometres (OEH, 2016). Due to their highly mobile nature the proposed development would unlikely fragment the population. The development site is a mainly cleared agricultural environment and it is unlikely to be providing a corridor for fauna movement. More connected woodland occurs south of the proposal site which would allow for fauna movement in an east west direction across the landscape.

The relationship of the local population to other populations of the species

The Regent Honeyeater is highly mobile and comprises a single population within South East Australia with exchange of individuals between regularly used areas. The proposal would not fragment the population or create a barrier to movement across its population extent. Thus, the proposal would be unlikely to impact on breeding, dispersal and genetic viability of the local population.

The extent to which the proposed development will lead to an increase in threats and indirect impacts that may in turn lead to a decrease in the viability of the local population.

Threats that impact on the survival of the Regent Honeyeater have been defined in the National Recovery Plan for the Regent Honeyeater (Commonwealth of Australia, 2016). These are listed as; a small population size, habitat loss and fragmentation, habitat degradation and increased competition from other nectivorous birds. The proposal would have a minor contribution to habitat loss and fragmentation considering the existing highly cleared and fragmented landscape.

The measures proposed to contribute to the recovery of the species in the IBRA subregion

The National Recovery Plan for the Regent Honeyeater proposes four strategies to contribute to the recovery of the Regent Honeyeater. These are to:

- Improve the extent and quality of Regent Honeyeater habitat
- Bolster the wild population with captive-bred birds until the wild population becomes self-sustaining
- Increase understanding of the size, structure, trajectory and viability of the wild population
- Maintain and increase community awareness, understanding and involvement in the recovery program

Offsets that are required for the proposal would contribute to improving the extent and quality of Regent Honeyeater habitat.

10.1.4 Impacts to EPBC Listed Species

Koala

Although not recorded during targeted surveys, the EPBC Referral Guidelines for the Koala (DoE 2014) documents the 'Koala habitat assessment tool' to assist proponents in determining if a proposal may impact on habitat critical to the survival of the Koala. The tool is provided as Table 10-1 below as it applies to the proposal. Impact areas that score five or more using the habitat assessment tool contain habitat critical to the survival of the Koala. The assessment in Table 10-1 resulted in a score of 3 and as such habitat

within the study area is not considered to be critical to the survival of the Koala. An assessment of significant impact or EPBC referral is not considered necessary for this species.

Table 10-1: Koala habitat assessment tool for inland areas (DoE 2014)

Attribute	Score	Inland	Applicable to the proposal?
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	
	+1 (medium)	Evidence of one or more koalas within 2km of the edge of the impact area within the last 10 years.	
	0 (low)	None of the above.	✓ No Koala records within 2km of the development site
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	✓ White Box is a listed food tree and is the only tree present in the upper strata
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present.	
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥1000 ha.	
	+1 (medium)	Area is part of a **contiguous landscape** <1000 ha, but ≥500 ha.	
	0 (low)	None of the above.	✓
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	
	+1	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack	✓

Attribute	Score	Inland	Applicable to the proposal?
	(medium)	at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	✓ Study area is not considered a habitat refuge nor does it provide important connectivity to large areas surrounding a habitat refuge
Total	**3**	**Decision: The impact area does not contain habitat critical to the survival of the Koala. An assessment of significant impact is not required.**	

Regent Honeyeater, Swift Parrot, Superb parrot and Corben's Long-eared Bat

Other EPBC Act listed entities with the potential to occur at the site are the Critically Endangered Regent Honeyeater (*Anthochaera phrygia*), Critically Endangered Swift Parrot (*Lathamus discolor*), Vulnerable Superb Parrot (*Polytelis swainsonii*) and Vulnerable Corben's Long-eared Bat (*Nyctophilus corbeni*). An Assessment of significant impact was completed for these species (Appendix D) and concluded that a significant impact was unlikely on the basis that the proposal would not:

- lead to a long-term decrease in the size of a population of a species
- reduce the area of occupancy of a population,
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species

- disrupt the breeding cycle of a population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a species becoming established in the species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

White box – Yellow box – Blakely's Red Gum grassy woodland and derived native grasslands CEEC

The proposal would remove 17% of the patch of the Box Gum grassy woodland CEEC within the proposal area. The habitat within the patch is considered to be critical to the survival of the community and is the only known habitat meeting the condition criteria for the CEEC in the proposal area. Other areas of CEEC in the locality are likely to be limited based on the current land uses and resulting degradation observed during the site surveys. Although further changes to species composition and indirect impacts to the remaining area of the community are considered manageable, the loss of 17% of the patch containing critical habitat within the proposal area is considered to be potentially significant, as it is likely to reduce the long-term capacity of the patch to survive under current and future land management. **A referral under the EPBC Act is recommended for the White box – Yellow box – Blakely's Red Gum grassy woodland and derived native grasslands CEEC.**

EPBC Offset requirement

Potential significant impacts have been identified for the White box – Yellow box – Blakely's Red Gum grassy woodland and derived native grasslands CEEC. If the proposal is deemed to be a controlled action by the Commonwealth DoE, offsets are likely to be required in accordance with the EPBC Environmental Offsets Policy. Note: the NSW Biobanking offset scheme is endorsed by the federal government and federal matters can be included within this.

10.1.5 Impacts on aquatic ecology of Wuuluman Creek

The proposed infrastructure for the Wellington Solar Farm would not impact on the aquatic habitat of Wuuluman Creek. On the Eastern side of the proposal area where aquatic habitat is minimal and the creek is highly disturbed from grazing, a minimum 10 metre buffer would be in place between the solar infrastructure and creek bank. This is in accordance with the minimum buffer zones for a Type 3, Class 3 Water Way under the DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management. In the west of the site, where Wuuluman Creek is a Type 2 Class 3 waterway, a minimum 50 metre buffer would be in place between the solar infrastructure and creek bank.

An overhead powerline would cross over Wuuluman Creek in the south east of the proposal area. This is shown in Figure 1-1. No trees of shrubs are present on the riverbanks at this location and no aquatic habitat or riparian vegetation would need to be removed for the construction of the overhead powerline.

11 OFFSET SUMMARY

11.1 FBA ECOSYSTEMS AND SPECIES CREDITS

A total of 203 ecosystem credits have been generated for the development site (BCC Major Project 144/2017/4350MP Version 2). No species credits have been generated. The BCC full credit report is provided in Appendix E.

Ecosystem credits

Ecosystem credits are required for the following PCTs:

- PCT 266 - White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion – 203 ecosystem credits

Species credits

No species credits are required. Further detail is provided in Table 11-1 below.

A Biodiversity Offset Strategy (BOS) will be developed and implemented as part of the approval of the proposal. This offset will be managed in perpetuity to ensure that threatened species habitats are enhanced in the future.

It is proposed that an offset will be established subject to consent conditions within 2 years of the commencement of construction, which would be adequate for the retirement of biodiversity credits of a number and class specified in Table 11-1.

The retirement of these credits will be achieved by either:

(a) acquiring or retiring credits under the NSW Biodiversity Offsets Scheme as prescribed by the BC Act;
(b) making payments into an offset fund that has been established by the NSW Government; or
(c) providing suitable supplementary measures.

149ha of native vegetation occurs onsite outside the impact area and these areas could be considered for offsets.

11.2 EPBC MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Significant impacts to MNES will require offsets according to the EPBC Environmental Offsets Policy. Offsets according to this policy would be quantified if determination of the proposal as a controlled action is made by the Commonwealth DoE. The NSW Biobanking offset scheme is endorsed by the federal government and federal matters can be included within this. Appropriate assessment of offsets would be included in the Biodiversity Offset Strategy to be prepared for the proposal (BOS).

The BOS would also ensure offsets required for MNES are met according to the EPBC Environmental Offsets Policy.

Table 11-1 Credit requirements

Ecosystem credits

PCT type code	Plant community type name	Management zone area (ha)	Loss in Landscape Value	Loss in site value score	EEC Offset Multiplier	Credits req for TS	TS with highest credit req	TS offset multiplier	Ecosystem credits required
CW112	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	0.32	12.80	14.00	3.0	0		0.0	0
CW216	White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	0.90	12.80	34.67	3.0	25	Masked Owl	3.0	26
CW216	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	1.75	12.80	8.67	3.0	0		0.0	0
CW216	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	1.81	12.80	36.67	3.0	49	Speckled Warbler	2.6	56
CW216	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	5.86	12.80	23.33	3.0	82	Speckled Warbler	2.6	121
CW216	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	133.59	12.80	10.67	1.0	1467	Masked Owl	3.0	0

12 BIODIVERSITY CREDIT REPORT

The final credit report for the development is provided as Appendix E. The credit extract report produced by the BCC is provided overleaf. The report includes the requirement for 203 ecosystem credits.

BioBanking Credit Calculator

Ecosystem credits

Proposal ID :	144/2017/4350MP
Proposal name :	Wellington Solar Farm
Assessor name :	Brooke Marshall
Assessor accreditation number :	0035
Tool version :	v4.0
Report created :	07/11/2017 18:54

Assessment circle name	Landscape score	Vegetation zone name	Vegetation type name	Condition	Red flag status	Management zone name	Management zone area	Current site value	Future site value	Loss in site value	Credit required for bio diversity	Credit required for TS	TS with highest credit requirement	Average species loss	Species TG Value	Final credit requirement for management zone
Circle 1	12.80	CW112_Low	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Low	No	1	0.32	14.00	0.00	14.00	4	0		0.00	0.00	0
Circle 1	12.80	CW216_Moderate/Good_Other	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate/Good_Other	Yes	2	0.90	34.67	0.00	34.67	26	26	Masked Owl	61.11	3.00	26
Circle 1	12.80	CW216_Low	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Low	No	3	1.75	8.67	0.00	8.67	17	0		0.00	0.00	0
Circle 1	12.80	CW216_Moderate/Good	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate/Good	Yes	4	1.81	36.67	0.00	36.67	56	49	Speckled Warbler	33.33	2.60	56
Circle 1	12.80	CW216_Moderate/Good_Derived grassland	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate/Good_Derived grassland	Yes	5	5.86	23.33	0.00	23.33	121	108	Speckled Warbler	33.33	2.60	121
Circle 1	12.80	CW216_Moderate/Good_Poor	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate/Good_Poor	Yes	6	133.59	10.67	0.00	10.67	0	1,497	Masked Owl	33.33	3.00	0

BioBanking Credit Calculator

Species credits

Proposal ID :

Proposal name :

Assessor name :

Assessor accreditation number :

Tool version : v4.0

Report created : 07/11/2017 18:54

Scientific name	Common name	Species TG value	Identified population?	Can Id. popn. be offset?	Area / number of loss	Negligible loss	Red flag status	Number of credits
			No					

13 CONCLUSIONS

NGH Environmental has prepared this BAR on behalf of First Solar for the Wellington Solar Farm in Wellington, NSW. The purpose of this BAR is to address the requirements of the FBA, developed for Major Projects, and to address the biodiversity matters raised in the SEARs. In this BAR, biodiversity impacts have been assessed through:

- Comprehensive mapping and assessment completed in accordance with the requirements in Appendix 4 of the FBA
- The identification of one threatened species, the Masked Owl within the development site, the impacts to which have been adequately assessed
- Mitigation measures which have been outlined in Table 8-1 to reduce the impacts to biodiversity
- The generation of 203 ecosystem credits within the development site which will need to be offset
- Consideration of MNES and offset requirements under the EPBC Act Environmental Offsets Policy

In assessing the impacts of the proposal, it is noted that the solar array panels will modify not remove vegetation through shading, however for the purpose of this assessment, 100% vegetation removal within the solar arrays has been assumed.

The project site is derived from Box Gum Woodland EEC vegetation. Areas of better quality EEC have been avoided through successive layout revisions. Mitigation measures outlined in Section 6, will assist to further to reduce the impacts to biodiversity. Residual impacts of the proposal include the generation of 203 ecosystem credits. No species credits have been generated.

A BOS will be developed and implemented as part of the approval of the proposal. This offset will be managed in perpetuity to ensure that threatened species habitats are enhanced in the future.

It is proposed that an offset will be established subject to consent conditions within 2 years of the commencement of construction, which would be adequate for the retirement of biodiversity credits of a number and class specified in Table 11-1.

The retirement of these credits will be achieved by either:

(d) acquiring or retiring credits under the NSW Biodiversity Offsets Scheme as prescribed by the BC Act;
(e) making payments into an offset fund that has been established by the NSW Government; or
(f) providing suitable supplementary measures.

149ha of native vegetation occurs onsite outside the impact area and these areas could be considered for offsets.

The BOS would also ensure offsets required for MNES are met according to the EPBC Environmental Offsets Policy.

14 REFERENCES

Commonwealth of Australia (2016) *National Recovery Plan for the Regent Honeyeater* (*Anthochaera phrygia*).

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APPENDIX A SPECIES LISTS

Flora species list

Scientific name	Common name	Family	WSF1		WSF2		WSF3		WSF4		WSF5		WSF6		WSF7		WSF8		WSF9		WSF10		WSF11		WSF12		WSF13		WSF14		WSF15	
			% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.
Trees																																
Brachychiton populneus	Kurrajong	Malvaceae													40	2													5	1		
Callitris glaucophylla	White Cypress Pine	Cupressaceae																									20	5				
Eucalyptus albens	White Box	Myrtaceae																			30	1							5	1	30	1
Eucalyptus conica	Fuzzy Box	Myrtaceae	20	1																												
Eucalyptus melliodora	Yellow Box	Myrtaceae	20	1																												
Eucalyptus sideroxylon	Mugga Ironbark	Myrtaceae																									50	8	10	2		
Shrubs																																
**Lycium ferocissimum*	African Boxthorn	Solanaceae	1	1																	1	1					1	2				
Atriplex semibaccata	Creeping Saltbush	Chenopodiaceae																									1	10	1	10		
Einadia nutans	Climbing Saltbush	Chenopodiaceae									1	1													2	20	2	50	2	200		
Maireana microcarpa		Chenopodiaceae																											1	2		
Sclerolaena muricata	Black Rolypoly	Chenopodiaceae																											1	10		
Forbs																																
**Acetosella vulgaris*	Sheep Sorrel	Polygonaceae					1														1	2										
**Alternanthera pungens*	Khaki Weed	Amaranthaceae																			1	1					1	10	1	2		
**Arctotheca calendula*	Capeweed	Asteraceae			10	500			2	100																						
**Brassica sp*	Wild Mustard	Brassicaceae													1	1											2	100	2	50		
**Capsella bursa-pastoris*	Shepard's Purse	Brassicaceae			1	10					1	20																				
**Carthamus lanatus*	Saffron Thistle	Asteraceae							1	50	10	100			10	200	2	20	2	100	5	100	5	50	2	50	1	10	2	50	5	50
**Centaurea calcitrapa*	Star Thistle	Asteraceae															1	2	2	100			10	100								
**Centaurea solstitialis*	St Barnaby's Thistle	Asteraceae			1	5			5	100	15	200	1	3			40	500			1	5			1	10						
**Cerastium vulgare*	Mouse-ear Chickweed	Caryophyllaceae					1												5	50	1	50										
**Chenopodium multifidum*	Scented Goosefoot																												1	1		
**Chondrilla juncea*	Skeleton Weed	Asteraceae	1	1					1	20			1	1			2	20	1	10			1	2								
**Cirsium vulgare*	Spear Thistle	Asteraceae									1	2							1	5							1	2	1	20	5	50

Scientific name	Common name	Family	WSF1		WSF2		WSF3		WSF4		WSF5		WSF6		WSF7		WSF8		WSF9		WSF10		WSF11		WSF12		WSF13		WSF14		WSF15	
			% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.
**Conyza sp.*	Fleabane	Asteraceae			1	1					2	50																				
**Cucumis myriocarpus*	Paddy Melon	Cucurbitaceae	1	5			1																									
**Erodium spp.*	Crowfoot	Geraniaceae			1	50							1	1																		
**Heliotropium spp.*	A Heliotrope	Boraginaceae					5																									
**Hypochaeris radicata*	Catsear	Asteraceae					1		1	10			1	5					2	50	2	100	5	200	1	10	1	20			1	10
**Lepidium bonariense*	Argentine Peppercress	Brassicaceae	1	5	1	10					2	50					1	3			1	10										
**Lepidium sp.*	A Peppercress	Brassicaceae											1	50													2	200	2	500		
**Malva parviflora*	Small-flowered Mallow	Malvaceae	10	500			1		1	5			5	20					1	50			1	50			1	20	1	10	2	50
**Malva sp.*	Mallow	Malvaceae											5	10																		
**Marrubium vulgare*	Horehound	Lamiaceae											2	20							1	1					1	5	5	50	2	50
**Medicago polymorpha*	Burr Medic	Fabaceae (Faboideae)																							20	500	5	100			2	100
**Medicago sativa*	Lucerne	Fabaceae	5	50	50	500					2	50																				
**Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllaceae																	2	100											1	50
**Plantago lanceolata*	Lamb's Tongues	Plantaginaceae													5	100	2	10	2	100	2	50	1	50	1	20			1	20	1	5
**Polygonum aviculare*	Wireweed	Polygonaceae			2	100			2	50	2	100													2	50	2	50	1	10		
**Salvia verbenaca*	Vervain	Lamiaceae					1								2	100					1	10	10	100	2	100			2	10		
**Sida rhombifolia*	Paddy's Lucerne	Malvaceae																											1	50		
**Silybum marianum*	Variegated Thistle	Asteraceae	1	50			1				1	10			10	200			1	20	2	50							1	10	2	50
**Sonchus oleraceus*	Common Sowthistle	Asteraceae							1	2					5	100			2	50												
**Spergularia rubra*	Sandspurry	Caryophyllaceae					1																									
**Stellaria media*	Common Chickweed	Caryophyllaceae					1																									
**Taraxacum officinale*	Dandelion	Asteraceae																							1	10						
**Tolpis barbata*	Yellow Hawkweed	Asteraceae							1	1									1	1												
**Tribulus terrestris*	Cat-head	Zygophyllaceae							1	10			1	20																		
**Trifolium arvense*	Haresfoot clover	Fabaceae																														
**Trifolium campestre*	Hop Clover	Fabaceae (Faboideae)	1	50	5	50			20	500	10	200			1	20	10	500			10	100									1	50
**Trifolium glomeratum*	Clustered Clover	Fabaceae (Faboideae)							15	200	5	100							1	20												

Scientific name	Common name	Family	WSF1		WSF2		WSF3		WSF4		WSF5		WSF6		WSF7		WSF8		WSF9		WSF10		WSF11		WSF12		WSF13		WSF14		WSF15	
			% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.
**Trifolium repens*	White Clover	Fabaceae (Faboideae)																			10	100										
**Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)					2						2	50	5	200	2	200	10	200							5	200			1	50
**Veronica spp.*		Plantaginaceae																									2	100				
**Xanthium spinosum*	Bathurst Burr	Asteraceae			1	5	1								2	20					1	2										
Acaena novae-zelandiae	Bidgee-widgee	Rosaceae							2	50																						
Boerhavia dominii	Tarvine	Nyctaginaceae											1	1							1	1			1	5						
Calotis lappulacea	Yellow Burr-daisy	Asteraceae			1	20	1		5	100	1	5	1	50																		
Chrysocephalum apiculatum	Common Everlasting	Asteraceae																											1	20		
Convolvulus erubescens	Pink Bindweed	Convolvulaceae									1	1																				
Cotula australis	Common Cotula	Asteraceae																									1	2				
Crassula sieberiana	Australian Stonecrop	Crassulaceae											1	50																		
Cymbonotus lawsonianus	Bear's Ear	Asteraceae																							1	1	1	2				
Daucus glochidiatus	Native Carrot	Apiaceae									1	5															1	20				
Desmodium varians	Slender Tick-trefoil	Fabaceae (Faboideae)																													1	1
Dichondra repens	Kidney Weed	Convolvulaceae			10	500	1																									
Dysphania pumilio	Small Crumbweed	Chenopodiaceae					1																									
Euchiton involucratus	Star Cudweed	Asteraceae											1	1															1	5		
Geranium potentilloides		Geraniaceae																					1	50								
Glycine clandestina	Twining glycine	Fabaceae (Faboideae)																			1	1										
Glycine tabacina	Variable Glycine	Fabaceae (Faboideae)											2	2																		
Haloragis heterophylla	Variable Raspwort	Haloragaceae											1	1																		
Hydrocotyle laxiflora	Stinking Pennywort	Apiaceae					2		2	100			2	100											1	100						
Opercularia hispida	Hairy Stinkweed	Rubiaceae							1	2																						
Oxalis perennans	Oxalis	Oxalidaceae					1		2	100			1	100							1	10	2	100	5	100					2	100
Oxalis radicosa		Oxalidaceae							5	100			1	100	5	200	2	100	2	100	2	20					2	100			5	200
Plantago cunninghamii	Sago-weed	Plantaginaceae											1	10																		

Scientific name	Common name	Family	WSF1		WSF2		WSF3		WSF4		WSF5		WSF6		WSF7		WSF8		WSF9		WSF10		WSF11		WSF12		WSF13		WSF14		WSF15	
			% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.
Rumex brownii	Swamp Dock	Polygonaceae											2	20							1	1							1	5		
Senna barclayana	Smooth Senna	Fabaceae (Caesalpinioideae)					1						1	50									5	4					1	5	1	1
Sida corrugata	Corrugated Sida	Malvaceae											2	2											2	200			1	20		
Veronica plebeia	Trailing Speedwell	Plantaginaceae											1	1																		
Vittadinia cuneata	Fuzzweed	Asteraceae			1	5	1				1	20											2	20	2	5	1	2	1	20		
Wahlenbergia communis	Tufted Bluebell	Campanulaceae			1	1			1	10															2	100						
Wahlenbergia luteola	Bluebell	Campanulaceae							1	50			1	200											1	20			1	20		
Wahlenbergia stricta	Tall Bluebell	Campanulaceae					1				1	2					1	2									1	5				
Zaleya galericulata	Hogweed	Aizoaceae	1	3																												
Grasses																																
**Bromus catharticus*	Praire Grass	Poaceae													10	200			2	100							1	10	20	500	40	500
**Bromus diandrus*	Great Brome	Poaceae			1	2																										
**Bromus hordeaceus*	Soft Brome	Poaceae	20	100									1	20																		
**Bromus sp.*	Brome	Poaceae					20														5	100										
**Digitaria sanguinalis*	Crab Grass	Poaceae																							2	50						
**Echinochloa crus-galli*	Barnyard Grass	Poaceae			1	10																										
**Eragrostis curvula*	African Lovegrass	Poaceae																	1	4												
**Festuca spp.*		Poaceae																			20	500										
**Lolium perenne*	Perennial Ryegrass	Poaceae	5	100	1	10			2	100					30	500	2	100	10	200	5	100	10	100	2	100	5	200				
**Phalaris aquatica*	Phalaris	Poaceae																	2	50			10	50								
Aristida behriana	Bunch Wiregrass	Poaceae											1	5																		
Austrostipa aristiglumis	Plains Grass	Poaceae																									1	20				
Austrostipa setacea	Corkscrew Grass	Poaceae											1	2													1	50	10	100		
Austrostipa verticillata	Slender Bamboo Grass	Poaceae																									5	100				
Austrostipa sp.	Spear Grass	Poaceae			1	10	10		2	50			2	50											5	200			10	100		
Bothriochloa macra	Red Grass	Poaceae			1	50	10		5	200	40	500	1	50	1	50	20	500	20	500	5	100	20	200	30	100			2	50		

Scientific name	Common name	Family	WSF1		WSF2		WSF3		WSF4		WSF5		WSF6		WSF7		WSF8		WSF9		WSF10		WSF11		WSF12		WSF13		WSF14		WSF15	
			% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.	% cover	# indiv.
Chloris truncata	Windmill Grass	Poaceae			1	20	1		1	5			1	10									2	50	2	200			1	10		
Cynodon dactylon	Couch	Poaceae			1	5	5																									
Dichanthium sericeum	Queensland Bluegrass	Poaceae																							2	50	1	10				
Digitaria brownii	Cotton Panic Grass	Poaceae			1	10			1	50	2	75	30	500			2	100	2	100			2	50	5	200						
Digitaria divaricatissima	Umbrella Grass	Poaceae								5	1	10	2	10											5	200						
Elymus scaber	Common Wheatgrass	Poaceae							1																		2	100				
Enneapogon nigricans	Niggerheads	Poaceae											1	20					1	10					5	200	1	50	2	50		
Enneapogon spp.	Nineawn Grass, Bottlewashers	Poaceae							15	200																						
Enteropogon ramosus	Curly Windmill Grass	Poaceae			20	200					2	50	1	50																		
Eragrostis brownii	Brown's Lovegrass	Poaceae			1	20	1		1	10			1	100											2	50						
Eriochloa pseudoacrotricha	Early Spring Grass	Poaceae									5	100																				
Paspalidium constrictum	Knottybutt Grass	Poaceae							1	50																						
Paspalidium distans		Poaceae					1																									
Panicum effusum	Hairy Panic	Poaceae							1	5															1	100						
Rytidosperma caespitosum	Ringed Wallaby Grass	Poaceae																							2	50	1	5	2	10		
Sporobolus creber	Slender Rat's Tail Grass	Poaceae															1	5							1	20						
Graminoids																																
Juncus sp.	Rush	Juncaceae																														
Ferns																																
Marsilea drummondii	Common Nardoo	Marsileaceae																														

Fauna species list

Class	Scientific Name	Common Name	Status (BC/EPBC)	Number of Sightings
Amphibia				
	Crinia parinsignifera	Beeping froglet		1
	Crinia signifera	Clicking froglet		2
Aves				
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater		1
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		2
	Acanthiza nana	Yellow Thornbill		6
	Anthochaera carunculata	Red Wattlebird		1
	Cacatua galerita	Sulphur-crested Cockatoo		4
	Corvus bennetti	Little Crow		3
	Corvus coronoides	Australian Raven		10
	Cracticus tibicen	Australian Magpie		6
	Entomyzon cyanotis	Blue-faced Honeyeater		3
	Eolophus roseicapillus	Galah		20
	Grallina cyanoleuca	Magpie-lark		3
	Hirundo neoxena	Welcome Swallow		2
	Lichenostomus penicillatus	White-plumed Honeyeater		3
	Malurus cyaneus	Superb Fairy-wren		5
	Manorina melanocephala	Noisy Miner		7
	Ocyphaps lophotes	Crested Pigeon		2
	Pachycephala rufiventris	Rufous Whistler		1
	Platycercus eximius	Eastern Rosella		4
	Psephotus haematonotus	Red-rumped Parrot		9
	Rhipidura leucophrys	Willie Wagtail		8
	Sturnus vulgaris	Common Starling		7
	Tyto novaehollandiae	Masked Owl	Vulnerable (BC Act)	1
Microbats				
	Chalinolobus gouldii	Gould's Wattle Bat		
	Vespadelus sp.			
	Mormopterus sp.			
	Nyctophilus sp.			

APPENDIX B HOLLOW-BEARING TREE DATA

Easting	Northing	ID	Species	Height (m)	DBH (cm)	Small Trunk	Medium Trunk	Large Trunk	Small Limb	Medium Limb	Large Limb	Small Fissure	Medium Fissure	Large Fissure
148.963	-32.5249	HBT 1	Stag	12	40							2		
148.9627	-32.525	HBT 2	Stag	8	20	2								
148.9654	-32.5243	HBT 3	*Eucalyptus blakelyi*	12	50				1				1	
148.9662	-32.5241	HBT 4	Stag	10	30							3		
148.9671	-32.5239	HBT 5	Stag	12	40							2		
148.9672	-32.5239	HBT 6	Stag	6	20							1		
148.9673	-32.5239	HBT 7	*Eucalyptus sideroxylon*	12	50							1	2	
148.9659	-32.5242	HBT 8	*Eucalyptus blakelyi*	15	40		2							
148.9564	-32.5293	HBT 9	*Eucalyptus albens*	14	80		1		2					
148.9573	-32.5288	HBT 10	*Eucalyptus albens*	14	100					2				
148.9578	-32.5286	HBT 11	*Eucalyptus albens*	14	70				2	2				
148.9581	-32.5289	HBT 12	*Eucalyptus albens*	16	90		1			3				
148.9585	-32.5297	HBT 13	*Eucalyptus albens*	14	80		2							
148.9594	-32.5294	HBT 14	*Eucalyptus albens*	14	50		2			1				
148.9597	-32.5286	HBT 15	*Eucalyptus albens*	15	90			1		3				
148.959	-32.5283	HBT 16	*Eucalyptus albens*	12	90		2		1	2				
148.959	-32.5286	HBT 17	*Eucalyptus albens*	14	90		1	1		2				
148.9588	-32.5285	HBT 18	*Eucalyptus albens*	12	100		1			2				
148.9583	-32.5283	HBT 19	*Eucalyptus albens*	8	70		2							
148.9627	-32.525	HBT 2	Stag	8	20	2								
148.9654	-32.5243	HBT 3	*Eucalyptus blakelyi*	12	50				1				1	
148.9662	-32.5241	HBT 4	Stag	10	30							3		
148.9671	-32.5239	HBT 5	Stag	12	40							2		

Easting	Northing	ID	Species	Height (m)	DBH (cm)	Small Trunk	Medium Trunk	Large Trunk	Small Limb	Medium Limb	Large Limb	Small Fissure	Medium Fissure	Large Fissure
148.9672	-32.5239	HBT 6	Stag	6	20							1		
148.9673	-32.5239	HBT 7	*Eucalyptus sideroxylon*	12	50							1	2	
148.9659	-32.5242	HBT 8	*Eucalyptus blakelyi*	15	40		2							
148.9564	-32.5293	HBT 9	*Eucalyptus albens*	14	80		1		2					
148.9573	-32.5288	HBT 10	*Eucalyptus albens*	14	100					2				
148.9578	-32.5286	HBT 11	*Eucalyptus albens*	14	70				2	2				
148.9581	-32.5289	HBT 12	*Eucalyptus albens*	16	90		1			3				
148.9585	-32.5297	HBT 13	*Eucalyptus albens*	14	80		2							
148.9594	-32.5294	HBT 14	*Eucalyptus albens*	14	50		2			1				
148.9597	-32.5286	HBT 15	*Eucalyptus albens*	15	90			1		3				
148.959	-32.5283	HBT 16	*Eucalyptus albens*	12	90		2		1	2				
148.959	-32.5286	HBT 17	*Eucalyptus albens*	14	90		1	1		2				
148.9588	-32.5285	HBT 18	*Eucalyptus albens*	12	100		1			2				
148.9583	-32.5283	HBT 19	*Eucalyptus albens*	8	70		2							
148.9573	-32.5275	HBT 20	*Eucalyptus albens*	14	80		2							
148.9564	-32.5272	HBT 21	*Eucalyptus albens*	12	70	2			2					
148.963	-32.5296	HBT 22	Stag	10	70	2	3			2				
148.9587	-32.5259	HBT 23	Stag	10	30	2			1					
148.9609	-32.5254	HBT 24	*Eucalyptus blakelyi*	14	50		1	1						
148.96	-32.5256	HBT 25	*Eucalyptus blakelyi*	14	60									

Easting	Northing	ID	Species	Height (m)	DBH (cm)	Small Trunk	Medium Trunk	Large Trunk	Small Limb	Medium Limb	Large Limb	Small Fissure	Medium Fissure	Large Fissure
148.9588	-32.5259	HBT 26	*Eucalyptus blakelyi*	14	60									
148.9649	-32.5211	HBT 27	Building	0	0									
148.9608	-32.5192	HBT 28	*Eucalyptus albens*	14	80			1		2				
148.9593	-32.519	HBT 29	Hut	0	0									
148.9606	-32.5183	HBT 30	*Schinus molle*	12	80		1		1	2				
148.9642	-32.5172	HBT 31	*Eucalyptus albens*	14	70		2		1	2				
148.9668	-32.5169	HBT 32	Stag	10	40							1	2	
148.9649	-32.5137	HBT 33	*Eucalyptus albens*	12	70		2		1	2				
148.9655	-32.5136	HBT 34	*Eucalyptus albens*	12	70	1			2					
148.9645	-32.5125	HBT 35	Stag	6	20	2			1					
148.9703	-32.509	HBT 36	*Brachychiton populneus*	10	100					2				
148.9702	-32.5126	HBT 37	*Brachychiton populneus*	8	90							2		
148.9703	-32.513	HBT 38	*Eucalyptus albens*	14	80		2			2				
148.9701	-32.5181	HBT 39	*Eucalyptus sideroxylon*	15	70							3	5	
148.9702	-32.518	HBT 40	*Eucalyptus sideroxylon*	15	50								2	
148.9704	-32.5181	HBT 41	*Eucalyptus blakelyi*	16	60		1							
148.9706	-32.5181	HBT 42	*Eucalyptus blakelyi*	14	50		1			2				
148.9705	-32.5184	HBT 43	Stag	14	50							3	1	
148.9549	-32.5161	HBT 44	*Eucalyptus albens*	10	90			1	2	3				

Easting	Northing	ID	Species	Height (m)	DBH (cm)	Small Trunk	Medium Trunk	Large Trunk	Small Limb	Medium Limb	Large Limb	Small Fissure	Medium Fissure	Large Fissure
148.9584	-32.5135	HBT 45	*Eucalyptus albens*	14	90		1			1				
148.9582	-32.5135	HBT 46	*Eucalyptus albens*	8	60		1							
148.9593	-32.5142	HBT 47	*Eucalyptus albens*	14	70		1		2	3				
148.9595	-32.5144	HBT 48	*Eucalyptus albens*	14	60		1 bees							
148.9594	-32.5144	HBT 49	*Eucalyptus albens*	12	70					1		1		
148.9588	-32.5148	HBT 50	*Eucalyptus albens*	14	60					2				
148.9586	-32.5146	HBT 51	*Eucalyptus albens*	14	70							1		
148.9571	-32.5131	HBT 52	*Eucalyptus albens*	14	80		2		1					
148.9569	-32.5132	HBT 53	*Eucalyptus albens*	16	70					2				
148.9611	-32.5063	HBT 54	*Eucalyptus albens*	14	50					1	1			
148.9609	-32.507	HBT 55	*Eucalyptus albens*	14	80				1	2				
148.9488	-32.5078	HBT 56	*Eucalyptus albens*	16	80		2		2	2				
148.9493	-32.5111	HBT 57	Stag	6	30				1			1		
148.9469	-32.5116	HBT 58	Stag	6	70		2	1		3	1			
148.9469	-32.5117	HBT 59	Stag	16	60		3	1	2	3			1	
148.9468	-32.5125	HBT 60	*Eucalyptus melliodora*	15	90		1	2		2				
148.9466	-32.5132	HBT 61	*Eucalyptus albens*	14	70					2				
148.9466	-32.5134	HBT 62	Stag	6	70		1		1					

APPENDIX C EPBC PROTECTED MATTERS SEARCH

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.

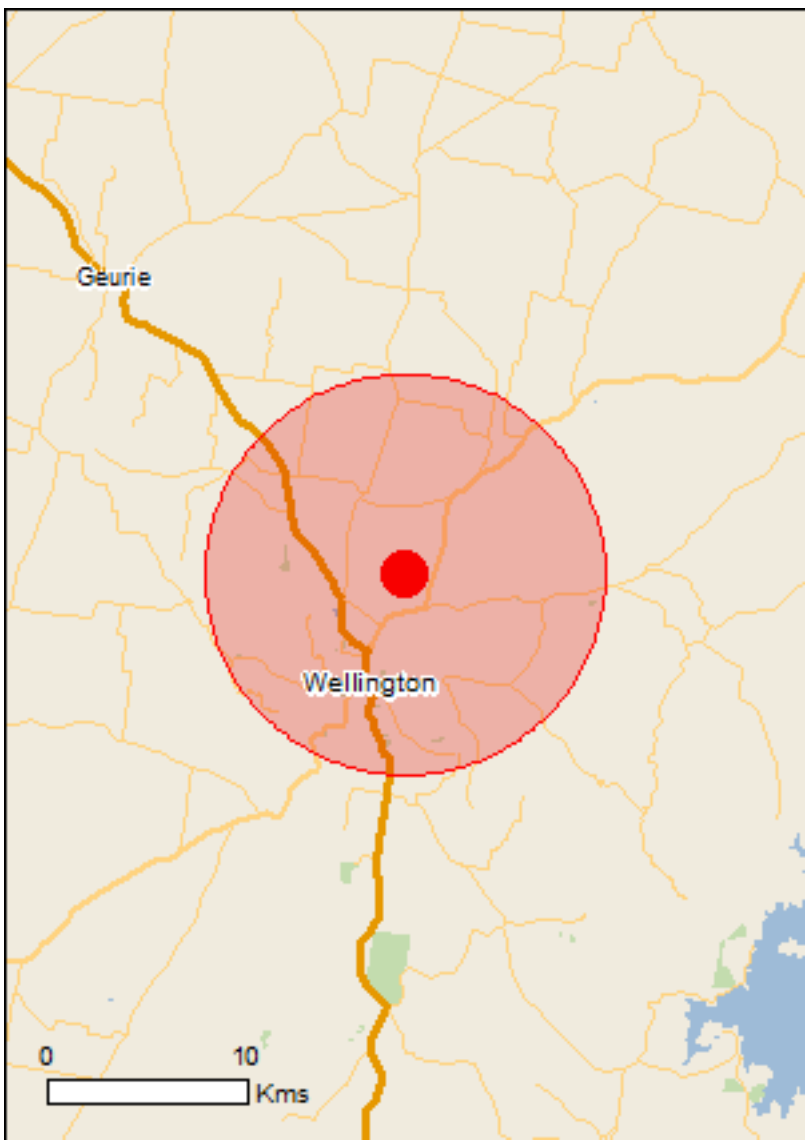
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

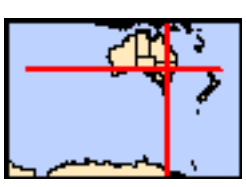
Report created: 16/05/17 10:59:35

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



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:	2
Listed Threatened Species:	28
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:	2
Commonwealth Heritage Places:	1
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:	29
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	800 - 900km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream
The macquarie marshes	150 - 200km 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
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	Foraging, feeding or related behaviour 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 likely 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
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within area
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
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
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 known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Androcalva procumbens		
[87153]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Philotheca ericifolia		
[64942]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically 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 likely to occur within area
Tylophora linearis		
[55231]	Endangered	Species or species habitat may occur within area
Reptiles		

Name	Status	Type of Presence
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 likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat may 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 Postal Commission
Commonwealth Land - Australian Telecommunications Commission

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Wellington Post Office	NSW	Listed place

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 known 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

Name	Threatened	Type of Presence
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
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 may 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
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
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
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
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
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to 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 within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur 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

Name	Status	Type of Presence 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
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		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

-32.51175 148.95987

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 D EPBC ACT ASSESSMENTS OF SIGNIFICANCE

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:

- White Box – Yellow Box – Blakely's Red Gum grassy woodland and derived native grasslands. (Critically Endangered)
- Regent Honeyeater (Critically Endangered)
- Swift Parrot (Critically Endangered)
- Superb Parrot (Vulnerable)
- Corben's Long Eared Bat (Vulnerable)

Different significant impact criteria apply depending on the level at which a species or community is listed (i.e. vulnerable, endangered, critically endangered etc.). The appropriate criteria have been applied to the entities listed above.

In the context of the assessments below, 'the action' refers to 'the proposal' as described in Section 1.

WHITE BOX – YELLOW BOX – BLAKELY'S RED GUM GRASSY WOODLAND AND DERIVED NATIVE GRASSLANDS (CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY)

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

Reduce the extent of an ecological community

One 9ha patch of EPBC listed Box-Gum Woodland Community occurs on the hill slope in the centre of the development site where more than 12 native forb species are present in the understory. The action will impact on the extent of the EPBC listed community by 1.61ha for the construction of a transmission line. This is 17 percent of the patch of Box Gum Grassy Woodland.

fragment or increase fragmentation of an ecological community,

The 1.61ha of box gum woodland that would be impacted on occurs on the edge of the woodland patch. The proposal would marginally decrease the patch size of the woodland however, it would not result in any further fragmentation.

adversely affect habitat critical to the survival of an ecological community

Habitat critical to the survival of the Box Gum Woodland includes the moderate to highly fertile slopes of the Western Slopes of NSW. Areas of Box Gum Grassy Woodland that meet the condition criteria for the EPBC listed community should be considered critical to the survival of the ecological community (DECC, 2010). The 9ha patch of Box-Gum Grassy Woodland within the proposal would be considered habitat critical to the survival of the ecological community. 1.61ha of the Box-Gum Grassy Woodland would be affected by the proposal.

modify or destroy abiotic factor necessary for an ecological community's survival, including reduction of groundwater levels or substantial alteration of surface water drainage patterns.

During construction, the proposal would have a short term gross impact upon soils and possibly surface water flow, within discreet 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.

cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionality important species, for example through regular burning or flora or fauna harvesting.

The development could cause a change in species composition through soil disturbance for the construction of the transmission line. Once the transmission line is constructed however, there would be no further disturbance to the understory and groundcover species would be able to regenerate from the soil seed bank. Mitigation measures have been recommended to adequately manage risks associated with weed and/or disease introduction and spread. The proposal would be unlikely to cause a substantial change in species composition in remaining areas of the community, including through tree removal and disturbance, harvesting, disease infection, weed invasion or alteration to grazing, burning or flooding regimes.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community including but not limited to: assisting invasive species that are harmful to the listed ecological community to become established or 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

The proposal has the potential to introduce or assist the spread of invasive weed species. The invasion of native vegetation by exotic perennial grasses is a particular risk for the community. These risks would be reduced to acceptable levels through weed and hygiene protocols, pre and post works weed control, soil erosion and sedimentation control and effective and timely site rehabilitation. The use of fertilisers is not proposed.

Chemical pollution risks would be reduced using chemical spill kits and site sediment control structures. With these controls in place, the works are not expected to result in impacts from weeds or pollutants

Interfere with the recovery of an ecological community

The objectives for the Box Gum Grassy Woodland Recovery Plan are to minimise the risk of extinction of the ecological community through:

1. Achieving no net loss in extent and condition of the ecological community
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
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 does not support the objectives of the recovery plan.

Conclusion

The proposal would remove 17% of the patch of the Box Gum grassy woodland CEEC within the proposal area. The habitat within the patch is considered to be critical to the survival of the community and is the only known habitat meeting the condition criteria for the CEEC in the proposal area. Other areas of CEEC in the locality are likely to be limited based on the current land uses and resulting degradation observed during the site surveys. Although further changes to species composition and indirect impacts to the remaining area of the community are considered manageable, the loss of 17% of the patch containing critical habitat within the proposal area is considered to be potentially significant, as it is likely to reduce the long-term capacity of the patch to survive. A referral under the EPBC Act is recommended for the White box – Yellow box – Blakely's Red Gum grassy woodland and derived native grasslands CEEC.

REGENT HONEYEATER AND SWIFT PARROT (CRITICALLY ENDANGERED)

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

lead to a long-term decrease in the size of a population

There are three known key breeding areas in NSW where the Regent Honeyeater is regularly recorded; the Capertee Valley, Bundarra-Barraba region and the Lower Hunter (OEH 2017). The Swift Parrot breeds in Tasmania (OEH 2017). As such, the development site contains potential foraging resources for these species only. Both species rely on flowering eucalypts as feed trees including White Box and would at best be infrequent visitors at the development site. The proposal would impact on 3.33 hectares of overstorey vegetation that could provide foraging resources for these species. Given this minor reduction in the context of the extensive patch woodland in the locality and that no breeding resources would be impacted, the proposal is unlikely to lead to a long-term decrease in the size of a population.

reduce the area of occupancy of the species

The broader proposal area will continue to contain suitable areas of foraging habitat and given the mobility of these species would not disrupt movements across the development site. The proposal would not reduce the area of occupancy of these species.

fragment an existing population into two or more populations

The proposal would not affect the ability of these species to move across the development site and would have no impact on breeding habitat. Woodland fragments surrounding the site would also continue to facilitate the movements of these species. The proposal would not fragment existing populations.

adversely affect habitat critical to the survival of a species

Core breeding habitat is considered critical to the survival of these species. As the proposal would not impact on breeding habitat, it would not impact on habitat critical to the survival of these species.

disrupt the breeding cycle of a population

As stated above, the proposal would not impact on breeding habitat and would not reduce the capacity of these species to move to and from breeding habitat. The proposal would not disrupt the breeding cycle of these species.

modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposal will remove approximately 3.33ha of woodland vegetation containing native canopy species providing potential foraging habitat. This modification and removal of habitat is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, as habitat has been avoided and will be retained within the proposal area, ensuring that large areas of suitable habitat remain. The areas being removed and modified would likely only constitute occasional foraging habitat.

result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposal is unlikely to result in invasive species such as these that are harmful to the Regent Honeyeater or Swift Parrot.

The proposal will modify the current land use, potentially creating additional shelter habitat for predatory invasive species such as foxes and cats, which are considered likely to be locally prevalent regardless of the proposal. Management protocols will be prepared and implemented as part of the Flora and fauna Management Plan for the proposal which will monitor and manage these species within the development site.

introduce disease that may cause the species to decline, or

Beak and Feather Disease has been proven to impact the Swift Parrot (DoE, 2017), however the proposal is not considered likely to act as a vector for the disease.

interfere with the recovery of the species

Core breeding areas and surrounding habitat are considered important to the recovery of these species. Maintaining movements across the landscape between breeding and foraging areas for the Swift Parrot is also considered important for this species recovery. The development site is not near any known breeding areas for these species. Habitats across the broader proposal area will remain available to the species and given their mobility, the proposal would not restrict the movements of the species across the development site. The proposal is unlikely to interfere with the recovery of the Regent Honeyeater or Swift Parrot.

SUPERB PARROT (VULNERABLE)

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

lead to a long-term decrease in the size of an important population of a species

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

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

The breeding population of Superb Parrots *Polytelis swainsonii* is approximately 6500. The species is somewhat mobile, and typically utilises foraging habitat within 10km of breeding habitat (SPRAT, 2017). No records of the Superb Parrot occur within the proposal area. No known population of Superb Parrot occurs within the proposal area.

The development site is not part of a core breeding area for the Superb Parrot. Nonetheless, the proposal will remove approximately 1.81ha of woodland vegetation containing native canopy and native understorey species and 1.75ha of low condition woodland with an exotic understorey in addition to the clearing of 17 hollow-bearing trees. Additionally, the potential foraging area for the species would be reduced as cropping would no longer occur within the development site. The proposal is not considered likely to lead to a long-term decrease in the size of the population, as the development would likely constitute only a small portion of the population's foraging and breeding range within the NSW South West Slopes.

reduce the area of occupancy of an important population,

As an important population is not considered to occur within the development site, the proposal is not considered to reduce the area of occupancy of an important population. The broader proposal area will continue to contain suitable areas of breeding and foraging habitat of a sufficient size and quality to maintain individuals of the species within the proposal area and the wider locality.

fragment an existing important population into two or more populations

As the individuals of the species are not considered to form an important population, the proposal is not considered to fragment an existing important population. Vegetative connectivity within the Proposal Area will be maintained and improved through planting and avoidance of impacts to vegetation. As the species is highly mobile, the proposal will not impact on its movement within or across the development site.

adversely affect habitat critical to the survival of a species

No habitat critical to the survival of the species exists within the development site. Suitable breeding, foraging and roosting habitats represented within the proposal area have been avoided by the proposal and will be retained, thus ensuring that these habitats are not adversely effected.

disrupt the breeding cycle of an important population

No known important population occurs within the proposal area. Three main breeding areas for the superb parrot occur in NSW. The nearest known breeding area to the proposal area occurs in the South West Slopes near Molong, approximately 65km south of Wellington. Within the South West Slopes, the Superb Parrot breeds in hollows in River Red Gum, Blakely's Red Gum, Apple Box, Grey Box, White Box and Red Box species. The nests are usually located near water and the same nest hollows are used in successive years. the individuals of the species are not considered to form an important population, the proposal is not considered likely to disrupt the breeding cycle of an important population. The superb parrot could potentially utilise the development site as a breeding resource, however the use of isolated paddock trees for breeding is considered unlikely. Suitable woodland habitat has been avoided and will be retained throughout the Proposal Area, thus ensuring that individuals could continue to utilise the Proposal Area, and the breeding cycle of the broader population is not disrupted.

modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposal will remove approximately 1.81ha of moderate to good quality woodland vegetation containing native canopy and native understorey species. Additionally, the potential foraging area for the species would be reduced as cropping would no longer occur within the development site. This modification and removal of habitat is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, as habitat has been avoided and will be retained within the proposal area, ensuring that large areas of suitable habitat remain. The areas being removed and modified would likely only constitute occasional foraging habitat.

result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

The proposal is not considered likely to result in invasive species becoming established within the Superb Parrot's habitat. Competition with Noisy Miners for breeding and foraging habitat and resources is a major threat to the species and cause for the decline in population numbers. Noisy Miners are already present at the development site. The proposal is unlikely to result in invasive species such as these that are harmful to the habitat of the Superb Parrot.

The proposal will modify the current landuse, potentially creating additional shelter habitat for predatory invasive species such as foxes and cats, which are considered likely to be locally prevalent regardless of the proposal. Management protocols will be prepared and implemented as part of the Flora and fauna Management Plan for the proposal which will monitor and manage these species within the development site.

introduce disease that may cause the species to decline

Beak and Feather Disease has been proven to impact the Superb Parrot (DoE, 2017), however the proposal is not considered likely to act as a vector for the disease.

interfere with the recovery of the species

Core breeding areas and surrounding habitat are considered important to the recovery of the species. The nearest known breeding area to the proposal area occurs in the South West Slopes near Molong, approximately 65km south of Wellington and the species typically utilises foraging habitat within 10km of breeding habitat. Habitats across the broader proposal area will remain available to the species and given its mobility, the proposal would not restrict the movements of the species across the development site. The proposal is unlikely to interfere with the recovery of the Superb Parrot.

Conclusion:

As the individuals of the species that could potentially utilise the development site are not considered to constitute an important population of the species, the proposal is not considered likely to impact on an important population. Though there will be the removal of 1.81ha of moderate to good quality woodland vegetation, 1.75ha of low condition woodland and 17 paddock trees containing hollows, the extent of vegetation removal is not considered likely to impact the species to the degree that they would no longer utilise the proposal area as habitat. Areas of vegetation where the species was detected have been avoided throughout the project design phase, and areas of higher quality native vegetation will be retained within the proposal area, thus ensuring that suitable habitat continues to occur within the proposal area. As such, impacts to the Superb Parrot are unlikely to be significant, and a referral under the EPBC Act is not required.

CORBEN'S LONG-EARED BAT (VULNERABLE)

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

lead to a long-term decrease in the size of an important population of a species

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

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

No known records of this species occur within the locality of the proposal area. A Nyctophilus species was detected through the ANABAT however the species could not be identified from calls alone. Suitable habitat for this species occurs within the proposal area. The proposal will remove a total of 17 hollow-bearing trees, which contain hollows suitable for roosting for Corben's Long-eared Bat. The foraging habitat contained within the development site is considered to be sub-optimal, with no shrub or small tree layers present, and would likely only be utilised on occasion. The species is considered likely, were it to occur within the development site not to be reliant solely on the hollow-bearing trees within the development site as a sole roosting resource. The higher quality remnants of vegetation containing similar densities of hollow-bearing trees and higher-quality understory and foraging habitat have been avoided by the proposal, thus the species is considered likely to remain viable within the proposal area, were it present. The proposal is not considered likely to lead to a long-term decrease in the size of an important population of the species.

reduce the area of occupancy of an important population,

There will be a reduction of approximately 1.81ha of moderate to good quality woodland vegetation and 1.75ha of low condition woodland. The species is highly mobile and is considered likely to use a number of woodland areas surrounding the proposal area, including the higher quality habitats within the proposal area, that have been avoided were it present. The proposal area will continue to contain suitable areas of roosting and foraging habitat of a sufficient size and quality to maintain a population of the species within the proposal area and the wider locality.

fragment an existing important population into two or more populations

Vegetative connectivity within the proposal area will be maintained and improved through planting and avoidance of impacts to vegetation. As the species is highly mobile, roosts singly or in pairs and relocates between multiple roost locations over successive nights (TSSC, 2015), the proposal will not impact on its movement within or across the proposal area.

adversely affect habitat critical to the survival of a species

No habitat critical to the survival of the species exists within the development site. Suitable foraging and roosting habitats represented within the proposal area have been avoided by the proposal and will be retained, thus ensuring that these habitats are not adversely effected.

disrupt the breeding cycle of an important population

The species is known to roost in large dead stags in NSW (DotE, 2015). Specific mitigation measures will be put in place for hollow-bearing tree removal to avoid impacts to the breeding cycle of the species if they are present

within the development site. Suitable breeding habitat will be retained throughout the proposal area, ensuring that individuals could continue to utilise the proposal Area, and the breeding cycle of the broader population is not disrupted.

modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposal will remove approximately 1.81ha of moderate to good quality woodland vegetation containing native canopy and native understorey species and 1.75ha of low condition woodland, including the clearing of 17 hollow-bearing trees. The vegetation to be removed as a result of the proposal is considered to constitute low quality foraging habitat and small amounts of potential roosting and breeding habitat. However, the modification and removal of this habitat is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, as higher quality areas of suitable habitat have been avoided and will be retained within the proposal area, ensuring that areas of suitable habitat remain. As such, the impacts to habitat are not considered likely to be such that the species is likely to decline, were it present within the development site.

result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Nyctophilus species are typically impacted by cats due to their slow flight and ground foraging habits. The proposal will modify the current landuse, potentially creating additional shelter habitat for predatory invasive species such as foxes and cats, which are considered likely to be locally prevalent regardless of the proposal. A management plan will be prepared and implemented which will monitor and manage these species within the proposal area and offset area.

introduce disease that may cause the species to decline

No diseases are known to impact the species. The proposal is not considered likely to introduce any diseases that would impact the species.

interfere substantially with the recovery of the species

Considering the small areas of potential foraging and roosting habitat to be removed, the mitigation measures in place to avoid impacts to individuals and that substantial habitat will remain within the broader proposal area and locality, the proposal is unlikely to interfere with the recovery of Corben's Long-eared Bat.

Conclusion:

The proposal will remove 1.81 ha of moderate to good quality woodland vegetation, 1.75ha of low condition woodland and 4 hollow-bearing trees. The habitat to be impacted is considered to constitute low-quality foraging habitat, and would likely only be utilised on occasion. Roosting may occur on occasion within hollow-bearing trees, however the species is known to utilise multiple roost hollows over successive nights, up to 4km apart (TSSC, 2015). As such, it is likely that any individuals utilising the site would only do so on occasion. Significant areas of better-quality habitat have been avoided by the proposal and will be retained within the broader proposal area. It is considered likely that, were the species present within the development site, the population would remain viable within the broader proposal area. As such, the proposal is unlikely to significantly impact the species, and a referral under the EPBC Act is not required.

APPENDIX E FINAL CREDIT REPORT

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 7/11/2017 Time: 6:54:29PM Calculator version: v4.0

Major Project details

Proposal ID:	144/2017/4350MP
Proposal name:	Wellington Solar Farm
Proposal address:	Goolma Road Wellington NSW 2820
Proponent name:	First Solar (Australia) Pty Ltd
Proponent address:	Level 3 16 Spring Street Sydney NSW 2000
Proponent phone:	02 9002 7710
Assessor name:	Brooke Marshall
Assessor address:	1/216 Carp St Bega NSW 2250
Assessor phone:	64928333
Assessor accreditation:	0035

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	0.32	0.00
White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	143.91	203.14
Total	144.23	203

Credit profiles

1. Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (CW112)

Number of ecosystem credits created	0
IBRA sub-region	Upper Slopes - Central West

Offset options - Plant Community types	Offset options - IBRA sub-regions
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (CW112) Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (CW138) White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (CW215) White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216) Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (CW280)	Upper Slopes - Central West and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216)

Number of ecosystem credits created	26
IBRA sub-region	Upper Slopes - Central West

Offset options - Plant Community types	Offset options - IBRA sub-regions
White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216) Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (CW112) Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (CW138) White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (CW215) Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (CW280)	Upper Slopes - Central West and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

3. White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216)

Number of ecosystem credits created	0
IBRA sub-region	Upper Slopes - Central West

Offset options - Plant Community types	Offset options - IBRA sub-regions
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (CW112) Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (CW138) White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (CW215) White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216) Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (CW280)	Upper Slopes - Central West and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

4. White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216)

Number of ecosystem credits created	177
IBRA sub-region	Upper Slopes - Central West

Offset options - Plant Community types	Offset options - IBRA sub-regions
White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, (CW216) Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, (CW112) Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (CW138) White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (CW215) Red Box - White Box +/- Red Stringybark hill woodland in the NSW South Western Slopes Bioregion, (CW280)	Upper Slopes - Central West and any IBRA subregion that adjoins the IBRA subregion in which the development occurs