Wallaby Creek Wind Farm

Preliminary Biodiversity Assessment

14 June 2023

Project No.: 0599824

The business of sustainability

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Signature Page

14 June 2023

Wallaby Creek Wind Farm

Preliminary Biodiversity Assessment

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Acronyms and Abbreviations

ALA	Atlas of Living Australia
API	Aerial photo interpretation
AOBV	Areas of Outstanding Biodiversity Value
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BOS	Biodiversity Offsets Scheme
BOSET	Biodiversity Offsets Scheme Entry Threshold
BUS	Bird Utilisation Survey
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DCCEEW	Department of Climate Change, Energy, Environment and Water (Commonwealth)
DPE	Department of Planning and Environment (NSW)
DRP	Darling River Plains Bioregion
DRP04	Bogan-Macquarie Sub-region
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ERM	Environmental Resources Management Australia Pty Ltd
IBRA	Interim Biogeographic Regionalisation for Australia
Koala SEPP 2021	*State Environmental Planning Policy (Koala Habitat Protection) 2021*
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013* (NSW)
MNES	Matters of National Environmental Significance
NEM	National Electricity Market
NSSS	Narromine South Switching Station
NSS	Southern Western Slopes Bioregion
NSS02	Inland Slopes Sub-region
NVR Map	Native Vegetation Regulatory Map
PCT	Plant Community Type
PBFD	Psittacine beak and feather disease
PMST	Protected Matters Search Tool
RSA	Rotor Swept Area
SAII	Significant and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SIG	Significant Impact Guidelines
SSD	State Significant Development
SSI	State Significant Infrastructure
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WoNS	Weeds of National Significance
WTG	Wind Turbine Generators

1. INTRODUCTION

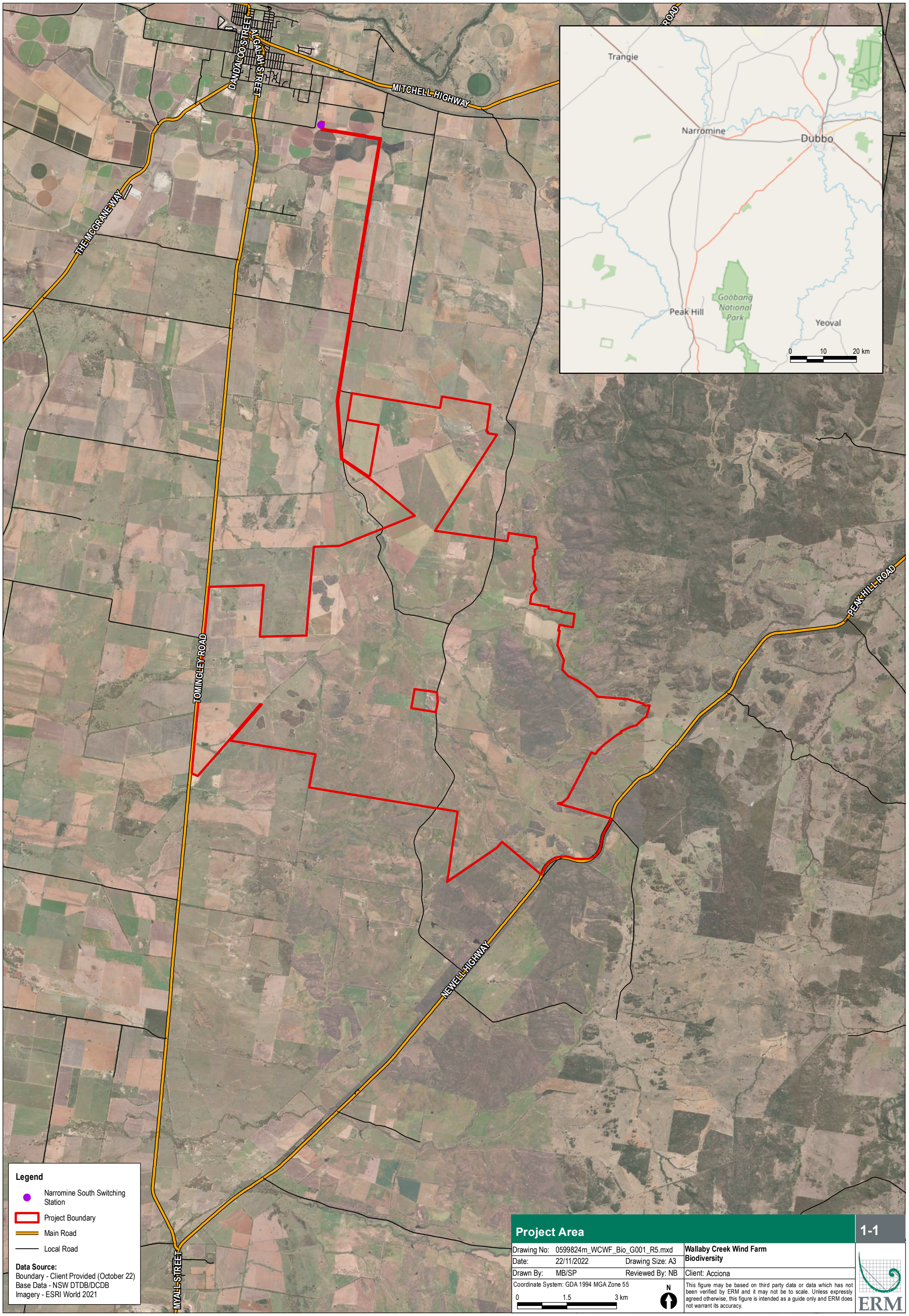
Acciona Energy Australia Global Pty Ltd (Acciona) proposes to develop the Wallaby Creek Wind Farm between the towns of Narromine and Tomingley in the Central West Region of NSW (the Project). The Project includes the in-perpetuity approval for construction, operation, maintenance and decommissioning of an up to 250 Megawatt (MW) wind farm, Battery Energy Storage System (BESS), associated infrastructure, ancillary activities and site access.

The Project is the total area and associated lots where project infrastructure and activities will occur. The Project is demarcated by the red Project Boundary, the line which marks the limits of the Project. A 132kV overhead transmission line or 132kV underground cable, connecting the Project to the existing Essential Energy Narromine South Switching Station (NSSS) will also be developed. This forms a piece of infrastructure referred to throughout as the transmission corridor.

Due to the early stage of design development, the Disturbance Footprint is not able to be accurately defined and is subject to ongoing design and refinement during the preparation of the EIS. For the purposes of this Assessment, a preliminary Disturbance Footprint of 441.1 ha has been assumed.

The Project is situated approximately 280 kilometres (by road) west of Sydney, and 10 km south-east of the township of Narromine across a total area of approximately 9,646.9 hectares (ha). It is located entirely within the Shire of Narromine Local Government Area (LGA) on land that is currently used generally for seasonal farming. The regional context of the Project is identified in **Figure 1-1**.

This Preliminary Biodiversity Assessment (this Assessment) supports an Application to the Department of Planning and Environment (DPE) for Secretary's Environmental Assessment Requirements (SEARs) and EPBC Referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (formerly DAWE).


DANDALOO STREET
GALAH STREET
MITCHELL HIGHWAY
THE MCGRANE WAY
TOMINGLEY ROAD
PEAK HILL ROAD
NEWELL HIGHWAY
MYALL STREET
Trangie
Narromine
Dubbo
Peak Hill
Goobang National Park
Yeoval
0 10 20 km
Legend
Narromine South Switching Station
Project Boundary
Main Road
Local Road
Data Source:
Boundary - Client Provided (October 22)
Base Data - NSW DTDB/DCDB
Imagery - ESRI World 2021
Project Area
1-1
Drawing No: 0599824m_WCWF_Bio_G001_R5.mxd
Date: 22/11/2022
Drawing Size: A3
Drawn By: MB/SP
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
0 1.5 3 km
N
Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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1.1 Objectives

The objective of this Assessment is to provide an indication of potential ecological constraints that may occur within the Project Boundary. The results of this Assessment builds upon an updated desktop review and the Spring 2021 and Summer 2022 field surveys completed by ERM on behalf of Acciona.

For the purpose of this Assessment, biodiversity values include:

- Native species and communities with a particular focus on those listed as migratory, vulnerable, endangered or critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Biodiversity Conservation Act 2016* (BC Act);
- Fauna species susceptible to turbine strikes (e.g., raptors); and
- Important habitat components (e.g., hollow-bearing trees) and landscape features.

This Assessment includes:

- Identification and mapping of threatened flora and fauna species records, important habitat components and landscape features, and fauna species susceptible to turbine strikes;
- Preliminary mapping of the extent and type of native Plant Community Types (PCTs) and Threatened Ecological Communities (TECs);
- Preliminary survey design including likely target species and seasonal survey techniques; and
- A description of outcomes and recommendations to support the ongoing Project design and assessment process.

This Assessment will be presented as an Appendix in the Scoping Report to facilitate the issue of the SEARs, a critical requirement prior to the development of the Environmental Impact Statement (EIS).

1.2 Project Description

As described in **Section 1.0**, the Project will consist of (at least) the following elements:

- Wind Farm: Up to 44 Wind Turbine Generators (WTG) with each having a hub height of up 180 m and tip height of up to 271.5 m;
- Battery Energy Storage System (BESS): With an approximate 100 MW / 200 MWh capacity to support stabilising the supply of electricity to the National Electricity Market (NEM) and associated ancillary infrastructure;
- Electrical Reticulation Network:
  - Substation: One on-site substation (with two potential location options being considered, shown as Option A and Option B in **Figure 1-2**) and associated transformers, switchroom and reactive plant (i.e. SynCon, STATCOM, and filter bank);
  - Transmission line: 132kV overhead transmission line or 132kV underground cable, connecting the Project to the existing Essential Energy Narromine South Switching Station (NSSS);
  - Internal electrical reticulation: Internal underground and overhead electrical reticulation;
  - Switchyard: New feeder at NSSS and other electricity equipment to connect to the existing 132 kV distribution network. Subject to agreement with Essential Energy, this is proposed to be to one of three empty bays. Alternatively, extension of the NSSS may be required;

- Other infrastructure: Internal access tracks connecting the Project infrastructure, hardstands, car parking, wind monitoring masts, concrete batching plants, crushing facilities, gravel / borrow pits, construction laydown areas, construction and operational compounds (including site office and maintenance and storage facilities) and security fencing;
- Ancillary Activities: Sourcing of materials for construction; sourcing of water for construction; subdivision and boundary adjustments relating to lease arrangements, visual screening and associated ancillary works; and
- Access Road Use and Upgrades: Site access likely via Benson/Tantitha Road and/or the Newell Highway, and wind farm components from either the Port of Newcastle or Port Kembla.

The preliminary Project layout is shown in **Figure 1-2**. Aspects not shown will be located within the Disturbance Footprint to be determined for inclusion in the EIS.

The final design and location of Project components (including infrastructure) will be subject to further detailed design and assessment, including consideration of the outcomes of technical and environmental assessments as part of the EIS. Disturbance areas for 'cut and fill' batters as well as Asset Protection Zones will also be defined during this process.

For the purposes of the Scoping Report and associated technical assessments, a preliminary Disturbance Footprint of 441.1 ha has been assumed.

The Permanent Disturbance Footprint is the area of land that will be subject to permanent alteration as a result of construction and operation of Project infrastructure until decommissioning and will comprise (but not be limited to):

- WTG foundations;
- Crane pads;
- Permanent access roads;
- Transmission line poles/towers and transmission line access roads;
- Electrical reticulation overhead cabling;
- Met masts;
- Substation/s, switching station, O&M and other facilities; and
- Public road upgrades required for the transport haul route.

The Temporary Disturbance Footprint is the area of land that will be temporarily disturbed during construction of the Project and rehabilitated and will comprise (but not be limited to):

- Access road construction batters;
- Underground electrical cable footprint;
- Concrete batching plants;
- Construction office compound;
- Some general laydown areas;
- Transmission line temporary access roads; and
- Laydown and assembly areas adjacent to the crane hardstand and wind turbine foundation.

The impact assessment to be included in the EIS will consider both the Temporary Disturbance Footprint and the Permanent Disturbance Footprint, noting the temporary impacted areas will be rehabilitated at completion of construction (subject to landowner agreement).

WILSONS LANE
NARROMINE
GAINSBOROUGH ROAD
620000
DAPPO ROAD
WEBBS SIDING ROAD
REIDS ROAD
Benson/Tanttha Road
6430000
FARRENDALE ROAD
THE MCGRANE WAY
VILLENEUVE DRIVE
CRAIGIE LEA LANE
WALLABY ROAD
PINEDEAN ROAD
BOOTLES ROAD
HABERWORTH LANE
6420000
FAIRVIEW ROAD
TOMINGLEY ROAD
Option B
Option A
BELOWRIE ROAD
NEWELL HIGHWAY
6410000

Legend

- Main Roads
- Minor Roads
- Parkes Narromine Railway

Project Elements

- Project Boundary
- Narromine South Switching Station
- Turbines
- Met Masts
- Access Tracks
- Public Road - Proposed Upgrade
- Carpark
- Hardstands
- Batching Plant
- Compound
- Laydown
- Borrow Pit
- O & M
- BESS
- Substations
- Transmission Line
- Transmission Corridor

Source:
Layout: Client Provided (October 22)
Basedata: NSW DCDB/ DTDB 2022
Imagery: ESRI World Imagery July 2021

Preliminary Project Layout with Transmission Line Corridor

F1-2

Drawing No:	0599824m_WCWF_SR_G014_R10.mxd		
Date:	29/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: DM	

Coordinate System: GDA 1994 MGA Zone 55

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Wallaby Creek Wind Farm
Scoping Report

Client: Acciona

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2. LEGISLATION

Table 2-1 below provides a description of the relevant legislative context. This report addresses the objectives and requirements of the legislation as it relates to the identification of biodiversity and ecological values. Impacts to these values will be addressed separately if required as part of the EIS.

Table 2-1 Legislation Applicable to this Preliminary Biodiversity Assessment

Relevant Legislation
Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
The EPBC Act requires approval of the Commonwealth Minister for the Environment for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES) as assessed in accordance with the EPBC Significant Impact Guidelines 1.1. The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and lists threatened species, ecological communities and other MNES. Any proposed action that is expected to have an impact on MNES must be referred to the Minister for assessment under the EPBC Act, or assessed under the existing bilateral agreement, or accredited process between the Commonwealth and the State of New South Wales (NSW). The ecological desktop review and field studies undertaken to date have determined the presence of MNES within the Project Boundary. The Project will need to be referred to the Australian Government Minister for the Environment.
NSW Statutory Legislation and Guidelines
Biodiversity Conservation Act 2016
The *Biodiversity Conservation Act 2016* (BC Act) came into effect on 25 August 2017. The BC Act replaced the *NSW Threatened Species Conservation Act 1995*, the *NSW Nature Conservation Trust Act 2001* and parts of the *NSW National Parks and Wildlife Act 1974*. The BC Act establishes mechanisms for: ■ The management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TEC); ■ The listing of threatened species, TECs and key threatening processes; ■ The development and implementation of recovery and threat abatement plans; ■ The declaration of critical habitat; ■ The consideration and assessment of threatened species impacts in development assessment process; and ■ Biodiversity Offsets Scheme (BOS), including the Biodiversity Values Map and Biodiversity Assessment Method (BAM) to identify serious and irreversible impacts (SAII). The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments. Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM. A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold (BOSET) tool is available to identify the presence of mapped biodiversity values within land proposed for development as well as the clearing thresholds that would trigger application of the BAM. A review of the BOSET was undertaken on 20 December 2021 and determined that areas within the Project Boundary are mapped as Areas of Biodiversity Value. The BOS applies to state significant development (SSD) and state significant infrastructure (SSI) projects unless the Secretary of the Department of Planning and Environment determines that the Project is not likely to have a significant impact. As this is an SSD development and there are recorded biodiversity values within the Project Boundary, therefore application of the BAM and the preparation of a Biodiversity Development Assessment Report (BDAR) will be required.

Relevant Legislation

Local Land Services Act 2013

The Local Land Services Act 2013 (LLS Act) regulates the management of vegetation on rural land. The amendments to the LLS Act have resulted in a change to the criteria for native vegetation clearing. There are now three different land categories for clearing on rural land:

- Category 1 – 'Exempt land' which will not be subject to clearing approval;
- Category 2 – 'Regulated Land' on which clearing of native vegetation may be carried out with or without approval in accordance with an 'allowable activity' or 'code' under the LLS Act, and
- 'Excluded Land' – Land not categorised in the Native Vegetation Regulatory Map and to which the LLS Act does not apply.

The Native Vegetation Regulatory Map (NVR Map) confirms that areas of Category 2 – Vulnerable Regulated Land are present within the Project Boundary and associated with the riparian areas along watercourses that run through the site. This will be further explored as part of the EIS process. There are also thin strips of Excluded Land. The LLS Act does not apply to these areas but biodiversity values in these areas will need to be assessed under the BAM and addressed in a BDAR for the Project.

It is likely that areas of Category 1- Exempt Land make up the bulk of the Project. These are areas in which broadacre cropping occurs and has historically occurred. Further to this, the underlying land use of the Project suggests that there are significant areas of Category -1 Exempt Land within mapped PCTs where broadacre cropping also occurs.

Biosecurity Act 2015

The NSW *Biosecurity Act 2015* (Biosecurity Act) came into effect on 1 July 2017, effectively replacing the *Noxious Weeds Act 1993*, and 13 other Acts, with a single Act. Under the *Noxious Weeds Act 1993* all landowners had a responsibility to control noxious weeds on their property. Under the Biosecurity Act broadly the same responsibility will apply and will be known as a General Biosecurity Duty.

The General Biosecurity Duty states "Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised." The general biosecurity duty applies to all weeds listed in Schedule 3 of the Biosecurity Act. Primary weeds have been identified in different Local Government Areas (LGA) due to the level of threat infestation they represent, some of the Weeds of National Significance (WoNS) are also listed as primary weeds in LGAs.

A strategic plan for each weed will be required at each site to define responsibilities and identify strategies and actions to control the weed species. These can be downloaded from: https://weeds.org.au/.

Fisheries Management Act 1994

The NSW *Fisheries Management Act 1994* provides for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Similar to the BC Act, the NSW *Fisheries Management Act 1994* lists threatened species, populations and ecological communities of fish and marine vegetation. Consideration of likely occurrence of threatened fish in the waterways within the Project Boundary will be provided within the EIS.

Schedule 6 of the NSW *Fisheries Management Act 1994* also lists the following key threatening process that may be relevant to this Project and will be addressed within the EIS:

- Degradation of native riparian vegetation along New South Wales water courses;
- Human-caused climate change; and
- Removal of large woody debris from New South Wales rivers and streams.

Any waterway crossing will need to consider an appropriately designed structure that does not obstruct fish passage and will be designed in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management and the Policy and Guidelines for Fish Friendly Waterway Crossings. Notwithstanding this, it is noted that a permit under section 219 would not be required for waterway crossings as Section 5.23 of the EP&A Act excludes SSD projects from requiring "a permit under section 201, 205 or 219 of the *Fisheries Management Act 1994".*

Relevant Legislation

State Environmental Planning Policy (Koala Habitat Protection) 2021

The *State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP 2021) was made and commenced on 17 March 2021. The Koala SEPP 2021 reinstates the policy framework of the Koala Habitat Protection SEPP 2019 to 83 Local Government Areas (LGA) in NSW. The Project is located wholly within the Narromine Shire LGA. Koala SEPP 2021 applies throughout the LGA but Koala SEPP 2020 applies within the following land zones:

- RU1 Primary Production Primary production, including agriculture and a diverse range of primary industry enterprises;
- RU2 Rural Landscape Compatible rural land uses, including extensive agriculture; and
- RU3 Forestry land uses and other development compatible with forestry land uses.

The Project would, as far as practicable, aim to be consistent with the objectives of the relevant Koala SEPP and will be addressed within the BDAR to be prepared to support the EIS.

3. METHODOLOGY

This Assessment aims to identify and describe key biodiversity values within the Project Boundary and to provide preliminary recommendations in terms of avoidance, mitigation and/or additional assessment required.

3.1 Desktop Review

The desktop review included the following resources:

- Online Threatened Biodiversity Data Collection (TBDC), including NSW BioNet Atlas, Vegetation Information System (VIS) database and threatened biodiversity profiles. Accessed 10 December 2021;
- Commonwealth Department of Agriculture, Water and the Environment (DAWE) (now DCCEEW) Protected Matters Search Tool (PMST) identifying threatened species and communities with potential to occur within the locality (10 km buffer around the Project Boundary). Accessed 9 May 2023 (**Appendix A**);
- NSW SEED Portal to identify Plant Community Types (PCT), threatened species or communities known or likely to occur, Mitchell Landscapes, map of Interim Biographic Regionalisation of Australia (IBRA) version 7;
- NSW eSPADE Soils and Land Mapping;
- NSW DPI Fisheries key fish habitat mapping;
- Bureau of Meteorology Groundwater Dependent Ecosystem Atlas;
- Weeds of National Significance and Priority Weeds within the LGA;
- Atlas of Living Australia (ALA) Database; and
- Local government databases.

3.2 Spring 2021 and Summer 2022 Field Surveys

Spring 2021 biodiversity field surveys were completed from 15 - 19 November 2021 with two ecologists in the field. During the survey event, the following was undertaken:

- Rapid data points for PCTs / TECs and vegetation zone mapping;
- Vegetation integrity plots (BAM plots);
- Fauna habitat assessments;
- Bird Utilisation Surveys; and
- Acoustic detection surveys for microbats.

The BAM requires targeted surveys to be completed when suitable habitat is identified for species credit species to inform the BDAR. These are species whose presence cannot be reliably predicted through PCTs or habitat types, and their presence or absence on a site must be confirmed through field survey.

Summer 2022 biodiversity field surveys were undertaken from 27 - 30 February 2022; During the survey event, the following was undertaken:

- Nocturnal spotlighting events;
- Acoustic detection surveys for microbats (anabats / songmeters); and
- Bird Utilisation Surveys.

It should be noted that although the field team deployed for 3 days, anabats were successfully deployed in the field for an extended period of time. This resulted in 9 nights of acoustic detection survey from the 27 February through to 8 March 2022.

A summary of the field survey effort is provided in **Table 3-3,** with the location of field surveys shown in **Figure 3-1**. **Figure 3-1** shows that some survey effort and locations were outside of the current Project Boundary. The Project has been revised and subsequently reduced throughout the preliminary design process to avoid areas of high-quality biodiversity and remnant vegetation where possible. As such, some survey locations are located beyond the Project Boundary.

The 2021 winter season had above average rainfall and the Project also received excellent spring rainfall, especially through November 2021, with total rainfall exceeding the monthly mean by over 100 mm (**Table 3-1**).

Table 3-1 Narromine Weather Station 2021 Monthly Rainfall Averages and Trends

Narromine Airport weather station (ID 51115)	Winter			Spring		
	Jun	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
Monthly Rainfall (mm)	89.6	58.8	*No data*	*No data*	29.0	160.5
Mean historical rainfall (mm)	31.5	28.1	41.8	41.1	63.1	59.1
Difference	+58.1	+30.7	NA	NA	-34.1	+101.4

The Narromine weather station was not available for data analysis for the summer 2022 survey, as such the available weather station at Dubbo Airport was used. The preceding summer months had well above mean rainfall, particularly through November 2021 and January 2022 where total rainfall was over double the mean rainfall (**Table 3-2**).

Table 3-2 Dubbo Weather Station 2021 Monthly Rainfall Averages and Trends

Dubbo Airport AWS (ID 65070)	Spring (21)			Summer (21/22)		
	Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Monthly Rainfall (mm)	36.8	35.4	180.8	73.4	130.0	41.0
Mean historical rainfall (mm)	41.5	45.8	66.6	49.2	41.2	30.6
Difference	-4.7	-10.4	+114.2	+24.2	+88.8	+10.4

Table 3-3 Field Survey Method and Effort

Survey type	Effort	Target species	Method
Spring 2021 Survey Effort			
Rapid data points	18 vegetation sample sites throughout the Project (presented on **Figure 3-1**)	Not applicable	PCTs were identified according to the NSW PCT classification as described in the NSW BioNet Vegetation Information System (VIS) using a combination of aerial photo interpretation (API), a review of regional vegetation mapping and ground-truthing of dominant structural / floristic attributes.
Vegetation integrity plots / BAM sites	15 plots completed (presented on **Figure 3-1**)	Not applicable	A total of 15 plot-based floristic surveys were conducted in accordance with s.5.2.1.9 of the BAM. Survey plots were established around a central 50 m transect and each included: ■ One 400 m^2 (20 m x 20 m) plot sampled for the presence of flora species. The plots were carefully examined to identify all flora species present. ■ One 1,000 m^2 (20 m x 50 m) plot to assess the functional attributes: number of large trees, stem size class, tree regeneration and length of logs. ■ Five 1 m^2 sub-plots to assess average litter cover (and other groundcover components)
Bird Utilisation Surveys (BUS)	18 BUS completed 20-minute point observations per location	All threatened and non-threatened birds	18 BUS (20 minutes each) were undertaken. The methods adopted for the BUS were consistent with the requirements for a 'Level One' bird risk assessment (AusWEA 2005). This approach has been endorsed in the AusWEA Best Practice Guidelines (2007). The BUS method involved observers stationed at a fixed survey point for 20 minutes, recording abundance of all large bird species observed within 800 m and all small birds within 100 m. For each observation, flight height was documented. For all raptors, or birds flying at heights above 50 m, direction was also recorded.
Fauna Habitat Assessments	10 fauna habitat assessments	Not applicable	A total of 10 fauna habitat assessments were undertaken to determine potential habitat suitability for listed threatened species. Habitat assessments comprise an assessment of vegetation structure, relevant flora composition, ground cover and fauna utilisation. This assists in potential locations for targeted species survey throughout the BDAR process.
Acoustic detection for habitat detectors	24 nights of acoustic detection (8 anabats / songmeters for 3 nights)	All threatened microbat species	24 nights of acoustic detection via songmeters or anabat detectors (with results analysed by a bat call specialist). Detectors were set for recording before sunset and stopped after dawn and were placed in positions that sought to maximise the likelihood of bat recordings. This survey methodology is described in the BAM survey guide for threatened bats.

Survey type	Effort	Target species	Method
Summer 2022 survey effort			
Spotlighting for nocturnal species	2 nights of spotlighting, resulting in 3 nocturnal fauna transects	Nocturnal fauna species	3 nocturnal transects were undertaken across a variety of habitat for nocturnal species (such as the Australian Bustard, Bush-stone Curlew, Koala, Brush-tailed phascogale, Brush-tailed rock-wallaby, Pink-headed snake, Eastern pygmy-possum and Squirrel glider).
Targeted Fauna Searches	2 targeted fauna transects	South-eastern Glossy Black-Cockatoo and other species	2 targeted fauna searches were undertaken in potential suitable habitat (*Eucalyptus sideroxylon* communities) for the South-eastern Glossy Black-Cockatoo. Hollows were also recorded for this species (>15cm diameter) and for other obligate hollow users. The methods adopted for the targeted searches were area searches consistent with the *Survey guidelines for Australia's threatened birds* (DEWHA, 2010).
Bird Utilisation Surveys	2 BUS completed 20-minute point observations per location	All threatened and non-threatened birds	2 BUS (20 minutes each) were undertaken. The methods adopted for the BUS were consistent with the requirements for a 'Level One' bird risk assessment (AusWEA 2005). This approach has been endorsed in the AusWEA Best Practice Guidelines (2007). The BUS method involved observers stationed at a fixed survey point for 20 minutes, recording abundance of all large bird species observed within 800 m and all small birds within 100 m. For each observation, flight height was documented. For all raptors, or birds flying at heights above 50 m, direction was also recorded.
Acoustic detection for habitat detectors	72 nights of acoustic detection (8 anabats / songmeters for 9 nights)	All threatened microbat species	72 nights of acoustic detection via songmeters or anabat detectors (with results analysed by a bat call specialist). Detectors were set for recording before sunset and stopped after dawn and were placed in positions that sought to maximize the likelihood of bat recordings. This survey methodology is described in the BAM survey guide for threatened bats.

Legend

- Anabat
- BUS Point
- Habitat Survey
- Hollow Count
- Opportunistic
- Spotlighting
- BAM Plot
- Rapid Veg Assesment
- Targeted Fauna Transect
- Spotlighting Transect
- Project Boundary

Data Source:
Boundary - Client Provided (WCWF_AoI_20220829.shp)
Base Data - NSW DTDB/DCDB
Imagery - ESRI World 2021

2021/2022 Field Survey Locations and Effort

3.1

Drawing No:	0599824m_WCWF_Bio_G002_R3.mxd		**Wallaby Creek WF Biodiversity**
Date:	22/11/2022	Drawing Size: A3	
Drawn By:	MB/SP	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 1 2 km

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3.3 Likelihood of Occurrence

Consistent with the accepted approach for biodiversity assessment, a preliminary likelihood of occurrence assessment was undertaken for the Project, informed by desktop sources and the field survey results. Desktop sources identified a number of fauna and flora species listed under the EPBC Act and BC Act that have been recorded previously or are predicted to occur within a 10 km buffer of the Project Boundary. The likelihood of occurrence approach refines the desktop generated list using site-specific and species-specific habitat information.

The assessment ranks the likelihood of the species occurring within the Project Boundary through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey.

The criteria applied are outlined in **Table 3-4.** The preliminary likelihood of occurrence assessment is provided in **Appendix D** of this report.

Table 3-4 Likelihood of Occurrence Criteria

Factor	Preferred Habitat Exists	Suitable Habitat Exists[1]	Habitat does not Exist[2]
Records within Project Boundary	Known	Known	Known
Records in the locality[3]	Likely	Potential	Unlikely
No records in the locality, but Project is within known distribution	Potential	Unlikely	Unlikely
No records in the locality, and Project is outside of distribution	Unlikely	Unlikely	Unlikely

1. *Habitat may be considered suitable, but not preferred.*
2. *Based on sources reviewed and/or field survey results.*
3. *'Locality' refers to a 10 km buffer around the Project Boundary.*

3.4 Assumptions and Limitations

The field and desktop assessments provide an overview of the biodiversity values that exist within the Project Boundary. Surveys were undertaken at discrete locations to ground truth remote sensing mapping and to gain a general understanding of the types of species and habitat features that occur. Not all portions within the Project Boundary could be visited during the field survey.

The absence of a species from a database list or observational studies does not confirm its absence within the Project Boundary. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of species. Similarly, the timing of the survey precludes the detection of a number of migratory and wader species that are typically absent from the area at that time of the year. Future targeted biodiversity surveys will be completed.

To overcome these limitations, the likelihood of occurrence is based on the precautionary approach and identifies species that have the potential to occur rather than relying on species sightings alone.

4. BIODIVERSITY VALUES

This chapter summarises the results of the desktop review and field investigations used to understand and assess the potential biodiversity values present within the Project Boundary. Key landscape features and a summary of biodiversity values within the Project Boundary are summarised in **Table 4-1.**

Table 4-1 Summary of Landscape Features and Biodiversity Values

Landscape Feature	Summary Notes
IBRA Bioregion IBRA Sub-region	The Project is located within two bordering Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions and Sub-regions: ■ NSW Southern Western Slopes Bioregion (NSS) and the Inland Slopes Sub-region (NSS02), of which almost all of the Project sits within; and ■ Darling Riverine Plains Bioregion (DRP) and the Bogan-Macquarie Sub-region (DRP04); which borders the northern extent of the Project.
Land use and history of disturbance	The area within the Project Boundary has generally been utilised for small to mid-scale pastoral and cropping operations, with a predominant focus on sheep for merino wool and broadacre cereal cropping. As a result, densely vegetated areas are primarily located close to or on the ridges and inclines within the Project Boundary.
Vegetation	The area within the Project Boundary was characterised by a mix of improved pasture and high-quality native grasslands, with small remnant patches of woodlands in varying levels of condition. The Project also consists of densely vegetated ridge tops, scattered remnant trees, linear fragments of riparian vegetation and linear fragments of vegetation along fence lines. Based on the results of the Spring field survey, 25 PCTs have been recorded within the Project Boundary. Of these vegetation communities, 18 have association with BC Act listed TECs, and 13 have association with EPBC Act listed TECs.
Threatened species	Six (6) threatened species were identified within the Project Boundary determined from the field surveys over 2021 and 2022. These include: ■ Dusky Woodswallow ■ Spotted Harrier ■ Grey Crowned Babbler (Eastern sub species) ■ Yellow-bellied Sheath-tailed Bat ■ Diamond Firetail ■ Masked Owl Two (2) threatened species were identified outside the Project Boundary from the field surveys over 2021 and 2022. These include: ■ Brown Treecreeper ■ Corben's Long-eared Bat The following sixteen (16) threatened species are considered likely to occur within the Project Boundary based on the Likelihood of Occurrence Assessment (Appendix D): ■ South-eastern Glossy Black-Cockatoo ■ Speckled Warbler ■ Varied Sittella ■ Little Eagle ■ Little Lorikeet ■ Swift Parrot ■ Barking Owl ■ Flame Robin ■ Superb Parrot

Landscape Feature	Summary Notes
	■ Little Pied Bat ■ Corben's Long-eared bat (based off microbat call analysis) ■ Spotted-tailed Quoll ■ Grey-headed Flying-Fox ■ Koala ■ Bluegrass ■ Silky Swainson-pea Further field surveys will be conducted in accordance with the BAM to inform an EIS.
Areas of Geological Significance	There are no karst, caves, crevices, cliffs or other areas of geological significance within the Project Boundary.
Areas of Outstanding Biodiversity Value (AOBV)	There are no Areas of Outstanding Biodiversity Value (AOBV) mapped within the within the Project Boundary.
Aquatic habitat	NSW Hydrography mapping shows Fiddlers Creek and Tomingley Creek occur within the southern portion of the Project, and Bradys Cowel within the northern portion. Wallaby Creek flows in a roughly North/South direction down the length of the Project and is connected to Jack's Creek in the southern portion. Associated drainage lines are present and farm dams are also common across the agricultural landscape. Indirect impacts and sensitive creek crossing designs will be considered as part of the EIS.
Habitat Values	The key habitat types likely to occur within the Project Boundary, based on the desktop review and the Spring 2021 and Summer 2022 survey, are: ■ Native grasslands; ■ Woodlands; ■ Ridgelines and stony (granite dominated) habitats; ■ Waterways and dams; and ■ Hollow-bearing trees. This habitat would provide important foraging, roosting and nesting habitat for a range of fauna.

4.1 Vegetation Communities

The South Western Slope Bioregion (NSS) is dominated by a sub-humid climate, characterised by hot summers and no dry season. The NSS is a large area of foothills and ranges comprising the western fall of the Great Dividing Range to the edge of the Riverina Bioregion. Vegetation communities are dominated by white box woodlands and open woodlands where higher rainfall occurs in the east, and to the west and north vegetation communities are dominated by grey box and white cypress pine.

Large portions of land within the Project Boundary have been disturbed and are characterised by grazed native and modified grasslands resulting from vegetation clearing and livestock grazing.

A review of the state vegetation type mapping for the Central West / Lachlan region (Version 1.4. VIS_ID 4468) was undertaken to access existing vegetation mapping information within the Project Boundary.

In the 2021 Spring survey, ERM conducted 15 vegetation integrity plots (BAM plots) across the Project, as well as 18 rapid data points. Further collection of BAM plots will be undertaken to meet the BAM requirements and will be completed in subsequent survey periods.

This mapping was further refined based on the spring survey observations and BAM plot data, resulting in a total of 22 PCTs being identified across the Project (**Figure 4-1**), including the area of non-native vegetation. **Table 4-2** below lists these PCTs and the area (ha) of each within the Project Boundary.

Table 4-2 Plant Community Types Mapped within the Project Boundary

PCT No.	PCT Name	Vegetation Class	Potential TEC	Area in Project Boundary (ha)	% Project Boundary
0	Non-native	NA	-	3,719.3	38.55
27	Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Riverine Plain Woodlands	BC Act and EPBC Act endangered: ■ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions BC Act critically endangered: ■ Artesian Springs Ecological Community in the Great Artesian Basin	1.9	0.02
36	River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Inland Riverine Forests	BC Act critically endangered: ■ Artesian Springs Ecological Community in the Great Artesian Basin	0.5	0.01
45	Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine Plain Grasslands	BC Act and EPBC Act critically endangered: ■ Natural Grasslands of the Murray Valley Plains; and ■ Artesian Springs Ecological Community in the Great Artesian Basin.	21.8	0.23
49	Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Semi-arid Floodplain Grasslands	EPBC Act endangered: ■ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions BC Act critically endangered: ■ Artesian Springs Ecological Community in the Great Artesian Basin	2.4	0.03
70	White Cypress Pine woodland on sandy loams in central NSW wheatbelt	Floodplain Transition Woodlands		126.4	1.31

PCT No.	PCT Name	Vegetation Class	Potential TEC	Area in Project Boundary (ha)	% Project Boundary
74	Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Floodplain Transition Woodlands	BC Act and EPBC Act critically endangered: ■ White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	59.4	0.62
76	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Floodplain Transition Woodlands	BC Act and EPBC Act endangered: ■ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	247.8	2.57
77	Yarran shrubland of the NSW central to northern slopes and plains	North-west Plain Shrublands	BC Act critically endangered: ■ Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	18.4	0.19
80	Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion	Floodplain Transition Woodlands	BC Act and EPBC Act endangered: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	11.9	0.12
81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Floodplain Transition Woodlands	BC Act and EPBC Act endangered: ■ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	0.3	0.003
82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion	Floodplain Transition Woodlands	BC Act and EPBC Act endangered: ■ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	19.3	0.20

PCT No.	PCT Name	Vegetation Class	Potential TEC	Area in Project Boundary (ha)	% Project Boundary
83	Yellow Box woodland on sandy loam soils on alluvial plains mainly in the upper Darling Riverine Plain Bioregion	Inland Floodplain Woodlands	BC Act and EPBC Act critically endangered: ■ White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions; and ■ Artesian Springs Ecological Community in the Great Artesian Basin.	0.4	0.004
110	Western Grey Box - Cypress Pine shrubby woodland on stony footslopes in the NSW South Western Slopes Bioregion and Riverina Bioregion	Western Slopes Dry Sclerophyll Forests	BC Act and EPBC Act endangered: ■ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	0.3	0.004
185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Inland Rocky Hill Woodlands	-	279.5	2.90
186	Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion	Inland Rocky Hill Woodlands	BC Act critically endangered: ■ Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	113.7	1.18
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodlands	BC Act endangered: ■ Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	0.9	0.01

PCT No.	PCT Name	Vegetation Class	Potential TEC	Area in Project Boundary (ha)	% Project Boundary
217	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Western Slopes Dry Sclerophyll Forests	BC Act critically endangered: ■ Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	616.6	6.39
250	Derived tussock grassland of the central western plains and lower slopes of NSW	Western Slopes Grassland	BC Act and EPBC Act critically endangered: ■ White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions EPBC Act endangered: ■ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	923.7	9.58
267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodlands	BC Act and EPBC Act critically endangered: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	108.2	1.12
461	Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	Western Slopes Grassy Woodlands		199.9	2.07

PCT No.	PCT Name	Vegetation Class	Potential TEC	Area in Project Boundary (ha)	% Project Boundary
796	Derived grassland of the NSW South Western Slopes	Western Slopes Grasslands	BC Act critically endangered: ■ White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	3,174.3	32.90
TOTAL				**9646.9**	**100%**

THE MCGRANE WAY

Benson/Tantitha Road

TOMINGLEY ROAD

PEAK HILL ROAD

NEWELL HIG

Legend

- Project Boundary
- Main Road
- Local Road

Data Source:
Boundary - Client Provided (October 2022)
PCT - West Lachlan v1.4 VIS ID 4468
Base Data - NSW DTDB/DCDB
Imagery - ESRI World 2021

PCT ID, PCT Name

- 0, Not Native
- 27, Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- 36, River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
- 45, Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
- 49, Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- 70, White Cypress Pine woodland on sandy loams in central NSW wheatbelt
- 74, Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- 76, Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- 77, Yarran shrubland of the NSW central to northern slopes and plains
- 80, Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion
- 81, Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
- 82, Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion
- 83, Yellow Box woodland on sandy loam soils on alluvial plains mainly in the upper Darling Riverine Plain Bioregion
- 110, Western Grey Box - Cypress Pine shrubby woodland on stony footslopes in the NSW South Western Slopes Bioregion and Riverina Bioregion
- 185, Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
- 186, Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion
- 201, Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- 217, Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion
- 250, Derived tussock grassland of the central western plains and lower slopes of NSW
- 267, White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- 461, Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 796, Derived grassland of the NSW South Western Slopes

Plant Community Types within the Project Boundary

4.1

Drawing No:	0599824m_WCWF_Bio_G003_R4.mxd		**Wallaby Creek WF**
Date:	22/11/2022	Drawing Size: A3	
Drawn By:	MB/SP	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 1 2 km

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ERM

4.2 Threatened Ecological Communities

Six (6) TECs were identified within the Protected Matters Search Tool as having the potential to occur within the Project (**Figure 4-2**). These TECs include:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia;
- Weeping Myall Woodlands;
- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland;
- Poplar Box Grassy Woodland on Alluvial Plains; and
- Natural Grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland.

A further three (3) TECs have the potential to occur based on their association with PCTs identified in **Table 4-2**:

- Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South-Western Slopes Bioregion (PCT 217, 186, 77);
- Fuzzy Box Woodland on alluvial Soils of the South-Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions (PCT 201); and
- Artesian Springs Ecological Community in the Great Artesian Basin. (PCT 83, 49. 45, 27).

These will need further assessment and confirmation throughout subsequent survey periods.

THE MCGRANE WAY

Benson / Tantitha Road

TOMINGLEY ROAD

PEAK HILL ROAD

NEWELL HIGHWAY

Legend

- Project Boundary
- Main Road
- Local Road

Data Source:
Boundary - Client Provided
(WCWF_AoI_20220829.shp Outline applied)
PCT - West Lachlan v1.4 VIS ID 4468
Base Data - NSW DTDB/DCDB
Imagery - ESRI World 2021

Floodplain Transition Woodlands

- 74, Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- 76, Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- 80, Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion
- 81, Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
- 82, Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion

Inland Floodplain Woodlands

- 83, Yellow Box woodland on sandy loam soils on alluvial plains mainly in the upper Darling Riverine Plain Bioregion

Inland Riverine Forests

- 36, River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Inland Rocky Hill Woodlands

- 186, Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion

Riverine Plain Grasslands

- 45, Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion

Riverine Plain Woodlands

- 27, Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Semi-arid Floodplain Grasslands

- 49, Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Western Slopes Dry Schlerophyll Forests

- 110, Western Grey Box - Cypress Pine shrubby woodland on stony footslopes in the NSW South Western Slopes Bioregion and Riverina Bioregion
- 217, Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion

Western Slopes Grassland

- 250, Derived tussock grassland of the central western plains and lower slopes of NSW
- 796, Derived grassland of the NSW South Western Slopes

Western Slopes Grassy Woodlands

- 201, Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- 267, White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Potential Threatened Ecological Communities within the Project Boundary

4.2

Drawing No:	0599824m_WCWF_Bio_G004_R4.mxd		**Wallaby Creek Wind Farm**
Date:	22/11/2022	Drawing Size: A3	**Biodiversity**
Drawn By:	MB/SP	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 1 2 km

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ERM

4.3 Candidate Species

In accordance with the requirements of Section 5.2 of the BAM, the BDAR will identify the habitat suitability for threatened species within the Project Boundary (refer to **Appendix D** for a preliminary likelihood of occurrence). Species that meet all the relevant criteria will be automatically populated in the BAM-Calculator (BAM-C) to be assessed either for ecosystem credits or species credits. No further assessment is required for those species that are unlikely to occur or where the Project is considered unsuitable habitat.

- **Ecosystem credit species** are considered likely to have suitable habitat on the subject land and must be assessed for impacts, including measures taken to avoid, minimise and mitigate impacts. These species are referred to as 'predicted species' in the BAM-C and the assessor must calculate ecosystem credits to offset any residual impacts.
- **Species credit species** are likely to have suitable habitat on the subject land. They are referred to as 'candidate species' in the BAM-C and will require further assessment.

A preliminary list of candidate species is provided in **Table 4-3.**

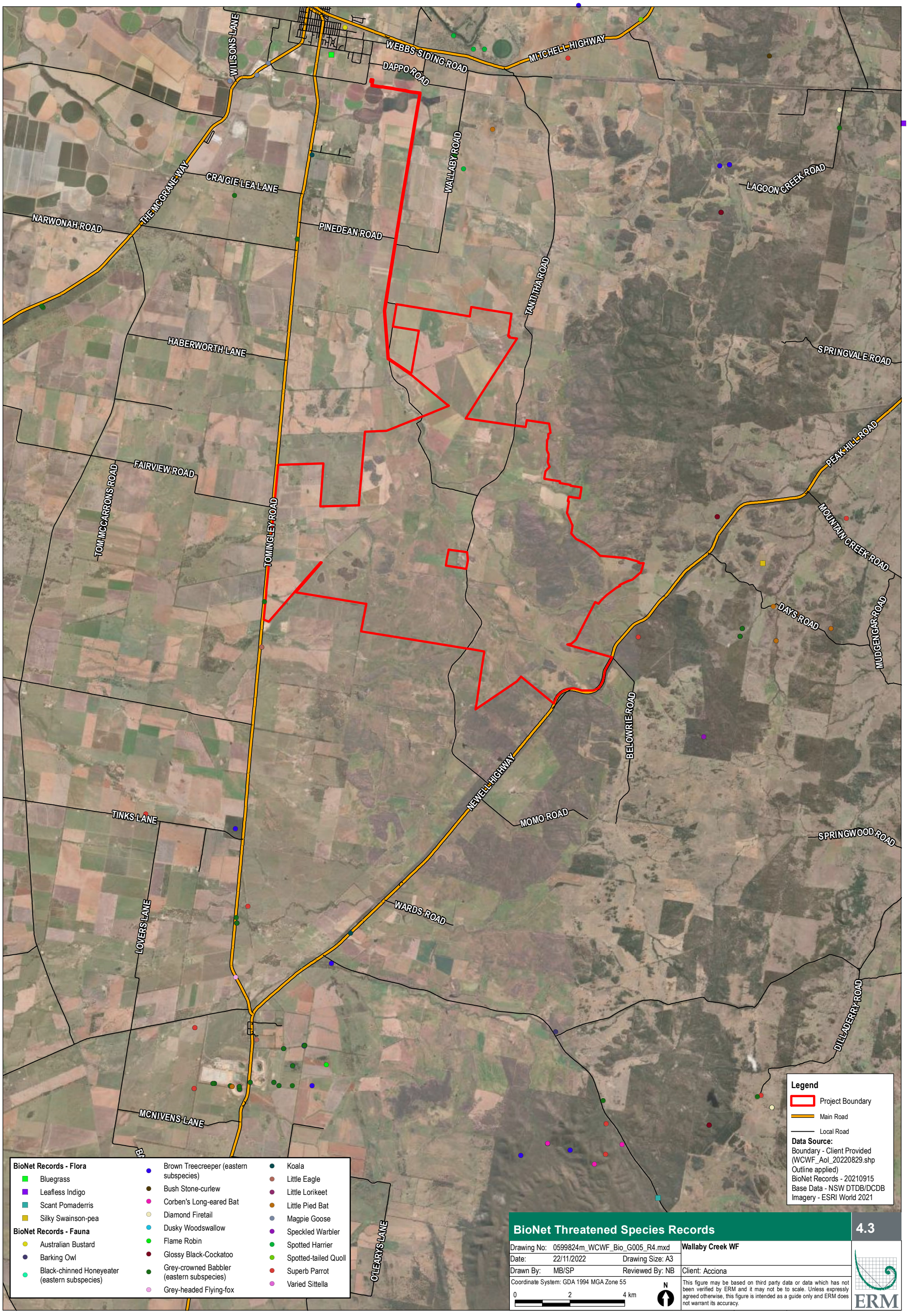
Table 4-3 Preliminary List of Candidate Species that will require Assessment under the BAM

Scientific Name	Common Name	Survey Months
Fauna		
Anthochaera phrygia	Regent Honeyeater	Year round
Aprasia parapulchella	Pink-tailed Legless Lizard	September – November
Ardeotis australis	Australian Bustard	Year round
Burhinus grallarius	Bush Stone-curlew	Year round
Calyptorhynchus banksii samueli	Red-tailed Black cockatoo	May – December
Calyptorhynchus lathami	South-eastern Glossy Black-Cockatoo	January – September
Crinia sloanei	Sloane's Froglet	July – August
Haliaeetus leucogaster	White-bellied Sea-Eagle	July – December
Hamirostra melanosternon	Black-breasted Buzzard	September – November
Hieraaetus morphnoides	Little Eagle	August - October
Hoplocephalus bitorquatus	Pale-headed Snake	November – March
Lophochroa leadbeateri	Major Mitchell's Cockatoo	September – December
Lophoictinia isura	Square-tailed Kite	September - January
Ninox connivens	Barking Owl	May – December
Pandion cristatus	Eastern Osprey	April – November
Phascogale tapoatafa	Brush-tailed Phascogale	December – June
Phascolarctos cinereus	Koala	Year round
Polytelis swainsonii	Superb Parrot	September – November
Pteropus poliocephalus	Grey-headed Flying-Fox	October – December
Turnix maculosus	Red-backed Button-quail	Year round
Tyto novaehollandiae	Masked Owl	May – August

Scientific Name	Common Name	Survey Months
Flora		
Dichanthium setosum	Bluegrass	November – May
Pterostylis cobarensis	Greenhood Orchid	October
Diuris tricolor	Pine Donkey Orchid	September – October
Lepidium monoplocoides	Winged Peppercress	November – February
Swainsona murrayana	Slender Darling Pea	September
Swainsona recta	Small Purple Pea	September – November
Swainsona plagiotropis	Red Darling Pea	September

4.4 Threatened Species

Threatened species records obtained from the NSW BioNet Atlas are presented in **Figure 4-3** and threatened species observed and identified in the Spring 2021 surveys are presented in **Figure 4-4**.



BioNet Threatened Species Records

4.3

Drawing No:	0599824m_WCWF_Bio_G005_R4.mxd		Wallaby Creek WF
Date:	22/11/2022	Drawing Size: A3	
Drawn By:	MB/SP	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 2 4 km

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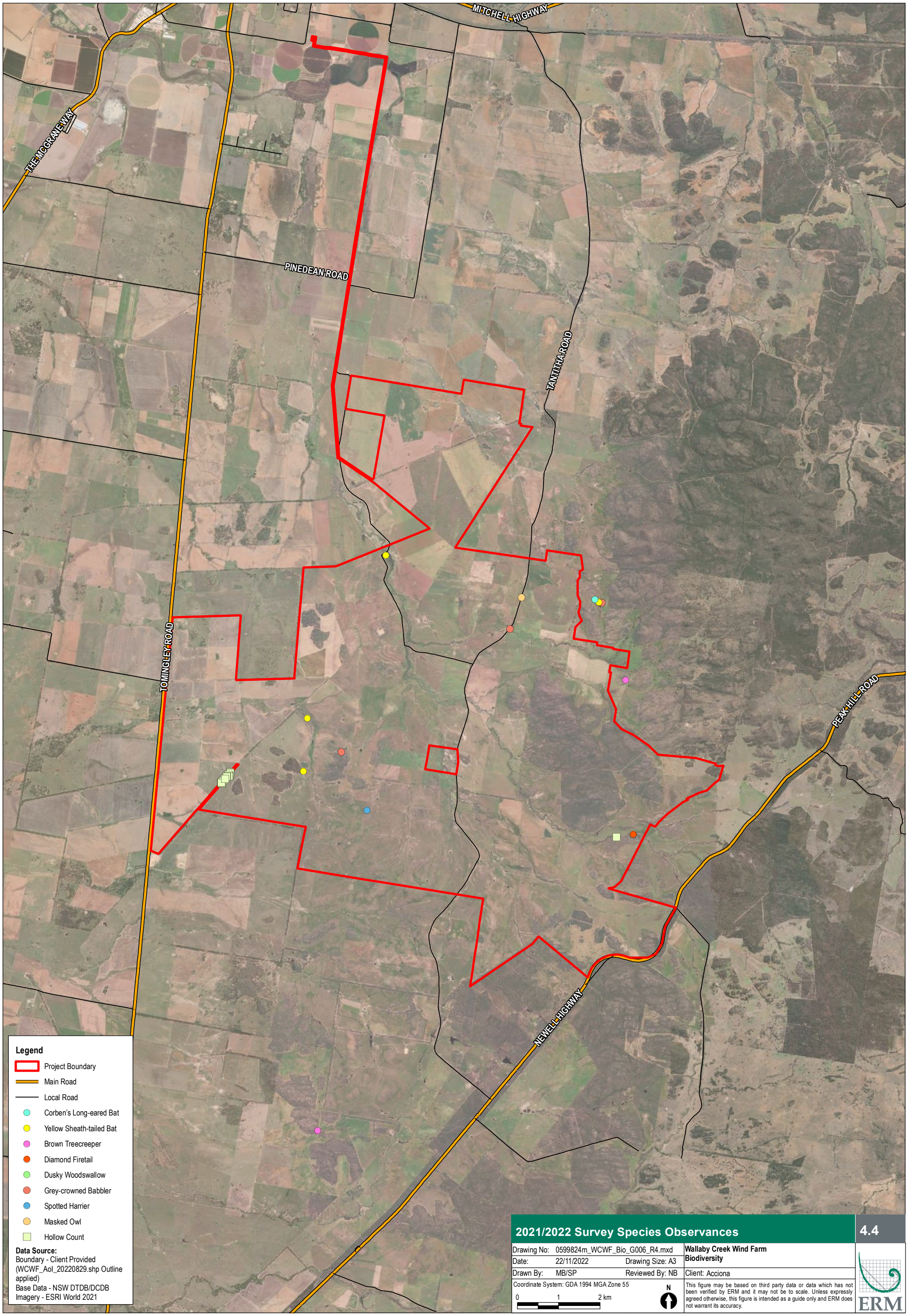

2021/2022 Survey Species Observances

4.4

Drawing No:	0599824m_WCWF_Bio_G006_R4.mxd		**Wallaby Creek Wind Farm** **Biodiversity**
Date:	22/11/2022	Drawing Size: A3	
Drawn By:	MB/SP	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 1 2 km

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ERM

4.4.1 Flora

A review of the NSW BioNet and ALA databases did not identify records of any threatened flora species inside the Project. In addition the candidate threatened flora listed in **Table 4-3**, the likelihood of occurrence assessment (**Appendix D**) considered two (2) flora species as likely to occur based on suitable habitat present within the Project.

The likelihood of occurrence assessments also considered ten (10) species as having the potential to occur based on suitable habitat present within the Project.

These species are detailed in **Table 4-4.**

Table 4-4 Threatened Flora Species Likely or Potential to Occur within the Project

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Recorded during Spring 2021 or Summer 2022 Survey
Species credit Species					
Swainsona sericea	Silky Swainson-pea	V	-	Likely	No
Dichanthium setosum	Bluegrass	V	V	Likely	No
Androcalva procumbens	-	V	V	Potential	No
Austrostipa wakoolica	-	E	E	Potential	No
Diuris tricolor	Pine Donkey Orchid	V	-	Potential	No
Homoranthus darwinioides	Fairy-bells	V	V	Potential	No
Lepidium aschersonii	Spiny Pepper-cress	V	V	Potential	No
Lepidium monoplocoides	Winged Pepper-cress	E	E	Potential	No
Pterostylis cobarensis	Greenhood Orchid	V	-	Potential	No
Swainsona plagiotropis	Red Darling pea	V	V	Potential	No
Swainsona recta	Small Purple-pea	E	E	Potential	No
Tylophora linearis	-	V	E	Potential	No

During the ERM 2021 Spring field surveys, transects were undertaken targeting candidate species within areas of suitable habitat, as well as searches for threatened flora during general traverses and BAM plot survey work.

No threatened flora species were recorded during the ERM 2021 Spring field surveys. No BAM plot surveys or threatened flora transects were conducted in Summer 2022 field surveys. As such, no threatened flora species were recorded during this survey event. Additional BAM plot surveys will be undertaken during the EIS assessment.

The survey effort for threatened flora will be continued during upcoming field surveys to meet the requirements of the BAM.

4.4.2 Fauna

A review of NSW BioNet Atlas identified that two (2) threatened fauna species have been recorded within the Project Boundary in the last 50 years. There were multiple records of additional threatened species within 10 km of the site, these have been considered within the Likelihood of Occurrence Assessment in **Table 4-5.**

The Likelihood of Occurrence Assessment identified a total of seven (7) fauna species that are considered known to occur within the Project based on records in the Project and locality, the presence of preferred habitat, or from observance in the Spring 2021 and Summer 2022 surveys.

The Likelihood of Occurrence Assessment identified a further 16 fauna species that are considered likely to occur within the Project based on the records in the locality, identification from the Spring 2021 and Summer 2022 surveys (but outside the Project Boundary) and the presence of preferred habitat.

These species are detailed in **Table 4-5**.

Table 4-5 Threatened Fauna Species Known or Likely to Occur within the Project

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of Occurrence	Recorded During Surveys
Species credit Species					
Aphelocephala leucopsis	Southern Whiteface	-	V	Known	No
Artamus cyanopterus	Dusky Woodswallow	V	-	Known	Yes
Circus assimilis	Spotted Harrier	V	-	Known	Yes
Pomatostomus temporalis	Grey-crowned Babbler	V	-	Known	Yes
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat	V	-	Known	Yes
Stagonopleura guttata	Diamond Firetail	V	V	Known	Yes
Tyto novaehollandiae	Masked Owl	V	-	Known	Yes
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	Likely	Yes
Calyptorhynchus lathami	South-eastern Glossy Black-Cockatoo	V	V	Likely	No
Chthonicola sagittata	Speckled Warbler	V	-	Likely	No
Daphoenositta chrysoptera	Varied Sittella	V	-	Likely	No
Hieraaetus morphnoides	Little Eagle	V	-	Likely	No
Glossopsitta pusilla	Little Lorikeet	V	-	Likely	No
Lathamus discolor	Swift Parrot	E	CE	Likely	No
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	E	Likely	None
Ninox connivens	Barking Owl	V	-	Likely	No

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of Occurrence	Recorded During Surveys
Petroica phoenicea	Flame Robin	V	-	Likely	No
Polytelis swainsonii	Superb Parrot	V	V	Likely	No
Chalinolobus picatus	Little Pied Bat	V	-	Likely	No
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Likely	Potentially
Dasyurus maculatus maculatus	Spotted-tailed Quoll	V	E	Likely	No
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	Likely	No
Phascolarctos cinereus	Koala	E	E	Likely	No

4.5 Bird Utilisation

Prescribed impacts related to wind farm development apply not only to threatened species but also to any resident raptor species and nomadic or migratory species whose flight paths are likely to cross the Project (Paragraph 6.7.1.5 of the BAM).

Initial Bird Utilisation Surveys (BUS) were undertaken by ERM during the Spring 2021 and Summer 2022 surveys. The survey effort was consistent with the requirements for a 'Level One' bird risk assessment in accordance with the *Best Practice Guidelines for Wind Energy Developments in Australia* issued by the Clean Energy Council (2018) and AusWind (2005) *Wind Farms and Birds: Interim Standards for Risk Assessment.* During the formal BUS, a combined total of 61 species were recorded over the Spring and Summer survey periods.

During the initial BUS, three (3) raptor species were considered vulnerable to collision and were recorded within the likely Rotor Swept Area (RSA), however the level of use of the site by these species was considered low.

- Wedge-tailed Eagle (*Aquila audax*);
- Brown Falcon (*Falco berigora*); and
- Spotted Harrier (*Circus assimilis*).

Operational wind farms pose a collision risk to birds and bats where rotor strike can cause injury or death. Fatalities and injuries are usually caused by a collision with the moving blades (blade strike), or with the turbine infrastructure. The EIS and BDAR will assess potential collision risks to both birds and bats.

4.6 Bat Utilisation

Analysis of the calls that were obtained from the songmeters and anabats deployed in the 2021 Spring and Summer 2022 surveys returned a total of 12 species' identifications (**Appendix C**). Of these species, two species listed as threatened were identified as present within the Project Boundary. These species are listed in **Table 4-6** and depicted in **Figure 4-4**.

Table 4-6 Threatened Bat Species Identified During Spring surveys

Scientific Name	Common Name	BC Act Status	EPBC Act Status
Ecosystem Species			
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	Vulnerable
Saccolaimus flaviventris	Yellow-bellied sheath-tailed Bat	Vulnerable	-

Calls from *Nyctophilus* spp. have been confirmed within the Project Boundary. Three species of *Nyctophilus* possibly occur within the Project Boundary. *Nyctophilus corbeni* (Corben's Long-eared Bat) is listed Vulnerable under the BC Act and the EPBC Act. The call of the different *Nyctophilus* spp. cannot be distinguished from each other. It should be noted that the Corben's Long-eared Bat is also listed as vulnerable under the EPBC Act, however all species would be subject to further survey assessment in the future.

5. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Based on the results of the desktop assessment and the Spring 2021 and Summer 2022 surveys, a preliminary assessment of Matters of National Environmental Significance (MNES) within the Project Boundary has been provided in **Table 5-1.**

Table 5-1 Preliminary Assessment of Matters of National Environmental Significance

MNES	Relevance to the Project
World Heritage Properties	Not identified within the Project Boundary or within 50 km radius.
National heritage properties	Not identified within the Project Boundary or within 50 km radius.
Wetlands of international importance	There are no wetlands of international importance within the Project Boundary. The closest records are greater than 100 km from the Project Boundary (as identified within the Protected Matters Search Tool (PMST)) and include: ■ Banrock station wetland complex - 700-800 km upstream ■ The Macquarie Marshes – 150-200 km upstream ■ Riverland – 600-700 km upstream ■ The Coorong, and Lakes Alexandrina and Albert Wetland – 800-900 km upstream
Threatened Ecological Communities	The PMST identified the following EPBC Threatened Ecological Communities as likely or with the potential to occur within the Project Boundary: ■ Poplar Box Grassy Woodland on Alluvial Plains ■ Grey Box (*Eucalyptus microcarpa*) Grassy Woodland and Derived Native Grasslands of South-eastern Australia ■ Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions ■ Weeping Myall Woodlands ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ■ Natural grasslands on basalt and dine-textured alluvial plains of northern New South Wales and southern Queensland Further assessment and analysis within the BDAR will confirm TECs within the Project Boundary. Fieldwork completed to date has identified areas of potential White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland within the Project Boundary. For this community to meet the requirements of the EPBC Act TEC, the structure generally needs to be of a woodland community and excludes areas of derived native grassland.
Threatened species	12 EPBC Act listed species are considered likely to occur based on records in the locality and the presence of preferred habitat: ■ Bluegrass (Vulnerable) ■ Brown Treecreeper (south-eastern) (Vulnerable) ■ Corben's Long-eared Bat (Vulnerable) ■ Diamond Firetail (Vulnerable) ■ South-eastern Glossy Black-Cockatoo (Vulnerable) ■ Grey-headed Flying-Fox (Vulnerable) ■ Koala (Endangered) ■ Spotted-tail Quoll (Endangered) ■ Superb Parrot (Vulnerable) ■ Swift Parrot (Critically Endangered) ■ Southern Whiteface (Vulnerable) ■ South-eastern Hooded Robin (Endangered)

MNES	Relevance to the Project
	In the case of Corben's Long-eared Bat, the call from this species has been recorded across the Project but is not readily distinguished between other individuals in the *Nyctophilus* genus. However, a conservative approach of considering it likely to occur has been taken.
Migratory species	No migratory species listed under the EPBC Act were recorded during the field surveys or assessed as known or likely within the Likelihood of Occurrence assessment.
Commonwealth Land area	Two (2) commonwealth areas were listed on the PMST: ■ Commonwealth Land - Australian Telecommunications Corporation ■ Commonwealth Land - Commonwealth Trading Bank of Australia These areas are not within the Project Boundary and are located in the towns of Narromine and Dubbo respectively
The Great Barrier Reef Marine Park	Not identified within the Project Boundary or within 50 km radius.
Nuclear actions	Not Applicable.
Water resources as they relate to Nuclear Power	Not Applicable.

Under the EPBC Act a referral is required to the Australian Government DCCEEW for projects, or 'actions', that are likely to have a significant impact on a MNES or the environment on Commonwealth land. The Australian Government Minister for the Environment determines whether or not the Proposal will need formal assessment and approval under the EPBC Act. If so, that Proposal is a controlled action under the EPBC Act.

The findings of biodiversity values assessment carried out to date have not confirmed the physical presence of threatened species listed under the EPBC Act in the Project, however, the Project will be referred to the Australian Government Minister for Environment through the preparation of a Referral as a conservative measure. The extent to which all TECs are present across the site also requires further assessment as potential impacts are still relatively unknown.

Preliminary impact assessments under the *Significant Impact Guidelines 1.1- Matters of National Environmental Significance* have been completed in **Appendix E** for the following MNES considered likely to occur within the Project Boundary:

- Bluegrass (Vulnerable)
- Brown Treecreeper (south-eastern) (Vulnerable)
- Corben's Long-eared Bat (Vulnerable)
- Diamond Firetail (Vulnerable)
- South-eastern Glossy Black-Cockatoo (Vulnerable)
- Grey-headed Flying-Fox (Vulnerable)
- Koala (Endangered)
- Spotted-tail Quoll (Endangered)
- Superb Parrot (Vulnerable)
- Swift Parrot (Critically Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC (Critically Endangered)

Habitat maps/extent of occurrence maps for these species and communities are also outlined in **Appendix E**.

6. PRELIMINARY IMPACT ASSESSMENT

The construction and operation of the Project has the potential to cause impacts to threatened species, raptors and TECs listed under the BC Act and EPBC Act. These will need to be considered as part of the EIS to be prepared under Part 4 of the NSW EP&A Act. As there are recorded biodiversity values within the Project Boundary, application of the BAM and the preparation of a BDAR will be required.

Candidate species will be selected for further assessment by considering how they and their habitat might be affected by the Project. In this instance the main potential impacts of the Project (during construction and operation) that would need to be assessed include:

- Clearing of TECs;
- Loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local population of native species, particularly threatened and migratory species;
- Loss of and impact to resident raptor nesting sites;
- Increased habitat fragmentation;
- Mortality and injury of avian and microchiropteran species from turbine strike;
- Mortality and injury from vehicle strike and vegetation clearing; and
- Mortality and injury from barotrauma.

Mitigation measures relevant to threatened species, TECs, native vegetation communities, species vulnerable to turbine strikes, hydrology and construction impacts will be addressed within the EIS. There is also a risk that weeds may be transported within and off-site. Mitigation measures to reduce the chance of the spread of weeds will be considered within the EIS.

6.1 Serious and Irreversible Impacts

The principles used to determine if a development will have serious and irreversible impacts, include impacts that:

- Will cause a further decline of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to be in a rapid rate of decline, or
- Will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or
- Impact on the habitat of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very limited geographic distribution, or
- Impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

The following species and communities are listed by the NSW Department of Planning and Environment (DPE) as likely to be at risk of serious and irreversible impact (SAII) (if impacted by a development):

- Regent Honeyeater; and
- White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland TEC.

The Regent Honeyeater is listed in the Likelihood of Occurrence Assessment (**Appendix D**) as potentially having habitat within the Project Boundary and fieldwork completed to date has identified areas of potential White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland within the Project Boundary. Under the *Biodiversity Conservation Act 2016*, a determination from the approval authority of whether an impact is serious and irreversible must be made in accordance with the principles prescribed in *clause 6.7* of the *Biodiversity Regulation 2017* for a species or community with a potential for SAII trigger. Further assessment within the Project Boundary would be required to determine the presence or absence of the Regent Honeyeater and White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland TEC.

6.2 MNES Significant Residual Impact

Preliminary impact assessments under the *Significant Impact Guidelines 1.1- Matters of National Environmental Significance* have been completed in **Appendix E** for the following MNES considered likely to occur within the Project:

- Bluegrass (Vulnerable)
- Brown Treecreeper (South-eastern) (Vulnerable)
- Corben's Long-eared Bat (Vulnerable)
- Diamond Firetail (Vulnerable)
- South-eastern Glossy Black-Cockatoo (Vulnerable)
- Grey-headed Flying-Fox (Vulnerable)
- Koala (Endangered)
- Spotted-tail Quoll (Endangered)
- Superb Parrot (Vulnerable)
- Swift Parrot (Critically Endangered)
- South-eastern Hooded Robin (*Melanodryas cucullata cucullata*)
- Southern Whiteface (*Aphelocephala leucopsis*)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC (Critically Endangered)

Habitat maps/extent of occurrence maps for these species and communities are also outlined in **Appendix E**.

A summary of significant residual impact for each species and the TEC has been outlined in **Table 6-1**. A preliminary Disturbance Footprint of 441.1 ha has been applied for the purposes of this impact assessment.

It should be noted, that while the Disturbance Footprint of 441.1 ha is anticipated to occur within the Project Boundary, the Disturbance Footprint extends beyond the Project Boundary in two locations. As such, the following disturbance has not been accounted for in the MNES significance impact calculations:

- South of the Project Boundary, where the public road upgrades are proposed to occur on the Newell Highway, as the extent of disturbance associated with road upgrades has not yet been determined; and
- The borrow pit access tracks' buffer leading from the borrow pit and connecting south to the Newell Highway, as the extent of disturbance required to upgrade this access point has not yet been determined.

The Disturbance Footprint of these areas will be included in the EIS.

Table 6-1 MNES Significant Residual Impact Summary

Species	Habitat within Project	Habitat within Indicative Disturbance Footprint	Comments	Impact Significance
Bluegrass	4,322.7 ha	213.9 ha of potential habitat	A conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment undertaken. No habitat critical to the survival of this species has been recorded within the Project Boundary. This is due to the uncertainty around habitat distribution, as the Project Boundary is outside of the modelled SPRAT distribution. Given that the records that exist within the Project locality are substantially dated (1892) and that potential disturbance to this species will only impact a small amount of potential habitat available throughout the Project Boundary (4.9%), significant impact is unlikely. Further to this, BAM plots and flora transects undertaken for the EIS will indicate any potential populations of this species to be avoided. Based on the potential disturbance of up 213.9 ha or approximately 4.9% of the total potential Bluegrass habitat within the Project Boundary, it is unlikely that Bluegrass will experience a significant impact from the proposed development.	Unlikely to be significant
Brown Treecreeper (south-eastern)	1,359.9 ha	35.4 ha of potential habitat	The assessment of the Brown Treecreeper has identified potential foraging and breeding habitat within the Project Boundary. Accordingly, this habitat also constitutes as habitat critical to the survival of the species. Approximately 35.4 ha, or 2.6 % of available breeding and foraging habitat within the Project Boundary has the potential to result in a significant impact to this species. The removal or disturbance of any habitat critical to the survival of the species may potentially be significant to this species.	Potential to be significant
Corben's Long-eared Bat	1,584.7 ha	57 ha of potential foraging and roosting habitat	Corben's Long-eared Bat (*Nyctophilus corbeni*) has been identified as likely to occur within the Project Boundary. Calls from *Nyctophilus* spp. have been confirmed within the Project Boundary. Three species of *Nyctophilus* possibly occur within the Project. *Nyctophilus corbeni* (Corben's Long-eared Bat) is listed Vulnerable under the EPBC Act and BC Act. The call of this species cannot be distinguished from each other. However, a conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment has been undertaken.	Unlikely to be significant

Species	Habitat within Project	Habitat within Indicative Disturbance Footprint	Comments	Impact Significance
			Potential foraging and roosting habitat totalling 1,584.7 ha, accounting for approximately 16.4 % of the total Project. The total amount of habitat potentially to be disturbed by the Project is up to 57 ha or approximately 3.6 % of the total potential foraging and roosting habitat within the Project. The potential disturbance of 57 ha is unlikely to impact an important population, fragment or reduce the extent of the species, or adversely affect habitat critical to the survival of this species. Further to this, it is still unclear whether Corben's Long-eared Bat is the *Nyctophilus* species identified within the audio recordings, and further assessment will have to be undertaken.	
Diamond Firetail	5,906.7 ha	271.3 ha of potential habitat	The assessment of the Brown Treecreeper has identified potential foraging and breeding habitat within the Project Boundary. Accordingly, this habitat also constitutes as habitat critical to the survival of the species. Approximately 271.3 ha, or 4.6 % of available breeding and foraging habitat within the Project Boundary has the potential to result in a significant impact to this species. The removal or disturbance of any habitat critical to the survival of the species may potentially be significant to this species.	Potential to be significant
Grey-headed Flying-Fox	1,300 ha	34.3 ha of potential foraging habitat	The Grey-headed Flying-Fox has been identified as likely to occur within the Project Boundary due to recent records within the locality and the distance to a flying-fox camp with known Grey-headed Flying-Fox activity (as per the flying-fox camp monitor from the DCCEEW). Due to this species preference for roosting in large conglomerations in roosting camps, breeding and roosting habitat is unlikely to occur within the Project Boundary as these sites are highly conspicuous due to the numbers which appear during roosting. Thus, the Project is likely to provide only foraging habitat in the form of flowering myrtaceous species (given this species is a nectarivore and frugivore). Foraging habitat within the Project accounts for approximately 1,300 ha, of which 34.3 ha of this may be impacted by the proposed development. This represents 2.6 % of the available habitat within the Project. The disturbance of this small amount of potential habitat, along with the availability of flowering myrtaceous species in the wider locality and Project Boundary, and the species' extensive foraging habitats, it is unlikely to be significantly impacted by minimal amounts of linear clearing.	Unlikely to be significant

Species	Habitat within Project	Habitat within Indicative Disturbance Footprint	Comments	Impact Significance
Koala	1,804.9 ha	59.4 ha of potential foraging and breeding habitat	Potential habitat for the koala within the Project Boundary provides foraging, breeding and dispersal functions. The clearing of 59.4 ha of breeding and foraging habitat, while representing a small amount of available habitat within the Project Boundary (3.3%), has the potential for significant impact to the species. The impact to koala dispersal as result of the Project will be short in duration and temporary (koalas will not be impeded and dispersal opportunities will be maintained). It is therefore unlikely that a significant residual impact will occur from the disturbance to koala dispersal habitat (grassland PCTs associated with this species). As such, dispersal function in this area is not going to be impacted by the proposed development and has not been mapped with associated grassland PCTs. The nature of the development, with wind turbines and unsealed access tracks, will not cause a barrier to koala dispersal across the landscape, so the dispersal function of this area of habitat is maintained. However, due to the clearing of 59.4 ha of potential habitat critical to the survival (breeding and foraging) of the species, even whilst representing a small amount of habitat within the Project (3.3%), there is the potential for significant impact to the species.	Potential to be significant
South-eastern Glossy Black-Cockatoo	1,676.9	55.7 ha of potential breeding habitat	The South-eastern Glossy Black-Cockatoo (as *Calyptorhynchus lathami* under EPBC Act) has been identified as likely to occur within the Project Boundary. Habitat for this species can be delineated between breeding and foraging habitat. Foraging habitat is comprised exclusively of she-oak species (*Allocasuarina* spp. and *Casuarina* spp.). Breeding habitat comprises of large hollows (>40 cm) located within mature eucalypts in associated PCTs. All habitat for this species is considered habitat critical to the survival of the species. Potential breeding habitat within the Project totals 1,676.9 ha, accounting for approximately 17.4% of the total Project. The total amount of potential breeding habitat that may be disturbed by the Project is 55.7 ha or approximately 3.3 % of the total habitat within the Project. The potential disturbance of 55.7 ha has the potential to impact an important population, adversely affect habitat critical to the survival of the species and potentially affect the breeding cycle.	Potential to be significant

Species	Habitat within Project	Habitat within Indicative Disturbance Footprint	Comments	Impact Significance
Spotted-tailed Quoll	931.7 ha	13.3 ha of potential foraging and breeding habitat	No habitat critical to the survival of the species was mapped for the Spotted-tailed Quoll as the Recovery Plan for this species denotes that it cannot be mapped. However, potential disturbance to 13.3 ha of potential habitat for this species may still present a significant impact. Due to the Project being within the western extent of the species' distribution any reduction in habitat or disturbance to this habitat may have an effect on the species' area of occupancy, remove critical habitat features utilised for denning and subsequently breeding, and disrupt the breeding cycle. Note this species' home ranges do not overlap more than one male and one female. Therefore, though 13.3 ha only represents 1.4% of available habitat within the Project Boundary, its disturbance could potentially be significant.	Potential to be significant
Superb Parrot	5,532.6 ha	250.8 ha of potential foraging habitat	The assessment of the Superb Parrot identified foraging habitat within the Project Boundary; predominantly used in winter by this species. Breeding habitat for this species has quite specific criteria which has not yet been identified as present within the Project and is likely to be south of the Project Boundary. The removal of 250.8 ha of foraging habitat critical to the survival of this species, while being a small portion of the available habitat within the Project (4.5%), may still constitute a reduction in area of occupancy for this species.	Potential to be significant
Swift Parrot	1,205.6 ha	29.3 ha of potential foraging habitat	While the Swift Parrot does not breed in the mainland, foraging activities are expected to occur within potential habitat within the Project Boundary. Accordingly, habitat critical to the survival of the species is present within the Project Boundary. Approximately 29.3 ha, or 2.4 % of available foraging habitat within the Project Boundary, is expected to be potentially disturbed. The removal or disturbance of any habitat critical to the survival of the species may potentially be significant to this species.	Potential to be significant

Species	Habitat within Project	Habitat within Indicative Disturbance Footprint	Comments	Impact Significance
Southern Whiteface	1,807.8 ha	59.9 ha of potential foraging and breeding habitat	The assessment of the Southern Whiteface has identified potential foraging and breeding habitat within the Project Boundary. Accordingly, this habitat also constitutes as habitat critical to the survival of the species. Approximately 59.9 ha, or 3.3% of available breeding and foraging habitat within the Project Boundary has the potential to result in a significant impact to this species. The removal or disturbance of any habitat critical to the survival of the species may potentially be significant to this species.	Potential to be significant
South-eastern Hooded Robin	1,805.4 ha	59.9 ha of potential foraging and breeding habitat	The assessment of the South-eastern has identified habitat within the Project Boundary that is likely to be utilised for both breeding and foraging functions. Accordingly, this habitat also constitutes as habitat critical to the survival of the species. Approximately 59.9 ha, or 3.3% of available breeding and foraging habitat within the Project Boundary has the potential to result in a significant impact to this species. The removal or disturbance of any habitat critical to the survival of the species may potentially be significant to this species.	Potential to be significant
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC	167.6 ha	3.9 ha of potential habitat	The area of this TEC present within the Project Boundary is to be determined during future survey effort. The area of the associated PCTs (PCT 74, 85 and 267) within the Project Boundary is 167.6 ha. An estimated area of impact associated with the proposed development for the Project is 3.9 ha. Given that this TEC is severely restricted in range throughout this Bioregion, any reduction in its extent is likely to be considered significant, therefore the proposed developed has the potential to present a significant impact on the TEC. Further to this, fragmentation to this TEC is also a risk, particularly given that further work is required to delineate and confirm patches of this TEC within the Project Boundary.	Potential to be significant

6.3 Recommendations and Next Steps

The desktop assessment and field surveys undertaken to date have highlighted a range of known and potential biodiversity constraints. To effectively avoid and minimise impacts associated with the Project Boundary, the following management recommendations will be considered in the EIS:

- Minimise loss of existing native vegetation where practicable, including in areas of high biodiversity value and where there is TEC occurrence.
  - Minimise impacts by maximising footprint in areas of non-native vegetation. Further assessment of PCTs (particularly 250 and 796) may identify larger extents of non-native vegetation (such as those under cropping or of considerable low biodiversity value).
- Aim to minimise habitat loss for threatened species within the Disturbance Footprint:
  - Avoid areas with high hollow potential and mature trees, such as PCTs associated with Box Gum (PCTs 74, 76, 80, 81, 82, 83, 110, 217 and 267)
  - Further micro-siting to avoid known mature trees with hollows may be required.

Further field surveys are recommend to identify and confirm PCTs, areas of TEC, high quality habitat features and determine the presence or absence of threatened species.

6.3.1 Recommended Mitigation Measures

The Project at this early development and assessment phase has taken steps to prioritise the avoidance and mitigation of potential impacts to biodiversity. This includes the early and proactive decision to undertake field surveys for the Project to make more informed decisions about impact assessment to environmental values. This early and proactive decision has helped inform the most current layout in order to avoid highly sensitive areas prior to the BAM assessment.

The following steps are considered essential in ensuring an adequate assessment of biodiversity values is continued throughout future stages of the project:

- Prepare and submit a BDAR in accordance with the BAM, that includes design recommendations to avoid and minimise impacts to significant biodiversity features and SAII entities;
- Prepare a detailed assessment of MNES;
- Conduct further BAM plots to delineate vegetation zones, and targeted seasonal fauna and flora surveys for species considered likely or with the potential to occur within the Project Boundary, in accordance with relevant Commonwealth or State survey guidelines; and
- Effectively minimise impacts associated with the Project through appropriate implementation of the mitigation hierarchy (avoid, minimise and mitigate).

6.4 Preliminary Risk Guidance

The results of the survey effort to date have identified a number of biodiversity constraints that should be considered as part of the design development to avoid and minimise impacts, and to reduce offset liability. These are summarised below and shown on **Figure 6-1**.

- There are large areas within the Project Boundary where non-native vegetation has been confirmed as occurring. These areas are either dominated by exotic grasses or are under cropping land and are designated as 'PCT 0 – Not Native' on the vegetation mapping shown in **Figure 6-1**. These areas may meet the mapping definition of Category 1 – Exempt Land as defined by the *Local Land Services Act 2013*, which means that there may be spatial evidence (which can be confirmed through field assessment) to map these areas as non-native and thereby exclude them from assessment using the Biodiversity Assessment Method (BAM). In addition to this field-verified map prepared by ERM (**Figure 6-1)**, there are also areas that are

currently mapped as 'excluded land' under the NVR Map. These areas are excluded from provisions of the *Local Land Services Act 2013* but do need to be assessed for biodiversity values under the BAM and addressed in the BDAR.

- PCT 45 and PCT 77 are generating a substantially higher credit obligation than other PCTs, due to a high vegetation integrity score determined through the BAM plots undertaken to date. These areas should be avoided where practicable in the final design.
- Areas of the site mapped as PCT 250 - derived tussock grassland of the central western plains and lower slopes of NSW and PCT 796 - derived grassland of the NSW South Western Slopes have a lower biodiversity value for flora and fauna habitat as they lack the floristic structure and condition of woodland or open forest vegetation communities. These PCTs are less likely to generate species credits and should be considered a moderate constraint, with additional field verification required during the EIS phase to delineate areas of any TEC.
- Location of WTGs and other infrastructure within areas of non-native vegetation and derived grasslands should be a primary objective of the design process, where practicable. Further surveys will provide further refinement and assessment of PCT 796 and PCT 250 polygons. This could provide increased areas of non-native vegetation (that are under cropping or areas of low biodiversity value). It is expected that as additional plot-based data is collected, additional areas of these lower biodiversity value PCTs will be identified.
- Where WTGs and associated infrastructure are located in PCT 186, consideration should be given to the placement of WTGs and other infrastructure into PCT 185, as this PCT is of lower value for supporting threatened species and is typically located adjacently to the threatened PCT 186, especially where vegetated ridges are present. This is not critical but would reduce potential offset costs.
- PCTs towards the east of the Project Boundary are typically of more significant biodiversity value due to the reduced amount of cropping towards the ridgelines. This was also reflected throughout the fauna observations during the survey, with 3 of the 4 protected bird species observed where there were higher quality woodlands where permanent water was a habitat feature.
- PCTs associated with box gum and red gums (such as PCT 74, 76, 80, 81, 82, 83, 110, 185, 186, 201, 217, 267 and 461) are producing relatively high counts of species diversity in comparison to grasslands within the Project Boundary and should be treated as areas to avoid, where practicable, due to the nature of the threatened species that are known to, or potentially will, utilise these areas within the Project Boundary.

THE MCGRANE WAY

TOMINGLEY ROAD

Benson/Tantitha Road

PEAK HILL ROAD

NEVERLL HI

Legend

- Project Boundary
- Main Road
- Local Road
- Brown Treecreeper
- Diamond Firetail
- Dusky Woodswallow
- Grey-crowned Babbler
- Spotted Harrier
- Masked Owl
- Corben's Long-eared Bat
- Yellow Sheath-tailed Bat
- TEC
- Exempt Lands
- Turbines

Data Source:
Boundary, Layout - Client Provided (October 2022)
Base Data - NSW DTDB/DCDB
Imagery - ESRI World 2021

PCT ID, PCT Name

- 0, Not Native
- 5, River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion.
- 27, Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- 36, River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
- 45, Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
- 49, Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- 54, Buloke - White Cypress Pine woodland in the NSW South Western Slopes Bioregion
- 70, White Cypress Pine woodland on sandy loams in central NSW wheatbelt
- 74, Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- 76, Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- 77, Yarran shrubland of the NSW central to northern slopes and plains
- 80, Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion
- 81, Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
- 82, Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion
- 83, Yellow Box woodland on sandy loam soils on alluvial plains mainly in the upper Darling Riverine Plain Bioregion
- 110, Western Grey Box - Cypress Pine shrubby woodland on stony footslopes in the NSW South Western Slopes Bioregion and Riverina Bioregion
- 185, Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
- 186, Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion
- 201, Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- 217, Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion
- 250, Derived tussock grassland of the central western plains and lower slopes of NSW
- 267, White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- 268, White Box - Blakelys Red Gum - Long-leaved Box - Nortons Box - Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion
- 280, Red Stringybark - Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion
- 332, Tumbledown Red Gum - Black Cypress Pine - Red Stringybark woodland on rocky hills in the NSW central western slopes
- 461, Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 796, Derived grassland of the NSW South Western Slopes

Preliminary Biodiversity Constraints

6.1

Drawing No:	0599824m_WCWF_Bio_G008_R4.mxd		**Wallaby Creek Wind Farm Biodiversity**
Date:	29/11/2022	Drawing Size: A3	
Drawn By:	MB	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

0 1 2 km

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ERM

APPENDIX A PMST DATABASE SEARCH

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. Please see the caveat for interpretation of information provided here.

Report created: 09-May-2023

Summary

Matters of National Environment 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 (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	43
Listed Migratory Species:	10

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In feature area
Riverland	600 - 700km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site	In feature area
The macquarie marshes	100 - 150km upstream from Ramsar site	In buffer area only

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area	In buffer area only
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area	In buffer area only
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo [82926]	Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area	In feature 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	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature 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]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
PLANT			
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Austrostipa wakoolica [66623]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Homoranthus darwinioides [12974]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat likely to occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hemiaspis damelii			
Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [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.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian & Overseas Telecommunications Corporation [14074]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [14066]	NSW	In buffer area only
Unknown		
Commonwealth Land - [14065]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Narwonah Materials Distribution Centre	2022/09226		Completed	In buffer area only
Controlled action				
Parkes to Narromine Section Inland Rail, NSW	2016/7731	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

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APPENDIX B BIRD UTILISATION SURVEY DATA

Wallaby Creek WF bird survey data collectiion

Site	date	time	survey type	X	Y	Common name	scientific name	quantity	height of flig	distance from	comments	Threatened Status
BUS01	15-Nov	858	Fixed point	-32.383409	148.344560	Noisy friarbird	Philemon corniculatus	1	10	100	13 degrees, sunny, slight breeze	NA
BUS01	15-Nov	858	Fixed point	-32.383409	148.344560	Rufous whistler	Pacycephala rufiventris	2	10	20		NA
BUS01	15-Nov	858	Fixed point	-32.383409	148.344560	Yellow thornbill	Acanthiza nana	2	8	20		NA
BUS02	15-Nov	1158	Fixed point	-32.348096	148.298038	Australian magpie	Gymnorhina tibicen	2	10	20	16 degrees, moderate winds, sunny	NA
BUS02	15-Nov	1158	Fixed point	-32.348096	148.298038	Noisy miner	Manorina melanocephala	2	10	20		NA
Opportunistic	15-Nov	1230	Opportunistic	-32.425078	148.298489	White-necked heron	Ardea pacifica	1	75	100		NA
Opportunistic	15-Nov	1325	Opportunistic	-32.426327	148.280284	Spotted harrier	Circus assimilis	1	5	75	Spotted Harried oobserved hunting low in the fields before perching on fence post.	Vulnerable (NSW)
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Willie wagtail	Rhipidura leucophrys	4	5	20	12 degrees, slight wind, sunny	NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Western gerygone	Gerygone fusca	2	10	50		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Magpie-lark	Grallina cyanoleuca	1	11	25		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Torresian crow	Corvus orru	2	20	50		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	White-necked heron	Ardea pacifica	1	10	15		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Weebill	Smicrornis brevirostris	1	5	40		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Spiny-cheeked honeyeater	Acanthagenys rufogularis	2	1	100		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Rufous songlark	Cincloramphus mathewsi	1	15	100		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Noisy miner	Manorina melanocephala	4	3	50		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	White-plumed honeyeater	Ptilotula penicillata	1	8	40		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Australasian pipit	Anthus australis	1	1	30		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Crested pigeon	Ocyphaps lophotes	1	5	50		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Yellow-rumped thornbill	Acanthiza chrysorrhoa	6	1	25		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Galah	Eolophus roseicapilla	1	30	70		NA
BUS03	16-Nov	820	Fixed point	-32.406211	148.264326	Pelican	Pelecanus conspicillatus	1	150	150	Flying south, observed east of the survey point.	NA
BUS04	16-Nov	1100	Fixed point	-32.382912	148.267182	Noisy miner	Manorina melanocephala	4	10	10	16 degrees, slight breeze, overcast	NA
BUS04	16-Nov	1100	Fixed point	-32.382912	148.267182	Striated pardalote	Pardalotus striatus	1	6	40		NA
BUS04	16-Nov	1100	Fixed point	-32.382912	148.267182	Torresian crow	Corvus orru	2	15	100		NA
BUS04	16-Nov	1100	Fixed point	-32.382912	148.267182	Australian magpie	Gymnorhina tibicen	1	7	40		NA
BUS04	16-Nov	1100	Fixed point	-32.382912	148.267182	Pied butcherbird	Cracticus nigrogularis	2	18	100		NA
Opportunistic	16-Nov	1509	Fixed point	-32.380365	148.339198	Grey-crowned babbler	Pomatostomus temporalis	1	12	10	located close to anabat 14	NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Torresian crow	Corvus orru	2	50	50	Sunny, 12 degrees, strong breeze	NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Australian magpie	Gymnorhina tibicen	1	20	100		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Chestnut-rumped thornbill	Acanthiza uropygialis	2	2	15		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Weebill	Smicrornis brevirostris	4	2	20		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Red-capped robin	Petroica goodenovii	2	3	25		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Galah	Eolophus roseicapilla	2	40	100		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Pied currawong	Strepera graculina	1	30	100		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Black-faced cuckoo-shrike	Coracina novaehollandaie	1	10	25		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	Yellow-faced honeyeater	Caligavis chrysops	2	6	75		NA
BUS05	17-Nov	719	Fixed point	-32.494753	148.267801	White-eared honeyeater	Nesoptilotis leucotis	2	6	100		NA
Opportunistic	17-Nov	830	opportunistic	-32.496263	148.268633	Brown treecreeper	Climacteris picumnus	1	7	5	Located in patch of cypress close to the dam	Vulnerable (NSW)
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Noisy miner	Manorina melanocephala	1	7	10	Sunny, 18 degrees, moderate wind	NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Pied butcherbird	Cracticus nigrogularis	4	10	10		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Australian magpie	Gymnorhina tibicen	7	5	25		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Eastern rosella	Platycerus eximius	2	3	30		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Chestnut-rumped thornbill	Acanthiza uropygialis	10	3	45		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Black-faced cuckoo-shrike	Coracina novaehollandaie	1	6	50		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	white-bellied cuckoo-shrike	Coracina papauensis	1	5	55		NA
BUS06	17-Nov	1001	Fixed point	-32.486764	148.265766	Western gerygone	Gerygone fusca	1	2	60		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Noisy miner	Manorina melanocephala	1	5	20	24 degrees, sunny, slight breeze	NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Eastern rosella	Platycerus eximius	1	5	25		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Pied butcherbird	Cracticus nigrogularis	1	10	150		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Torresian crow	Corvus orru	2	20	150		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Crested pigeon	Ocyphaps lophotes	1	5	150		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Galah	Eolophus roseicapilla	1	30	75		NA
BUS07	17-Nov	1201	Fixed point	-32.482727	148.263303	Brown songlark	Cincloramphus cruralis	1	2	100		NA
BUS08	17-Nov	1253	Fixed point	-32.477947	148.261142	Brown songlark	Cincloramphus cruralis	1	5	50	24 degrees, sunny, slight breeze	NA
BUS08	17-Nov	1253	Fixed point	-32.477947	148.261142	Rufous whistler	Pacycephala rufiventris	3	10	100		NA
BUS08	17-Nov	1253	Fixed point	-32.477947	148.261142	Yellow-rumped thornbill	Acanthiza chrysorrhoa	4	10	100		NA
BUS08	17-Nov	1253	Fixed point	-32.477947	148.261142	Red-capped robin	Petroica goodenovii	1	2	50		NA
BUS09	17-Nov	1456	Fixed point	-32.485951	148.287722	Torresian crow	Corvus orru	2	11	5	26 degrees, sunny, slight winds	NA
BUS09	17-Nov	1456	Fixed point	-32.485951	148.287722	Brown songlark	Cincloramphus cruralis	1	0	5		NA
BUS09	17-Nov	1456	Fixed point	-32.485951	148.287722	Noisy miner	Manorina melanocephala	2	5	100		NA
BUS09	17-Nov	1456	Fixed point	-32.485951	148.287722	Australian magpie	Gymnorhina tibicen	1	10	100		NA
BUS09	17-Nov	1456	Fixed point	-32.485951	148.287722	Blue-faced honeyeater	Entomyzon cyanotis	1	10	50		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Rainbow bee-eater	Merops ornatus	2	10	20	24 degrees, sunny, slight breeze	NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Magpie-lark	Grallina cyanoleuca	1	10	50		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Yellow thornbill	Acanthiza nana	2	7	10		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Ringneck	Barnadius zonarius	6	0	30		NA

BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Red-rumped parrot	Psephotus heamatonotus	2	6	30		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Apostlebird	struthidea cinerea	4	0	20		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Striped honeyeater	Plectorhyncha lanceolata	1	3	25		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Willie wagtail	Rhipidura leucophrys	2	0	15		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Spiny-cheeked honeyeater	Acanthagenys rufogularis	1	7	30		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	White-plumed honeyeater	Ptilotula penicillata	4	6	30		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Noisy miner	Manorina melanocephala	2	5	40		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Pied butcherbird	Cracticus nigrogularis	1	5	40		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Welcome swallow	Hirundo neoxena	1	30	50		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Stubble quail	Coturnix pectoralis	1	0	100		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Brown falcon	Falco berigora	1	15	100		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Australasian pipit	Anthus australis	1	6	50		NA
BUS10	17-Nov	1700	Fixed point	-32.441018	148.325288	Torresian crow	Corvus orru	2	10	50		NA
Opportunistic	17-Nov	1810	Opportunistic	-32.386429	148.315890	Grey-crowned babbler	Pomatostomus temporalis	6	15	5		Vulnerable (NSW)
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Dusky woodswallow	Artamus cyanopterus	2	0	10	16 degrees, sunny, moderate wind	Vulnerable (NSW)
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Rufous songlark	Cincloramphus mathewsi	3	12	10		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	White-plumed honeyeater	Ptilotula penicillata	4	12	10		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Red-rumped parrot	Psephotus heamatonotus	6	3	20		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Fairy martin	petrochelidon ariel	4	25	30		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Peaceful dove	Geopelia placida	1	5	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Noisy miner	Manorina melanocephala	1	10	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Spiny-cheeked honeyeater	Acanthagenys rufogularis	2	10	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Black-faced cuckoo-shrike	Coracina novaehollandaie	1	7	60		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Willie wagtail	Rhipidura leucophrys	2	1	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Stubble quail	coturnix pectoralis	1	0	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Blue-faced honeyeater	Entomyzon cyanotis	1	7	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Galah	Eolophus roseicapilla	2	15	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Rainbow bee-eater	Merops ornatus	1	3	45		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Common bronzwing	Phaps chalcoptera	1	4	45		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Little corella	Cacatua sanguinea	2	5	40		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Magpie-lark	Grallina cyanoleuca	1	15	100		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	White-browed woodswallow	Artamus superciliosus	1	3	15		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Australian magpie	Gymnorhina tibicen	1	10	30		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Diamond firetail	stagonopleura guttata	1	4	50		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Restless flycatcher	Myiagra inquieta	2	2	40		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Laughing kookaburra	Dacelo novaehollandae	2	10	100		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Red wattlebird	Anthochaera carunculata	1	18	15		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Torresian crow	Corvus orru	2	25	150		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Superb fairywren	Malurus cyaneus	2	1	10		NA
BUS11	18-Nov	715	Fixed point	-32.430885	148.348846	Australasian pipit	Anthus australis	1	3	10		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Rufous whistler	Pacycephala rufiventris	6	6	40	24 degrees, sunny, slight breeze	NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Western gerygone	Gerygone fusca	1	5	25		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Rainbow bee-eater	Merops ornatus	2	4	15		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Crested pigeon	Ocyphaps lophotes	1	5	100		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Apostlebird	struthidea cinerea	1	2	75		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Grey fantail	rhipidura albiscapa	4	2	50		NA
BUS12	18-Nov	1010	Fixed point	-32.420717	148.351568	Torresian crow	Corvus orru	1	15	150		NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Rufous whistler	Pacycephala rufiventris	2	5	40	27 degrees, sunny, light winds	NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Yellow-faced honeyeater	Caligavis chrysops	1	5	10		NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Torresian crow	Corvus orru	2	25	100		NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Laughing kookaburra	Dacelo novaehollandae	2	10	100		NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Rainbow bee-eater	Merops ornatus	1	10	100		NA
BUS13	18/11/2021	1215	Fixed point	-32.415419	148.349340	Australian magpie	Gymnorhina tibicen	1	25	250		NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Noisy miner	Manorina melanocephala	3	5	5	30 degrees, sunny, moderate wind	NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Rainbow bee-eater	Merops ornatus	1	10	50		NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Rufous whistler	Pacycephala rufiventris	1	10	50		NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Australian magpie	Gymnorhina tibicen	1	10	110		NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Torresian crow	Corvus orru	2	25	200		NA
BUS14	18-Nov	1532	Fixed point	-32.401533	148.343854	Galah	Eolophus roseicapilla	2	25	20		NA
BUS15	18-Nov	1557	Fixed point	-32.397203	148.346406	Crested pigeon	Ocyphaps lophotes	3	10	20	28 degrees, sunny, moderate wind	NA
BUS15	18-Nov	1557	Fixed point	-32.397203	148.346406	Brown treecreeper	Climacteris picumnus	1	5	40		Vulnerable (NSW)
BUS15	18-Nov	1557	Fixed point	-32.397203	148.346406	Brown songlark	Cincloramphus cruralis	1	10	45		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Noisy miner	Manorina melanocephala	3	10	50	27 degrees, moderate winds, sunny	NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Torresian crow	Corvus orru	2	2	50		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Galah	Eolophus roseicapilla	2	25	400		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Little corella	Cacatua sanguinea	1	30	400		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Wedge-tailed eagle	Aquila Adux	2	100	2000	Spotted off the eastern rdigeline peak east of the survey point. Both circling and rising to 100m	NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Magpie-lark	Grallina cyanoleuca	1	10	150		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Peaceful dove	Geopelia placida	1	10	200		NA
BUS16	18-Nov	1627	Fixed point	-32.375400	148.331185	Crested pigeon	Ocyphaps lophotes	1	5	25		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Jacky winter	Microeca fascinans	2	20	10	21 degrees, sunny	NA

BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Willie wagtail	Rhipidura leucophrys	1	10	10		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Brown treecreeper	Climacteris picumnus	2	8	40		Vulnerable (NSW)
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Rufous songlark	Cincloramphus mathewsi	1	5	50		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Noisy friarbird	Philemon corniculatus	1	6	40		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Red-rumped parrot	Psephotus heamatonotus	2	6	25		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Black-faced cuckoo-shrike	Coracina novaehollandaie	1	15	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Australasian grebe	Tachybaptus novaehollandiae	2	0	40		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Magpie-lark	Grallina cyanoleuca	5	15	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	White-plumed honeyeater	Ptilotula penicillata	6	2	70		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Crested pigeon	Ocyphaps lophotes	2	3	50		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Diamond dove	Geopelia cuneata	1	6	110		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Australian magpie	Gymnorhina tibicen	2	10	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Common bronzwing	Phaps chalcoptera	1	5	75		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Spiny-cheeked honeyeater	Acanthagenys rufogularis	2	7	60		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Rufous whistler	Pacycephala rufiventris	1	10	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Welcome swallow	Hirundo neoxena	1	6	50		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Galah	Eolophus roseicapilla	2	15	60		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Pied butcherbird	Cracticus nigrogularis	1	5	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Eastern rosella	Platycerus eximius	1	0	100		NA
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Grey-crowned babbler	Pomatostomus temporalis	6	2	100		Vulnerable (NSW)
BUS17	19-Nov	706	Fixed point	-32.380429	148.339451	Noisy miner	Manorina melanocephala	1	12	100		NA
BUS18	19-Nov	1116	Fixed point	-32.429125	148.279572	Brown songlark	Cincloramphus cruralis	1	25	20	25 degrees, moderate wind, overcast	NA

APPENDIX C BAT CALL ANALYSIS REPORT

Bat Call Analysis Report

Narromine

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Document Records - Quality

TITLE	Bat Analysis for the site at Narromine
FILED AS	PR21014_Bat Report Narromine

Revision	Date	Prepared by (name/title)	Reviewed by (name/ title)	Approved by (name/title)
Version A	14/12/2021	Kelly Matthews, Principal Ecologist	ERM	Client

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FIGURES

1.0 Introduction

1.1 Background

Green Tape Solutions were commissioned to undertake bat call analysis for a project in Narromine located in New South Wales.

1.2 Scope of Work

The specific scope of works for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of the bat call surveys conducted at the project site.

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using five Anabat Swift detectors (Titley Electronics) and three songmeter Passive monitoring was undertaken from 15 to 18 November 2021. The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using full-spectrum fitted with omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

Call identification for this dataset was based on call keys and descriptions published for Queensland (Reinhold *et al.*, 2001) and New South Wales (Pennay *et al.*, 2004).

Species' identification was further refined using the probability of occurrence of each species based on their geographic distribution (Churchill, 2008, Van Dyck and Strahan, 2008). Species nomenclature used in this report follows Churchill (2008).

The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible -** call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

2.3 National Standard

The format and content of this report complies with the nationally accepted standards for the interpretation and reporting of Anabat and Songmeter data (Reardon, 2003), which is currently available from the Australasian Bat Society at www.ausbats.org.au.

3.0 Results

3.1 Total Species Recorded

The majority of calls were considered to be of medium to good quality calls.

A total of 32,664 sequence files were analysed. A proportion of these files contained background noise or resulted in poor quality calls that did not provide bat calls for analysis. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

A summary of the species identified through bat call analysis is provided in **Table 1**.

Table 1: Summary of bat call analysis

Species	NC Act	EPBC Act	M14	M15	M16	M17	M18	SM1	SM3	SM4
Austronomus australis	LC	NOC	Definite	Definite	Definite	Definite		Definite	Definite	
Chalinolobus gouldii	LC	NOC	Definite	Definite						
Chalinolobus morio	LC	NOC	Definite	Definite						
Nyctophilus sp	V or LC	V or LC	Probable							
Ozimops petersi	LC	NOC		Possible			Possible			
Ozimops planiceps	LC	NOC	Possible		Possible	Possible				
Saccolaimus flaviventris	V	NOC	Definite		Definite		Definite		Definite	
Scotorepens greyii	LC	NOC			Probable	Probable				Probable
Scotorepens balstoni	LC	NOC	Probable				Probable		Probable	
Vespadelus vulturnus	LC	NOC	Possible				Possible	Possible		

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

3.2 Samples of Calls / Sequences Files

Samples of call extracted from the dataset for each species identified is provided in the following figures

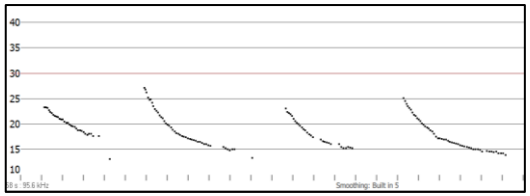
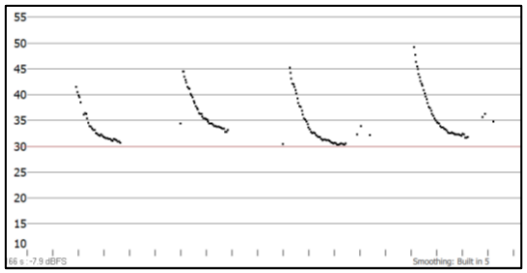
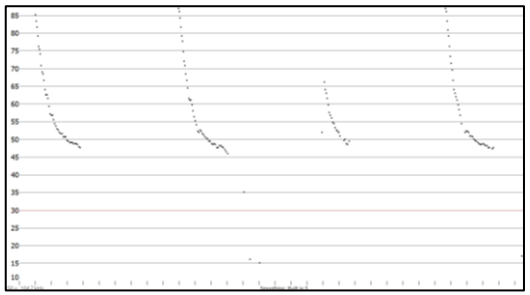
Species' information	Exanple of Calls	Species known location (Extract from Ausbats maps from Australian Bat Society)
Figure 1: Definite *Austronomus australis* This bat is easily recognised by its constant frequency calls range in bandwidth from 10.5 to 15 kHz (Pennay *et al.*, 2004).		
Figure 2: Definite *Chalinolobus gouldii* This species has a curved shape call with characteristic frequency 28 to 34kHz. Pulse alternate in frequency and mostly down-sweeping tail or no tail.		
Figure 3: Definite *Chalinolobus morio* *C. morio* has a down-sweeping tail curved pulse with characteristic frequency 47.5 to 53 kHz. It has often a very brief characteristic section. Species that overlap in frequency (*Vespadelus troughtoni, V. pumilus* and *V. vulturnus*) but all have up-sweeping tails.		

Figure 4: Possible *Ozimops petersi or O. ridei*

This species has flat pulse with a characteristic frequency 29 to 31.5 kHz. If they are calling at lower than 30.5 kHz, it is indistinguishable from *Ozimops ridei*.

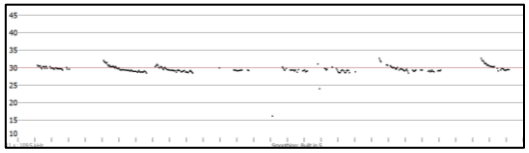


Figure 5: Possible *Ozimops planiceps*

This species has flat pulse with a characteristic frequency 28 to 36 kHz.

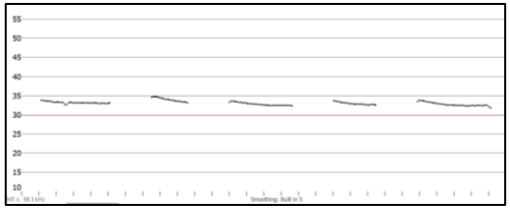
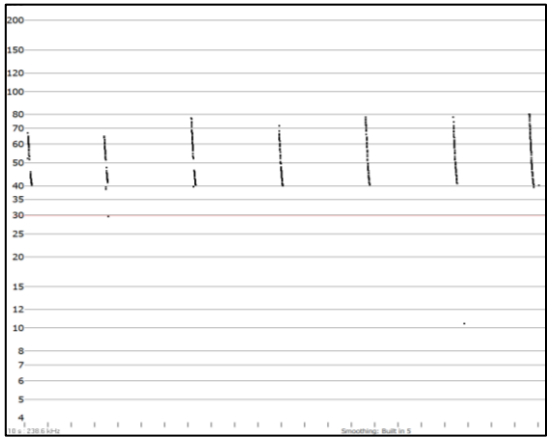


Figure 6: Definitely *Nyctophilus sp*

This species displays a near-vertical pulse, characteristic frequency between 80 and 35KHz (Pennay *et al*, 2004).

The call of these species cannot be distinguished from each other.



N. Corbeni

N. geoffroyi

N. gouldi

Figure 7: Definite *Saccolaimus flaviventris*

Curved, characteristic frequency 18 to 21.5 kHz. The characteristic frequency does not go above 22 kHz. Other species that could overlap do not occur in this area.

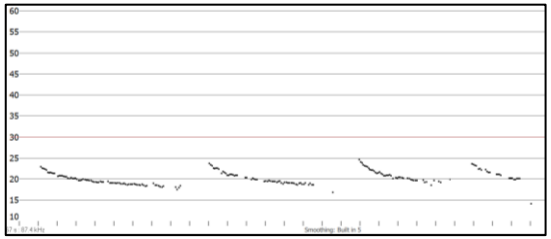


Figure 8: Probable *Scotorepens balstoni*

Curved. Up-sweeping tail common. Characteristic frequency 36 to 41.5 kHz. (Reinhold *et al.*, 2001).

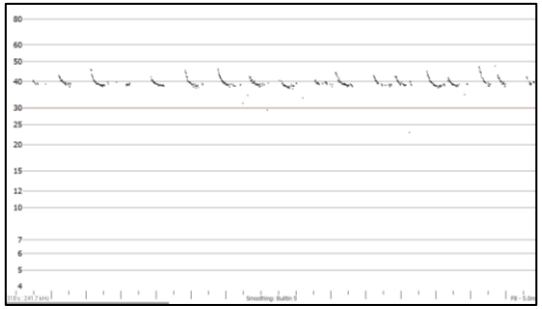


Figure 9: Probable *Scotorepens greyii*

S. greyii has a curved and up-sweeping tail pulse. Its characteristic frequency is between 36 to 41.5 kHz. The up-sweeping tail and time of characteristic section + tail exceeding time of pre-characteristic section will distinguish this from *Falsistrellus tasmaniensis* most of the time.

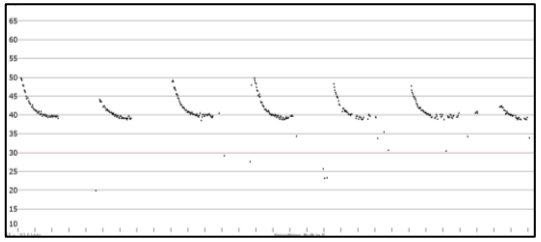
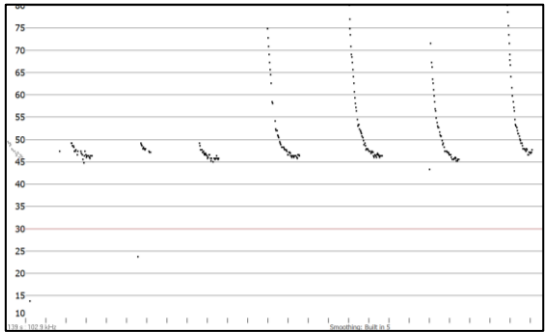


Figure 10: Probably *Vespadelus vulturnus*

Curved and up-sweeping tail calls with characteristic frequency between 45 to 47 kHz.

It cannot be distinguished from *V. regulus*, or some *V. darlingtoni* when up-sweeping tail. However, regulus does not occur in this area.

It is distinguished from *Miniopterus schreibersii oceanensis* by having consecutive pulses even, with mostly up-sweeping tails and drop in frequency of pre-characteristic section mostly less than 2 kHz.



4.0 Conclusion

A total of 10 microbat species were either confirmed ‘definite’, ‘probable’ or ‘possible’ within the Project area. All bats identified on the site were expected to be present within the region.

Calls from *Nyctophilus sp* have been confirmed across the project areas. Three species of *Nyctophilus* possibly occur within the Project Area. *N corbeni* is listed Vulnerable under the EPBC Act and NC Act. The call of this species cannot be distinguished from each other.

5.0 References

CHURCHILL, S. 2008. *Australian Bats,* Sydney, Allen and Unwin.

DEWHA 2010. Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. *In:* DEPARTMENT OF THE ENVIRONMENT WATER HERITAGE AND THE ARTS (ed.). Canberra.

PENNAY, M., LAW, B. A. & REINHOLD, L. 2004. Bat calls of New South Wales: Region based guide to the echolocation calls of microchiropteran bats. *In:* NSW DEPARTMENT OF ENVIRONMENT AND CONSERVATION (ed.). Hurstville.

PWCNT 2002. Key to the Bat Calls of the Top End of the Northern Territory. *In:* PARKS AND WILDLIFE COMMISSION OF THE NORTHERN TERRITORY (ed.). Damian J. Milne.

REARDON, T. 2003. Standards in bat detector based surveys. *Australasian Bat Society* Newsletter 20.

REINHOLD, L., LAW, B., FORD, G. A. & PENNAY, M. 2001. *Key to the Bat Calls of South-east Queensland and North-east New South Wales*, Queensland Department of Natural Resources and Mines.

VAN DYCK, S. & STRAHAN, R. 2008. *The Mammals of Australia (Third Edition); ,* Sydney, New Holland.

Bat Call Analysis Report

Wallaby Creek Wind Farm Project

Prepared for ERM

Prepared by:

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Client Manager: Kelly Matthews
Report Number: ME22019_Bat Call Analysis Wallaby Creek Wind Farm

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Document Records - Quality

TITLE	Bat Analysis for the Wallaby Creek Wind Farm
FILED AS	ME22020_Bat Call Analysis Wallaby Creek Wind Farm

Revision	Date	Prepared by (name/title)	Reviewed by (name/ title)	Approved by (name/title)
Version A	10/05/2022	Kelly Matthews, Principal Ecologist	ERM	Client

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1.2 Scope of Work

The specific scope of works for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of all of the bat call surveys conducted at the project site.

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using eight Anabat Swift detectors (Titley Electronics). Passive monitoring was undertaken from 27 February to 8 March 2022. The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using full-spectrum fitted with omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

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3.0 Results

3.1 Total Species Recorded

The majority of calls were considered to be of medium to good quality calls.

A total of 17,478 sequence files were analysed. A proportion of these files (6,793) in this dataset contained background noise or resulted in poor quality calls that did not provide bat calls for analysis. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

A summary of the species identified through bat call analysis is provided in **Table 1**.

Table 1: Summary of bat call analysis

Species	Biodiversity Act	EPBC Act	1	2	3	4	5	6	7	8
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Chalinolobus morio	LC	NOC	Definite		Definite	Definite		Definite	Definite	Definite
Nyctophilus corbeni	V	V		Possible		Possible	Possible		Possible	Possible
Nyctophilus geoffroyi	LC	NOC		Possible		Possible	Possible		Possible	Possible
Nyctophilus gouldii	LC	NOC		Possible		Possible	Possible		Possible	Possible
Ozimops petersi	LC	NOC	Definite			Definite	Definite	Definite	Definite	Definite
Ozimops planiceps	LC	NOC	Definite		Definite	Definite	Definite	Definite	Definite	Definite
Saccolaimus flaviventris	V	NOC	Definite	Definite		Definite	Definite	Definite	Definite	Definite
Scotorepens balstoni	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
Scotorepens greyii	LC	NOC	Possible	Possible	Possible	Possible	Possible	Probable	Probable	Probable
Vespadelus vulturnus	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

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Samples of call extracted from the dataset for each species identified is provided in the following figures

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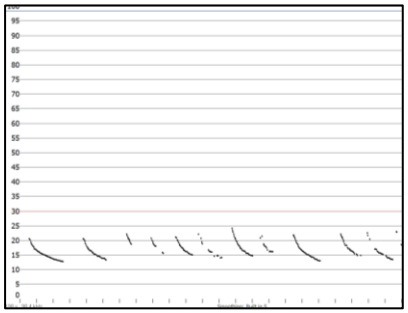
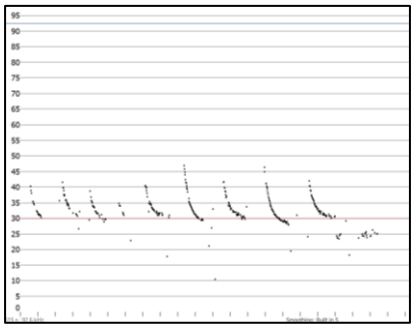
Figure 1: *Austronomus australis* This bat is easily recognised by its constant frequency calls range in bandwidth from 10.5 to 15 kHz (Pennay *et al.*, 2004).		
Figure 2: *Chalinolobus gouldii* This species has a curved shape call with characteristic frequency 28 to 34kHz. Pulse alternates in frequency and mostly down-sweeping tail or no tail.		

Figure 3: *Chalinolobus morio*

C. morio has a down-sweeping tail curved pulse with characteristic frequency 47.5 to 53 kHz. It has often a very brief characteristic section.

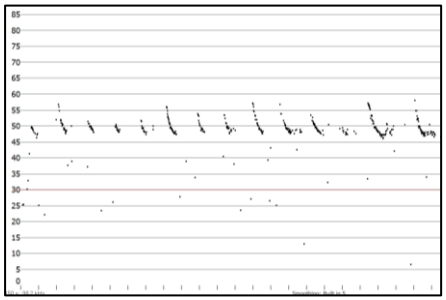
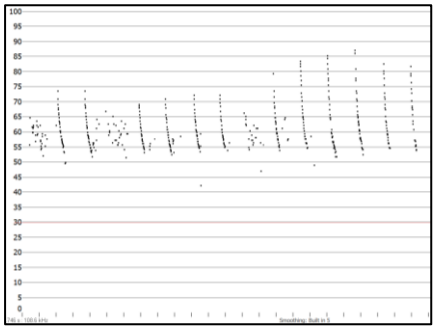


Figure 4: *Nyctophilus spp*

This species displays a near-vertical pulse, characteristic frequency between 80 and 35KHz (Pennay *et al*, 2004).

The species from this genus cannot be distinguished from each other. There are two species that are known to occur in the project area.



N. geoffroyi

N. gouldi

N. Corbeni

Figure 5: *Ozimops petersi*

This species has flat pulse with a characteristic frequency 29 to 31.5 kHz. Unless calling at lower than 30.5 kHz, it is indistinguishable from *Ozimops ridei*.

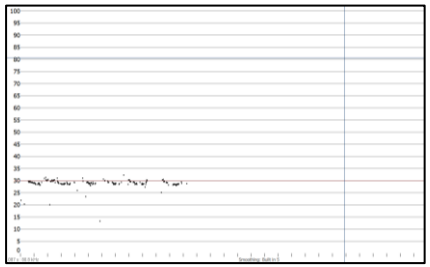


Figure 6: *Ozimops planiceps*

This bat calls are flat and its characteristic is between 24 and 29 kHz.

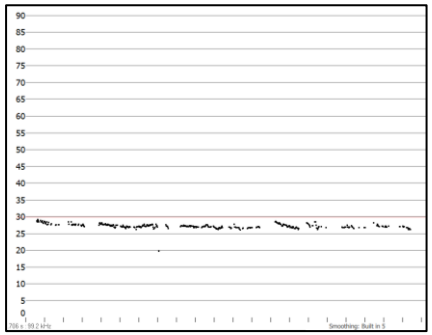


Figure 7: *Saccolaimus flaviventris*

Curved, characteristic frequency 18 to 21.5 kHz. The characteristic frequency does not go above 22 kHz. Other species that could overlap do not occur in this area.

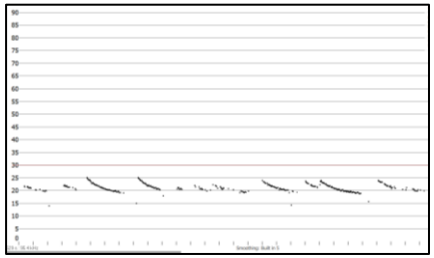


Figure 8: *Scotorepens balstoni*

Pulse of this species is curved with tail variable. Characteristic frequency 31 to 35 kHz and the frequency of the knee 33 to 37 kHz.

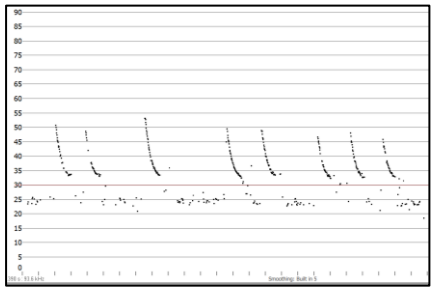


Figure 9: *Scotorepens greyii*

S. greyii has a curved and up-sweeping tail pulse. Its characteristic frequency is between 36 to 41.5 kHz.

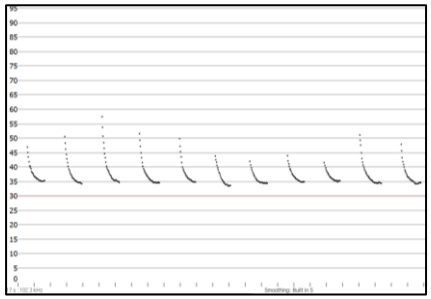
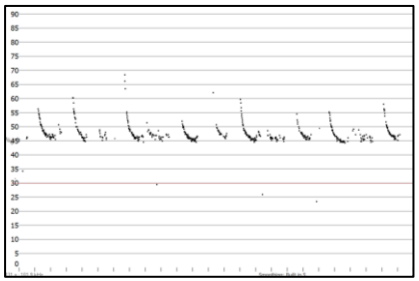


Figure 10: *Vespadelus vulturnus*

Curved and up-sweeping tail calls with characteristic frequency between 45 to 53 kHz.



4.0 References

CHURCHILL, S. 2008. *Australian Bats,* Sydney, Allen and Unwin.

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VAN DYCK, S. & STRAHAN, R. 2008. *The Mammals of Australia (Third Edition); ,* Sydney, New Holland.

APPENDIX D LIKELIHOOD OF OCCURRENCE ASSESSMENT

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Birds							
Anseranas semipalmata	Magpie Goose	V	-	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off. Nests are formed in trees over deep water. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	**Potential:** There are multiple records to the north-west of the Project Boundary within the locality. There is a lack of preferred habitat in the Project Boundary.	No	No
Anthochaera phyrgia	Regent Honeyeater	CE	CE	This species mainly inhabits temperate woodlands and open forest of the inland slopes of south-east Australia. Sometimes also sporadically found in drier coastal woodlands and forests. NSW distribution is very patchy and primarily confined to the two main breeding areas and surrounding fragmented woodlands. The species prioritises Box-ironbark woodlands that support a significantly high abundance and species richness of bird species. These woodlands require significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key foraging species include mugga ironbark, yellow box, white box and swamp mahogany.	**Potential**: The Project Boundary is within the known distribution and there exists the potential for preferred habitat to exist across the site. However, there are no records within the Project Boundary or within the locality, and it is not a mapped as an Important Area for the species under the BAM. There are records in and around the locality of Dubbo, approximately 20 km away. The most recent record is from 2014.	No	Yes
Ardeotis australis	Australian Bustard	E	-	In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees.	**Potential:** The Project Boundary is within the known distribution and there exists the potential for preferred habitat to exist across the site. However, there are no records within the Project Boundary or within the locality of the Project. There are records in and around the locality of Narromine approximately 20 km away. The most recent record of which occurs from 2014.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Artamus cyanopterus	Dusky woodswallow	V	-	The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	**Known:** Preferred habitat does exist within the Project Boundary and this species was observed in the Spring 2021 survey within the Project.	Yes	Yes
Botaurus poiciloptilus	Australasian Bittern	E	E	In New South Wales, it occurs along the coast and is also frequently recorded in the Murray Darling Basin, notably in floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. The species occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g., *Phragmites, Cyperus*, *Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate.	**Unlikely:** The Project Boundary is within the known distribution, however there are no records within the Project Boundary or the locality. The nearest record is over 40 km away to the north. There is also a lack of preferred habitat in the Project Boundary.	No	No
Burhinus grallarius	*Bush Stone-curlew*	*E*		*The bush-stone curlew is common in northern Australia, however in the south-east is either rare or extinct. It inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. It is largely nocturnal and active on moonlit nights. It also forages on insects and small vertebrates, such as frogs, lizards and snakes.*	*Potential: The Project Boundary is within the known distributions, however there are no records within the Project Boundary or the locality. There is also preferred habitat for this species within the Project Boundary. The nearest record is approximately 12 km to the north.*	*No*	*Yes*

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Calidris ferruginea	Curlew Sandpiper	E	CE	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in salt works and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	**Unlikely**: The Project Boundary is within the known distribution, however there are no records within the Project Boundary or the locality. There may be suitable habitat for this species within the Project Boundary in the form of farm dams, waterholes and ephemeral pools. The nearest record is approximately 24 km to the north in Dubbo.	No	No
Callocephalon fimbriatum	Gang-gang cockatoo	V	E	The gang-gang cockatoo occurs in tall mountain forests and woodlands, particularly in those that are heavily timbered and mature. Often moves to drier more open eucalypt forests and woodlands (like box-gum and box-ironbark assemblages) or in dry forest in coastal areas and often in urban areas.	**Unlikely:** The Project Boundary is within the known distribution, however there are no records within the Project Boundary or the locality. Given that the occurrences in the extremities of its range are rare and habitat on sire is not heavily timbered or mature, it is unlikely to occur. The nearest record is approximately 60 km to the south, in the southern section of Goobang National Park.	No	No
Calyptorhynchus banksii samueli	Red-tailed Black cockatoo	V	-	In NSW, the inland species is known to occur around watercourses and overflows of the Darling, Paroo, Bogan, Macquarie and Barwon Rivers. They are found in a wide variety of habitats, but prefer eucalyptus forest and woodlands, particularly river red gum and coolabah lined watercourses. Acacia and casuarina woodlands are also utilised in more arid zones.	**Potential**: The Project Boundary is within the known distribution, however there are no records within the Project Boundary or the locality. There is preferred habitat for this species within the Project Boundary, particularly along watercourses that contain river red gum and patches of casuarina. The nearest record is approximately 24 km to the north in Dubbo.	No	Yes
Calyptorhynchus lathami (as *Calyptorhynchus lathami* under EPBC Act)	South-eastern Glossy Black-Cockatoo	V	V	This species inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Black she-oak and forest sheoak are important foods. Belah is also utilised for foraging resources. The species is also dependant on large-hollow bearing eucalypts for nesting sites.	**Likely:** The Project Boundary is within the known distribution and there is a record within the locality in close proximity to the Ugumijil Creek. Preferred habitat also occurs within the Project Boundary.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Chthonicola sagittata	Speckled Warbler	V	-	This species lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	**Likely:** There are records within the locality of the Project and preferred habitat in the form of *Eucalyptus* communities and regrowth, as well as tussock grasses, occurs within the Project Boundary.	No	Yes
Circus assimilis	Spotted Harrier	V	-	This species disperses widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	**Known:** this species is recorded within the Project locality and was recorded foraging over grasslands during the Spring 2021 survey within the Project Boundary.	Yes	Yes
Climacteris picumnus victoriae	Brown Treecreeper (Eastern subspecies)	V	-	This species is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Found in eucalypt woodlands (i*ncluding Box-Gum Woodland*) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses;	**Likely:** There are multiple records from BioNet within the locality and preferred habitat exists on site with eucalypt forest and woodland. This species was also recorded in the Spring 2021 survey outside of the Project Boundary.	Yes	Yes
Daphoenositta chrysoptera	Varied Sittella	V	-	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	**Likely:** There are multiple records in the locality and preferred habitat exists within the Project Boundary in the form of eucalypt forests and woodlands.	No	Yes

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Falco hypoleucos	Grey Falcon	E	V	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species frequents timbered lowland plains, particularly acacia shrub lands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter. Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	**Potential:** Lack of records within the locality, however the Project Boundary is within the distribution for the species and contains preferred habitat.	No	Yes
Glossopsitta pusilla	Little Lorikeet	V	-	NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g., paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	**Likely:** There are records within the locality and there is preferred habitat within the Project Boundary.	No	Yes
Grantiella picta	Painted Honeyeater	V	V	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower, although it breeds in quite narrow roadside strips if ample mistletoe fruit is available. The species appears to prefer mistletoe as a nest substrate and selects nest sites in habitats where mistletoe prevalence and parasitism rates are high.	**Potential:** There is a lack of records in the locality however the Project Boundary contains preferred habitat of casuarinas, and mature box-ironbark-yellow gum woodlands containing mistletoe.	No	Yes

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Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	This species is widespread along the coast of NSW and along major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water, including large rivers, swamps, lakes, and the sea. Terrestrial habitat includes coastal dunes, tidal flats, grassland, heathland, woodland and forest (including rainforest). Breeding habitat, like most large eagles, consists of mature tall open forest, tall woodland and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts. They feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.	**Unlikely:** Preferred habitat of large areas of open areas is located to the north of the Project Boundary at the Macquarie River. This is subsequently where all local records are restricted too. Nesting habitat within the Project Boundary may be associated with open forests adjacent to the Wallaby Creek where larger eucalypts are found, however preference for the larger waterways would be more likely.	No	No
Hamirostra melanosternon	Black-breasted Buzzard	V	-	This species is found sparsely in areas of less that 500mm rainfall of north-western NSW. In inhabits a range of inland habitats, especially along timbered watercourses (its preferred breeding habitat). It also hunts over grassland and sparsely timbered woodlands.	**Unlikely:** Portions of the Project are within the known distribution, while others, to the east of the Project Boundary, are within the predicted distribution. Some suitable habitat occurs within the Project Boundary, but there are no records within the Project Boundary or locality, with the nearest being east over 58 km away.	No	No
Hieraaetus morphnoides	Little Eagle	V	-	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. It occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also utilised. Like most eagles, builds large stick nests in tall living trees within remnant patches.	**Likely:** The Project Boundary is within the known distribution of the species and there are 8 records within the locality. There is also preferred habitat within the Project Boundary.	No	Yes

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Hirundapus caudacutus	White-throated Needletail	-	V	The white-throated needletail is a migratory species with is usually seen in Eastern Australia from October to April. It breeds in the northern hemisphere near Siberia, Mongolia and Korea. They are often seen in Australia before storms where they follow low pressure troughs and approaching cold fronts (sometimes bushfires) which lift insects for their foraging. The white-throated needletail is almost exclusively aerial and are typically recorded most often above wooded areas, including open forests and rainforest. This species may roost in these areas as well, both among dense foliage and hollows, though this is likely uncommon.	**Potential:** The Project Boundary is within the known distribution and records are to the south, however these are outside the locality. There is also preferred habitat to identify this species.	No	Yes
Lathamus discolor	Swift Parrot	E	CE	Breeds in Tasmania during Spring and Summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland and in NSW they occur in areas where eucalypts are flowering in large numbers, or where there are abundant lerp (from sap-suckign bugs) infestations. Favoured trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood C. *gummifera,* Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*.	**Likely:** The Project Boundary is within the known distribution and records are within the locality to the south east. There is also preferred habitat within the Project Boundary for this species. However, the Project Boundary is not within a mapped Important Area for the species under the BAM.	No	Yes
Leipoa ocellata	Malleefowl	E	V	The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. Much of the best habitat for Malleefowl has already been cleared or has been modified by grazing by sheep, cattle, rabbits and goats.	**Unlikely:** there is a lack of records in the locality and the Project Boundary does not contain preferred habitat.	No	No

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Lophochroa leadbeateri leadbeateri	Major Mitchell's Cockatoo (eastern)	E	-	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	**Potential:** There are no records of this species within the site or locality. The closest records are further north near Dubbo (approximately 20 km away. Some preferred habitat occurs in the form of *Callitris* forest.	No	Yes
Lophoictinia isura	Square-tailed Kite	V	-	This species ranges along coastal and subcoastal areas. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It occupies a variety of timbered habitats, including dry woodlands and open forests, with a preference for timbered watercourses. In more arid areas, is has been observed in stony country with various grass covers, open acacia shrub land and patches of low open eucalypt woodland.	**Potential:** There are no records of this species within the Project Boundary or locality. The closest records are further north near Dubbo and Narromine (approximately 20 km away. The Project Boundary contains preferred habitat of dry woodlands and open forests and is within the known distribution.	No	Yes
Ninox connivens	Barking Owl	V	-	The Barking Owl is found throughout continental Australia except for the central arid regions and occurs in a wide but sparse distribution in NSW. It inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g., western NSW) due to the higher density of prey found on these fertile riparian soils. Roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance.	**Likely:** There are two records within the locality of the Project. The two records are 6 km (2006) and 8 km (2001). There is preferred roosting habitat in *Casuarina* spp. within the Project Boundary.	No	Yes

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Numenius madagascariensis	Eastern Curlew	-	CE, Mi	Within Australia, the species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (*Zosteraceae*). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal salt works and sewage farms.	**Unlikely:** No records within the locality, the Project Boundary is not within the distribution for the species and suitable habitat is not present within Project Boundary. The closes record is over 200 km away.	No	No
Pandion cristatus	Eastern Osprey	C	-	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. They favour coastal areas, especially the mouths of large rivers, lagoons and lakes.	**Unlikely:** A record exists south of Dubbo along the Macquarie river; however, the Project Boundary is only partially within the predicted distribution of the species, and no suitable habitat exists within the Project Boundary.	No	No
Petroica phoenicea	Flame Robin	V	-	The Flame Robin is endemic to south eastern Australia. In NSW it breeds in upland areas, and in winter many birds move to the inland slopes and plains. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. In winter, birds migrate to drier more open habitats in the lowlands (i.e., valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	**Likely:** There are records within the locality of the Project and there is preferred habitat within the Project Boundary in the form of pastures, native grasslands, dry forests and open woodlands.	No	Yes

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Polytelis swainsonii	Superb Parrot	V	V	This species is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. This species inhabits box-gum, box-cypress-pine and Boree Woodland and River Red Gum Forest.	**Likely:** There are multiple records within the locality. The Project Boundary contains preferred habitat for this species within its boundary, typically in the form of river red gum along waterways, as well as a box gum, and cypress pine woodland.	No	Yes
Pomatostomidae temporalis	Grey-crowned Babbler (eastern subspecies	V	-	In NSW, this species inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds.	**Known:** there are multiple records of this species within the locality and the Project Boundary. Preferred habitat for the species is within the Project Boundary and the species was sighted in the Spring 2021 Survey.	Yes	Yes
Rostratula australis	Australian Painted Snipe	E	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby.	**Potential.** There are no records of the species in the locality, however there are small and limited patches of preferred habitat may occur across the site of temporary flooded grasslands and shrub land.	No	Yes

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Stagonopleura guttata	Diamond Firetail	V	V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	**Known:** The diamond firetail has records within the locality and has preferred habitat within the Project Boundary in the form of grassy eucalypt woodlands and grasslands.	Yes	Yes
Turnix maculosus	Red-backed Button-quail	V	-	This species is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical from western NSW (a breeding record from Finley in 1954; the Macquarie Marshes in 1955; and Coolabah in 2000) Inhabit grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate areas, typically only in regions subject to annual summer rainfall greater than 400 mm. In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass, Blady Grass and Buffel Grass.	**Unlikely:** while there is preferred habitat within the Project Boundary, records are not within the locality with the closest being over 200 km away, and only part of the Project Boundary within the 'predicted' distribution range.	No	No
Tyto novaehollandiae	Masked Owl	V	-	Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. It inhabits dry eucalypt forests and woodlands from sea level to 1100 m. While a forest species, often hunts along the edges of forests, including roadsides. Roosts and breed in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	**Known:** Preferred habitat exists, however records within the Project Boundary and the locality are absent. The Project Boundary is within the known distribution of the species. This species was observed during the Summer 2022 surveys	Yes	Yes
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	V	E	The South-eastern Hooded Robin occurs throughout south-eastern Australia from far south-east Queensland through to South Australia. The population is severely fragmented due to known and abundant threats. The species is largely sedentary and prefer habitats of dry eucalyptus and acacia woodlands and shrublands with an open understorey, some grassy areas and a complex round later.	**Likely:** preferred habitat exists within the Project Boundary and records of this species exist within the locality to the east, approximately 2 km away**.**	No	Yes

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Neophema chrysostoma	Blue-winged Parrot	-	V	The Blue-winged Parrot inhabits a range of habitats, from coastal, sub-coastal and inland areas, through to semi-arid zones. The species tends to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. This species breeds south of the Great Dividing Range in Tasmania and Mainland Australia.	**Potential:** habitat requirements for this species are broad, and as such preferred habitat cannot be discounted within the Project, however the closest record of this species is approximately 50 km to the east of the Project Boundary	No	Yes
Aphelocephala leucopsis	Southern Whiteface	-	V	This species is a small stocky thornbill-like bird occurring across most of mainland Australia. This species inhabits a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands and plains.	**Known**; Preferred habitat exists within the Project Area and records of this species are present within the Project and within the locality.	No	Yes
Fish							
Maccullochella macquariensis	Trout Cod	E	E	Trout Cod inhabit a large (60—100 m wide), deep (>3 m) flowing river section with a sand, silt and clay substrate that contains abundant snags and woody debris. Trout Cod are often angled from within, under or adjacent to snags, branch piles, and steep clay banks, usually in areas of relatively fast current. In the Murray and Murrumbidgee Rivers Trout Cod occupy stream positions characterised by a high abundance of large woody debris (or 'snags') in water that is comparatively deep and close to riverbanks. However, midstream snags are also an important habitat component. As a large proportion of the streams that the Trout Cod originally inhabited are now degraded, it is difficult to accurately determine the habitat requirements of the species.	**Unlikely**: There are a lack of records in the locality, and the Project Boundary is outside the known distribution, but within the 'may occur' distribution for the species.	No	No
Maccullochella peelii	Murray Cod	-	V	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Murray Cod are frequently found in the main channels of rivers and larger tributaries. The species is, therefore, considered a main-channel specialist.	**Unlikely**: There are a lack of records in the locality, and the Project Boundary is outside the known distribution for the species. There is a lack of preferred habitat in the Project Boundary.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Macquaria australasica	Macquarie Perch	E	E	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks	**Unlikely**: There are a lack of records in the locality, and the Project Boundary is outside the known distribution for the species. There is a lack of preferred habitat in the Project Boundary.	No	No
Bidyanus bidyanus	Silver Perch, Bidyan	V	CE	Silver perch are endemic to the Murray-Darling system (including all states and sub-basins) (Allen et al., 2002; Lintermans, 2007). Hatchery-bred silver perch are also stocked out of their range in a number of impoundments on east coast river systems, where they seemingly fail to reproduce. Silver perch formerly utilised a diversity of habitats within the Murray-Darling system.	**Unlikely**: Preferred habitat not present within the Project, as fast-flowing, clear and deep tributaries are not present and current drainage systems are unlikely to support this species. There are also no records within the Project or locality.	No	No
Frogs							
Crinia sloanei	Sloane's Froglet	V	E	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It is associated with periodically inundated areas in grassland, woodland and disturbed habitats	**Potential:** While no records exist within the locality (the closest being south of the Project in the Goobang National Park approximately 25 km away), The Project Boundary is within the known distribution and small areas of preferred habitat are present.	No	Yes
Reptiles							
Aprasia parapulchella	Pink-tailed Worm-lizard (or Pink-tailed Legless Lizard)	V	V	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slope. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites	**Potential:** No records within the locality, however the Project Boundary is within the known distribution, with preferred habitat present.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Hoplocephalus bitorquatus	Pale-headed Snake	V	-	Although the Pale-headed snake distribution is very cryptic, it now appears to have contracted to a patchy and fragmented distribution. The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	**Potential:** A historical record does exist within the locality (1978). The Project Boundary is within the predicted distribution and has preferred habitat for the species.	No	Yes
Hemiaspis damelii	Grey Snake	E	E	In NSW, the Grey Snake's habitat includes the margins of ephemeral wetlands within River Red Gum (*Eucalyptus camaldulensis*) and Black Box (*E. largiflorens*) vegetation communities and Tangled Lignum (*Duma florulenta*) swamps. The species shelters in soil cracks, rocks, logs, flood debris, and abandoned burrows within these habitats.	**Unlikely:** The preferred habitat is typically absent from the Project as there are few associated ephemeral wetlands and floodplains. The closest known record for this species is approximately 130 km north of the Project Boundary.	No	No
Anomalopus mackayi	Five-clawed Worm-skink, Long-legged Worm-skink	E	V	This species occurs close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees. They live in permanent deep tunnel-like burrows and deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs.	**Unlikely:** Suitable habitat for this species may exist in the presence of Eucalyptus, grassy paddocks and grasslands, however there are no records within the Project or locality. The closest record is approximately 230 km to the north of the Project Boundary	No	No
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bar	V	V	This species occurs primarily in areas with extensive cliffs and caves. Roosts in caves, crevices in cliffs, old mines and in the mud nests of Fairy Martins (*Petrochiledon ariel*). Also found in well-timbered areas containing gullies.	**Potential:** There are no records within the locality, however areas of well-timbered gullies, and presence of Fairy Martins across the site suggest that there is possible occurrence. The nearest records are associated 13km to the north of the Project Boundary.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Chalinolobus picatus	Little Pied Bat	V	-	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.	**Likely:** there are records within the locality and preferred habitat within the Project Boundary exists in the form of open forest and woodland, cypress pine forests and Bimbil box woodlands.	No	Yes
Dasyurus maculatus	Spotted-tail Quoll (south-eastern mainland population)	v	E	This species is recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.	**Likely:** There are records within the locality and the Project Boundary is within the known distribution of this species. There is preferred habitat of open forest and woodland within the Project Boundary.	No	Yes
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	The species is found in a wide range of inland woodland vegetation types. These include box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. The species inhabits a variety of vegetation types, but it is distinctly more common in box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland.	**Likely:** The species was identified in the locality throughout both field surveys from acoustic detection methods. The Project Boundary is within the potential distribution for the species and preferred habitat is present.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.	**Potential:** There are no records within the locality and the Project Boundary is within the known and predicted distribution of this species. There is preferred habitat of dry sclerophyll forest within the Project Boundary.	No	Yes
Phascolarctos cinereus	Koala	E	E	Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species. Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.	**Likely:** There are two records of the species within the locality. One historical record approximately 1 km south (1978) and one recent one 5 km north (2004). The Project Boundary is within the distribution for this species (inland) and has preferred habitat and foraging trees.	No	Yes
Pseudomys novaehollandiae	New Holland Mouse	-	V	This species has a fragmented distribution across NSW. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. It is a social animal, living predominantly in burrows shared with other individuals Distribution is patchy in time and space, with peaks in abundance during early to mid-stages of vegetation succession typically induced by fire	**Unlikely:** Only partial areas of the Project Boundary are within the known distribution and there are no records within the locality.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	Grey-headed Flying-Foxes are generally found within 200 km of the eastern coast of Australia. They occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	**Likely:** A flying-fox camp with observations of Grey-headed Flying-Foxes as recent as 2018 exists 25 km, near Dubbo to the north-east. There is also a record within the locality, dated 2018, approximately 13 km to the south. Preferred habitat does occur within the Project Boundary, and it is within the known distribution.	No	Yes
Saccolaimus flaviventris	Yellow-bellied Sheathtail bat	V	-	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	**Known:** There are records just beyond the locality buffer of 10 km. There is preferred habitat within the Project Boundary in the form of open woodlands and cleared areas with access to water (a primary habitat component of microbats). This species was detected in the Spring 2021 survey.	Yes	Yes
Flora							
Androcalva procumbens	-	V	V	This species is endemic to NSW and inhabits sandy sites often along roadsides. It is recorded in redgum and mugga ironbark communities, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and Callitris area. Also, in *Eucalyptus fibrosa* subsp. *nubila, Eucalyptus dealbata*, *Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo. Flowers from August to December, fruiting period is summer to autumn.	**Potential:** There are no records within the vicinity, and the Project Boundary is within the known and 'may occur' distributions for the species. There is preferred habitat in the Project Boundary in the form of Mugga Ironbark and red gum communities. As well as *Callitris* communities.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Austrostipa wakoolica	-	E	E	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans.* Flowers from October to December, mainly in response to rain.	**Potential:** There are no records within the vicinity, and the Project Boundary is within the 'may occur' distribution for the species. There is preferred habitat in the Project Boundary in the form of white cypress and other grassland communities.	No	Yes
Dichanthium setosum	Bluegrass	V	V	Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula* and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species. Associated with heavy basaltic black soils and red-brown loams with clay subsoil.	**Likely:** There are locality records to the north, close to Narromine, and the Project Boundary is within the distribution for the species. There is preferred habitat in the Project in the form of eucalypt communities and other grassland communities.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Diuris tricolor	Pine Donkey Orchid	V	-	Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as Bulbine species. Usually, flowers from early September to late October. The species is a tuberous, deciduous terrestrial orchid and the flowers have a pleasant, light sweet scent. The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris* spp.). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of eucalypt, ironbark, acacia and *Callitris* communities.	No	Yes
Homoranthus darwinioides	Fairy Bells	V	V	Rare in the central tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils. landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand. Associated species include *Callitris endlicheri, Eucalyptus crebra, E. fibrosa, C. trachyphloia, E. beyeri subsp. illaquens, E. dwyeri, E. rossii, Leptospermum divaricatum, Melaleuca uncinata, Calytrix tetragona, Allocasuarina* spp. and *Micromyrtus* spp. Flowers in Spring or from March to December.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of *eucalyptus* and *Callitris* communities.	No	Yes
Lepidium aschersonii	Spiny Pepper-cress	V	V	Occurs on gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmannii*) and Grey Box (*Eucalyptus microcarpa*). Inhabit vegetation structure that varies from open to dense with sparse grassy understorey and occasional heavy litter.	**Potential**: State distribution does not overlap the Project Boundary, however occurrence of habitat dominated by the 4 indicator species occurs readily across the Project Boundary. The nearest record occurs approximately 50 km to the north east.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Lepidium monoplocoides	Winged Pepper-cress	E	E	Winged Pepper-cress occurs predominantly in mallee scrub in semi-arid areas. Sites are seasonally moist to water-logged with heavy, fertile soils and a mean annual rainfall of around 300 to 500 mm. The predominant vegetation is usually an open-woodland dominated by *Allocasuarina luehmannii* and/or *eucalypt*s, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses (notably *Danthonia spp*. and *Stipa spp.*), but the seasonally waterlogged sites preferred by Winged Pepper-cress also support a number of moisture dependent herbs, such as *Marsilea spp.* (Nardoo). Also known from riparian woodland.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of *Eucalyptus* and *Allocasuarina* communities.	No	Yes
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock *Poa labillardieri*, - *Eucalyptus aggregata* and *Leptospermum* spp. near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford	**Unlikely:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is potential suitable habitat in the Project Boundary in the form of *Eucalyptus* and *Leptospermum* communities where *Themeda* spp. occurs.	No	No
Prasophyllum sp. Wybong	A leek-orchid	-	CE	A perennial orchid, appearing as a single leaf over winter and Spring. Flowers in Spring and dies back to a dormant tuber over summer and autumn Known to occur in open eucalypt woodland and grassland The NSW Herbarium considers *Prasophyllum sp. Wybong* (C. Phelps ORG5269) and *Prasophyllum petilum* to be synonyms (i.e., the same species). This taxonomic recognition will be released n the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation.	**Unlikely:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is potential suitable habitat in the Project Boundary in the form of *Eucalyptus* and *Leptospermum* communities where *Themeda* spp. occurs.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Pterostylis cobarensis	Greenhood Orchid	V	-	Habitats are eucalypt woodlands, open mallee or *Callitris* shrublands on low stony ridges and slopes in skeletal sandy-loam soils. Associated species include *Eucalyptus morrisii, E. viridis, E. intertexta, E. vicina, Callitris glaucophylla, Geijera parviflora, Casuarina cristata, Acacia doratoxylon, Senna spp.* and *Eremophila spp.* Flowers from September to November.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of eucalypt, *Senna, Eremophila*, *Acacia* and *Casuarina* communities.	No	Yes
Swainsona murrayana	Slender Darling-pea,	V	V	The Slender Darling-pea often grows in heavy soils, especially depressions, and is also found on grey and red to brown clay and clay-loam soils in *Atriplex vesicaria* (Bladder Saltbush) herbland, *Eucalyptus largiflorens* (Black Box) woodland and grassland communities and is frequently associated with *Maireana* species.	**Unlikely:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is also no preferred habitat within the Project Boundary.	No	No
Swainsona plagiotropis	Red Darling Pea	V	V	Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising *Austrodanthonia, Enteropogon acicularis* and *Austrostipa* grassland communities. Associated species include *Austrostipa aristiglumis*, *A. nodosa, A. setacea, Homopholis proluta, Chloris truncata, Austrodanthonia caespitosa, A. duttoniana, Enteropogon acicularis, Hordeum spp., Lolium rigidum, Rhodanthe corymbiflora, Calotis scabiosifolia, Microseris lanceolata* and *Chrysocephalum apiculatum.* Flowering is from August to November, with fruit maturing in November. The species is a perennial, but the lifespan is unknown.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of *Austrostipa* grassland communities.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	Habitat Summary: *Summarised from DPE's Threatened Species Profiles* *	Likelihood of Occurrence	Recorded during Field Surveys (Spring 2021, Summer 2022)	Additional survey and assessment likely to be required?
Swainsona recta	Small Purple-pea (Mountain Swainson-pea)	E	E	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by *Eucalyptus blakelyi, E. melliodora, E. rubida* and *E. goniocalyx.* Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, Poa tussocks *Poa* spp. and spear-grasses *Austrostipa spp.* Plants die back in summer, surviving as a rootstock until they shoot again in autumn. Flowers throughout Spring, with a peak in October.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of eucalypt communities.	No	Yes
Swainsona sericea	Silky Swainson-pea	V	-	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains unknown.	**Likely:** there is a record within the locality to the east of the Project Boundary. There is preferred habitat within the Project Boundary in the form of Box Gum woodland and *Callitris* spp.	No	Yes
Vincetoxicum forsteri listed as *Tylophora linearis*	-	V	E	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii*. Also grows in association with *Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species* and *Casuarina species*. Flowers in Spring, with flowers recorded in November or May and is suspected to be related to rainfall, with fruiting probably 2 to 3 months later.	**Potential:** There are no records within the vicinity, but the Project Boundary is within the distribution for the species. There is preferred habitat in the Project Boundary in the form of eucalypt, *Callitris* and *Allocasuarina* communities.	No	Yes

APPENDIX E SIGNIFICANT IMPACT ASSESSMENTS

Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable

The proposed development of the Project is unlikely to lead to a significant impact to the Corben's Long-eared Bat

Corben's Long-eared Bat (*Nyctophilus corbeni*) has been identified as likely to occur within the Project Boundary. Calls from *Nyctophilus spp.* have been confirmed within the Project Boundary.

Three species of *Nyctophilus* possibly occur within the Project Boundary. *Nyctophilus corbeni* (Corben's Long-eared Bat) is listed as Vulnerable under the EPBC Act and BC Act. The call of this species cannot be distinguished from each other. However, a conservative approach of considering this species likely to occur within the Project has been taken, and subsequently an MNES impact assessment has been undertaken. This species also occurs over a large range, throughout Queensland, New South Wales, Victoria and far eastern parts of South Australia.

There are multiple records from 1997/1998 for Corben's Long-eared Bat occurring to the south of the Project within Goobang National Park, approximately 16 km away. There are no records within the Project Boundary or the locality (10 km buffer). Corben's Long-eared Bat is an insectivorous bat that hunts in flight or by foliage gleaning in flight or by foraging on the ground (Lumsden and Bennett 2000; Schulz and Lumsden 2010). Corben's Long-eared Bat has been found to roost solitarily, primarily in dead trees or dead spouts of trees, but may also occur in colonies consisting of 10-20 individuals roosting in ironbarks, cypress and Buloke (*Allocasuarina luehmannii*) (Schulz and Lumsden 2010). This potential foraging and roosting habitat totals 1,5847 ha, accounting for approximately 16.4 % of the total Project. The total amount of habitat potentially disturbed by the proposed development is up to 57 ha or approximately 3.6 % of the total potential foraging and roosting habitat within the Project Boundary.

Roosting and breeding activity for the Corben's Long-eared Bat is likely to occur within areas of Mugga Ironbark and cypress and Buloke forests which both present open canopy cover >10 m high where *Nyctophilus* spp. are more likely to forage (Wentzel, et al., 2019), and where higher proportions of standing dead and stags occur for roosting. Habitat for this species is likely to be associated with PCT 70, 74, 76, 80, 81, 82, 83, 110, 185, 186, 201, 217 and 267. All of these PCTs are associated with Ironbark, cypress and Buloke (in composition with other eucalypt species) and may represent potential foraging and roosting habitat. Habitat for this species has been mapped in **Figure E-1** MNES Habitat Area for Corbens Long-eared Bat.

Open canopy over is more readily utilised for foraging by this species due to the propensity to glean insects from foliage within flight while, being able to hunt beside vegetation clutter or within vegetation stands (Wentzel, et al., 2019). Given this species' wide distribution and that areas surrounding the Project Boundary (such as Goobang National Park) are known habitat for this species, it is unlikely that the Project hosts an 'important population' necessary for long-term survival and recovery.

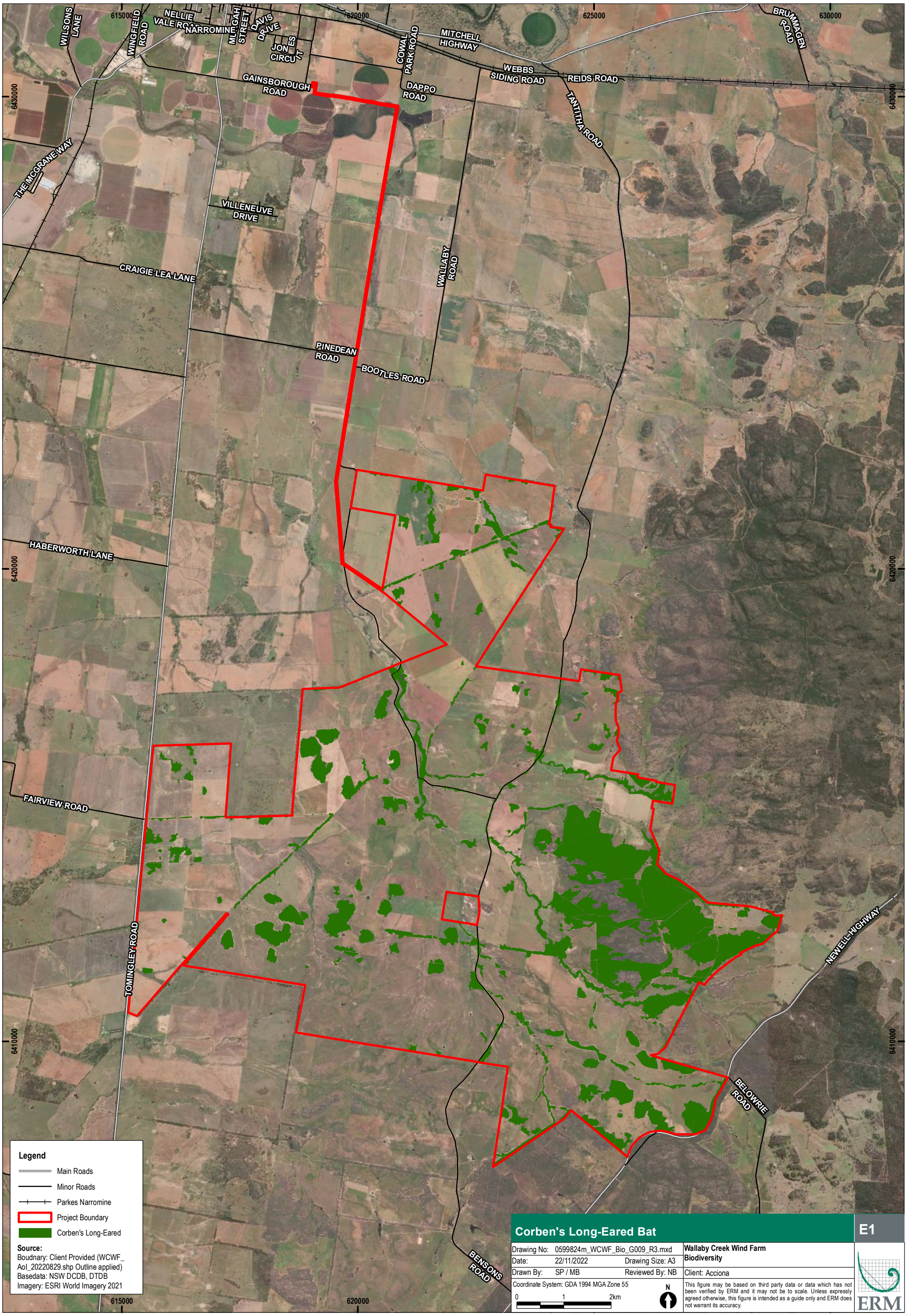
There is a potential for this species to collide with the wind turbine blades proposed within the Project Boundary when foraging or travelling between roosts. *Nyctophilus* spp. may only utilise a roost over a single day and then transfer to other roosts, with consecutive roost sites generally within four (4) km of each other (Lumsden et al., 2008). The risk of collision is considered low to moderate for *Nyctophilus* spp., since the greatest risk of collision impacts are present for microbats that forage in open areas and above the canopy (such as the Eastern Free-tailed Bat and Gould's Wattled Bat), rather than those that forage within foliage or on the ground (Van Dyck and Strahan, 2008). Additional bat surveys are proposed for future field assessment and additional data will be obtained to inform ongoing management and potential impact for the species.

Based on the potential disturbance of up to 57 ha or approximately 3.6 % of the total potential foraging and roosting habitat within the Project Boundary for Corben's Long-eared Bat habitat, a significant impact assessment in accordance with the Commonwealth's Significant Impact Guidelines (SIG) 1.1 is presented in the following table.

Table E 1 Significant Impact Assessment for the Corben's Long-eared Bat

Criteria	Description	Criteria Triggered?
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,	There is no evidence that the Project supports an important population of this species, including the possibility that this species is not the *Nyctophilus* spp. that has been recorded throughout the survey periods. The proposed disturbance of 57 ha of potential foraging and roosting habitat within the Project Boundary is unlikely to lead to a long-term decrease of the species.	No
Reduce the area of occupancy of an important population,	There is no evidence that the Project supports an important population of this species, including the possibility that this species is not the *Nyctophilus* spp. that has been recorded throughout the survey periods. Further to this, the area of occupancy is currently unknown for this species, except for their roosting network, known to be within 4km of consecutive roosts. This species is anticipated to take long flights at night between roosts. The proposed disturbance of 57 ha of potential foraging and roosting habitat within the Project Boundary is unlikely to reduce the area of occupancy of this species.	No
Fragment an existing important population into two or more populations,	It is unlikely that the Corben's Long-eared bat, which is capable of long flight distances and has a wide distribution will be fragmented from other populations due to Wallaby Creek Wind Farm. Given that the Project is characterised by fragmented woodlands (in distinct Mugga Ironbark patches and fragmented Cypress/Buloke along higher altitude ridgelines) it is unlikely that the Disturbance Footprint will fragment the populations within the Project Boundary either. Further to this, layout and design has been refined throughout an iterative process to include the location of Wind Turbine Generators (WTGs) away from remnant vegetation where possible, reducing the potential for fragmentation.	No
Adversely affect habitat critical to the survival of a species,	Habitat within the Project Boundary could be considered habitat critical to the survival of the species as it is anticipated that foraging, breeding, roosting and dispersal may occur within those areas; however, given the extent of the habitat within the Project Boundary this is unlikely to adversely affect this habitat	Unlikely
Disrupt the breeding cycle of an important population,	Little is known about the breeding of this species; however, it is expected that this is seasonal. Project activities are unlikely to disrupt the breeding cycle. Impacts are more likely to be direct (collision and barotrauma) rather than to breeding cycles. The removal of 57 ha of habitat is unlikely to contribute to breeding cycle impacts.	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed disturbance will not exceed 57 ha of potential habitat or 3.6 % of the total potential foraging and roosting habitat and is unlikely to be decreased to the point where the species will experience decline.	No

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	This species conservation advice does not outline any particular invasive species that are known to be a key threat to the species. There is mention of foxes and feral cats that present as possible predators, but this is speculative and unknown. The Project and its related development are unlikely to introduce an invasive species to the Project or exacerbate the current invasive species presence. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the introduction and spread of invasive species that will avoid harm to this species.	No
Introduce disease that may cause the species to decline, or	This species conservation advice does not outline any particular diseases that are known to be a key threat to the species. The Project and its related development are unlikely to introduce disease that may cause the species to decline. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases that may cause this species to decline.	No
Interfere with the recovery of the species.	It is unlikely the construction and operation of this proposed development will interfere substantially with the recovery of this species.	No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Main Roads
Minor Roads
Parkes Narromine
Project Boundary
Corben's Long-Eared
Source:
Boudnary: Client Provided (WCWF_ AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Corben's Long-Eared Bat
E1
Drawing No: 0599824m_WCWF_Bio_G009_R3.mxd
Date: 22/11/2022
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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Superb Parrot (*Polytelis swainsonii*) – Vulnerable

The proposed development of the Project has the potential to lead to a significant impact to the Superb Parrot

Superb Parrot (*Polytelis swainsonii*) has been identified as likely to occur across the Project. There was no detection of Superb Parrot during BUS surveys conducted on field, further investigation will need to be conducted to determine its presence across the Project.

The Superb Parrot is listed Vulnerable under the EPBC Act and BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken due to records and distributions, and subsequently an MNES impact assessment has also been undertaken. This species occurs over most of eastern NSW and northern Victoria.

There are numerous records dating back from 1988 to as recently as 2020 for the Superb Parrot within the locality of the Project (10 km buffer). The Superb Parrot is an herbivorous parrot that mostly feeds on the ground on seeds, seed pods and cereals, and at times from within the forest canopy on the flowers, fruits and lerps of eucalypts and the berries of mistletoe (TSSC, 2016). Superb Parrots usually utilise hollow branches or hollow trunks of eucalypts for nesting, preferring River Red Gum (*Eucalyptus camaldulensis)* and Blakely's Red Gum (*E. blakelyi)*, usually near a watercourse and within 10 km of breeding habitat (DAWE, 2021). This potential foraging and nesting habitat totals 5,532.6 ha within the Project. The total amount of habitat potentially disturbed by the proposed development is up to 250.8 ha or 4.5 % of the total potential foraging and roosting habitat within the Project Boundary.

Nesting and breeding activity for the Superb Parrot often occurs directly within, or within a 10 km radius of, box-gum woodland featuring hollow branches of dead or living trees. The three main breeding areas in NSW, all relatively far south of the Project Boundary, are outlined below:

- An area of the south-west slopes, bounded by Molong, Rye Park, Yass, Coolac, Cootamnundra and Young;
- Along the Murrimbidgee River, between Wagga Wagga and Toganmain Station, and farther north at Goolgowi; and
- Along the Murray and Edward Rivers, from east Barmah and Millewa State Forest to south of Taylors Bridge.

Habitat critical to the survival of this species is classified by the Recovery Plan for this species (DAWE, 2022):

- Breeding habitat is classified as:
  - Riverine forests in the Riverina and box-gum woodlands in the tablelands and slopes of NSW (in the areas outlined above)
  - Obligate hollows with the following characteristics
    - A diameter at breast height of around 113 cm, and tree height between 12 to 24 m;
    - Hollow with entrance diameter of 8-12 cm;
    - Hollow with a depth of 59-122 cm;
    - Hollow with a floor diameter of 15-22 cm; and
    - Hollows that are located on a branch or stem with a diameter of 36-49 cm.
- Foraging habitat is classified as:
  - All preferred foraging habitat during both breeding and non-breeding season other than exotic feeding grounds (such as agricultural lands and non-native feeding grounds)

- Habitat for the long-term maintenance of the species is classified as:
  - All key biodiversity areas for this species
  - Any potential suitable foraging and breeding habitat in the south-eastward range shift (the aforementioned bounding of the south-west slopes that begins at Molong, south of the Project Boundary)

Within the Project Boundary, suitable foraging habitat is associated with box-gum, grassland and other eucalypt (due to the presence of mistletoe – such as Mugga Ironbark) PCTs. These PCTs are 45, 49, 74, 75, 80, 81, 82, 83, 110, 185, 186, 201, 217, 250, 267, 461 and 796. Habitat for this species is mapped in **Figure E-2.**

This species is unlikely to use the Project for breeding purposes as primary breeding areas are considerably south of the Project Boundary, and there is a distinct lack of the specific hollow requirements that this species utilises during breeding, and only small patches of box-gum are within the Project Boundary.

When not breeding, the species utilises a range of natural and non-natural habitats, preferring areas of high plant productivity. Some years this sees the Superb Parrot moving further north during winter. Given this species' distribution occurs around the Project Boundary and preferred habitat for this species is known to occur within the Project Boundary, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for foraging.

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and nesting sites and when moving further north during winter. Additional bird surveys are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

Based on the potential disturbance of up to 250.8 ha or 4.5% of the total potential Superb Parrot foraging habitat within the Project Boundary, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 2 Significant Impact Assessment for the Superb Parrot

Criteria	Description	Criteria Triggered?
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,	There is evidence that the Project may support an important wintering population of Superb Parrot. The proposed disturbance of 250.8 ha of potential foraging habitat within the Project Boundary may lead to a long-term decrease of the species. However, the area of potential foraging habitat represents only a small proportion of the overall Project.	Potentially
Reduce the area of occupancy of an important population,	There is evidence that the Project may support an important wintering population of Superb Parrot, further to this, foraging habitat critical to the survival of the species is likely present within the associated mapped PCTs (those with a composition of box-gum, grasslands and eucalypt). The proposed removal of foraging habitat critical to the survival of the species within the Project Boundary is an action that would potentially interfere with the recovery of the Superb Parrot and reduce the area of occupancy, as outlined within the species recovery plan. However, the proposed disturbance is limited to only 250.8 ha of foraging habitat critical to the survival of the species which represents only a small proportion of the overall Project.	Potentially

Criteria	Description	Criteria Triggered?
Fragment an existing important population into two or more populations,	It is unlikely that the population of Superb Parrot, which is known to be distributed around and south of the Project Boundary, will be fragmented because of the proposed development. Given that the Project is characterised by fragmented woodlands it is unlikely that the Disturbance Footprint will further fragment the populations within the Project Boundary. Further to this, layout and design has been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where possible, reducing the potential for fragmentation.	No
Adversely affect habitat critical to the survival of a species,	Habitat within the Project Boundary is considered foraging habitat critical to the survival of the species as it is anticipated that foraging may occur within the areas with a composition of box-gum, grasslands and eucalypt. However, the proposed disturbance is limited to only 250.8 ha of potential foraging habitat critical to the survival of the species which represents only a small proportion of the overall Project.	Potentially
Disrupt the breeding cycle of an important population,	Nesting occurs between September and December, and this species inhabit hollows that are specific in their classification. These specific hollows were not readily identified throughout the Project Boundary during the survey periods; however, their total absence cannot be discounted at this stage. Given that primary breeding areas are not close to the Project, and with only small patches of suitable breeding habitat with potentially limited hollow availability, it is unlikely that the species utilises the Project for breeding. The removal of 250.8 ha of foraging habitat is unlikely to contribute to breeding cycle impacts. Layout and design have been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where practicable, reducing the potential for disruption to the breeding cycle.	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed disturbance will not exceed 250.8 ha of potential foraging habitat. This potential foraging habitat comprises 4.5 % ha of the total potential habitat within the Project Boundary, but since the habitat present is potentially critical foraging habitat for the survival of the species, declines of the species are possible.	Potentially
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	This species conservation advice does not outline any particular invasive species that are known to be a key threat to the species. There is mention of competition for nesting hollows between the Superb Parrot and the Common Starling, Galah and Corella species, which is increased when nest hollows are removed from a site. As preferred breeding habitat is found south of the Project Boundary, competition for nesting hollows is unlikely to be an issue within the Project Boundary. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the introduction and spread of invasive species that will avoid harm to this species.	No

Criteria	Description	Criteria Triggered?
Introduce disease that may cause the species to decline, or	Superb Parrot is susceptible to Psittacine beak and feather disease (PBFD) which can be increased due to loss of nest hollows. As preferred breeding habitat is found south of the Project Boundary, loss of nesting hollows is unlikely to be an issue within the Project Boundary. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases that may cause this species to decline. Layout and design have been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where possible.	No
Interfere with the recovery of the species.	There is evidence that the Project may support an important wintering population of Superb Parrot, further to this, habitat critical to the survival of the species used for foraging is likely present within the associated mapped PCTs (those with a composition of box-gum, grasslands and eucalypt). The proposed removal of foraging habitat critical to the survival of the species within the Project Boundary is an action that would potentially interfere with the recovery of the Superb Parrot and reduce the area of occupancy, as outlined within the species recovery plan. However, the proposed disturbance is limited to only 250.8 ha of habitat critical to the survival of the species which represents only a small proportion of the overall Project.	Potentially

WILSONS LANE
WINGFIELD ROAD
NELLIE VALE ROAD
NARROMINE
MCGRANE STREET
DAVIS DRIVE
JONES CIRCUIT
COWAL PARK ROAD
MITCHELL HIGHWAY
BRUMMAGEN ROAD
WEBBS SIDING ROAD
REIDS ROAD
GAINSBOROUGH ROAD
DAPPO ROAD
TANTITHA ROAD
THE MCGRANE WAY
VILLENEUVE DRIVE
CRAIGIE LEA LANE
WALLABY ROAD
PINEDEAN ROAD
BOOTLES ROAD
HABERWORTH LANE
FAIRVIEW ROAD
TOMINGLEY ROAD
NEWELL HIGHWAY
BELOWRIE ROAD
BENSONS ROAD

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Legend

- Main Roads
- Minor Roads
- Parkes Narromine Railway
- Project Boundary
- Superb Parrot

Source:
Boudnary: Client Provided (WCWF_AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021

Superb Parrot

E2

Drawing No:	0599824m_WCWF_Bio_G010_R3.mxd		Wallaby Creek Wind Farm Biodiversity
Date:	22/11/2022	Drawing Size: A3	
Drawn By:	SP / MB	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

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Bluegrass (*Dichanthium setosum*) – Vulnerable

The proposed development of the Project is unlikely to lead to a significant impact to Bluegrass

Bluegrass (*Dichanthium setosum*) has been identified as likely to occur across the Project from the Project Likelihood of Occurrence assessment. There was no detection of Bluegrass during BAM Plot surveys conducted during field surveys; further investigation will need to be conducted to determine its presence within the Project Boundary.

Bluegrass is listed Vulnerable under the EPBC Act and BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment undertaken. This species occurs primarily in the north-east of NSW and QLD, with scattered occurrences to the west and south of the distribution; however, Commonwealth distribution mapping (SPRAT) does not overlap with the Project Boundary. State distribution mapping does predict that the species could occur within the Project Boundary but is on the western edge of its known extent. Therefore, if a population of this species is recorded within the Project Boundary, it may be considered an important population due to being near the limit of the species' range, as outlined by SIG 1.1.

There are two historical records of Bluegrass in Narromine, approximately 9 km north of the Project Boundary. Records are dated from the 1800's, and as such reliability is lower than if records were more recent. Bluegrass is associated with heavy basaltic black soils and red-brown loams with clay subsoil and with the Brigalow Belt bioregion (TSSC, 2015). It persists in areas with a moderate level of disturbance in cleared woodlands, roadsides with grassy remnants and land used for grazing and pastures. Bluegrass is associated with other species expected to be and/or recorded as present within the Project Boundary, including *Eucalyptus albens, E. melliodora, Themeda triandra, Lomandra longiflora* and *Vittadinia* and *Wahlenbergia* species.

This species has associated PCTs within the Project Boundary. Potential habitat for this species within the Project includes PCT 27, 45, 81, 201, 250, 461 and 796. While this species has associated PCTs, there have been no records of this species within the Project Boundary from the survey periods and the BAM plot surveys that have been conducted. The potential habitat of the associated PCTs totals 4,322.7 ha. The total amount of habitat to be potentially disturbed by the proposed development is up to 213.9 ha or approximately 4.9% of the total habitat within the Project Boundary.

There is a potential for this species to be disturbed by the construction and maintenance of infrastructure within in the Project Boundary through clearing of habitat. Clearing of habitat can also result in recruitment of introduced grasses such as African Lovegrass (*Eragrostis curvula)* that pose a threat to Bluegrass. African Lovegrass has been identified to occur within the Project Boundary and has the potential to spread due to project activities.

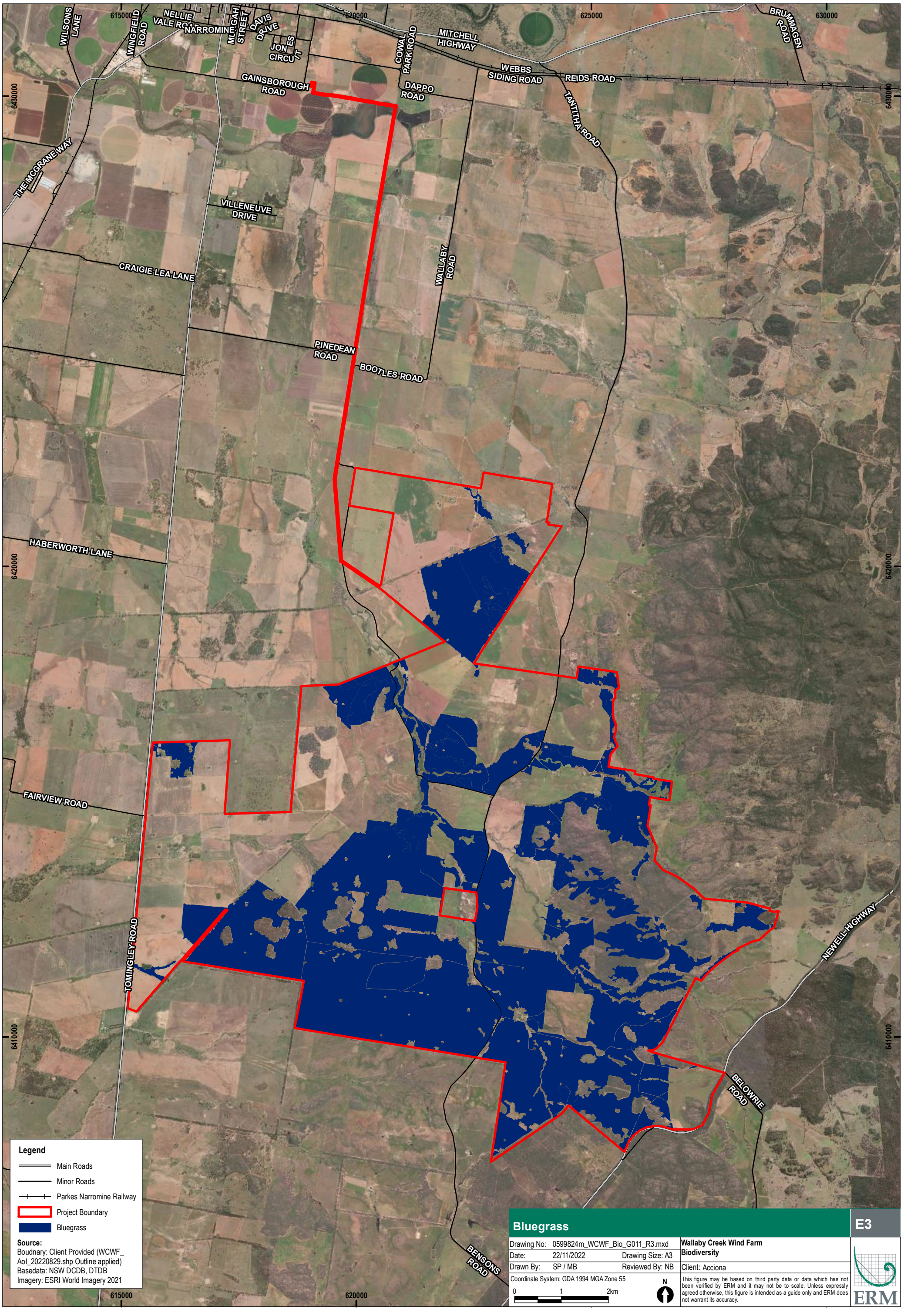
Additional surveys are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species. Surveys should be done between Spring and Summer when the plant is visible and flowering as it becomes dormant between Autumn and Winter.

Based on the potential disturbance of up 213.9 ha or approximately 4.9% of the total potential Bluegrass habitat within the Project Boundary, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 3 Significant Impact Assessment for Bluegrass

Criteria	Description	Criteria Triggered?
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,	There is no evidence that the Project currently supports an important population of Bluegrass. Historical records are from 1892 and 9 km from the Project Boundary. No records of this species were observed during field surveys and within BAM plots to date. However, given the amount of associated PCTs that could support this species, its occurrence cannot be discounted. Even if a population was recorded and as such designated as an important population (edge of range), since this species' distribution is currently uncertain within the Project Boundary, and the potential disturbance of 213.9 ha of habitat which represents 4.9% of potential habitat, project activities are unlikely to lead to a long-term decrease of an important population.	No
Reduce the area of occupancy of an important population,	This species does not have a defined area of occupancy. The Project is outside of the Commonwealth modelled distribution (SPRAT) and there is a wide expanse of potential habitat in NSW and Queensland to support this species, the removal of 213.9 ha of potential Bluegrass habitat within the Project Boundary is highly unlikely to impact the area of occupancy.	No
Fragment an existing important population into two or more populations,	There is no evidence that the Project supports an important population of Bluegrass as the Project Boundary is outside of the Commonwealth modelled distribution and historical records are from 1892 and 9 km from the Project Boundary. Therefore, where disturbance to this species may occur in grasslands and other associated PCTs within the Project Boundary, it would not fragment an existing important population. The potential disturbance of 213.9 ha of habitat within the Project is unlikely to fragment an existing population.	No
Adversely affect habitat critical to the survival of a species,	No habitat critical to the survival of this species has been recorded for Bluegrass. At current, all habitat is potential due to historical records and uncertain distribution due to the discrepancy between NSW and Commonwealth distribution maps. Bluegrass is also known to inhabit areas of high to moderate disturbance, and therefore any action is unlikely to have an adverse effect.	No
Disrupt the breeding cycle of an important population,	There is no known population of Bluegrass present within the Project Boundary. Records are 9 km from site and from 1892 and may no longer accurate due to high levels of modification in the locality.	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The Project Boundary is outside of the Commonwealth modelled distribution of Bluegrass and this species is yet to be determined to be present within the Project Boundary. Potential habitat for the species accounts for 213.9 ha or 4.9% of the total available habitat within the Project Boundary. Clearance of associated species, such as Silver-leaved Ironbark (*Eucalyptus melanophloia),* Yellow-Box *(E. melliodora),* Manna Gum (*E. viminalis)*, would be detrimental to its establishment but not cause the species to decline. The small scale of disturbance is unlikely to result in modification, destruction, removal, isolation or a decrease in the availability of habitat to the extent that the species is likely to decline.	No

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	There is no known population of Bluegrass present within the Project Boundary currently. Establishment of Coolatai, Lippia or African Lovegrass would be detrimental to Bluegrass establishment, however African Lovegrass is already present within the Project Boundary.	No
Introduce disease that may cause the species to decline, or	The conservation advice for *Dichanthium setosum* does not list any diseases that threaten this species.	No
Interfere with the recovery of the species.	The Project is not in the vicinity of any priority management sites and there is no recovery plan for this species applicable within the Project Boundary.	No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BRUMMAGEN ROAD
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NEWELL HIGHWAY
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Legend
Main Roads
Minor Roads
Parkes Narromine Railway
Project Boundary
Bluegrass
Source:
Boudnary: Client Provided (WCWF_AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Bluegrass
E3
Drawing No: 0599824m_WCWF_Bio_G011_R3.mxd
Date: 22/11/2022
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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Koala (*Phascolarctos cinereus*) – Endangered

The proposed development of the Project has the potential to lead to a significant impact to the koala

The koala (*Phascolarctos cinereus*) has been identified as likely to occur within the Project Boundary. There was no detection of the koala during field surveys, further investigation is required to determine its presence within the Project Boundary.

The koala is listed as Endangered under the EPBC Act at metapopulation level (combined populations of QLD, NSW and ACT) and Endangered under the BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment. This metapopulation occurs over most of coastal and inland QLD and NSW but its distribution is patchy.

Under the *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022) habitat for the koala is described as:

> *Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.*

Furthermore, habitat critical to the survival of the species has also been defined. These are habitats that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors and other relevant factors are considered when identifying habitat that is critical to the survival of the species:

> *(a) Whether the habitat is used during periods of stress (examples: flood, drought or fire);*
>
> *(b) whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);*
>
> *(c) the extent to which the habitat is used by important populations;*
>
> *(d) whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;*
>
> *(e) whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;*
>
> *(f) whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;*
>
> *(g) any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.*

Koala food trees are typically considered to be those of the following genus: *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Melaleuca.*

This considered, the Project Boundary contains koala habitat which varies in amount and type. For the purposes of the Project, koala habitat has been delineated with associated PCTs.

The following PCTs comprise breeding and foraging habitat: PCT 27, 70, 74, 76, 77, 80, 81, 82, 83, 110, 185, 186, 201, 214, 267 and 491. These PCTs comprise koala food trees that are likely to be

utilised for breeding and foraging. This potential foraging and breeding habitat totals 1,804.9 ha. The total amount of habitat to be potentially disturbed by the Project is up to 59.4 ha or 3.3 %.

PCT 19, 250 and 796 are also associated PCTs, however these are grassland communities across the Project and are likely only utilised by the koala for dispersal behaviour. Dispersal habitat for koala can include a wide range of land use types, as they are known to utilise an array of habitats that include forests and woodlands, roadside and rail vegetation and paddock trees (DAWE, 2022). The smaller areas of habitat are regarded as providing a safe intervening ground matrix between trees and patches to forage and facilitate movement (DAWE, 2022). These areas may be used occasionally as shelter areas for dispersing koalas as they move through the landscape to areas of higher preference. This dispersal habitat associated with PCT 19, 250 and 796 has not been mapped, as mapping guidance for this species as per the NSW Department of Planning and Environment's *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide* (DPE 2022) indicated mapping all PCTs associated with the koala and defining suitable habitat as PCTs with koala trees present. Grassland PCTs within the Project Boundary have been predominantly cleared of suitable koala trees.

It is unlikely that the removal of 17.4 ha of koala habitat will significantly fragment koala habitat in the locality due to habitat connectivity within the Project Boundary and locality and constitutes low impact to the dispersal and breeding koala habitat. While linear habitat loss will occur and result in small amounts of fragmentation, dispersal ability will likely not be impacted due to the connectivity within the Project Boundary and locality, and koalas' preference to traverse through tortuous connected vegetation paths even where fragmentation exists (MacIntyre et al., 2020). The proposed wind farm development will not reduce the ability for koalas to disperse across the landscape as the access tracks, overhead transmission lines and wind turbine towers will not cause a barrier to koala dispersal.

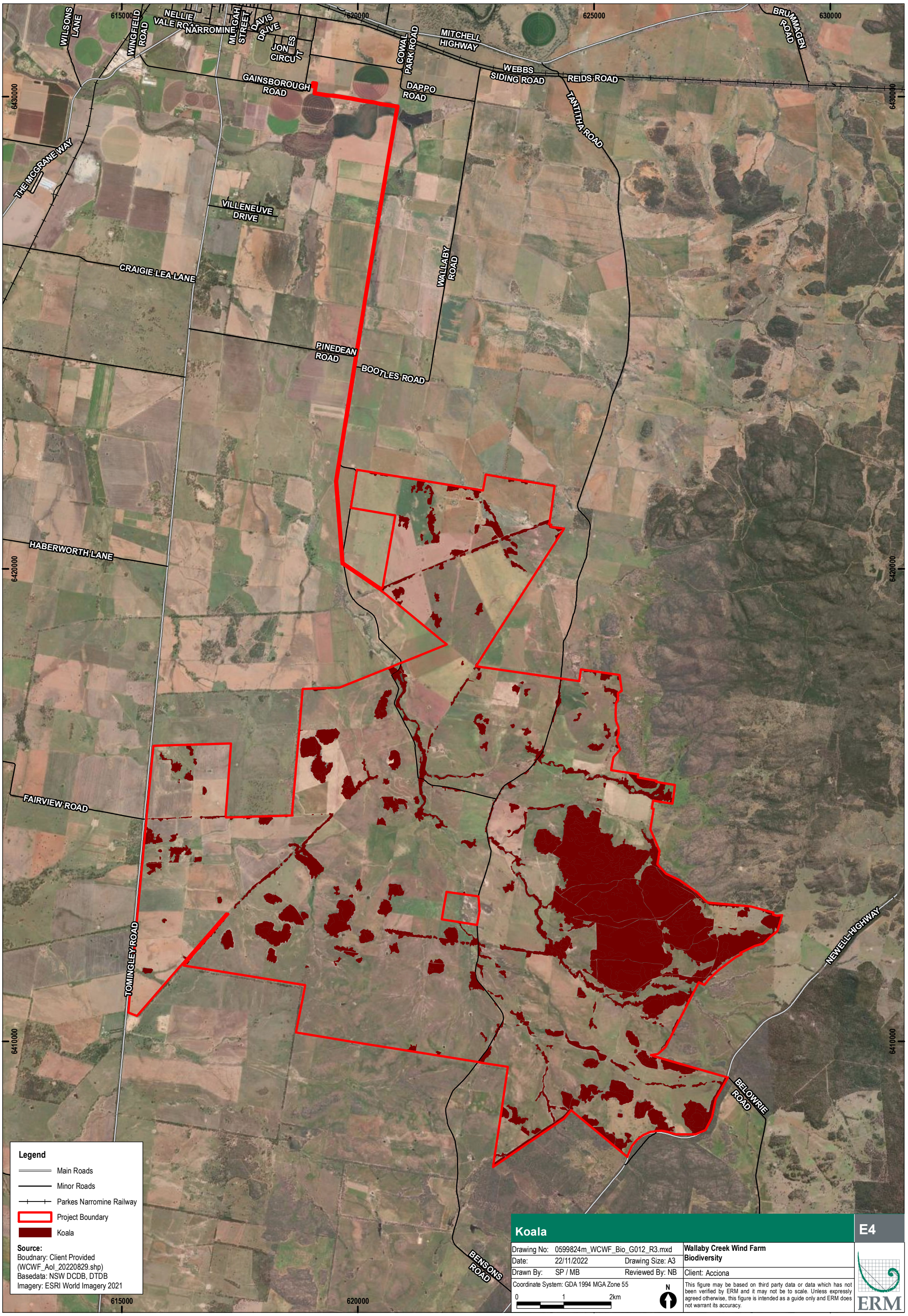
Based on the potential disturbance of up to 59.4 ha or 3.3 % of the total potential koala habitat within the Project, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 4 Significant Impact Assessment for the Koala

Criteria	Description	Criteria Triggered?
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 is evidence that the Project could potentially support an important population of the koala. However, the potential disturbance of 59.4 ha of potential foraging and breeding habitat within the Project Boundary is unlikely to lead to a long-term decrease of the species. Further to this, the clearing of dispersal habitat will be a short-term impact, as the ecological function of dispersal will be retained once construction ceases. The impact from the clearing of small amounts of remnant vegetation and linear corridors for the construction of Project infrastructure is unlikely to lead to a long term-decrease of the species. Additionally, only 59.4 ha of breeding and foraging habitat will be impacted through the proposed development for the Project. This habitat, composed of eucalypt forest and woodland, is likely to be utilised by the koala more so than potential dispersal habit within the Project Boundary. It is unlikely that the removal of koala dispersal habitat within the Project Boundary will lead to a decrease in the size of the koala population, as the wind farm will not cause a barrier to koala dispersal. In addition, there is only a small impact of 59.4 ha to potential foraging/breeding habitat.	No

Criteria	Description	Criteria Triggered?
Reduce the area of occupancy of the species	The area of occupancy for the koala is 19,428 km^2 determined from mapping and records from 2000 from state governments and CSIRO (DAWE, 2020). Thus, the clearing of such a small area of potential remnant habitat (59.4 ha) will not remove habitat patches altogether and does not substantially reduce the area of occupancy for the species.	No
Fragment an existing population into two or more populations	The clearing of 59.4 ha of koala habitat is unlikely to fragment existing populations. The Project is already fragmented with isolated patches of potential habitat throughout modified landscapes and grasslands. Where populations do occur within these isolated habitats, clearing impact will primarily only remove small linear areas of habitat used by the species for dispersal and movement opportunities. The removal of 59.4 ha of koala habitat is unlikely to fragment koala habitat within the Project, as fragmentation has already occurred for koala populations in this area. Furthermore, given the infrastructure type, it is expected that the koala will still be able to disperse across tracks and small cleared areas once construction has finished, thus not removing the ability for populations to disperse.	Unlikely
Adversely affect habitat critical to the survival of a species	This habitat for the koala within the Project has been determined as habitat critical to the survival of the species as it provides foraging, breeding and dispersal functions. The clearing of 59.4 ha of habitat critical to the survival of the species, while representing a relatively small (3.3 %) amount of habitat within the Project Boundary, may adversely affect the species. Mitigation measures such as pre-clearance surveys will ensure impacts to the species are further mitigated to allow dispersal opportunities to persist as a result of the development. This will include minimising access tracks widths and micro siting turbines and infrastructure corridors to avoid eucalypt trees used for shelter when dispersing.	Potential
Disrupt the breeding cycle of a population	Koalas breed once per year however, if conditions are unsuitable and the population is facing lack of resources or disease, this can cause unsuccessful breeding. The home range for the koala is highly variable, however evidence suggests it can range from anywhere between 3 to 500 ha (Wilmott, 2020). The low density of koala records in the locality suggests the area is not integral for the breeding and genetic diversity of the species. The proposed development also avoids much of the breeding habitat associated with the surrounding riparian vegetation, given that this area may of higher utilisation by the koala. The removal of 59.4 ha of habitat is unlikely to disrupt breeding cycles. Layout and design have been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where possible, reducing the potential for disruption to the breeding cycle.	Unlikely

Criteria	Description	Criteria Triggered?
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed disturbance will not exceed 59.4 ha of potential habitat. This potential habitat comprises 3.3 % of the Project and is unlikely to cause the species to decline.	No
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species such as feral cats (*Felis catus*) and dogs (*Canis lupus)* are common pests encountered NSW and are particularly harmful to native, threatened mammals. Both of these invasive species are known to occur in the Project Boundary and locality. The proposed development activities during construction and operation will adopt and follow biosecurity measures, including development of and adherence to a Biosecurity Management Plan, that will ensure that further invasive species are not introduced into the Project Boundary. It is also noted that one of the main threats to koalas is wild dogs. Wild dogs were not recorded from any of the field investigations but may be present. However, it is unlikely that the proposed development will increase the abundance of wild dogs to a level that would result in mortalities to koalas.	No
Introduce disease that may cause the species to decline	Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and Chlamydia (*Chlamydia pecorum*) There is also no evidence to suggest the construction and/or operational activities would introduce a disease, such as Chlamydia, that would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, as detailed in a Biosecurity Management Plan. This includes following biosecurity measures and ensuring proper personal protection equipment is worn by construction workers and vehicle wash downs before entering any areas near koala habitat.	No
Interfere with the recovery of the species	The interim recovery objectives for the koala are: ■ Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility; and ■ Maintain the quality, extent, and connectivity of large areas of koala habitat surrounding habitat refuges. The Disturbance Footprint occurs predominately in modified and cleared areas, as well as fragmented remnant patches of koala habitat. The Disturbance Footprint will only impact a small portion of koala habitat within the Project Boundary. Therefore, the development does not interfere with the above recovery objectives.	No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GAINSBOROUGH ROAD
DAPPO ROAD
WEBBS SIDING ROAD
REIDS ROAD
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CRAIGIE LEA LANE
WALLABY ROAD
PINEDEAN ROAD
BOOTLES ROAD
HABERWORTH LANE
FAIRVIEW ROAD
TOMINGLEY ROAD
NEWELL HIGHWAY
BELOWRIE ROAD
BENSONS ROAD
Legend
Main Roads
Minor Roads
Parkes Narromine Railway
Project Boundary
Koala
Source:
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Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
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Wallaby Creek Wind Farm
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Spotted-tailed Quoll (SE Mainland Population) (*Dasyurus maculatus maculatus*) – Endangered

The proposed development of the Project has potential to lead to a significant impact to the Spotted-tailed Quoll

Spotted-tailed Quoll (*Dasyurus maculatus maculatus*) has been identified as likely to occur across the Project. There was no detection of Spotted-tailed Quoll during field surveys, further investigation will need to be conducted to determine its presence within the Project Boundary.

Spotted-tailed Quoll is listed Endangered under the EPBC Act and Vulnerable under the BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment undertaken. The south-eastern mainland population occurs from central Queensland and extends down the east coast and into western Victoria.

There is one (1) record of Spotted-tailed Quoll within the locality of the Project (10 km buffer) from 2021 and potential preferred habitat is within the Project Boundary. The Spotted-tail Quoll is a carnivorous marsupial, their diet consists of small, prey species under 5 kg including mammals, birds, invertebrates, and reptiles. They are a solitary animal, with the males occupying a large home range than the females and this is dependent on the quality of habitat available. They are considered a forest dependent species, although their habitats range from closed forests to open woodlands and coastal heathlands as well as grasslands adjacent to forested areas (TSSC, 2020). This potential habitat within the Project Boundary totals 931.7 ha. The total amount of habitat to be potentially disturbed by the Project is up to 13.3 ha or 1.4% of the total potential habitat within the Project Boundary.

Spotted-tailed Quolls utilise landscape features such as fallen logs, hollow trees, rocks and boulders as dens and, in their absence, they may occupy existing rabbit or wombat burrows. When necessary, a female will dig her own burrow. An individual will rotate between a number of dens, up to 20 has been observed, spending 1 to 4 days in each. Foraging and movement between dens is most common at night. Habitat critical to the survival of the Spotted-tailed Quoll have been found to be large patches of forest with the adequate availability of denning resources and high densities of medium-sized mammalian prey. Their habitat will also include a “latrine site”, a communal site utilised by multiple individuals for defecation, often situated among boulder fields, cliff-faces or stream beds.

Given distribution of the Spotted-tailed Quoll is patchy and records are not common in the locality, it is unlikely that the Project hosts an ‘important population’ necessary for long-term survival and recovery.

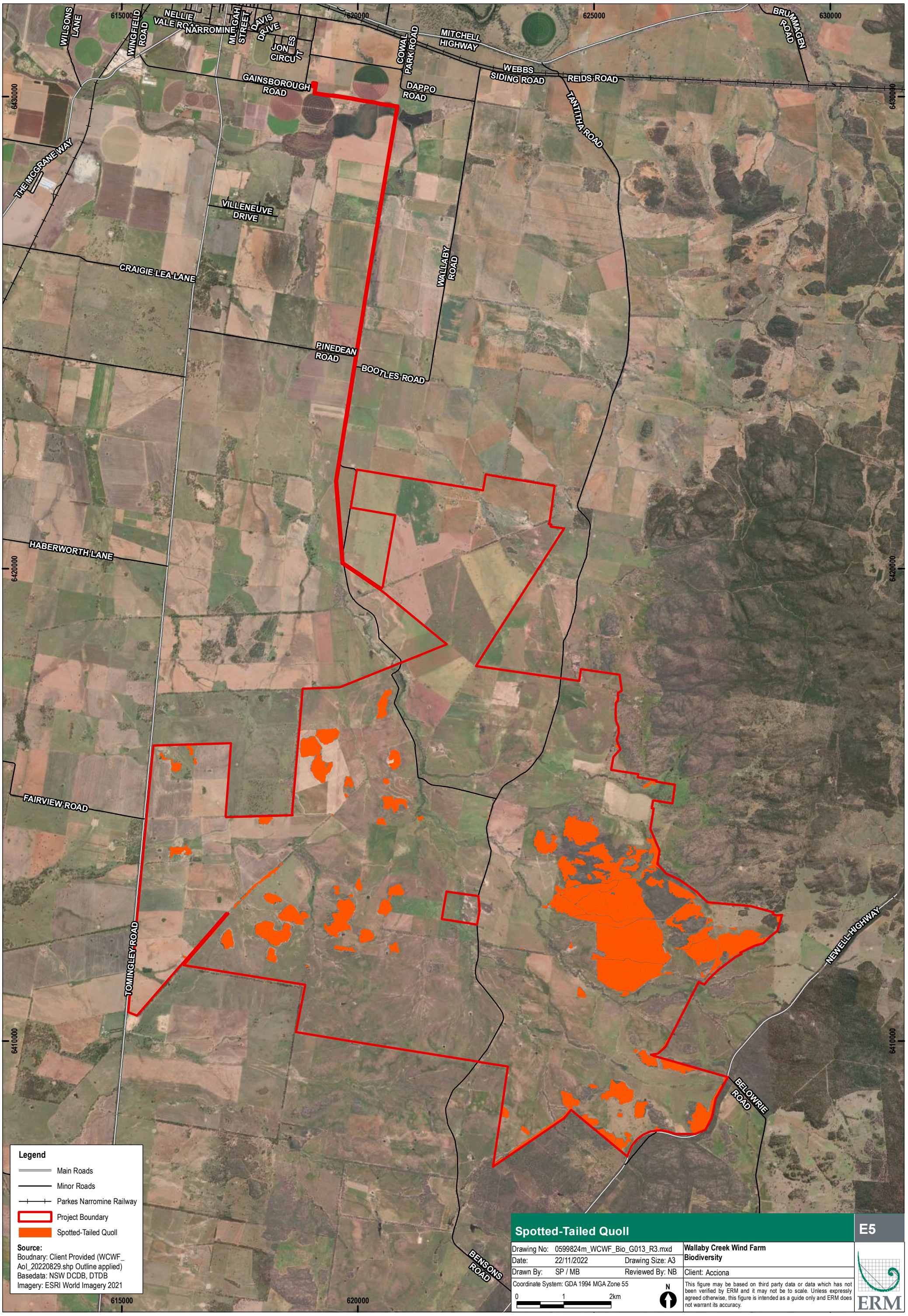
Currently, habitat critical to the survival of this species is not possible to map. Habitat for this species has instead been mapped utilising NSW’s associated PCT mapping. PCTs comprising potential habitat for this species include PCT 81, 110, 186, 201, 217 and 461.

There is a potential for this species to be disturbed by the construction and maintenance of infrastructure within the Project Boundary through clearing of habitat. Additional surveys are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species. Surveys can be done year-round.

Based on the proposed disturbance of up to 13.3 ha or 1.4% of the total potential Spotted-tailed Quoll habitat within the Project Boundary, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 5 Significant Impact Assessment for the Spotted-tailed Quoll

Criteria	Description	Criteria Triggered?
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	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. The recent record in the locality suggests that the Project may be habitat of a single individual, but the proposed disturbance of 13.3 ha of potential habitat is unlikely to lead to a long-term decrease of the species.	No
Reduce the area of occupancy of the species	The Project lies in the very western extent of the Spotted-tailed Quoll, and any reduction in habitat or disturbance to this habitat may have an effect on the species' area of occupancy, therefore the proposed disturbance of 13.3 ha of potential habitat has potential to reduce the area of occupancy of the species in western NSW.	Potential
Fragment an existing population into two or more populations	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. Therefore, the proposed disturbance of 13.3 ha of potential habitat is unlikely to fragment an existing population.	No
Adversely affect habitat critical to the survival of a species	Spotted-tailed Quolls require a number of habitats features to support their availability of dens (fallen logs, hollow trees, rocks). The proposed disturbance for the Project of 13.3 ha of potential habitat has the potential to remove critical features used for dens, as well as disruption to their latrine sites and connectivity between males and females.	Potential
Disrupt the breeding cycle of a population	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. Disturbance to the home range of a single individual has the potential to disconnect a female from the nearby males, decreasing her chance of reproduction.	Potential
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed disturbance will not exceed 13.3 ha of potential habitat. This potential habitat comprises 1.4% of the total habitat available within the Project Boundary and is unlikely to be decreased to the point where the species will experience decline.	No
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	There is evidence that other species of Quoll are susceptible to Cane Toad poisoning, and it is assumed that this would also apply to the Spotted-tailed Quoll. Cane Toads are not currently a concern for the location of the Project. There is mention of foxes, feral cats and wild and domestic dogs that present as possible predators, but this is speculative and unknown. The Project and its related development are unlikely to introduce an invasive species within the Project Boundary or exacerbate the current invasive species presence.	No
Introduce disease that may cause the species to decline	There are no introduced diseases known to pose a threat against Spotted-tailed Quolls. It is known that they are sensitive to 1080 baiting and a small, fragmented population would be seriously impacted by exposure to 1080. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases or substances such as 1080 that may cause this species to decline.	No
Interfere with the recovery of the species	The Project has not been identified as an area of importance to the Spotted-tailed Quoll and the proposed development will not impact the recovery of the species.	No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TOMINGLEY ROAD
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BENSONS ROAD
Legend
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Minor Roads
Parkes Narromine Railway
Project Boundary
Spotted-Tailed Quoll
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Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Spotted-Tailed Quoll
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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Swift Parrot (*Lathamus discolor*) – Critically Endangered

The proposed development of the Project has potential to lead to a significant impact to the Swift Parrot

Swift Parrot (*Lathamus discolor*) has been identified as likely to occur across the Project. There was no detection of Swift Parrot during BUS field surveys, further investigation will need to be conducted to determine its presence within the Project Boundary.

Swift Parrot is listed as Critically Endangered under the EPBC Act and Endangered under the BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken, and subsequently an MNES impact assessment. The Swift Parrot breeds in Tasmania and migrates to the mainland in winter where it inhabits inland slopes and coastal areas of Victoria, NSW and southern QLD.

There are 2 records of Swift Parrot within the locality of the Project Boundary (10 km buffer), a group of 11 recorded in 2000 and 5 recorded in 2013. In NSW they occupy forests and woodlands along the coast and the western slopes region, and when inland areas are experiencing drought, they will show preference for the coastal habitat. The Swift Parrot feeds primarily on eucalypt nectar, as well as lerps, seeds and fruit. When breeding in Tasmania, they rely on Tasmanian Blue Gum, and when on the mainland in winter, they prefer to feed among box-ironbark, grassy woodlands and Spotted Gum woodland or coastal *Eucalyptus robusta* woodland. In NSW white box-yellow gum-Blakely's red gum woodland has been identified as important habitat, in addition to the box-ironbark habitat that contains Mugga Ironbark (TSSC, 2016).

Potential foraging habitat for this species is associated with PCTs that contain box-gums or ironbarks. associated PCTs within the Project include PCT 64, 76, 80, 81, 82, 83, 110, 201, 217, 267, and 461. This potential foraging habitat totals 1205.6 ha within the Project Boundary. The total amount of potential foraging habitat to be disturbed by the proposed development is up to 29.3 ha or approximately 2.4% of the total potential foraging habitat within the Project Boundary. Potential foraging habitat within the Project Boundary for this species has been mapped as **Figure E-6** MNES Habitat Areas for Swift Parrot.

Swift Parrots have been seen to form groups between 30 and a few hundred, depending on the abundance of food in an area. Roosting sites are selected on the suitability of the vegetation structure for providing social interaction between the group, with preference shown for taller trees, and proximity and availability of food sources. High site fidelity has been observed in the Swift Parrot, a group may return to a roosting site on an irregular basis if resources and climatic conditions remain suitable. Given distribution of the Swift Parrot is known to the locality, it is possible that the Project may host an 'important population' necessary for long-term survival and recovery.

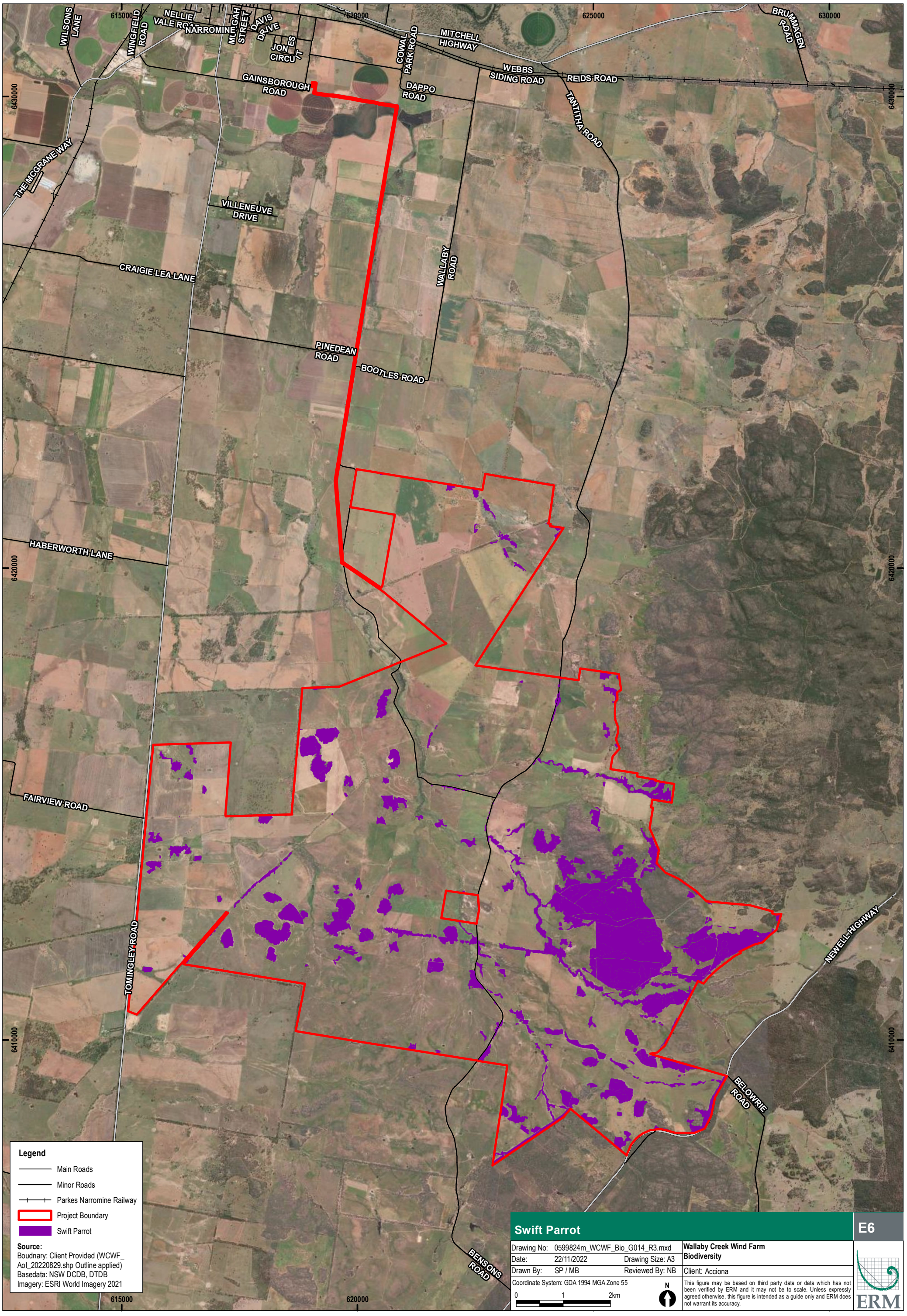
There is a potential for this species to be disturbed by the construction and maintenance of infrastructure in the Project Boundary through clearing of habitat. There is also potential for this species to collide with the wind turbine blades present in the Project Boundary when foraging or migrating. The risk of collision is considered low to moderate, foraging often occurs in the tallest available trees and therefore flight paths may be of concern. However, data on aspects such as height flight during migration of the Swift Parrot is lacking. Additional surveys are proposed for future field investigations and further data will be obtained to inform ongoing management and potential impact for the species. Surveys should be done in winter upon the Swift Parrot's arrival to the mainland, before they return back to Tasmania in spring.

Based on the proposed disturbance of up 29.3 ha or approximately 2.4 % of the total potential Swift Parrot foraging habitat within the Project Boundary, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 6 Significant Impact Assessment for the Swift Parrot

Criteria	Description	Criteria Triggered?
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	Potential foraging habitat for the Swift Parrot is present within the Project Boundary, associated with PCT 64, 76, 80, 81, 82, 83, 110, 201, 217, 267, and 461, totalling 1205.6 ha. The area of foraging habitat that has the potential to be impacted by the proposed development is expected to be 29.3 ha or 2.4% of potential foraging habitat present within the Project Boundary. While habitat critical is not defined within the recovery plan or conservation advice for this species, given that potential foraging habitat does occur within the Project Boundary, this can be assumed to be habitat critical to the survival of the species. A reduction in line with approximately 29.3 ha or 2.4% of available foraging habitat within the Project Boundary, is unlikely to lead to a long-term decrease in the size of the Swift Parrot population, as a large extent of potential foraging habitat associated with Mugga Ironbark will still remain.	No
Reduce the area of occupancy of the species	The predicted area of occupancy for this species was estimated at 57,000 km^2 (TSSC, 2016), due to its large non-breeding range and associated long-distance movement. Occupied foraging habitat is estimated at between 7.5 km^2 and 98 km^2. Given that no breeding habitat is within the Project Boundary, and that only 29.3 ha or 2.4% of potential foraging habitat is anticipated to be disturbed, it is unlikely that this small amount will reduce the area of occupancy for species' foraging habitat.	No
Fragment an existing population into two or more populations	The removal of only 29.3 ha or 2.4% of potential foraging habitat is unlikely to fragment populations within the Project Boundary. This is due to this species being highly mobile and the proposed development is unlikely to present a significant impact to dispersal between foraging habitats to the point where this species fragments into two or more populations.	No
Adversely affect habitat critical to the survival of a species	While critical habitat is not defined within the recovery plan or conservation advice for this species, potential foraging habitat does occur within the Project Boundary, and this can be assumed to be habitat critical to the survival of the species. The removal of 29.3 ha of potential foraging habitat, accounting for 2.4% of total potential habitat across the Project Boundary, has the potential to adversely affect habitat critical to the survival of this species.	Potential
Disrupt the breeding cycle of a population	The Swift Parrot only breeds in Tasmania, the proposed development will have no impact on the breeding cycle of the Swift Parrot	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Potential foraging habitat for the Swift Parrot is present within the Project Boundary, associated with PCT 64, 76, 80, 81, 82, 83, 110, 201, 217, 267, and 461. This totals 880.4 ha. The area of potential foraging habitat that may be impacted by the Project is expected to be 29.3 ha or 2.4% of potential foraging habitat present within the Project Boundary. While critical habitat is not defined within the recovery plan or conservation advice for this species, potential foraging habitat does occur within the Project Boundary, and this can be assumed to be habitat critical to the survival of the species. A reduction in line with approximately 29.3 ha or 2.4% of available foraging habitat within the Project Boundary, is unlikely to lead to a long-term decrease in the size of the Swift Parrot population, as a	No

Criteria	Description	Criteria Triggered?
	large extent of potential foraging habitat associated with Mugga Ironbark will still remain.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Swift Parrots are known to be predated by Sugar Gliders which target the eggs, nestlings and the sitting female, but this is not of concern to the Swift Parrot on the mainland. They are also known to be predated by feral cats, as outlined in the *Threat abatement plan for predation by feral cats* (DoE, 2015). Feral cats were not identified in field surveys but are likely present. The proposed development is unlikely to lead to an increased presence of feral cats and all activities for construction and operation will be managed in line with a developed Pest and Weed Management Plan.	No
Introduce disease that may cause the species to decline	The Swift Parrot is susceptible to PBFD amongst nestlings, unlikely to impact the population when on the mainland. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases that may cause this species to decline. All activities for construction and operation will be managed in line with a developed Pest and Weed Management Plan.	No
Interfere with the recovery of the species	The National Recovery Plan for the Swift Parrot (Saunders & Tsaroz, 2011) outlines the following objectives for the species recovery: ■ prevent further decline of the Swift Parrot population. ■ To achieve a demonstrable sustained improvement in the quality and quantity of Swift Parrot habitat to increase carrying capacity. The Project Boundary includes potential foraging habitat and will have a small area of impact of 29.3 ha which is unlikely to cause a decline in the population. Therefore, the Project is unlikely interfere with the recovery objectives for the Swift Parrot.	No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Minor Roads
Parkes Narromine Railway
Project Boundary
Swift Parrot
Source:
Boudnary: Client Provided (WCWF_ AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Swift Parrot
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – Critically Endangered

The proposed development of the Project has potential to lead to a significant impact to the White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC

The White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC is listed as 'Critically Endangered' under the EPBC Act and BC Act and has been identified as likely to occur within the Project Boundary.

It is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs (where shrub cover comprises less than 30% cover), and a dominance or prior dominance of White Box (*Eucalyptus albens*) and/or Yellow Box (*E. melliodora*) and/or Blakely's Red Gum (*E. blakelyi*) trees. In the Nandewar bioregion, Grey Box (*E. microcarpa* or *E. moluccana*) may also be dominant or co-dominant. In the woodland state, tree cover is generally discontinuous and of medium height with canopies that are clearly separated.

To be considered part of the listed ecological community under the EPBC Act remnant areas must also:

- have a predominantly native understorey (i.e., more than 50% of the perennial vegetative ground layer must comprise native species), and
- be 0.1 ha or greater in size and contain 12 or more native understorey species (excluding grasses), including one or more identified important species; or
- be 2 ha or greater in size and have either natural regeneration of the overstorey species or an average of 20 or more mature trees per ha.

Fieldwork completed to date has identified areas of potential White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland within the Project Boundary. For this community to meet the requirements of the EPBC Act TEC, the structure generally needs to be of a woodland community and excludes areas of derived native grassland within the Project Boundary.

The Project Boundary is also within range of the TEC, within the 'may occur' extent of its distribution. Within the NSW South Western Slopes Bioregion, it is estimated that around approximately 4% of this TEC exists as remnants with greater than 20% canopy cover and are 10 ha in size or larger.

Potential habitat for this TEC has been associated with the following PCTs: PCT 74, 85 and 267. This habitat is mapped in **Figure E-7.** Habitat associated with grasslands has been excluded at this stage as habitat without canopy cover in the form of derived native grassland is in low condition. Estimated habitat extent throughout the Project Boundary is 167.6 ha, with the proposed development to potentially disturb 3.9 ha, or approximately 2.3 % of the total potential extent of the TEC within the Project Boundary.

The extent to where this TEC occurs in its woodland and derived native grassland form will be continually refined and assessed through further BAM plots and assessment as part of the EIS process.

To assist in the preservation of the ecological community, it is recommended that a buffer zone of at least 30 metres be maintained from the outer edge of an identified patch, where practicable.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 7 Significanct Impact Assessment for White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – Critically Endangered

Criteria	Description	Criteria Triggered?
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	The exact area of the patch present within the Project Boundary is to be determined during future survey efforts. The area of the associated PCTs (PCT 74, 85 and 267) within the Project is 167.6 ha. An estimated area of impact associated with the proposed development for the Project is 3.9 ha. Given that this TEC is severely restricted in range throughout this Bioregion, any reduction in its extent is likely to be considered significant, and therefore the proposed developed has to potential to cause a significant impact on the extent of the TEC.	Potential
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	While this TEC has not been exactly defined within the Project Boundary, as this will be subject to future surveys, there is the potential for as yet undetermined patches of this TEC to be fragmented by the proposed development. Further refinement will be undertaken to ensure that areas of TEC are delineated and then avoided by proposed development infrastructure. This will then reduce the likelihood of fragmentation of any known patches of this TEC.	Potential
Adversely affect habitat critical to the survival of an ecological community	Habitat critical to the survival of Box-Gum Grassy Woodland is on the moderate to highly fertile soils of the western slopes of NSW and Queensland. In addition, degraded woodland areas not considered part of the listed ecological community may also be essential to the long-term conservation of Box-Gum Grassy Woodland, by virtue of their landscape setting (e.g., providing connectivity) or remaining flora/fauna habitat features (e.g., occurrence of rare or threatened species, tree hollows), and should also be considered as potential habitat critical to the survival of this ecological community. At current, all mapped potential TEC occurrence is classified as habitat critical to the survival. The removal of 3.9 ha of this TEC would constitute an adverse effect.	Potential
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Hydrology impacts as a result of the Project have not been explored as part of this assessment and will be considered in the EIS. However, given the nature of the Project and the limited area of impact to surface water and groundwater, it is not considered likely that there will be a significant impact to abiotic factors necessary for this TEC. Mitigation measures will also be included in the design to result in no changes to surface water or groundwater hydrology that could impact on the TEC area.	No

Criteria	Description	Criteria Triggered?
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 kills or inhibit the growth of species in the ecological community, or	The area of the potential occurrence identified within the Project Boundary is to be determined during future survey efforts. The area of the associated PCTs (PCT 74, 85, 267) within the subject land is 167.6 ha. Outside the disturbance area, biosecurity requirements, particularly in relation to weed species, will be implemented to reduce the likelihood of changes to community composition. The Project is unlikely to cause substantial change to the species composition. Biosecurity measures will be implemented to reduce the introduction and establishment of invasive species. These measures will further explore the mitigation measures to be undertaken to minimise the impacts of chemicals utilised, if any, for weed management within the Project Boundary and the consideration of native vegetation including the TEC.	No
Interfere with the recovery of an ecological community	A National Recovery Plan for this TEC (DECCW, 2010) outlines the following objectives for recovery: ■ achieving no net loss in extent and condition of the ecological community throughout its geographic distribution; ■ increasing protection of sites with high recovery potential; ■ increasing landscape functionality of the ecological community through management and restoration of degraded sites; ■ increasing transitional areas around remnants and linkages between remnants; and ■ 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. There is the potential that the proposed development will result in a net loss in the extent of the TEC, however, further refinement of the extent of the TEC will be undertaken through the EIS process.	Potential

WILSONS LANE
WINGFIELD ROAD
NELLIE VALE ROAD
NARROMINE
MCGRAH STREET
DAVIS DRIVE
JONES CIRCUIT
COWAL PARK ROAD
MITCHELL HIGHWAY
BRUMMAGEN ROAD
WEBBS SIDING ROAD
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THE MCGRANE WAY
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PINEDEAN ROAD
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Legend

- Main Roads
- Minor Roads
- Parkes Narromine Railway
- Project Boundary
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Source:
Boudnary: Client Provided (WCWF_AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

E7

Drawing No:	0599824m_WCWF_Bio_G015_R3.mxd		**Wallaby Creek Wind Farm**
Date:	22/11/2022	Drawing Size: A3	**Biodiversity**
Drawn By:	SP / MB	Reviewed By: NB	Client: Acciona

Coordinate System: GDA 1994 MGA Zone 55

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South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*) – Vulnerable

The proposed development of the Project has potential to lead to a significant impact to the South-eastern Glossy Black-Cockatoo

The South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*) has been identified as likely to occur across the Project. There was no detection of the South-eastern Glossy Black-Cockatoo during BUS surveys conducted on field, further investigation will need to be conducted to determine its presence across the Project, particularly in relation to the presence of potential breeding habitat (suitable hollows).

The South-eastern Glossy Black-Cockatoo has recently been listed as Vulnerable under the EPBC Act and BC Act. A conservative approach of considering this species likely to occur within the Project Boundary has been taken due to records and distributions, and subsequently an MNES impact assessment has also been undertaken. This species occurs over most of eastern NSW, south-east QLD and eastern Victoria. There are records dating back from 1880 to as recently as 2006 for the South-eastern Glossy Black-Cockatoo within the locality of the Project (10 km buffer).

Habitat for this species can be delineated into foraging and breeding habitat. South-eastern Glossy Black-Cockatoo is an herbivorous parrot that feeds almost exclusively on seeds of the she-oak (*Allocasuarina* spp. and Casuarina spp.). Foraging habitat in inland NSW typically comprises of drooping she-oak (*A. verticillata*), broombush she-oak (*A. diminuta*), mallee she-oak (*A. gymnanthera*), Belah (*C. cristata*), although other species (e.g., buloke (*A. luehmannii*)) may be utilised in some years (DAWE, 2022)

Breeding habitat for this species consists of hollows within mature eucalypts. In NSW this has been found to be species such as narrow-leaved ironbark (*Eucalyptus crebra*), blue-leaved ironbark (*E. nubila*), Blakely's red gum (*E. blakelyi*) and river red gums (*E. camaldulensis*). However, all eucalypts may support this species, living or dead, and potential nesting hollows typically are defined with the following traits:

- >8 m above the ground;
- Located in branches >30 cm in diameter;
- Branch or stem no more than 45 degrees from vertical; and
- Minimum entrance diameter of >15 cm.

Habitat critical to the survival of this species is consistent with the above habitat definitions (breeding and foraging) and any other areas that support the SIG 1.1 definition of habitat critical. This includes considering areas not currently occupied by the subspecies, because they have been recently burnt, but are capable of supporting cockatoo populations in future.

This potential foraging and breeding habitat totals 1,676.9 ha within the Project Boundary. The total amount of habitat potentially disturbed by the proposed development is up to 55.7 ha or 3.3% of the total potential foraging and roosting habitat within the Project Boundary.

Within the Project Boundary, suitable breeding habitat is associated with ironbark and other eucalypts (such as river red gum) PCTs. These PCTs are 36, 70, 74, 76, 80, 81, 82, 83, 110, 185, 186, 201, 217 and 461.

Habitat for this species is mapped in **Figure E-8**.

This species has the potential to use the Project for breeding purposes where suitable hollows are present within mapped habitat. Further work will need to be undertaken to map suitable breeding hollows and assess foraging habitat for this species as there is currently limited knowledge of breeding and foraging habitat within the Project Boundary.

Given this species' distribution occurs around the Project Boundary and preferred breeding habitat for this species is known to occur within the Project Boundary, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for breeding where hollows are present.

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and breeding sites. Additional bird surveys and habitat mapping are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

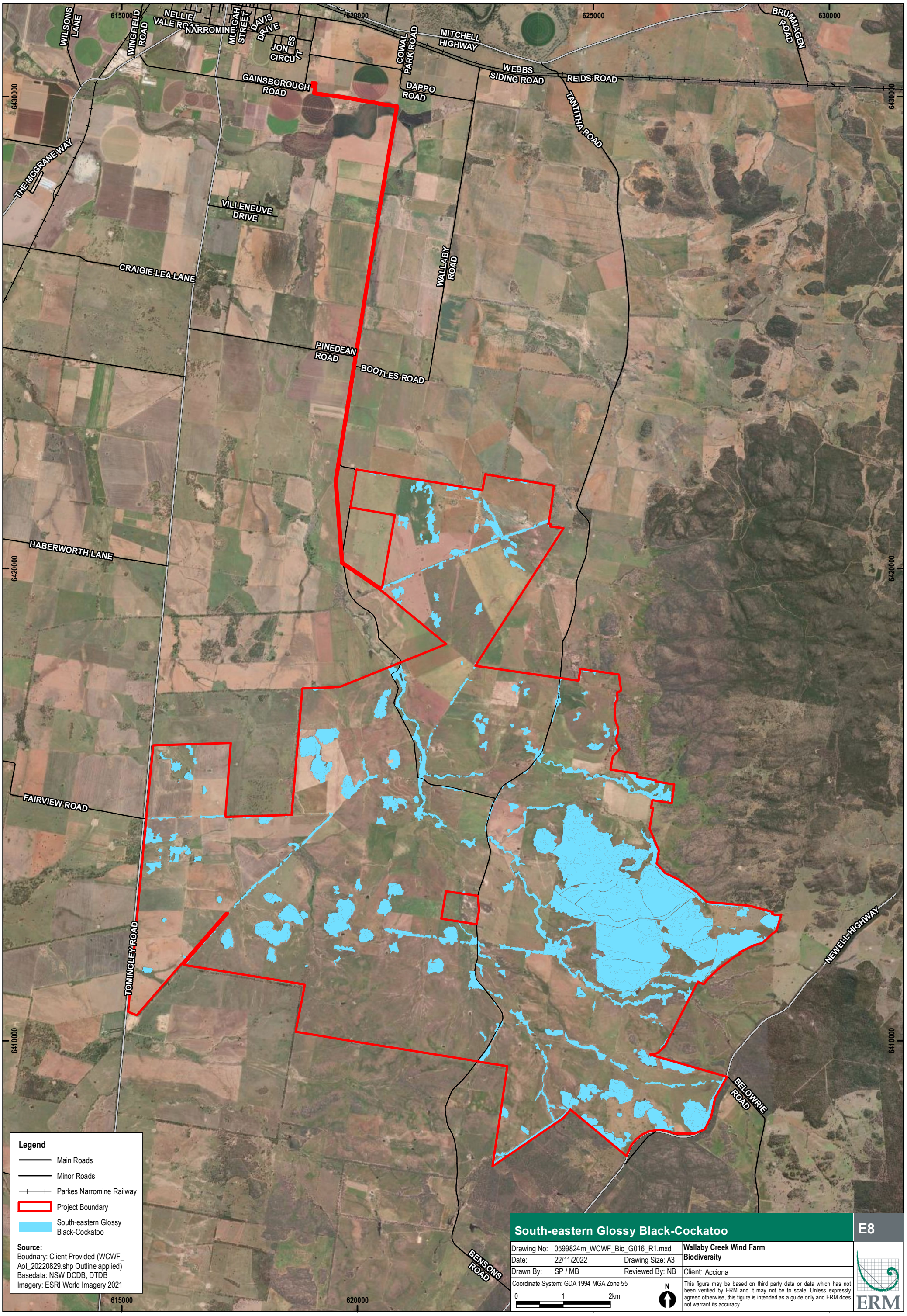
Based on the potential disturbance of up to 55.7 ha or 3.3% of the total potential foraging habitat within the Project Boundary, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 8 Significant Impact Assessment for the South-eastern Glossy Black-Cockatoo

Criteria	Description	Criteria Triggered?
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,	There is evidence that the Project may have the potential to support an important population, especially where breeding habitat (hollows within eucalypts that meet the identified traits) is present. The proposed disturbance of 55.7 ha of potential breeding habitat within the Project Boundary may lead to a long-term decrease of the species, especially considering the size of the required hollows and the lengthy time it takes for these hollows to form. However, the area of potential breeding habitat represents only a small proportion of the overall Project, and this habitat will be further assessed to retain appropriate breeding hollows if present within the Project Boundary.	Potentially
Reduce the area of occupancy of an important population,	There is evidence that the Project may have the potential to support an important population, especially where breeding habitat (hollows within eucalypts that meet the identified traits) is present. The proposed removal of breeding habitat considered habitat critical to the survival of the species within the Project is an action that would potentially interfere with the recovery of the species and reduce the estimated area of occupancy for this species. However, the proposed disturbance is limited to only 55.7 ha of habitat critical to the survival of the species which represents only a small proportion of the overall Project.	Potentially
Fragment an existing important population into two or more populations,	It is unlikely that a population of South-eastern Glossy Black-Cockatoo which is known to be distributed around the Project, will be fragmented because of the proposed development. Given that the Project is characterised by fragmented woodlands it is unlikely that the Disturbance Footprint will further fragment any potential populations utilising habitat within the Project Boundary. Further to this, layout and design has been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where possible, reducing the potential for fragmentation.	No

Criteria	Description	Criteria Triggered?
Adversely affect habitat critical to the survival of a species,	Habitat within the Project Boundary is considered breeding habitat critical to the survival of the species as it is anticipated that breeding would occur in suitable hollows in the associated PCTs. The removal of such hollows would adversely affect habitat critical to the survival of the species. However, the proposed disturbance is limited to only 55.7 ha of potential habitat critical to the survival of the species and additional surveys will be undertaken to map the extent of suitable hollows within the Project Boundary.	Potentially
Disrupt the breeding cycle of an important population,	Nesting occurs in large hollows in both living and dead eucalypt trees. These specific hollows were not abundantly identified throughout the Project Boundary during the survey periods. However, eight suitable hollows were identified within one patch of remnant mature eucalypts in the south-eastern section of the Project. As such, all suitable habitats may have similar potential for suitable hollows but survey confirmation will be required. The removal of 55.7 ha of breeding habitat has potential to contribute to breeding cycle impacts. However, the proposed disturbance is limited to only 55.7 ha of potential habitat critical to the survival of the species and additional surveys will be undertaken to map the extent of suitable hollows within the Project Boundary. Layout and design have been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where practicable, reducing the potential for disruption to the breeding cycle.	Potentially
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed disturbance will not exceed 55.7 ha of potential breeding habitat. This potential foraging habitat comprises 3.3% ha of the total potential habitat within the Project Boundary, but since the habitat present is potentially critical breeding habitat for the survival of the species, declines of the species are possible.	Potentially
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	This species conservation advice does not outline any particular invasive species that are known to be a key threat to the species. There is mention of competition for nesting hollows between the Superb Parrot and the Common Starling, Galah and Corella species, which is increased when nest hollows are removed from a site. Competition for nesting hollows is possible within the Project Boundary. However, the construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the introduction and spread of invasive species and thus aim to mitigate and avoid harm to this species.	No
Introduce disease that may cause the species to decline, or	The South-eastern Glossy Black-Cockatoo is susceptible to PBFD which can be increased due to loss of nest hollows. As preferred breeding habitat has the potential to occur within the Project Boundary, this could make the species more susceptible to the disease. However, the proposed disturbance is limited to only 55.7 ha of potential habitat critical to the survival of the species and additional surveys will be undertaken to map the extent of suitable hollows within the Project Boundary. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases that may cause this species to decline. Layout and design have been refined throughout an iterative process to include the location of WTGs away from remnant vegetation where possible.	Unlikely

Criteria	Description	Criteria Triggered?
Interfere with the recovery of the species.	There is evidence that the Project may have the potential to support an important population of this species and habitat used for breeding critical to the survival of the species is likely to be present within the associated mapped PCTs (those with a composition of ironbarks and other remnant mature eucalypts). The proposed removal of potential breeding habitat critical to the survival of the species within the Project Boundary is an action that would potentially interfere with the recovery of the species and reduce the area of occupancy, as outlined within the species conservation advice. However, the proposed disturbance is limited to only 55.7 ha of potential habitat critical to the survival of the species and additional surveys will be undertaken to map the extent of suitable hollows within the Project Boundary.	Potentially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Project Boundary
South-eastern Glossy Black-Cockatoo
Source:
Boudnary: Client Provided (WCWF_ AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
South-eastern Glossy Black-Cockatoo
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Drawing No: 0599824m_WCWF_Bio_G016_R1.mxd
Date: 22/11/2022
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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Grey-headed Flying-fox (*Pteropus poliocephalus*) - Vulnerable

The proposed development is unlikely to lead to a significant impact to the Grey-headed Flying-fox.

The Grey-headed Flying-fox is considered to have the potential to occur within the Project Area. It is a canopy-feeding nectarivore and frugivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands (TSSC, 2001).

The Project is approximately 25 km south of the closest active colony containing recent Grey-headed Flying-fox activity (as per the interactive flying-fox viewer maintained by DCCEEW). This colony is located near Dubbo. Grey-headed Flying-foxes are capable of nightly flights of up to 50 km from their roost to different feeding areas as food resources change (Eby unpubl. cited in Eby 1991). Thus, the Project Area has potential foraging habitat as it is within a 50 km range from the closest colony. There is a recent record in the locality from 2018 for the species, approximately 5 km south-west of the Project Boundary (BioNet, 2022).

It is noted that many myrtaceous tree species that make up the diet of the Grey-headed Flying-fox flower at different times of the year. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera* (Eby & Law, 2008; Eby, 2016; Eby et al., 2019). The Project Area contains many of these myrtaceous species.

Where the existence of these important winter and spring flowering vegetation communities is verified in the field, they are considered habitat critical to the survival of the Grey-headed Flying-fox (DAWE, 2021). Therefore, habitat within the Project Area is considered potential foraging habitat critical to the survival of the species. This potential Grey-headed Flying-fox foraging habitat has been mapped in line with the correlated PCTs for this species, being PCT 36, 70, 76, 81, 83, 217, 267 and 461.

This potential foraging habitat totals approximately 1,300 ha and is displayed in **Figure E-9**. However, it is difficult to predict which vegetation communities will produce foraging resources at certain times of the year. With consideration of the Project Area being within 50 km from the nearest Grey-headed Flying-fox colony, the foraging resources present are potential resources for the species. The total amount of potential Grey-headed Flying-fox foraging habitat planned to be removed as a result of the Project is 34.3 ha or 2.6% of the total potential foraging available within the Project Boundary.

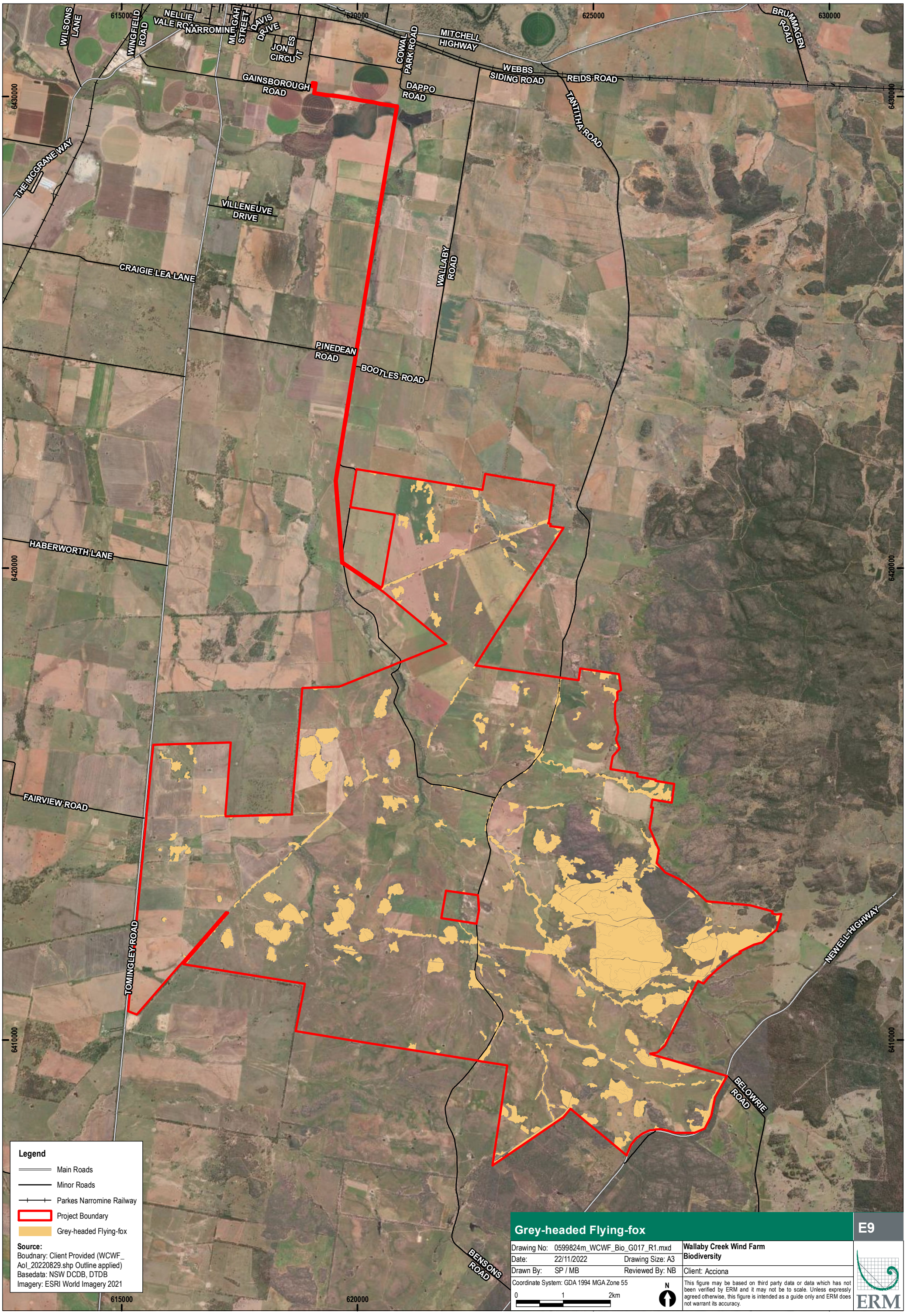
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 9 Significance Impact Assessment for the Grey-headed Flying-Fox

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The Grey-headed Flying-fox is considered to exist as one national population split into separate colonies due to the constant genetic exchange and movement between camps throughout the species' entire geographic range (DAWE, 2021). No roost sites will be directly or indirectly affected by the Project. The amount of potential foraging habitat to be cleared is up to 34.3 ha. This species has the potential to forage within parts of the Project on an opportunistic and occasional basis. On a local and regional scale, the habitat planned to be removed forms a small proportion of foraging resources. Intensification of light and noise are not expected to adversely affect local populations of the Grey-headed Flying-Fox. The Project does not support an important population of the species. Therefore, the proposed development is unlikely to lead to a long-term decrease in the size of the population.	No
Reduce the area of occupancy of an important population,	The proposed development will involve the removal of 34.3 ha of potential Grey-headed Flying-Fox foraging habitat. Given the abundant accessibility of eucalypts in the locality and the wider landscape, the removal of vegetation is unlikely to have a significant impact on the area of occupancy of the species. The clearing of such small linear patches of vegetation across the Project and the retention of patches of myrtaceous vegetation will ensure that the area of occupancy for the species is not significantly reduced.	No
Fragment an existing important population into two or more populations,	Grey-headed Flying-Foxes are highly mobile and forage over extensive areas. The clearing of 34.3 ha of potential Grey-headed Flying-Fox foraging habitat will not further fragment the existing population. This clearing impact will only remove discrete pockets of foraging habitat. Such small clearings will ensure that Grey-headed Flying-Fox habitat remains connected, both within and outside of the Project.	No
Adversely affect habitat critical to the survival of a species,	The Project contains myrtaceous species that are seasonal foraging resources considered habitat critical to the survival of the Grey-headed Flying-Fox. However, the Project Area is approximately 25 km south from the closest active colony with recent Grey-headed Flying-Fox activity (as per the interactive flying-fox viewer maintained by the DCCEEW). Despite this, clearing will impact a small proportion of potential habitat critical to the survival of the species. The removal of 34.3 ha of potential foraging habitat within the Project Boundary equates to 2.6% of the 1,300 ha available in the Project Boundary. With consideration of the Project Area being 25 km from the nearest Grey-headed Flying-Fox roosting camp, and the availability of current foraging habitat throughout the Project and wider landscape, the removal of 34.3 ha of potential foraging habitat is unlikely to adversely affect habitat critical to the survival of the species.	Unlikely

Criteria	Description	Criteria Triggered?
Disrupt the breeding cycle of an important population,	Colonies of Grey-headed Flying-Fox rest, socialise, breed and give birth at roosting sites also known as camps. No known camps will be removed as part of the proposed development works. Intensification of light and noise during construction are not expected to adversely affect the breeding cycle of any colonies of Grey-headed Flying-Fox. The Project is approximately 25 km south from the closest active colony with recent Grey-headed Flying-Fox activity (per the interactive flying-fox viewer of the DoE). Thus, the proposed development is not anticipated to disrupt the breeding cycle of an important population.	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The Project contains myrtaceous species that are foraging resources considered habitat critical to the survival of the Grey-headed Flying-Fox. Nonetheless, the impact will not adversely affect the quality of habitat to the extent that the species is likely to decline. This is because clearing will occur in such small proportions of the larger landscape, at only 2.6 % of available habitat in the Project. The seasonal foraging resources to be removed are commensurate to an abundance of other vegetation communities within the locality. Hygiene measures to be implemented during construction will minimise weed encroachment into adjacent habitat which consequently means habitat quality degradation will be prevented.	No
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	The proposed development is not anticipated to introduce invasive species that are harmful to the Grey-headed Flying-Fox. The proposed development activities during construction and operation will adopt and follow biosecurity measures to mitigate the introduction or further spread of invasive species within the Project Boundary.	No
Introduce disease that may cause the species to decline, or	There is currently limited information necessary to assess and quantify the risks posed to Grey-headed Flying-Fox populations by the introduction of diseases (DAWE, 2021). The proposed development is not anticipated to introduce diseases to any Grey-headed Flying-Fox colonies. There is no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn if a Grey-headed Flying-fox is encountered. Only appropriately trained and licensed workers will handle wildlife.	No
Interfere with the recovery of the species.	The National Recovery Plan for the Grey-headed Flying-Fox (DAWE, 2021), outlines nine specific recovery objectives intended to be achieved over ten years. They are: 1. Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-Fox. 2. Identify, protect and increase roosting habitat of Grey-headed Flying-Fox camps. 3. Determine trends in the Grey-headed Flying-Fox population to monitor the species' national distribution, habitat use and conservation status. 4. Build community capacity to coexist with Grey-headed Flying-foxes and minimise the impacts on urban settlements from new and existing camps while avoiding interventions to move on or relocate entire camps.	No

Criteria	Description	Criteria Triggered?
	5. Increase public awareness and understanding of Grey-headed Flying-Foxes and the recovery program and involve the community in the recovery program where appropriate. 6. Improve the management of Grey-headed Flying-Fox camps in areas where interaction with humans is likely. 7. Significantly reduce levels of licenced harm to Grey-headed Flying-Foxes associated with commercial horticulture. 8. Support research activities that will improve the conservation status and management of Grey-headed Flying-Foxes. 9. Reduce the impact on Grey-headed Flying-Foxes of electrocution on power lines, and entanglement in netting and on barbed-wire. The first recovery objective is applicable to this assessment because native foraging habitat that is critical to the survival of the Grey-headed Flying-Fox has been identified in the Project. As previously outlined, the seasonal foraging resources are minimal compared to the abundance of other suitable vegetation within the locality. The removal of 34.4 ha of potential Grey-headed Flying-Fox foraging habitat within the Project Area equates to 2.6 % of the total potential habitat available to the species within the Project Boundary. Therefore, the proposed development will not interfere with the recovery of the species.	
Significant Impact: Not Significant		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Grey-headed Flying-fox
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Southern Whiteface *(Aphelocephala leucopsis*) - Vulnerable

The proposed development has the potential to lead to a significant impact to the Southern Whiteface

The Southern Whiteface is considered known to occur within the Project Area, primarily on the basis of records and preferred habitat availability within the Project Area. This species has been recently listed as Vulnerable under the EPBC Act due to substantial reductions in population by an estimated 30-50% every decade since 1999, with no indication that declines are slowing.

This species occurs throughout most of mainland Australia south of the tropics and in all States and Territories, with the exception of Tasmania. This species occupies a broad range of habitats where open woodlands and shrublands are present, where there is an understorey of grasses or shrubs, or both. These habitat types are typically dominated by acacia or eucalypts on ranges, foothills and lowlands, and plains (TSSC, 2023). This species utilises the same habitat types to breed and to forage and nests will be made in a tree hollow, crevice or in low bushes. This species forages primarily on insects and seeds, typically from bare ground or leaf litter.

Habitat critical to the survival of the species includes areas of:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- habitat with low tree densities and an herbaceous understorey litter cover which provides essential foraging habitat;
- •Living and dead trees with hollows and crevices which are essential for roosting and nesting.

As this species does not have directly correlated associated PCTs in NSW, and as this species is not threatened under the BC Act (NSW), PCTs have been selected based on their potential to provide habitat functionality as per the habitat critical definition to the survival of this species. As such, associated PCTs considered habitat for this species are PCT 27, 36, 49, 70, 74, 76, 77, 80, 81, 82, 83, 110, 185, 186, 201, 217, 267 and 461.

Potential habitat within the Project Area accounts for approximately 1,807.8 ha and is displayed within **Figure E-10.** The total amount of potential Southern Whiteface habitat planned to be removed as a result of the Project is 59.9 ha or 3.3% of the total potential habitat available within the Project Boundary

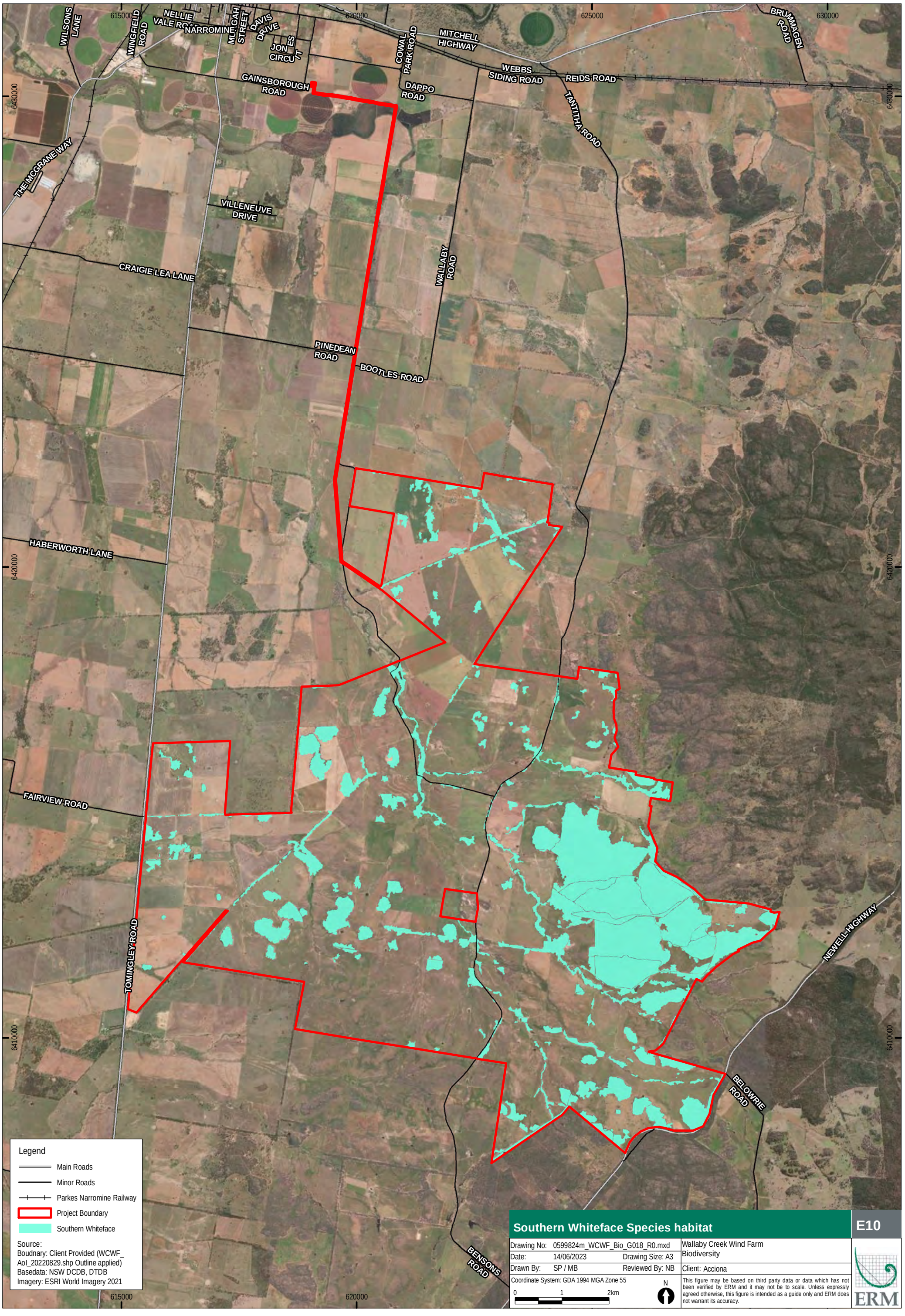
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 10 Significance Impact Assessment for Southern Whiteface

Criteria	Description	Criteria Triggered?
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 has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 59.9 ha to potential habitat for this species is unlikely to lead to a long-term decrease of an important population.	Unlikely

Criteria	Description	Criteria Triggered?
Reduce the area of occupancy of an important population,	Area of occupancy for this species is currently understood to be 70,000 km^2 (TSSC, 2023). An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 59.9 ha to potential habitat for this species is unlikely to reduce the area of occupancy to an important population.	Unlikely
Fragment an existing important population into two or more populations,	An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 59.9 ha to potential habitat for this species is unlikely to fragment an existing important population into two or more populations. Further, this species is unlikely to utilise the RSA of wind turbine infrastructure (due to its low habitat requirements and foraging activity being near to the ground), and ancillary infrastructure related to the Project is unlikely to be an impediment to this species.	Unlikely
Adversely affect habitat critical to the survival of a species,	Habitat critical to the survival of this species is defined as below (TSSC, 2023)" ■ relatively undisturbed open woodlands and shrublands with an understory of grasses or shrubs, or both; ■ habitat with low tree densities and an herbaceous understorey litter cover which provides essential foraging habitat; ■ Living and dead trees with hollows and crevices which are essential for roosting and nesting. The associated PCTs will constitute habitat critical to the survival of this species under the above definition and the direct removal of 59.9 ha has the potential to adversely affect the extent and quality of this habitat.	Potential
Disrupt the breeding cycle of an important population,	An important population has yet to be determined present within the Project Area. And while this species may be disrupted from the potential removal of 59.9 ha, including where trees and large shrubs are removed where potential breeding may occur. However no important population is likely to be present within the Project Area and as such, the potential impacts are unlikely to affect the breeding cycle of an important population	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	Potential habitat accounts for approximately 1,808.7 ha within the Project Area, and potential impacts to this habitat may account for up to 59.9 ha (or 3.3% of available habitat) for this species. The removal of such a small amount of habitat is unlikely to modify, destroy, remove or isolate that habitat to the extent where a local population is likely to decline.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	No invasive species are directly attributed toa threatening process for this species within the Conservation Advice (TSSC, 2023), though it is likely that this species is occasionally predated upon by these species. Weed invasion from habitat degradation from livestock, however, is listed as a threatened process nominated by the Conservation Advice. Due to the primarily agricultural land use of the Project Area, it is likely that the resultant fragmentation and modification of the remnant vegetation from this land use has established invasive species (both flora and fauna) that already affect the current vegetation and the potential removal of 59.9 ha of habitat is	Unlikely

Criteria	Description	Criteria Triggered?
	unlikely to result in the establishment or exacerbation of these species in the local area.	
Introduce disease that may cause the species to decline, or	The conservation advice for this species does not list any diseases that threaten this species.	No
Interfere with the recovery of the species.	The Project is not in the vicinity of any priority management sites and there is no recovery plan for this species applicable within the Project Boundary.	No
Significant Impact: Potentially significant		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WALLABY ROAD
PINEDEAN ROAD
BOOTLES ROAD
HABERWORTH LANE
FAIRVIEW ROAD
TOMINGLEY ROAD
NEWELL HIGHWAY
BELOWRIE ROAD
BENSONS ROAD
Legend
Main Roads
Minor Roads
Parkes Narromine Railway
Project Boundary
Southern Whiteface
Source:
Boudnary: Client Provided (WCWF_AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Southern Whiteface Species habitat
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Drawing No: 0599824m_WCWF_Bio_G018_R0.mxd
Date: 14/06/2023
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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South-eastern Hooded Robin *(Melanodryas cucullata cucullata*) – Endangered

The proposed development has potential to lead to a significant impact to the South-eastern Hooded Robin

The South-eastern Hooded Robin is considered likely to occur within the Project Area, on the basis of records and preferred habitat availability within the Project Area. This species has been recently listed as Endangered under the EPBC Act due to substantial reductions in population by >50 % over the last decade, with no indication that declines are slowing and a high reliability that this trend will continue (TSSC, 2023).

Declines to this species are partially attributed to its ongoing threats such as increased predation from introduced species (cats and foxes), invasive weeds and competition with noisy miners, over-grazing by domestic stock, introduced rabbits, and overabundant Macropod species.

This species primarily ranges throughout south-eastern Australia across far South-east Queensland, most of New South Wales and Victoria, and parts of eastern South Australia. This species has broad habitat preferences and occupies dry eucalypt and acacia woodlands and shrublands with an open understorey some grassy areas and a complex ground layer. This species forages on insects and small lizards taken from the ground where rocks and fallen timber litter the ground. Breeding typically occurs in small nesting cups situated within a tree fork or crevice between 1 and 5 metres above the ground. This species likely utilises the same habitat for both breeding and foraging functions.

Habitat critical to the survival of this species is defined in the Conservation Advice for this species (TSSC, 2023) as:

- dry eucalypt and acacia woodlands and shrublands remnants with an open understorey, some grassy areas and a complex ground layer, often in or near clearings or open areas;
- structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses;
- standing dead or live trees and tree stumps are also essential for nesting, roosting and foraging;
- moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat

Potential habitat for this species is associated with PCTs that contain eucalypt or acacia dominated shrublands. Associated PCTs within the Project Area include PCT 27, 36, 70, 74, 76, 77, 80, 81, 82, 83, 110, 185, 186, 201, 217, 267 and 461. This potential habitat totals 1,804.5 ha within the Project Boundary. The total amount of potential habitat to be disturbed by the proposed development is up to 59.9 ha or approximately 3.3% of the total potential habitat within the Project Boundary. Potential habitat within the Project Boundary for this species has been mapped as **Figure E-11**.

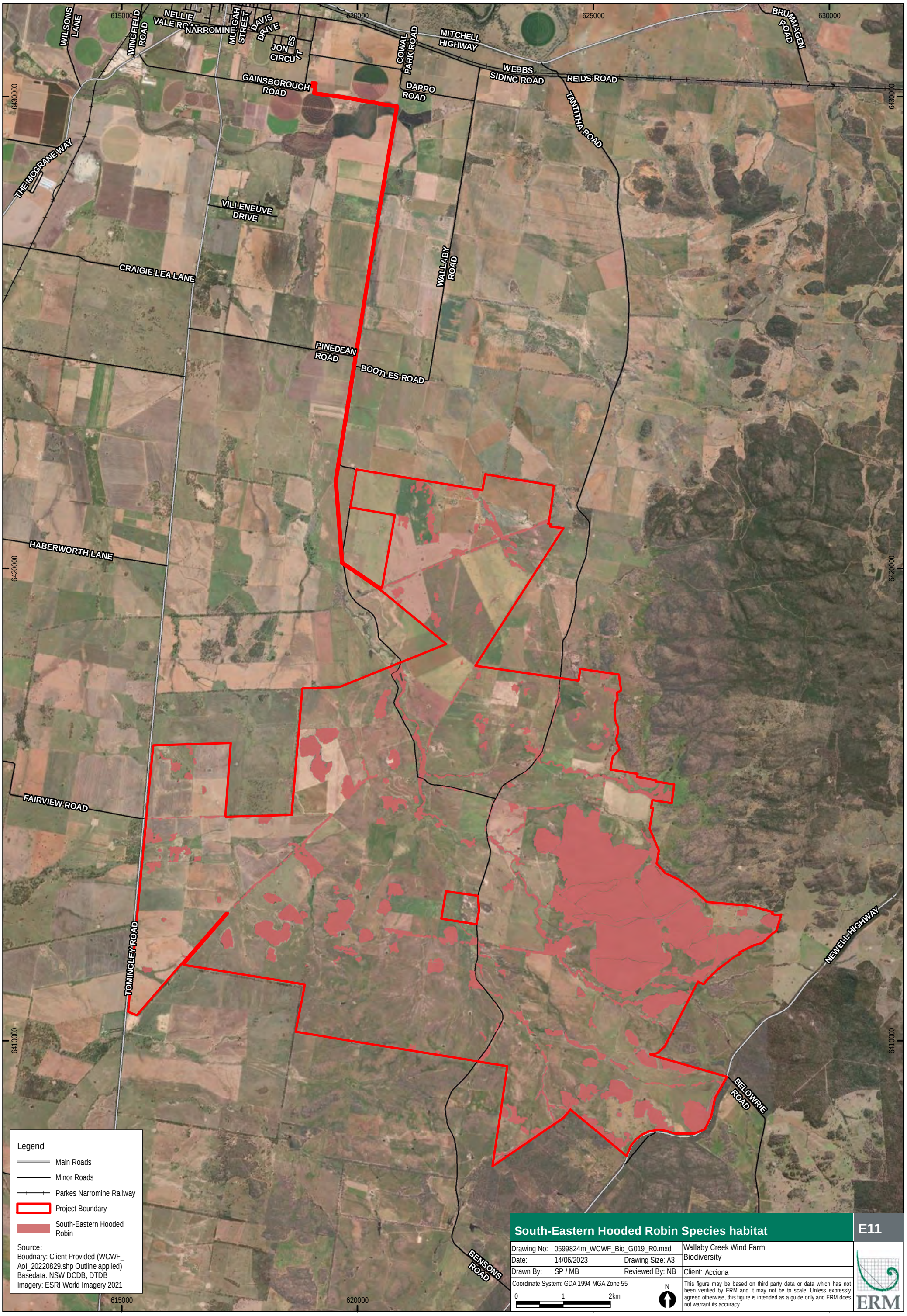
Potential habitat within the Project Area accounts for approximately 1,805.4 ha and is displayed within **Figure E-11**. The total amount of potential Southern Whiteface habitat planned to be removed as a result of the Project is 59.9 ha or 3.3% of the total potential habitat available within the Project Boundary.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 11 Significant Impact Assessment for the South-eastern Hooded Robin

Criteria	Description	Criteria Triggered?
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	An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and that the Project is located well within the known distribution, the impact of 59.9 ha to potential habitat for this species is unlikely to lead to a long-term decrease of the size of a population.	Unlikely
Reduce the area of occupancy of the species	Area of occupancy for this species is currently understood to be approximately 30,000 km^2 (TSSC, 2023). An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and that the Project is located well within the known distribution, the impact of 59.9 ha to potential habitat for this species is unlikely to reduce the area of occupancy to an important population.	Unlikely
Fragment an existing population into two or more populations	This species is not known to be severely fragmented, however some populations of this species may be fragmented, and these are assumed to be genetically isolated. The Project is situated well within known habitat of the species within its distribution and records surrounding the Project boundary are numerous. This is representative of potential wider regional connectivity for this species within the surrounding habitat, but also that this species is unlikely to be fragmented from the Project or loss of a small proportion of the available habitat for this species within the Project (59.9 ha or 3.3%).	Unlikely
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of this species is defined as below (TSSC, 2023)" ■ dry eucalypt and acacia woodlands and shrublands remnants with an open understorey, some grassy areas, and a complex ground layer, often in or near clearings or open areas; ■ structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs, and a ground layer of moderately tall native grasses; ■ standing dead or live trees and tree stumps are also essential for nesting, roosting, and foraging; ■ moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat The associated PCTs will constitute habitat critical to the survival of this species under the above definition and the direct removal of 59.9 ha has the potential to adversely affect the extent and quality of this habitat.	Potential
Disrupt the breeding cycle of a population	This species may be disrupted from the potential removal of 59.9 ha, including where trees are removed where potential breeding may occur within associated potential habitat. Further assessment of this species will have to be undertaken throughout the EIS process in order to determine the extent to which potential impacts may affect areas of breeding habitat for this species.	Potential

Criteria	Description	Criteria Triggered?
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Potential habitat accounts for approximately 1,805.4 ha within the Project Area, and potential impacts to this habitat may account for up to 59.9 ha (or 3.3% of available habitat) for this species. The removal of such a small amount of habitat has the potential to modify, destroy, remove or isolate that habitat to the extent where a local population is likely to decline. This is due in part due to the presence of a species potentially being regarded as an isolated population (this species is largely sedentary), however this will require further assessment under the EIS process to determine.	Potential
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species are directly referenced as a threatening process to this species and is partly attributed to the current decline in species abundance. Weed invasion from habitat degradation from livestock, invasive rabbits and over-abundant macropods, as well as predation from invasive species (such as cats and foxes) are listed as a threatened process nominated by the Conservation Advice. Due to the primarily agricultural land use of the Project Area, it is likely that the resultant fragmentation and modification of the remnant vegetation from this land use has established invasive species (both flora and fauna) that already affect the current vegetation and the potential removal of 59.9 ha of habitat is unlikely to result in the establishment or exacerbation of these species in the local area.	Unlikely
Introduce disease that may cause the species to decline	The conservation advice for this species does not list any diseases that threaten this species.	No
Interfere with the recovery of the species	Further fragmentation and habitat clearing for this species may be disproportionately impactful to this species due to its sharp and recent population and range retractions. Although clearing is limited to a small proportion of available habitat, the removal of potential breeding habitat has the potential to result in the interference of this species recovery	Potential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BOOTLES ROAD
HABERWORTH LANE
FAIRVIEW ROAD
TOMINGLEY ROAD
NEWELL HIGHWAY
BELOWRIE ROAD
BENSONS ROAD
Legend
Main Roads
Minor Roads
Parkes Narromine Railway
Project Boundary
South-Eastern Hooded Robin
Source:
Boudnary: Client Provided (WCWF_ AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
South-Eastern Hooded Robin Species habitat
E11
Drawing No: 0599824m_WCWF_Bio_G019_R0.mxd
Date: 14/06/2023
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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Diamond Firetail (*Stagonopleura guttata*) - Vulnerable

The proposed development has the potential to lead to a significant impact to the Diamond Firetail

The Diamond Firetail is considered known to occur within the Project Area, as this species was identified within the Project Area during surveys undertaken. This species has been recently listed as Vulnerable under the EPBC Act due to substantial reductions in population by an estimated 30-50% every decade since 1999, with no indication that declines are slowing.

This species is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records in NSW that overlap with the Project Area's Bioregion (South Western Slopes). This species occupies eucalypt, acacia or casuarina woodlands, open forest and other lightly timbered habitats, including farmlands and grasslands with scattered trees. Preference is for areas with low tree density, few large logs and like other finches, high grass and shrub cover (DCCEEW, 2023)

Habitat critical to the survival of the species includes areas of:

- Eucalypt, acacia or Casuarina woodlands, open forests and other lightly timbered habitats;
- Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding;
- Drooping she-oak (*Allocasuarina verticillata*) within the Mt Loft Ranges.

Potential habitat for this species is associated with PCTs that contain eucalypt or acacia dominated woodlands, shrublands, open forest and grassland areas. Associated PCTs within the Project Area include PCT 27, 36, 45, 70, 74, 76, 80, 81, 82, 83, 110, 185, 186, 201, 217, 250, 267, 461 and 796. Potential habitat within the Project Area accounts for approximately 5,906.7 ha and is displayed within **Figure E-12**. The total amount of potential Southern Whiteface habitat planned to be removed as a result of the Project is 271.3 ha or 4.6% of the total potential habitat available within the Project Boundary

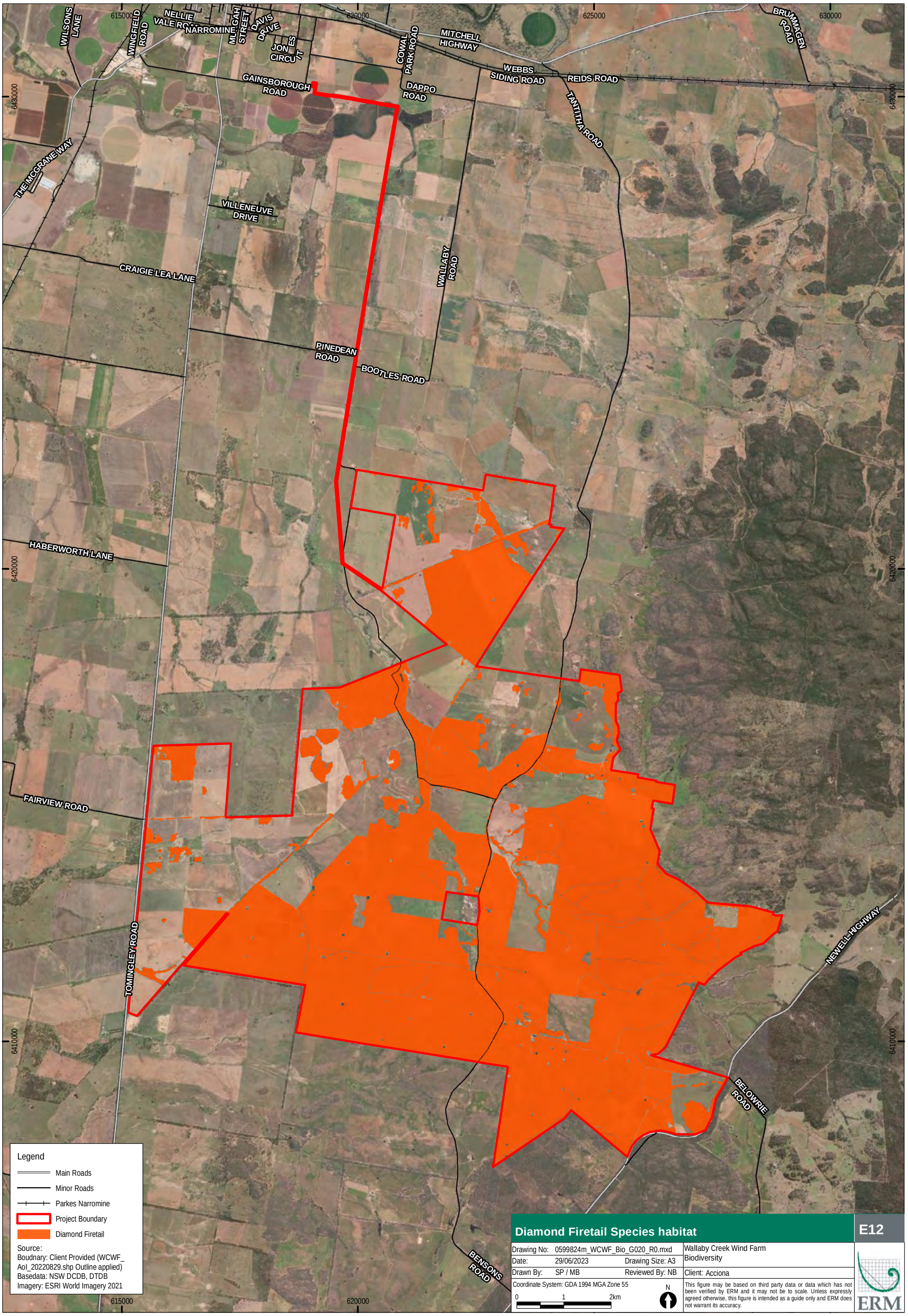
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 12 Significance Impact Assessment for Diamond Firetail

Criteria	Description	Criteria Triggered?
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 has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 271.3 ha to potential habitat for this species is unlikely to lead to a long-term decrease of an important population.	Unlikely
Reduce the area of occupancy of an important population,	Area of occupancy for this species is currently understood to be 25,000 km^2 (TSSC, 2023). An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 271.3 ha to potential habitat for this species is unlikely to reduce the area of occupancy to an important population.	Unlikely

Criteria	Description	Criteria Triggered?
Fragment an existing important population into two or more populations,	An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 271.3 ha to potential habitat for this species is unlikely to fragment an existing important population into two or more populations. Further, this species is unlikely to utilise the RSA of wind turbine infrastructure (due to its low habitat requirements and foraging activity being near to the ground), and ancillary infrastructure related to the Project is unlikely to be an impediment to this species.	Unlikely
Adversely affect habitat critical to the survival of a species,	Habitat critical to the survival of this species is defined as below (TSSC, 2023)" ■ Eucalypt, acacia or Casuarina woodlands, open forests, and other lightly timbered habitats; ■ Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting, and breeding; ■ Drooping she-oak (Allocasuarina verticillata) within the Mt Loft Ranges. The associated PCTs will constitute habitat critical to the survival of this species under the above definition and the direct removal of 271.3 ha has the potential to adversely affect the extent and quality of this habitat.	Potential
Disrupt the breeding cycle of an important population,	An important population has yet to be determined present within the Project Area. And while this species may be disrupted from the potential removal of 271.3 ha, including where trees and large shrubs are removed where potential breeding may occur. However no important population is likely to be present within the Project Area and as such, the potential impacts are unlikely to affect the breeding cycle of an important population	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	Potential habitat accounts for approximately 5,906.7 ha within the Project Area, and potential impacts to this habitat may account for up to 271.3 ha (or 4.6% of available habitat) for this species. The removal of such a small amount of habitat is unlikely to modify, destroy, remove or isolate that habitat to the extent where a local population is likely to decline.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	Invasive exotic annual grasses (e.g. African Lovegrass *Eragrostis curvula*) are directly attributed as a threatening process for this species within the Conservation Advice (TSSC, 2023), and exotic grasses and weeds are present across many of the grassland PCTs and non-remnant areas. Due to the primarily agricultural land use of the Project Area, it is likely that the resultant fragmentation and modification of the remnant vegetation from this land use has established invasive species (both flora and fauna) that already affect the current vegetation and the potential removal of 271.3 ha of habitat is unlikely to result in the establishment or exacerbation of these species in the local area. However, the clearing and fragmentation from the linear infrastructure proposed may spread exotic grasses into known habitat with a potential more native understorey, and as such result in degradation to the quality of habitat for this species and result in an increase of invasive species harmful to the Diamond Firetail	Potentially
Introduce disease that may cause the species to decline, or	The conservation advice for this species does not list any diseases that threaten this species.	No

Criteria	Description	Criteria Triggered?
Interfere with the recovery of the species.	The Project is not in the vicinity of any priority management sites and there is no recovery plan for this species applicable within the Project Boundary.	No
Significant Impact: Potentially significant		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Main Roads
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Parkes Narromine
Project Boundary
Diamond Firetail
Source:
Boudnary: Client Provided (WCWF_ AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Diamond Firetail Species habitat
E12
Drawing No: 0599824m_WCWF_Bio_G020_R0.mxd
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Drawing Size: A3
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Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
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Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) - Vulnerable

The proposed development has the potential to lead to a significant impact to the Brown Treecreeper (south-eastern)

The Brown Treecreeper (south-eastern) is considered likely to occur within the Project Area, primarily on the basis of observations made during the 2021 field surveys whereby this species was detected outside of the Project Area. This species has been recently listed as Vulnerable under the EPBC Act due to substantial reductions in population by an estimated 30-50% every decade since 1999, with no indication that declines are slowing.

This species occupies dry open eucalypt forests and woodlands, with this subspecies inhabiting primarily in woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey sometimes with one or more shrub species. They may also occur in mallee, forests and woodlands subject to period inundation (such as River Red Gum woodlands). This species is described as sedentary, with families of the birds occupying permanent territories/treed (TSSC, 2023). Brown treecreepers (south-eastern) nest and roost in naturally occurring tree cavities in a variety of eucalypt species. Hollows in standing dead or live trees and tree stumps are essential for nesting. Nests comprise cups of grass and bark lined with fur and feathers, built in a hollow limb or trunk.

Habitat critical to the survival of the species includes areas of:

- • Relatively undisturbed grassy woodland with native understorey.
  - Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators.
  - The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.
- Large living and dead trees which are essential for roosting and nesting sites and for foraging;
- Fallen timber which provides essential foraging habitat and;
- Hollows in standing dead or live trees and tree stumps are also essential for nesting.

Potential habitat for this species is associated with PCTs that contain eucalypt or acacia dominated shrublands. Associated PCTs within the Project Area include PCT 36, 70, 74, 76, 81, 201, 217, 267 and 461. This potential habitat totals 1,359.9 ha within the Project Boundary. The total amount of potential habitat to be disturbed by the proposed development is up to 35.4 ha or approximately 2.6 % of the total potential habitat within the Project Boundary and is displayed within **Figure E-13**.

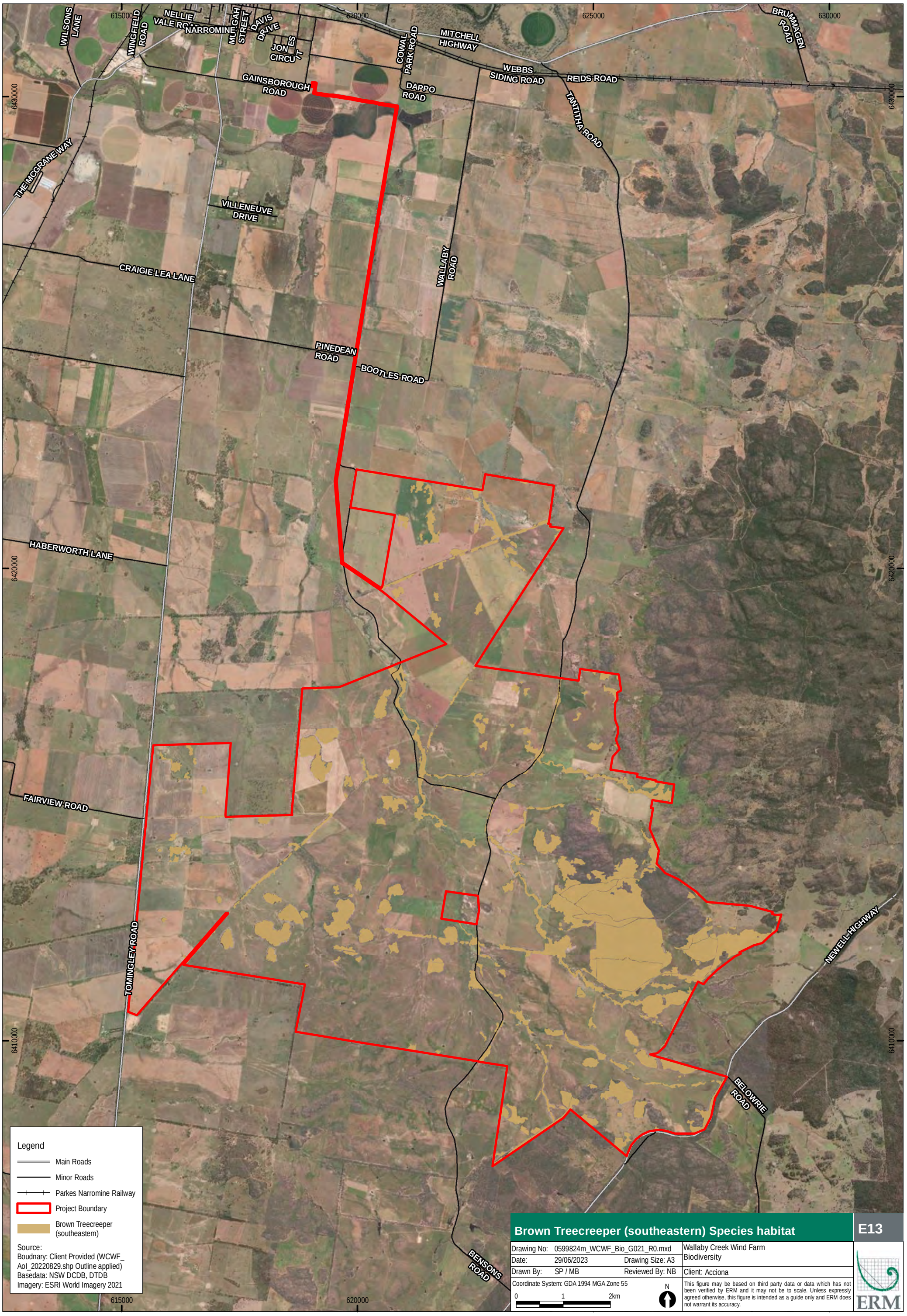
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 13 Significance Impact Assessment for Brown Treecreeper (south-eastern)

Criteria	Description	Criteria Triggered?
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 has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 35.4 ha to potential habitat for this species is unlikely to lead to a long-term decrease of an important population.	Unlikely

Criteria	Description	Criteria Triggered?
Reduce the area of occupancy of an important population,	Area of occupancy for this species is currently understood to be 25,000 km^2 (TSSC, 2023). An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 35.4 ha to potential habitat for this species is unlikely to reduce the area of occupancy to an important population.	Unlikely
Fragment an existing important population into two or more populations,	An important population has yet to be determined present within the Project Area for this species and given this species broad distribution and the current understanding that there are no impediments to this species dispersion across its large range, the impact of 35.4 ha to potential habitat for this species is unlikely to fragment an existing important population into two or more populations. Further, this species is unlikely to utilise the RSA of wind turbine infrastructure (due to its low habitat requirements and foraging activity being near to the ground for this subspecies), and ancillary infrastructure related to the Project is unlikely to be an impediment to this species.	Unlikely
Adversely affect habitat critical to the survival of a species,	Habitat critical to the survival of this species is defined as below (TSSC, 2023)" ■ Relatively undisturbed grassy woodland with native understorey. - Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators. - The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing. ■ Large living and dead trees which are essential for roosting and nesting sites and for foraging; ■ Fallen timber which provides essential foraging habitat and; ■ Hollows in standing dead or live trees and tree stumps are also essential for nesting. The associated PCTs will constitute habitat critical to the survival of this species under the above definition and the direct removal of 35.4ha has the potential to adversely affect the extent and quality of this habitat.	Potential
Disrupt the breeding cycle of an important population,	An important population has yet to be determined present within the Project Area. And while this species may be disrupted from the potential removal of 35.4 ha, including where trees and large shrubs are removed where potential breeding may occur. However no important population is likely to be present within the Project Area and as such, the potential impacts are unlikely to affect the breeding cycle of an important population	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	Potential habitat accounts for approximately 1,359.9 ha within the Project Area, and potential impacts to this habitat may account for up to 35.4 ha (or 2.6% of available habitat) for this species. The removal of such a small amount of habitat is unlikely to modify, destroy, remove or isolate that habitat to the extent where a local population is likely to decline.	Unlikely

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	No invasive species are directly attributed to a threatening process for this species within the Conservation Advice (TSSC, 2023), though it is likely that this species is occasionally predated upon by these species. Due to the primarily agricultural land use of the Project Area, it is likely that the resultant fragmentation and modification of the remnant vegetation from this land use has established invasive species (both flora and fauna) that already affect the current vegetation and the potential removal of 35.4 ha of habitat is unlikely to result in the establishment or exacerbation of these species in the local area.	Unlikely
Introduce disease that may cause the species to decline, or	The conservation advice for this species does not list any diseases that threaten this species.	No
Interfere with the recovery of the species.	The Project is not in the vicinity of any priority management sites and there is no recovery plan for this species applicable within the Project Boundary.	No
Significant Impact: Potentially significant		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MILGAH STREET
DAVIS DRIVE
JONES CIRCUIT
COWAL PARK ROAD
MITCHELL HIGHWAY
BRUMMAGEN ROAD
GAINSBOROUGH ROAD
DAPPO ROAD
WEBBS SIDING ROAD
REIDS ROAD
TANTITHA ROAD
THE MCGRANE WAY
VILLENEUVE DRIVE
CRAIGIE LEA LANE
WALLABY ROAD
PINEDEAN ROAD
BOOTLES ROAD
HABERWORTH LANE
FAIRVIEW ROAD
TOMINGLEY ROAD
NEWELL HIGHWAY
BELOWRIE ROAD
BENSONS ROAD
Legend
Main Roads
Minor Roads
Parkes Narromine Railway
Project Boundary
Brown Treecreeper (southeastern)
Source:
Boudnary: Client Provided (WCWF_AoI_20220829.shp Outline applied)
Basedata: NSW DCDB, DTDB
Imagery: ESRI World Imagery 2021
Brown Treecreeper (southeastern) Species habitat
E13
Drawing No: 0599824m_WCWF_Bio_G021_R0.mxd
Date: 29/06/2023
Drawing Size: A3
Drawn By: SP / MB
Reviewed By: NB
Coordinate System: GDA 1994 MGA Zone 55
0 1 2km
N
Wallaby Creek Wind Farm
Biodiversity
Client: Acciona
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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