BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Blessed Carlo College, Moama

Murray River Council LGA

MAY 2022

Report prepared by

OzArk Environment & Heritage

for Clarke Hopkins Clarke

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CERTIFICATION

I certify that I have reviewed and advised on the contents of this BDAR and, to the best of my knowledge, it is in accordance with the *NSW Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method 2020 (BAM 2020). The information it contains is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect biodiversity as a result of the proposed activity. This BDAR has been reviewed and advised by a BAM Accredited Assessor.

BDAR reviewed and advised by	**Dr David Orchard**
Signed	
Date	30.05.2022
Organisation	OzArk Environment & Heritage
Position	Ecologist
Qualification	Doctor of Philosophy
Accreditation number	BAAS21028

Executive summary

The Wilcannia-Forbes Diocese (the proponent) proposes to develop a new Catholic school in Moama, New South Wales, to be known as Blessed Carlo College (the proposal). OzArk Environment & Heritage (OzArk) was engaged by Clarke Hopkins Clarke (the client), on behalf of the proponent, to prepare the biodiversity assessment for the proposal. The proposal will clear up to 4.85 ha of native vegetation on Lot 76 DP751159, on the outskirts of Moama. The native vegetation clearing threshold for the relevant lot is 0.25 ha; as such, the proposal will trigger entry into the Biodiversity Offsets Scheme (BOS) and a Biodiversity Development Application Report (BDAR) is required.

The proposal will also require the removal of vegetation from adjacent road corridors for the purposes of site access, with the most pronounced impacts being to the Lignum Road corridor. Minor impacts to the corridor on Kiely Road are also anticipated. These impacts are included in the figure of 4.85 ha. The proponent has resolved to retain higher-quality vegetation where possible by implementing exclusion zones.

The native vegetation present on the subject land consists of one Plant Community Type (PCT), in two conditions states (zones: poor and moderate):

- PCT 237 - Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone

PCT 237 is associated with the following TECs:

- *Biodiversity Conservation Act 2016* (BC Act)-listed Endangered Ecological Community (EEC): Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)-listed EEC: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

The higher quality zone (237_Mod) met the relevant thresholds to be considered the EEC under the BC Act, but the lower quality zone (237_Poor) did not. Neither zone met the criteria to be considered a component of the EPBC Act community. Therefore, up to up to 0.46 ha of the BC Act-listed EEC will be removed by the current proposal.

In total, 24 ecosystem credit species were generated by the Biodiversity Assessment Method Calculator (BAM-C). The habitat suitability of the subject land for these species was assessed. Two species were removed from the list due to habitat constraints; therefore, 22 ecosystem credit species are assumed present, generating a total of 10 Ecosystem Credits. In addition, 21 species credit species were generated by the BAM-C. After consideration of habitat constraints, two species, the Swift Parrot and the White-bellied Sea Eagle, could be discounted, while 19 species credit species still had the potential to occur. Surveys were conducted for 17 of the 19 species. None of the targeted species were detected, as such, they are considered absent from the subject land. Two further species, the Masked Owl (*Tyto novaehollandiae*) and Sloane's Froglet (*Crinia sloanei*), were assumed present as it was not

the appropriate time of year to survey for them. Species credits for the Masked Owl and the Sloane's Froglet will be required to be offset, totalling 32 Species Credits.

The proponent intends to satisfy their Ecosystem and Species credit obligations by buying and retiring the necessary Ecosystem Credits from the open market or, if appropriate credits are not available, by paying directly into the Biodiversity Conservation Fund.

The significance of the proposed impact to EPBC Act-listed threatened, migratory, wetland and marine species, populations and communities predicted to occur within a 10 km search area was assessed. No significant impact to any threatened entity likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated and offset using the management actions recommended and the offset requirements detailed within this BDAR. Therefore, a referral of the proposal to the Federal Department of Agriculture, Water and the Environment for these matters is not required.

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment.

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1 Introduction

1.1 Background

The Wilcannia-Forbes Diocese (the proponent) proposes to develop a new Catholic School in Moama, New South Wales, to be known as Blessed Carlo College (the proposal). The proposal occupies up to 4.92 ha of land on Lot 76 DP751159 on Lignum Road and Kiely Road, on the northern outskirts of Moama in the Murray River Council Local Government Area (LGA; **Figure 1-1** to **1-3**).

OzArk Environment & Heritage (OzArk) was engaged by Clarke Hopkins Clarke (the client), on behalf of the proponent, to prepare the biodiversity assessment for the proposal. A preliminary desktop assessment identified the need for a Biodiversity Development Assessment Report (BDAR), due to the proposed clearing of native vegetation exceeding the threshold for entry into the NSW Biodiversity Offsets Scheme (BOS) under the *NSW Biodiversity Conservation Act* 2016 (BC Act). This report documents the assessment, which has been completed in accordance with the Biodiversity Assessment Method 2020 (BAM 2020) and details the proponent's biodiversity offset requirement (number of ecosystem and species credits).

1.2 The Proposal

The subject land is located on Lot 76 DP751159 on Lignum Road and Kiely Road, Moama (see **Figure 1-1** to **1-3**). At present, the site operates as both grazing and cropping land, although it is zoned as R1 – General Residential. It is also anticipated that vegetation will be removed from the road corridor on Lignum Road to allow access to the proposed college. Minor impacts to vegetation in the Kiely Road corridor are also anticipated. Where possible, higher quality vegetation will be retained. To this end, exclusion zones have been identified where no direct impacts to vegetation are permitted (**Figure 1-4**).

The new Blessed Carlo College is proposed as a K-12 school for the Wilcannia-Forbes Diocese. The proposal will be assessed as a State Significant Development (SSD).

Overall, the proposed activities have an impact footprint of 4.92 ha, all of which is considered native vegetation under BAM 2020. Based on the results of the initial survey, the proponent has elected to exclude patches of high biodiversity value from the development in order to protect the intrinsic ecological value of the site and enhance the aesthetics of the proposal. These exclusion areas are shown in **Figure 1.4** and amount to 0.07 ha, bringing the amount of native vegetation impacted down to 4.85 ha.

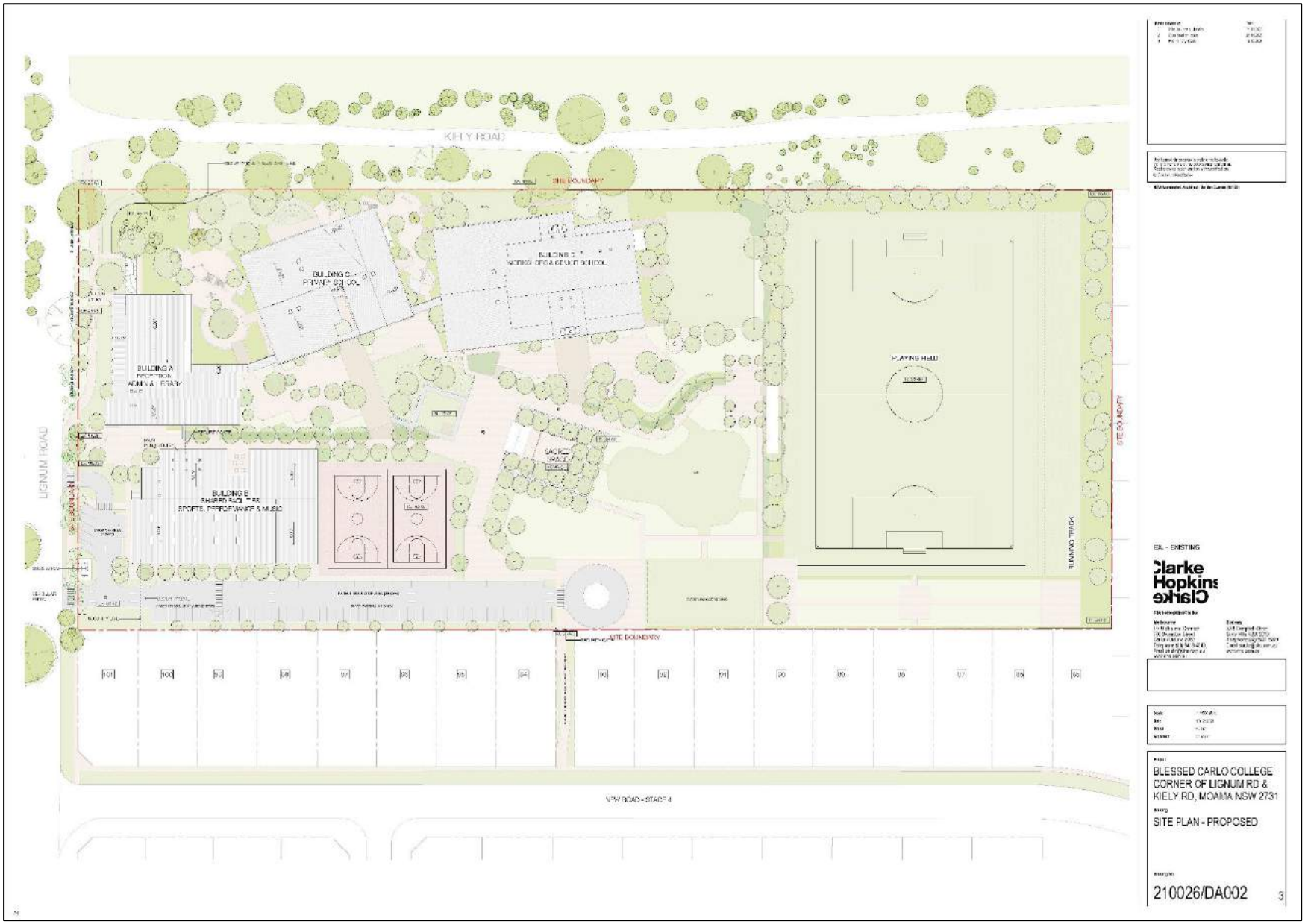


Figure 1-1. Proposed layout of the development as of 21 December 2021.

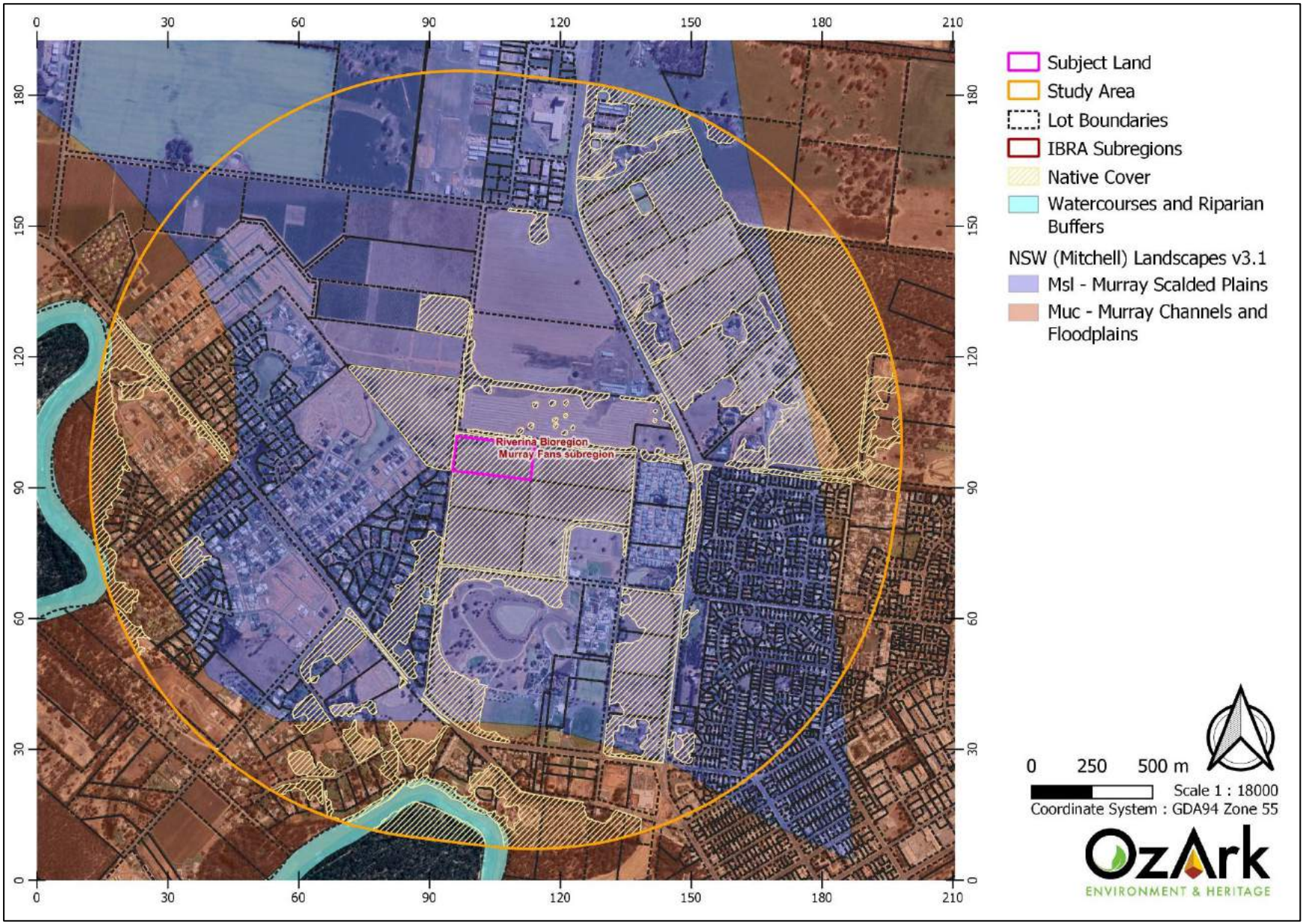


Figure 1-2. Location map showing the subject land, study area and key features required by the BAM (2020).

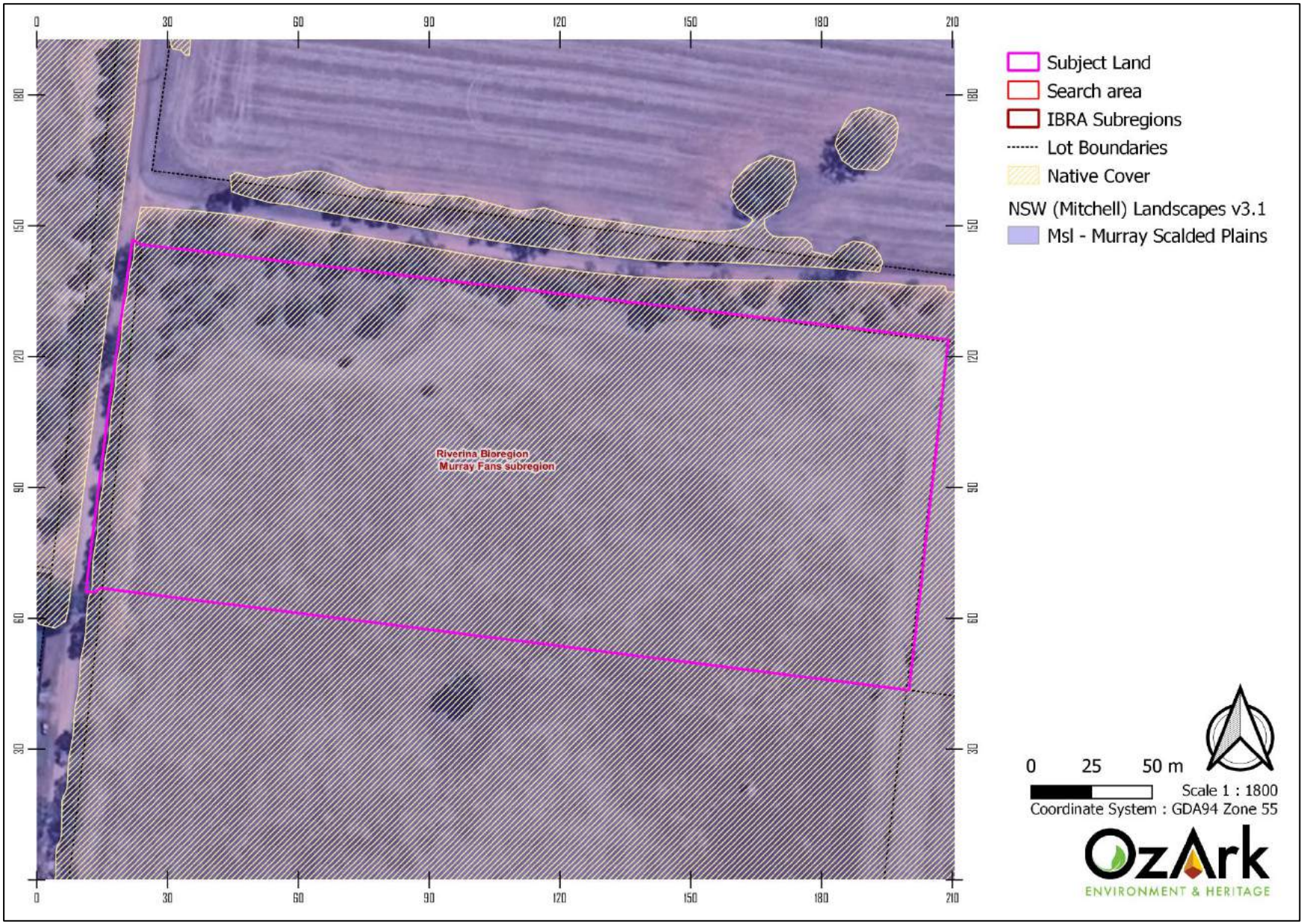


Figure 1-3. Site map showing the subject land and relevant landscape features.

Figure 1-4. Subject land showing some of the higher quality (237_Mod) vegetation that has been excluded to avoid impacts.

1.3 Relevant Terms

The following terms and definitions are used to describe the land assessed in this study.

Subject land – The area of land that is directly impacted by the proposed development (including building footprints and associated infrastructure).

Property boundary – Lot 76 DP751159 on which the subject land occurs.

Study area – Land within a 1,500 m buffer from the outside edge of the subject land. The study area is assessed for the purpose of establishing landscape context including native vegetation cover and associated threatened species.

10 km search area – The area within a 10 km radius of the subject land. This 10 km buffer has been used to search information sources, including the Protected Matters Search Tool (PMST) (Department of Agriculture, Water and the Environment 2021) and BioNet Atlas (DPIE, 2022) threatened species sightings.

1.4 Site Identification

The site is identified under the *Murray Local Environment Plan* 2011 and on the NSW Planning Portal as follows.

- **Lot/Section/Plan No:** 76 DP751159
- **Land Zoning:** R1 General Residential
- **Minimum Lot Size:** 0.04 ha
- **Terrestrial Biodiversity:** The lot includes areas mapped as having high terrestrial biodiversity value (**Appendix A**); however, some of these areas have been excluded from the final development footprint (see **Figure 1-4**).

The location of the proposal is shown on the site map (**Figure 1-1**) and the layout map (**Figure 1-2**).

1.5 Regulatory Context

The Proposal will be assessed under Part 4 (Regional Development) of the EP&A Act. The BC Act requires all Regional Developments to be assessed in relation to the BOS, if entry is triggered by the location and/or size of the development. The *Biodiversity Conservation Regulation 2017* sets out the thresholds for entry into the BOS, which are as follows.

- If the amount of native vegetation proposed to be cleared exceeds the threshold area for the lot size for the LEP zone.
- When the development is located on land identified in the Biodiversity Value Map (https://www.lmbc.nsw.gov.au/Maps/), as defined by Clause 7.3 of the Regulation.
- If, in the absence of the above thresholds, the Proposal is likely to be a significant impact to threatened species, ecological communities or their habitat.

Since the proposal involves clearing of up to 4.85 ha of native vegetation and the native vegetation clearing threshold is 0.25 ha (**Appendix A**), the threshold for clearing is exceeded and therefore the BOS applies.

The subject land was not identified as occurring on bushfire prone land, according to mapping provided by the NSW Rural Fire Service, and as such, under Section 4.15 of the EP&A Act, the proponent will not be required to address the relevant bushfire protection requirements of the Rural

Fire Service Document *Planning for Bush Fire Protection*. It is assumed that Asset Protection Zones (APZ) are included in the development footprint supplied by the proponent for the purposes of this BDAR.

1.6 Purpose

The purpose of the BDAR is to determine the biodiversity assets, including flora, fauna, threatened species, threatened communities and habitat values, of the subject land.

The BDAR also identifies any constraints on the proposal according to relevant Federal and NSW environmental legislations and includes the calculation of ecosystem and/or species credits requiring offset.

1.7 Legislation

1.7.1 International legislation

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)
- Ramsar Convention on Wetlands (Ramsar).

1.7.2 Commonwealth legislation

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including EPBC Act Environmental Offsets Policy and Significant Impact Guidelines Version 1.1, 2013.

1.7.3 NSW legislation

Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act provides the legal framework for the assessment and approval of the proposed activities. Part 4 of the EP&A Act requires the proponent to examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Biodiversity Conservation Act 2016 (BC Act)

Under the BC Act, the proponent has an obligation to consider impacts to all threatened species, populations and ecological communities listed in NSW, as well as ensuring the proposal does not exacerbate a Key Threatening Process (KTP). Entry to the BOS is triggered if any of the thresholds listed above (see Regulatory Context) are met.

Biodiversity Conservation Regulation 2017 (BCR)

The BCR defines the triggers and entry thresholds for the BOS. It also provides the rules for meeting offset obligations, triggers for authorities to refuse development applications and compliance provisions.

Biosecurity Act 2015

From 1 July 2017, the *Biosecurity Act 2015* and its subordinate legislation commenced. The *Noxious Weeds Act 1993* and part of the *Local Land Services Act 2013* (Part 10 Pests), among other acts,

have been repealed under the new *Biosecurity Act 2015*. Schedule 1 of the *Biosecurity Act 2015* contains the special provisions relating to weeds and duty to control weeds which pose a biosecurity risk.

The Department of Primary Industries (DPI) maintains a list of 'Priority Weeds' (previously referred to as noxious weeds) in NSW for the State and each region which impose an obligation on landholders to prevent, eliminate or minimise, so far as is reasonably practicable, any biosecurity risk they may pose. In addition, Local Government Areas may include their own priority weeds.

Fisheries Management Act 1994 (FM Act)

The objects of the FM Act are to:

- Conserve fish stocks and key fish habitats.
- Conserve threatened species, populations and ecological communities of fish and marine vegetation.
- Promote ecologically sustainable development, including the conservation of biological diversity.

Consistently with those objectives, the FM Act aims to:

- Promote viable commercial fishing and aquaculture industries.
- Promote quality recreational fishing opportunities.
- Appropriately share fisheries resources between the users of those resources.
- Provide social and economic benefits for the wider community of NSW.
- Recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

Section 201 of the FM Act states that a person other than a government authority must seek a permit from NSW Department of Primary Industries – Fisheries (DPI – Fisheries) for dredging or reclamation in a waterway. Dredging work means any work that involves excavating water land. Reclamation work means any work that involves depositing any material on water land.

Water Management Act 2000 (WM Act)

The WM Act aims to provide for the 'sustainable and integrated management of the water sources of the state for the benefit of both present and future generations.'

The WM Act provides for the granting of various licenses and approvals, including for the use of water and water supply work. Additionally, the WM Act identifies provisions relating to 'controlled activities' which includes (among other definitions):

The erection of a building or the carrying out of a work (within the meaning of the EPA Act)

The removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise.

It includes laying pipes and cables.

Approval (via a 'controlled activity' approval) is required from the Minister for Primary Industries under the WM Act if it is on 'waterfront land'. '*Waterfront land*' means the bed of any river, lake or estuary, and the land within 40 m of the riverbanks, lake shore or estuary mean high water mark.

State Environmental Planning Policies (SEPP)

State Environmental Planning Policy – Koala Habitat Protection 2021

State Environmental Planning Policies - Koala Habitat Protection (SEPP) encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'.

Currently both the SEPP 2020 and SEPP 2021 apply within NSW. This is an interim measure until all codes are developed under the 2021 SEPP. The SEPP 2020 applies to land zoned RU1, RU2 and RU3, excluding 9 LGAs within the Sydney basin. The SEPP 2021 applies to all other zoned land within the additional 74 LGAs. The subject land is zoned as R1 within the Murray River Council LGA, therefore the Koala SEPP 2021 applies to the present proposal.

A separate assessment of the subject land was undertaken in accordance with the EPBC Act referral guidelines for the vulnerable koala to assess the impacts on "habitat critical to the survival of the species" and impacts that "substantially interfere with the recovery of the species" (Department of the Environment, 2014). See **Appendix H**.

2 Methods

The ecological assessment was carried out in three stages:

1. Desktop searches and review of ecological databases and information to identify threatened species, populations or ecological communities listed in the BC Act, FM Act or the EPBC Act that have the potential to occur in the study area.
2. Field survey of the subject land to conduct BAM plots, identify vegetation communities and habitat features present and target predicted threatened species and ecological communities. Where a threatened species or community or habitat feature is identified, document the nature and extent of the protected matter and describe its 'viable local population' or occurrence.
3. Preparation of a BDAR that describes the impacts of the proposed activity on native vegetation and threatened species, populations and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts. The BDAR also includes a biodiversity credit summary that identifies the number of ecosystem credits and species credits required to offset the development.

2.1 Personnel

OzArk Environment & Heritage Pty Ltd (OzArk) operates under NSW Scientific Research License 101908, and NSW Department of Primary Industries (DPI) Accreditation of a corporation as an animal research establishment Ref No. AW2017/012. The role and key details of personnel involved in the project are provided in **Table 2-1**.

Table 2-1. Summary of OzArk personnel qualifications and roles in the assessment.

Name	Position	Role	CV Details
Madeline Walsh	Ecologist	Vegetation integrity plots (BAM plots), vegetation mapping, preliminary BAM-C calculations	• Accredited BAM assessor – Accreditation # BAAS21010 • Honours in Ecology – UNSW, Sydney • Bachelor of Environmental Biology – University of Technology, Sydney • WH&S Induction Training for Construction Work
Dr Crystal Graham	Senior Ecologist	Reporting, quality control, technical review	• Doctor of Philosophy – Biology – University of Sydney • Honours 1 – Biology – University of Sydney • Bachelor of Advanced Science – University of Sydney • 4WD Training • WH&S Induction Training for Construction Work • BAM training 2021
Dr David Orchard	Ecologist	Reporting	• Accredited BAM assessor – Accreditation # BAAS21028 • Doctor of Philosophy – Charles Sturt University • Graduate Diploma in Science (Botany) – University of New England • Bachelor of Arts – Australian National University • First aid training

			• WH&S Induction Training for Construction Work
Dr Sean Graham	Ecologist	Targeted surveys	• Postdoctoral Fellow – Penn State University • Doctor of Philosophy (Biology) – Auburn University • Master's in Biology – Georgia State University • Bachelor of Arts – Georgia State University

2.2 Desktop review

Existing information sources were reviewed to contextualise the study area, identify entities for targeted surveys, predict possible constraints, refine field survey methodology and assist with assessing the impacts of the proposal. Information sources consulted included:

- NSW Government Web Map Service (WMS) layers for NSW Imagery (compiled imagery, NSW Property, NSW Base Map and NSW Topographic Map) (http://spatialservices.finance.nsw.gov.au).
- EPBC Protected Matters Search Tool (https://www.environment.gov.au/epbc/protected-matters-search-tool)
- State Vegetation Type Map: Riverina Region Version v1.2 - VIS_ID 4469
- NSW DPI threatened fish indicative distribution maps (www.dpi.nsw.gov.au/fishing/species-protection/threatened-species-distributions-in-nsw/freshwater-threatened-species-distribution-maps)
- NSW BioNet Wildlife Atlas Vegetation classification (https://www.environment.nsw.gov.au/research/Visclassification.htm)
- NSW BioNet Threatened Biodiversity Data Collection (www.bionet.nsw.gov.au/)
- NSW BioNet Atlas (www.bionet.nsw.gov.au/)
- Register of Declared Areas of Outstanding Biodiversity Value (www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/critical-habitats)
- PlantNET, NSW Flora Online (www.plantnet.rbgsyd.nsw.gov.au/)
- Department of Environment and Planning *Biodiversity Values Map* (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap)
- Mapping of Vulnerable Lands – Steep and Highly Erodible (NSW Office of Environment and Heritage, 2011)
- Acid Sulphate Soils Risk mapping (NSW Office of Environment and Heritage, 1998)
- Directory of Important Wetlands of Australia (DIWA) (https://www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands)

- NSW wetlands mapping (NSW Office of Environment and Heritage, 2010)
- Important area mapping for Regent Honeyeater and draft important area mapping for Swift Parrot available from the Biodiversity Offsets and Agreement Management System (BOAMs).

All databases were searched prior to conducting initial fieldwork in August 2021 and reviewed (and updated where applicable) in January 2022 prior to final submission.

Results of the database searches are provided in **Appendix A**.

2.3 Field survey

2.3.1 BAM survey methodology

Vegetation communities are identified in accordance with the online NSW Master Plant Community Type Classification (OEH, 2018b), which is the current state-wide vegetation classification system for Plant Community Types (PCTs). This classification system is used for vegetation mapping, development assessment and site planning purposes. It describes over 1,500 PCTs across the state, and groups the vegetation communities into vegetation Class and Formation / Sub-formation as per Keith (2004).

In this study, PCTs were identified on the basis of the following inputs:

- Regional Scale State Vegetation Map*: Riverina Region Version v1.2 - VIS_ID 4469* (DPIE, 2016), which provides predictive mapping of PCTs in and around the subject land. This mapping is indicative only. It is not necessarily accurate at a fine scale for the purposes of the current study.
- Professional ecological knowledge about locally occurring vegetation types and landscape, soil and topographic patterns, including transitions from one community to another and potential for intergrades between plant communities.
- Field survey results to confirm the flora species present, vegetation structure, landscape position and soil type on the subject land and the extent and condition of native vegetation.
- The BioNet Vegetation Classification database, this being used to identify the candidate vegetation communities likely to be present based on the site conditions (flora species present, vegetation structure, bioregion, and landscape position and soil type) and the relevant published PCT descriptions.

If any of the PCTs were identified as having potential to be part of a Threatened Ecological Community (TEC), the relevant identification guidelines (NSW Scientific Committee listing criteria and Commonwealth identification guides) were consulted to determine the status of the vegetation community present. These guidelines provide the identification criteria used to positively identify the community as being part of the TEC. The criteria include location, species present, overstory species, weed cover, number and type of native species including whether certain ‘important’ native species are present.

Plant identification followed nomenclature in the Royal Botanic Gardens PlantNet online database (Royal Botanic Gardens and Domain Trust, 2019).

In total, six BAM plots were completed on 04 August 2021 (**Figure 4-2**). One plot (BC01) fell outside of the smaller, revised final footprint but was retained to provide suitable coverage for the vegetation zone.

The plot locations were randomly selected whilst ensuring adequate survey effort within each vegetation zone (**Table 2-2**). According to the BAM (2020), a minimum of three BAM plots are required for this subject land.

Table 2-2. Minimum number of plots and transects required per zone area (DPIE, 2020a).

Vegetation zone area (ha)	Minimum number of plots/transects
<2	1 plot/transect
>2 – 5	2 plots/transects
>5 – 20	3 plots/transects
>20 – 50	4 plots/transects
>50 – 100	5 plots/transects
>100 – 250	6 plots/transects
>250 – 1000	7 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone

Plots were surveyed according to the BAM (2020) as follows:

- The survey plots consisted of nested 20m x 50m and 20m x 20m plots
- Species composition and structure (species and percent cover) data collected from within 20m x 20m plot
- Vegetation function data (size and number of trees, presence of hollow-bearing trees and woody debris) collected from within 20m x 50m plot
- Percent of litter cover data collected within five 1m x 1m squares positioned at 5m, 15m, 25m, 35m and 45m points of the 50m plot
- The plots were positioned within the subject land and their GPS locations were recorded (GDA 94 / MGA Zone 55).

The remainder of the subject land was traversed by foot to confirm the nature of vegetation (i.e. native or non-native) and search for habitat features such as hollow bearing trees, rock outcrops, and nests.

2.3.2 Incidental surveys

Incidental flora and fauna sightings were recorded while undertaking the BAM plots and searching the subject land for hollow-bearing trees and other potential habitat features. Potential habitat such as rock, loose bark and coarse woody debris was recorded and examined for signs of cryptic species. Tracks and other areas of suitable substrate were searched for animal tracks. Other evidence of fauna presence on the subject land, such as scats, feathers and sloughed skins were also recorded.

2.3.3 Targeted surveys

Targeted surveys were carried out to confirm the presence/absence of a number of candidate species credit species identified by the BAM Calculator (BAM-C). A summary of OzArk's field survey methods is provided in **Table 2-3,** depicted in **Figure 5-2** and **5-3** and described in further detail in **Section 5.3.1** of this report.

Table 2-3. Summary of targeted survey methods and effort undertaken.

Survey dates	Method	Effort
24 September 2021 to 27 September 2021	• Diurnal bird surveys (concentrated at dawn and dusk) for the Bush Stone-Curlew (*Burhinus grallarius*), Little Eagle (*Hieraaetus morphnoides*), Major Mitchell's Cockatoo (*Lophochroa leadbeateri*), Square-tailed Kite (*Lophoictinia isura*), Superb Parrot (*Polytelis swainsonii*).	• 90 minutes targeted bird surveys
	• Baited camera traps for the Squirrel Glider (*Petaurus norfolcensis*).	• 3 nights x 3 cameras (9 trap nights)
	• Dusk habitat tree watching for the Squirrel Glider (*Petaurus norfolcensis*) and Barking Owl (*Ninox connivens*).	• 3 nights habitat tree watching
	• Nocturnal call playback for the Barking Owl (*Ninox connivens*) and Bush Stone-curlew (*Burhinus grallarius*).	• 3 nights call playback
	• Spotlighting for the Bush Stone-curlew (*Burhinus grallarius*), Barking Owl (*Ninox connivens*), and Koala (*Phascolarctos cinereus*).	• 3 consecutive nights spotlighting (total of ~90 minutes)
	• Elliot traps for ground-dwelling mammal species.	• 3 nights with 9 Elliot traps (27 trap nights)
	• Koala Spot Assessment Technique (SAT) surveys.	• 30 food trees assessed (Koala SAT)
	• Parallel transects (10 m separation) for threatened plants: Yellow Gum (*Eucalyptus leucoxylon* subsp. *pruinosa*), *Prasophyllum* sp. Moama, Slender Darling Pea (*Swainsona murrayana*), Silky Swainson-pea (*Swainsona sericea*)	• c. 4.71 km plant transects – 10 m spacing across all suitable habitat (flora surveys)
30 November 2021 to 02 December 2021	• Camera trap for the Squirrel Glider (*Petaurus norfolcensis*) and Brush-tailed Phascogale (*Phascogale tapoatafa*).	• 2 nights with 1 camera trap (2 trap nights)
	• Dusk habitat tree watching for the Squirrel Glider (*Petaurus norfolcensis*), Brush-tailed Phascogale (*Phascogale tapoatafa*), Barking Owl (*Ninox connivens*).	• 2 nights habitat tree watching
	• Nocturnal call playback for the Barking Owl (*Ninox connivens*) and Bush Stone-curlew (*Burhinus grallarius*).	• 2 nights call playback
	• Spotlighting for the Bush Stone-curlew (*Burhinus grallarius*), Barking Owl (*Ninox connivens*), and Koala (*Phascolarctos cinereus*).	• 2 consecutive nights spotlighting (total of ~60 minutes)

	• Ultrasonic bat call recording for the Southern Myotis (*Myotis macropus*) • Parallel transects (10 m separation) for threatened plants: A spear grass (*Austrostipa wakoolica*), Winged Peppercress (*Lepidium monoplocoides*), Austral Pillwort (*Pilularia novae-hollandiae*)	• 1 bat logger for 2 nights • c. 6.19 km plant transects – 10 m spacing across all suitable habitat (flora surveys)

2.4 Habitat suitability

The suitability of the subject land as habitat for all species credit species generated by the BAM-C was assessed (**Appendix D**).

The presence / absence of threatened species was categorised as follows:

- 'Present' surveyed– the species was recorded during field surveys or has been previously recorded on the subject land.
- 'Assumed present' – the species was predicted to occur by the BAM-C, suitable habitat features occur on the subject land for that species and no targeted survey or expert report was commissioned.
- 'Absent' constraint – None of the habitat constraints or geographic limitations are present, the habitat is degraded or the species is a vagrant.
- 'Absent' surveyed – Targeted surveys undertaken during the time period specified for the species in the Threatened Biodiversity Data Collection (TBDC) and following DPIE threatened species survey guidelines (DEWHA, 2010b). Where no relevant published guidelines exist, the survey must be undertaken using best practice methods.

EPBC-listed fauna that were predicted to occur within 10 km of the subject land were also assessed for their presence or absence on site (**Appendix E**).

2.5 Limitations

This study is based upon the species data available at the time of the study, and the environmental conditions, season, and time constraints imposed by the project for the field survey. Specific limitations on this study include the following:

- BAM plots were completed in winter, during which time many flora and fauna species may have been absent, difficult to detect, or difficult to identify.
- Bat calls were only recorded for two nights.

To overcome some of these limitations, a 'precautionary approach' for species presence has been adopted where required. For example, if suitable habitat for a particular threatened species is present on the site and conditions were not suitable for detecting the species at the time of the targeted survey, then the species is assumed to be present.

The above-mentioned constraints were also considered when preparing the recommendations of avoiding, minimising and mitigating potential impacts.

3 Landscape Features

3.1 Overview

A series of background searches were performed to comply with legal standards (**Table 3-1**).

Table 3-1. Environmental protection areas within the study area.

Environmental Protection Areas	Presence in the Study Area
Land identified on the Biodiversity Values Map under the *NSW BC Act 2016*	No (**Appendix A**).
Area of Outstanding Biodiversity Value (AOBV) under the *NSW BC Act 2016*	No.
Watercourse mapped as Key Fish Habitat (KFH) and/or within the extent of an aquatic Endangered Ecological Community, listed under the *Fisheries Management Act 1994.*	Yes, within the study area but not within the subject land (see **Appendix A** and **Figure 3-2**).
An area reserved or dedicated under the *National Parks and Wildlife Act 1974* or *Wilderness Act 1987*.	No.
Is the proposal located within land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation of other environmental protection purposes.	No.
A World Heritage Area.	No.
Environmental Protection Zones in environmental planning instruments.	No.
Lands protected under *NSW State Environmental Planning Policy*, SEPP Koala Habitat Protection 2020	Yes. All lands zoned RU1, RU2, or RU3 within the Murray River LGA, are subject to SEPP 2020. However, the subject land is zoned R1, therefore SEPP 2020 does not apply to the proposal.
Lands protected under *NSW State Environmental Planning Policy*, SEPP Koala Habitat Protection 2021	Yes. The subject land is zoned R1 within the Murray River LGA, therefore SEPP 2021 applies to this proposal.
Lands protected under *SEPP Sydney Drinking Water Catchment*.	No.
Aquatic reserves dedicated under the *Fisheries Management Act 1994.*	No.
Wetland areas dedicated under the Ramsar Wetlands Convention.	No.
Land subject to a conservation agreement under the *National Parks and Wildlife Act 1974.*	No.
Land identified as State Forest under the *Forestry Act 1916.*	No.
Acid sulphate area.	No.

3.2 Bioregion

The study area is situated in the Murray Fans subregion of the Riverina Bioregion, as per the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway & Cresswell, 1995). The Murray Fans subregion is characterised by geology, landforms, soil types and vegetation as described in **Table 3-2**.

Table 3-2. Description of the Murray Fans subregion (NSW NPWS 2003).

Bioregion	Riverina Bioregion
Subregion	Murray Fans
Geology	Quaternary alluvial sediments. Clay and sand with source bordering dunes, lakes and swamps.
Landforms	Relatively confined alluvial fan constrained by sediments from northern Victorian rivers, the Murrumbidgee fan and the Cadell fault. Meandering channels, floodplains, source bordering dunes, overflow lakes and swamps.
Soils	Red brown earths, grey clays and deep sands.
Vegetation	Extensive river red gum forests with river cooba on channels and low floodplains. Yellow Box and black box with saltbush on high floodplains and terraces. White cypress pines on dunes, sandy levees and lunettes. Common reed, cumbungi and grasses in swamps.

3.3 NSW (Mitchell) Landscapes

Landscapes with relatively homogenous geomorphology, soils and broad vegetation types in NSW have been classified and mapped at a 1:250, 000 scale. These landscapes are referred to as NSW (or Mitchell) Landscapes (Mitchell, 2002).

The subject land occurs wholly within the Murray Scalded Plains (**Figure 1-2**). The Murray Channels and Floodplains also occurs within the wider study area. The characteristics of these landscapes are described below.

Murray Scalded Plains

Quaternary alluvial plains with extensive scalding interpreted as relic floodplains, terraces or part of the Cadell tilt block. Red brown texture-contrast soils with extensive scalds. Prior stream channels of deep coarse sands with sandy levees and grey, brown and red cracking clays in depressions, relief 5 to 15m.

Mostly cleared, cropped and grazed. Formerly open woodland and grasslands of white cypress pine (*Callitris glaucophylla*), grey box (*Eucalyptus microcarpa*), bull oak (*Allocasuarina luehmannii*), and myall (*Acacia pendula*) with annual grasses and herbs.

Clearing status: Overcleared (92% cleared).

Murray Channels and Floodplains

Murray Channels and Floodplains landscape includes parts of four land systems: Canally, Murrumbidgee, Riverland and Wentworth.

Active channels and seasonally inundated floodplains of the Murray streams in Quaternary alluvium with associated billabongs, swamps, channels, levees and source bordering dunes, relief to 10m. Includes sca1ded alluvial flats, broad elevated floodplains and associated relict channels; isolated sandy rises, relief to 5m.

Channel banks of grey and brown clays with river red gum (*Eucalyptus camaldulensis*), black box (*Eucalyptus largiflorens*), and river cooba (*Acacia stenophylla*). River red gum around billabongs with dense lignum (*Muehlenbeckia cunninghamii*), common reed (*Phragmites australis*) and cumbungi (*Typha orientalis*). Flats of silty or cracking grey clays, rimmed with black box, lignum, and canegrass

(*Eragrostis australasica*). Highest flooded terrace with brown clays or red-brown texture-contrast soils carry yellow box (*Eucalyptus melliodora*). Dunes and sandplains of deep sandy brown soils or texture-contrast soils, locally calcareous, with belah (*Casuarina cristata*), white cypress pine (*Callitris glaucophylla*), mallee (*Eucalyptus* spp.) rosewood (*Alectryon oleifolius*), needlewood (*Hakea leucoptera*) and marginal clumps of black box, belah, prickly wattle (*Acacia victoriae*) over bluebush (*Maireana* spp.) and grasses.

Clearing status: Not overcleared (56% cleared).

3.4 Geology, Cave, Karst and Soil Features

The underlying geology and soil typical of the subject land and wider study area has been described in **Table 3-2** and above. No outcropping rock, surface rock, caves or karst formations were detected on the subject land.

3.5 Climate and Weather Data

The closest weather station to the subject land is Kyabram Weather Station (Station ID 080091) approximately 37 km south of the subject land (Bureau of Meteorology [BOM], 2022).

The study area generally experiences mild to warm summers, with the highest mean maximum temperature of 30.5°C experienced in January. Winters are mild to cool, with temperatures in the coolest month (July) ranging from a minimum of 3.1°C to a mean maximum of 13.2°C (BOM, 2022; **Figure 3-1**).

The field assessments were conducted between August and December of 2021. Weather conditions at the time of the initial BAM survey (04 August 2021) were cool, reaching a maximum of 13.6°C, with 1 mm of rain recorded at Kyabram Weather Station. Weather conditions during subsequent targeted surveys (24-27 September 2021 and 30 November-02 December 2021) were mild in September (overnight minimums of 1.6-4.6°C and daily maximums of 15.1-20.6°C) and hot in November/December (overnight minimums of 13.5-17.1°C and daily maximums of 32.2-35.0°C).

An average of 446.5 mm of rainfall is recorded annually at Kyabram Weather Station. Rainfall is relatively uniform throughout the year, with no obvious wet or dry season (BOM, 2022). In the two months prior to the initial BAM survey in August 2021, the region experienced rainfall above the long-term average (**Figure 3-1**). No rain fell during the targeted surveys, with the exception of 4.8 mm of rain recorded on the final day of survey (02 December 2021).

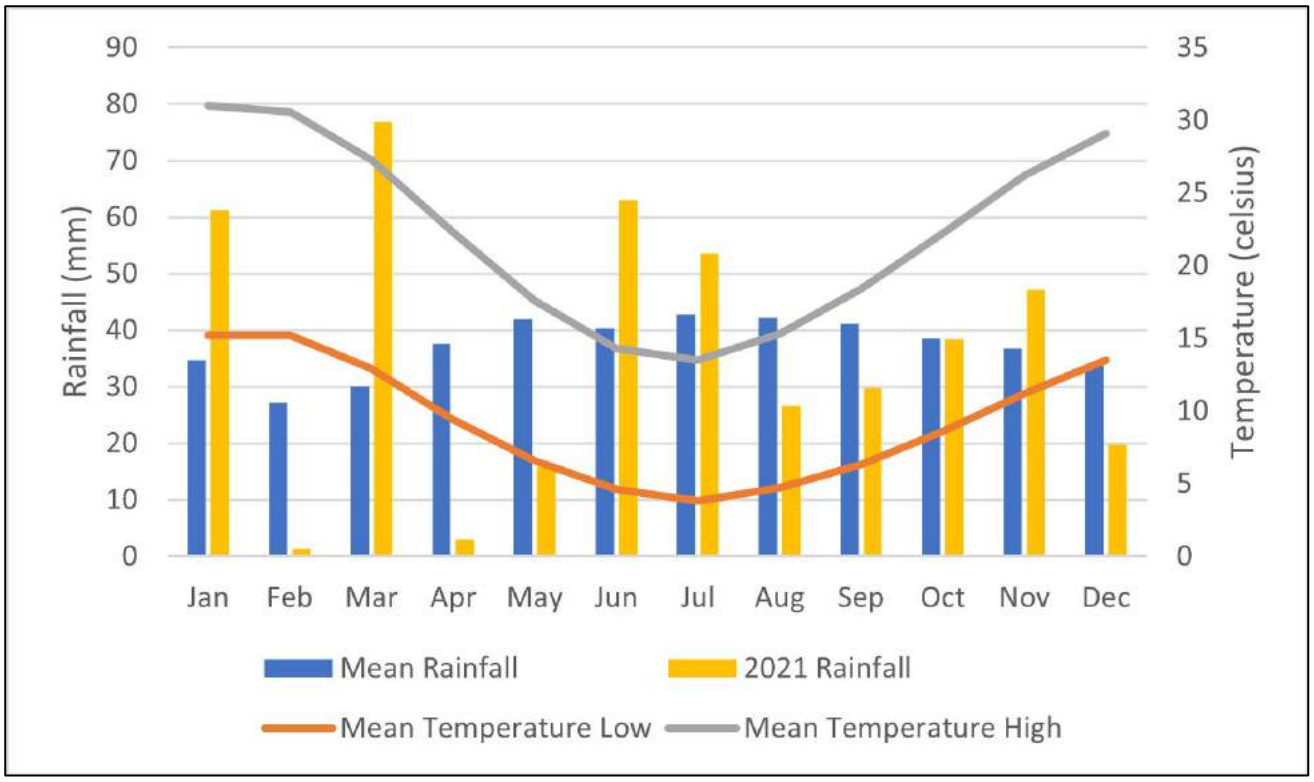


Figure 3-1. Climate statistics for Kyabram Weather Station (ID 080091) showing mean minimum and maximum temperatures, mean rainfall, and rainfall for 2021 (Bureau of Meteorology, 2022).

3.6 Biodiversity Values Map

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017.* The subject land does not contain land identified on the BV Map (**Appendix A**).

3.7 Areas of Outstanding Biodiversity Value

The site does not contain any currently listed Areas of Outstanding Biodiversity Value (AOBV).

3.8 SEPP (Koala Habitat Protection) 2020 and 2021

The subject land is zoned as R1 within the Murray River Council LGA, therefore the Koala SEPP 2021 applies to the present proposal. No Koala Plan of Management exists for the Murray River Council LGA and the land is >1 ha, as such, the land must be considered as to whether it constitutes “core koala habitat”. While the vegetation within the subject land is highly disturbed, it nevertheless contains areas of sparse woodland with the Koala food tree: Western Grey Box (*Eucalyptus microcarpa*); this species is listed in Schedule 2 of SEPP 2020 as a regionally significant feed tree species for the Koala in the Far West Koala Management Area. Western Grey Box made up more than 15% of the total number of trees in the upper canopy, therefore the subject land could potentially be considered core Koala habitat. However, as there are no records of Koalas within 10 km of the subject land and targeted Koala surveys (Koala SAT and spotlighting) failed to detect any Koalas, or signs of Koalas, on the subject land (**Section 5.3.1**), it is therefore not considered core Koala habitat.

A separate assessment of the subject land was undertaken under guidelines of the EPBC Act to assess the impacts on “habitat critical to the survival of the species” and impacts that “substantially interfere with the recovery of the species” (Department of the Environment, 2014). The koala habitat

assessment tool returned a total score of 1, and therefore the subject land does not constitute critical habitat for the Koala (score <5) and referral is not required in this instance. See **Appendix H**.

3.9 Native vegetation cover

Native vegetation cover (woody vegetation, including regrowth and plantations comprised of plants native to New South Wales and non-woody vegetation with no apparent signs of cultivation) was assessed within the study area and the subject land and estimated as the proportion of the study area retaining native vegetation (see **Figure 1-2** and **1-3**). A summary of the vegetation cover estimate is provided in **Table 3-3**. For the purposes of the BAM, the native vegetation cover class has been determined as 10%-30%.

Table 3-3. Native vegetation cover estimates in the study area.

Vegetation Cover Type	Description	Cover Within Study Area (ha)	Total area of Study Area (ha)	Native Cover within Study Area (%)
Native vegetation	Remnant woodland and associated derived grassland.	240.24	863.50	27.82

3.10 Rivers, Streams, Wetlands and Key Fish Habitat

No watercourses are mapped as occurring on the subject land (**Figure 3-2**). However, one Strahler 8th order stream (the Murray River) occurs within the wider study area. The Murray River is classed as Class 1 – Major Fish Habitat according to Fairfull and Witheridge (2003) and has been mapped as Key Fish Habitat (KFH) by the Department of Primary Industries – Fisheries. It has also been identified as Protected Riparian Land (PRL) by the Department of Planning, Industry and Environment.

Sediment runoff (caused by ground disturbance/vegetation removal by the proposal) has the potential to flow into the Murray River and cause indirect impacts. However, as the river is a minimum of 1.3 km from the subject land, and assuming standard mitigation measures are implemented, the likelihood of this occurring is low.

There are no wetlands mapped with the subject land; however, floodplain wetlands associated with the Murray River occur within the study area, approximately 1.3 km south of the proposal site. These wetlands follow the entire length of the Murray River as it crosses the 10 km search area and are generally mapped to within 1 km of the river. Wider floodplain wetlands occur c. 6.3 km to the east of the subject land, extending to approximately 4.8 km from the river edge.

There is a small farm dam approximately 20 m west of the subject land.

3.11 Groundwater Dependent Ecosystems

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment.

The degree of groundwater dependence of ecosystems can be categorised into three broad categories:

- Non-dependent ecosystems that occur mostly in recharge areas and have no connection with groundwater

- Facultative GDEs that require groundwater in some locations but not in others, particularly where an alternative source of water can be accessed to maintain ecological function. Minor changes to the groundwater regime in facultative GDEs with proportional or opportunistic groundwater dependence may not have any adverse impacts but these ecosystems can be damaged or destroyed if a lack of access to groundwater is prolonged
- Obligate GDEs that are restricted to locations of groundwater discharge and ecosystems located within aquifers (e.g. subterranean cave and stygofauna communities (Kuginis *et al*. 2012). Aquifer ecosystems are inherently groundwater dependent.

Groundwater dependent ecosystems have been classified into seven types under two broad categories as follows (Kuginis *et al*. 2012):

- Subsurface ecosystems – Underground ecosystems
- Karst systems and caves (limestone geology)
- Subsurface aquifer (phreatic) ecosystems
- Baseflow streams (hyporheic or subsurface component)
- Surface ecosystems – Above ground ecosystems
- Groundwater dependent wetlands
- Baseflow surface streams (surface/free-water component)
- Estuarine and near shore marine ecosystems
- Groundwater dependent terrestrial ecosystems; dependent on subsurface groundwater (phreatophytic).

The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems identified areas of low potential for interaction with terrestrial GDEs within the subject land and surrounding study area (**Figure 3-2**Figure 3-2; BOM, 2017). High- and moderate-potential terrestrial GDEs and moderate-potential aquatic GDEs narrowly occur within the wider study area (**Figure 3-2**Figure 3-2).

The proposal does not include the extraction of groundwater; however, contamination from construction operations, could impact on the quality of groundwater if adequate mitigation measures are not taken. See **Section 6** for recommended mitigation measures regarding GDEs.

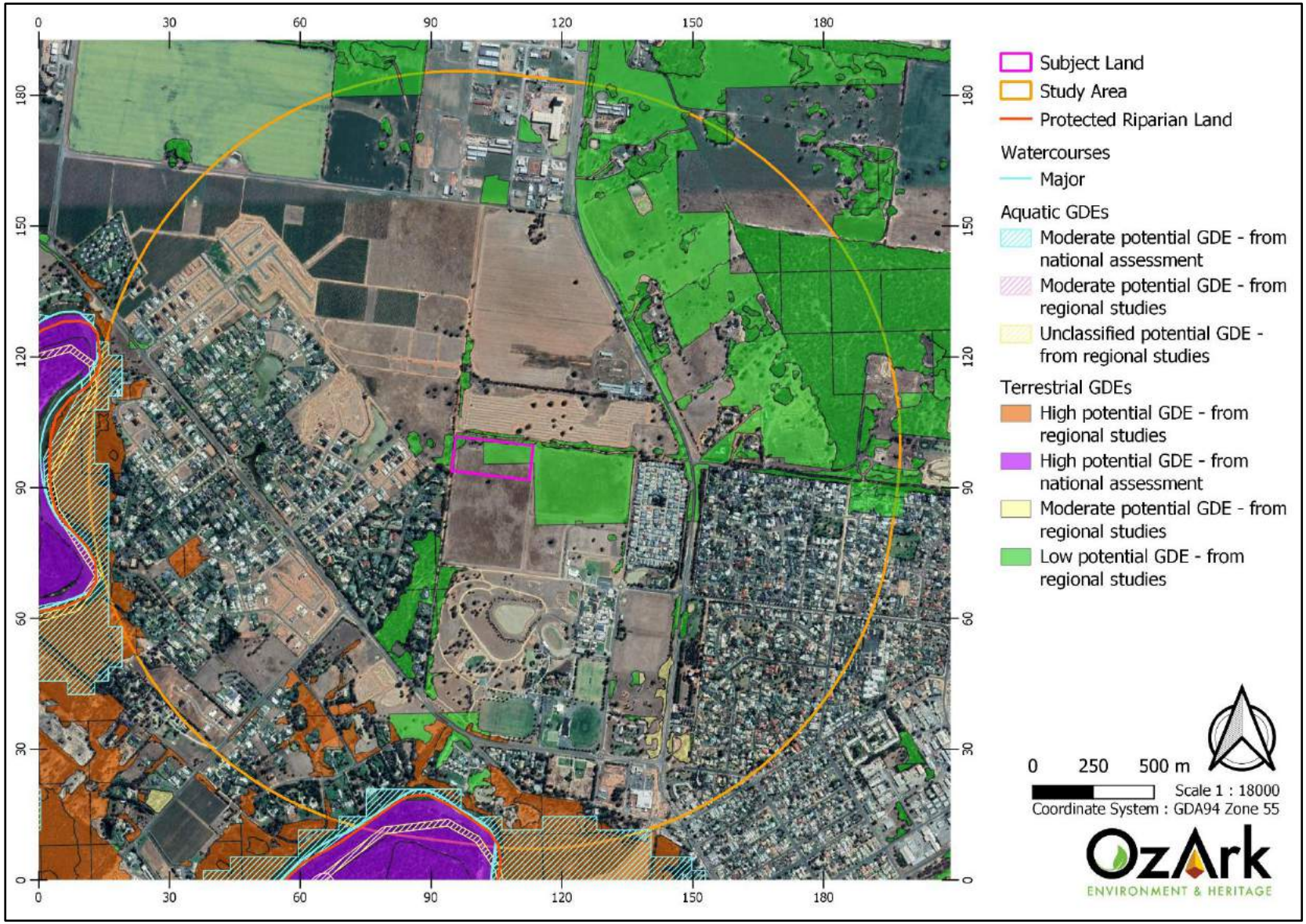


Figure 3-2. Watercourses, Groundwater Dependent Ecosystems, and Protected Riparian Land of the study area

3.12 Connectivity Features

The subject land is situated in a mixture of urban and rural land that has undergone extensive historic clearing. The subject land itself has been cleared for agricultural use, including both grazing and cropping, and only small remnants remain of the original vegetation, mostly in the road corridors. The most notable remaining connectivity features in the surrounding landscape occur in the road corridors, including Lignum Road and Kiely Road, and an expanse between Lignum Road and Charters Drive. The largest intact patch of native vegetation nearby is approximately 800 m north-east of the subject land; however, Cobb Highway, urban land, and cleared land prevents connectivity through to the subject land.

Collectively, the road corridor and wooded remnants may facilitate the movement of fauna species between larger local remnants; however, their narrow nature (combined with the high risk of vehicle strike) is likely to limit their usefulness.

4 Native Vegetation

4.1 Plant Community Types

The subject land has been subjected to extensive historical clearing. Consequently, vegetation within the subject land consists of small, wooded remnants, mostly within the road corridor, isolated paddock trees, derived grassland, and non-native vegetation.

Vegetation mapping (DPIE, 2016) available for the Riverina region models two PCTs within the subject land:

- PCT 44 – Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion
- PCT 237 – Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone

The field assessment determined that this modelling is partially correct; PCT 237 was present, but PCT 44 was not. PCT 237 was present throughout the entire proposal footprint, occurring in a total of two condition states: poor and moderate (**Figure 4-1**). Justification for PCT determination is given in Table 4-1. Plant Community Types present within the subject land.**Table 4-1**. The locations of the BAM plots are given in **Figure 4-2**. Photographs and data sheets completed in the field are provided in **Appendices B** and **C**.

Figure 4-1. Plant Community Types and Vegetation Zones identified during the vegetation survey.

Figure 4-2. Locations of BAM Vegetation Integrity plots.

Table 4-1. Plant Community Types present within the subject land.

PCT ID	PCT Name	Vegetation Formation	TEC Status BC Act	TEC Status EPBC Act	Justification of Identification	Current NSW Extent; Percent Cleared
237	Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone	Grassy Woodlands	Criteria met	237_Mod = criteria met 237_Poor = not the TEC	**Moderate condition:** • Woodland featuring Grey Box (*Eucalyptus microcarpa*) as the sole canopy species. Grey Box is the dominant species in PCT 237. • A shrub layer dominated by chenopod shrubs (chiefly *Sclerolaena* spp., including *S. muricata*, along with the bluebush *Maireana excavata* and the saltbush *Atriplex semibaccata*) was also present. *Sclerolaena muricata* and *Atriplex semibaccata* are components of PCT 237. • The groundcover was dominated by the High-threat Exotic grass Great Brome (*Bromus diandrus*), with a much lesser density of native grasses. *Austrostipa scabra* and *Chloris truncata*, both components of PCT 237, were common within this vegetation zone. • Filtering the NSW BioNet Vegetation Classification Database by the Murray Fans IBRA subregion and the dominant species in each stratum (*Eucalyptus microcarpa*, *Sclerolaena muricata*, *Atriplex semibaccata*, *Rytidosperma setaceum*, and *Chloris truncata*) returned a stronger match (5/6) for PCT 237 than for any alternative PCT (maximum 4/6). Among the alternative PCTs scoring 4/6, only one – PCT 76 – was reported to be dominated by *Eucalyptus microcarpa*, and this PCT lacks the chenopod shrub layer recorded from the subject land. **Poor condition:** • Derived grassland lacking a wooded canopy. • A shrub layer was present in places, typically containing the same chenopod species as the moderate condition zone (including *Sclerolaena muricata*, *Maireana excavata,* and *Atriplex semibaccata*). *Sclerolaena muricata* and *Atriplex semibaccata* are components of PCT 237.	4, 000 ha; 73.00%

					• The groundcover was typically dominated by the High-threat Exotic grass Great Brome (*Bromus diandrus*) but contained a significant native component in the form of the grasses *Rytidosperma setaceum*, *Chloris truncata*, and *Austrostipa scabra*, and a small number of forbs, including *Rumex brownii* and *Oxalis perennans*. With the exception of *R. setaceum*, these species are associated with PCT 237. A localised occurrence of *Austrostipa aristiglumis* was also recorded; this species is not associated with PCT 237 and may point to a transition into an occurrence of PCT 45 nearby. • Filtering the NSW BioNet Vegetation Classification Database by the Murray Fans IBRA subregion and the dominant species of each growth form (*Sclerolaena muricata*, *Maireana excavata, Atriplex semibaccata*, *Rytidosperma setaceum*, *Chloris truncata*, *Austrostipa scabra, Rumex brownii* and *Oxalis perennans*) returned a stronger match (7/9) for PCT 237 than for any alternative PCT (maximum 6/9). Among the alternative PCTs scoring 6/9, none are dominated by *Eucalyptus microcarpa*. PCT 76 scored 5/9 and was excluded for the reasons given above. • Occurs in proximity to areas of PCT 237 with a surviving canopy and with a similar spectrum of mid- and ground-layer species.	

4.2 Vegetation Zones, Patch Size and Vegetation Integrity

To be assessed under the BAM (2020), native vegetation on the subject land has been assigned a zone, based on its condition state and the patch to which it belongs.

One PCT (237) containing two vegetation zones was identified during the site assessment (**Table 4-2; Figure 4-3**). Vegetation on the subject land has been disturbed by historic clearing, cropping and grazing. Broad condition states have been determined by the presence or absence of the key structural elements of the PCT and the vegetation integrity (VI) score, calculated in the BAM-C using plot data. This method also compares data collected with the benchmarks for each PCT. The presence or absence of structural elements was assessed both by reviewing plot data and general observations made whilst carrying out field work. A description of each vegetation zone is provided below:

- **Vegetation zone 237_moderate** – A woodland (canopy cover c. 40%) featuring a canopy dominated by Grey Box (*Eucalyptus microcarpa*) as the sole tree species. A moderately dense midstorey (c. 51% cover) dominated by chenopod shrubs (chiefly *Sclerolaena* spp., along with the low shrubs *Maireana excavata* and *Atriplex semibaccata*) was also present. The understorey was dominated by the grass species Great Brome (*Bromus diandrus*), a High-threat Exotic species according to the BAM. Minor occurrences of several additional exotic grasses and forbs were also noted. Some native species were recorded at relatively high densities in the lower stratum, including the wallaby grass species *Rytidosperma setaceum* and Windmill Grass (*Chloris truncata*); in general, however, native groundcover species were low in both abundance and diversity.
- **Vegetation zone 237_poor** – Derived grassland lacking a canopy and with a sparse shrub layer (range 3-18% cover) defined by the same chenopod species observed in the moderate condition class. The understorey in the poor condition class was again dominated by *Bromus diandrus* but did support a range of native herbaceous species, the most common being *Rytidosperma setaceum*, *Chloris truncata* and the speargrass *Austrostipa scabra*. Native forbs typically occurred at low densities and included common species such as Swamp Dock (*Rumex brownii*), *Oxalis perennans*, and *Sida* spp. Numerous exotic forbs were also recorded, again at low densities. A minor occurrence of Plains Grass (*Austrostipa aristiglumis*) was also noted; this existed as a small component of a grassland dominated by *Bromus diandrus* and *Rytidosperma setaceum* and did not constitute a separate Plains Grass grassland (i.e., PCT 45).

A patch is defined in the BAM operational manual – Stage 1 (2020) as an area of native vegetation that occurs on the subject land and includes native vegetation that has a gap of less than 100 metres from the next area of native vegetation (or ≤30 m for non-woody ecosystems). The patch may extend onto land adjoining the subject land. The patch size should include derived communities (i.e. one or more of the structural components or strata layers is missing, modified or new) as these are likely to provide suitable habitat for at least some species. The extent of native vegetation was determined from a combination of satellite imagery and State Vegetation Mapping **(Figure 4-3**).

As more than 100 m separates vegetation in the north of the subject land from vegetation in the south, two patches were mapped. As total patch size exceeded the threshold for the largest patch size utilised by the BAM-C (100 ha), it was not necessary to continue mapping beyond

the study area. The patch sizes for the vegetation zones that were recorded on the subject land are provided in **Table 4-2** and depicted in **Figure 4-3**.

Table 4-2. Vegetation zones and patch sizes of native vegetation on the subject land.

PCT ID	Condition State	VI Score	HBT	Area Impacted (ha)	Patch Number	Patch Size	BAM Patch Size Class	Vegetation Zone	BAM Plots
237	Moderate	45.3	Y	0.46	1	882.97	>100 ha	237_Mod	BC01 BC05
237	Poor	8.8	N	4.39	1	882.97	>100 ha	237_Poor	BC02 BC03 BC04 BC06

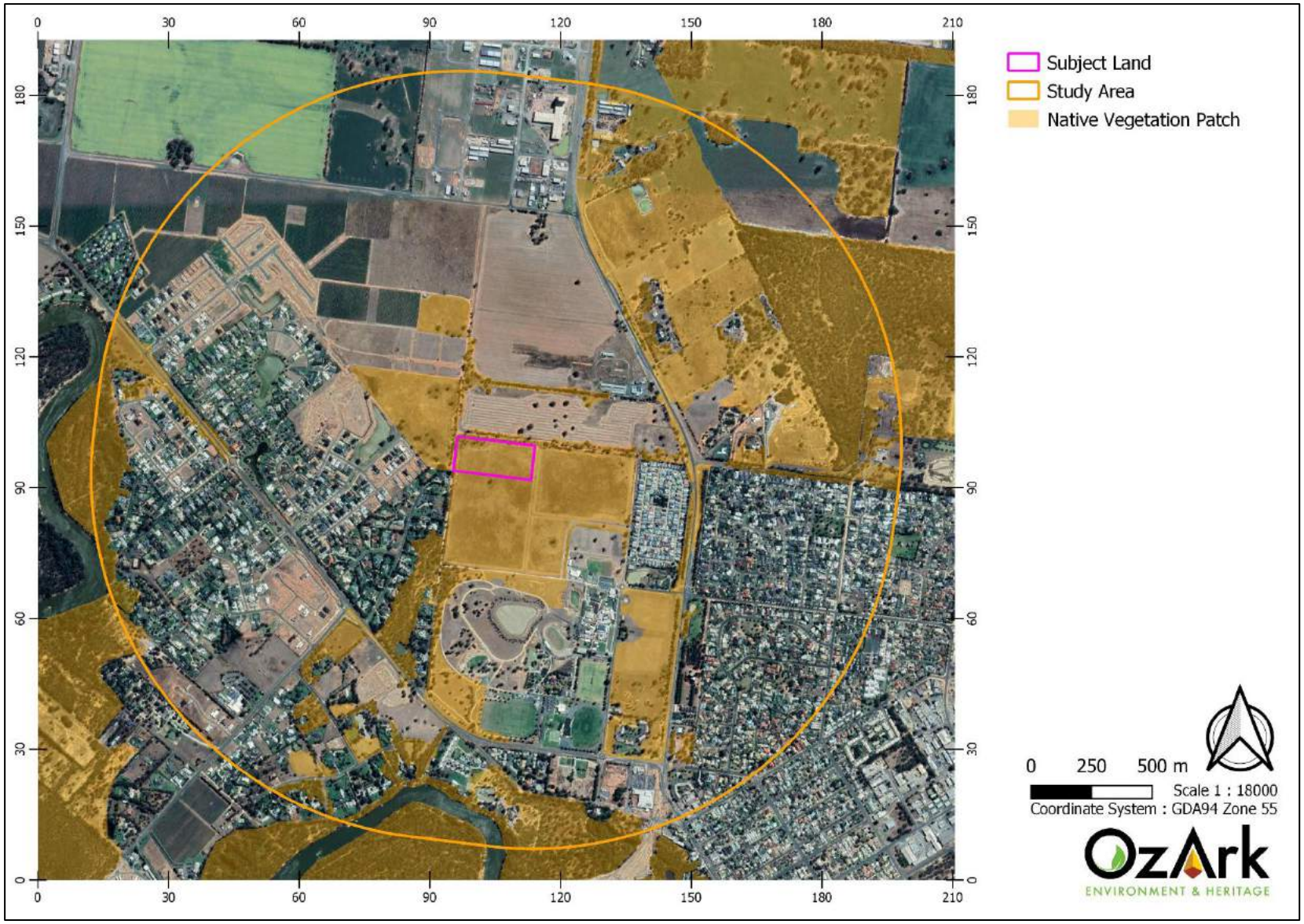


Figure 4-3. Native vegetation patch associated with the vegetation zones.

4.3 Flora Species Observed

The field survey identified a total of 32 flora species within the subject land (**Appendix C**). Of these, 20 species (62.50%) were native and 12 (37.50%) were exotic. One of the recorded exotic species – Treasure Flower (*Gazania rigens*) is listed as a High Threat Exotic (HTE) species under BAM and therefore the BC Act.

Plot data, plot photographs and a list of all flora species observed during the field assessment are provided in **Appendices B** and **C**.

4.4 Threatened Ecological Communities

PCT 237 is associated with the following TECs:

- BC Act-listed Endangered Ecological Community (EEC): Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- EPBC Act-listed EEC: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

The characteristics of both zones were compared against the BC Act guidelines for the EEC: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. PCT 237_Mod fitted the criteria for inclusion in the BC Act-listed community. PCT 237_Poor did not possess any regenerating Grey Box saplings and was dominated by the exotic species *Bromus diandrus.* Considering the degraded nature of PCT 237_Poor it would not respond well to management and therefore does not fit the criteria for the BC Act-listed community.

The characteristics of both zones were compared against the EPBC Act guidelines for Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. Neither zone fitted the criteria to be considered the EPBC Act-listed EEC (see **Figure 4-4** to **Figure 4-7**).

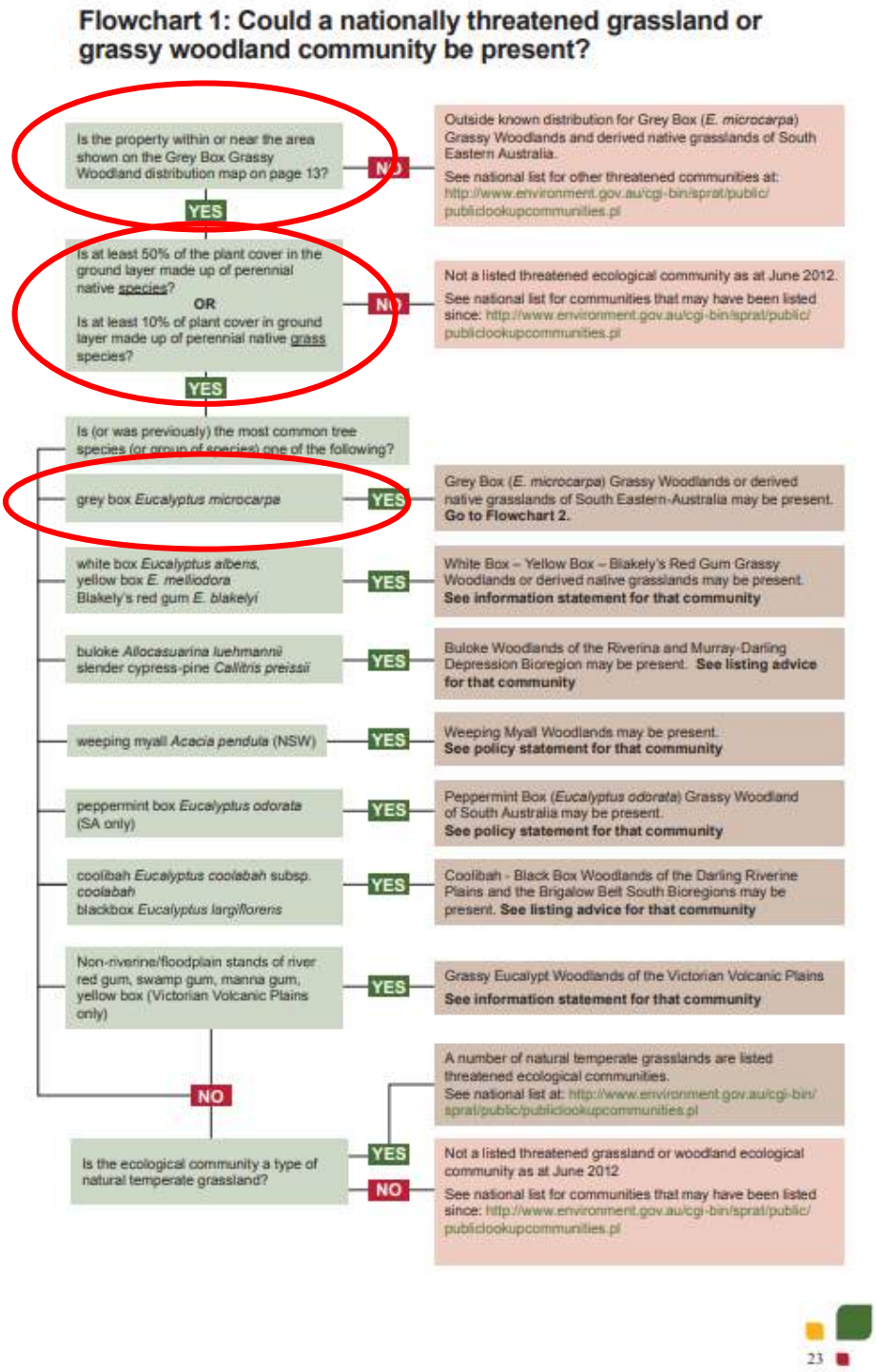


Figure 4-4. PCT 237_Mod assessed against the EPBC Guidelines for the TEC (Flowchart 1)

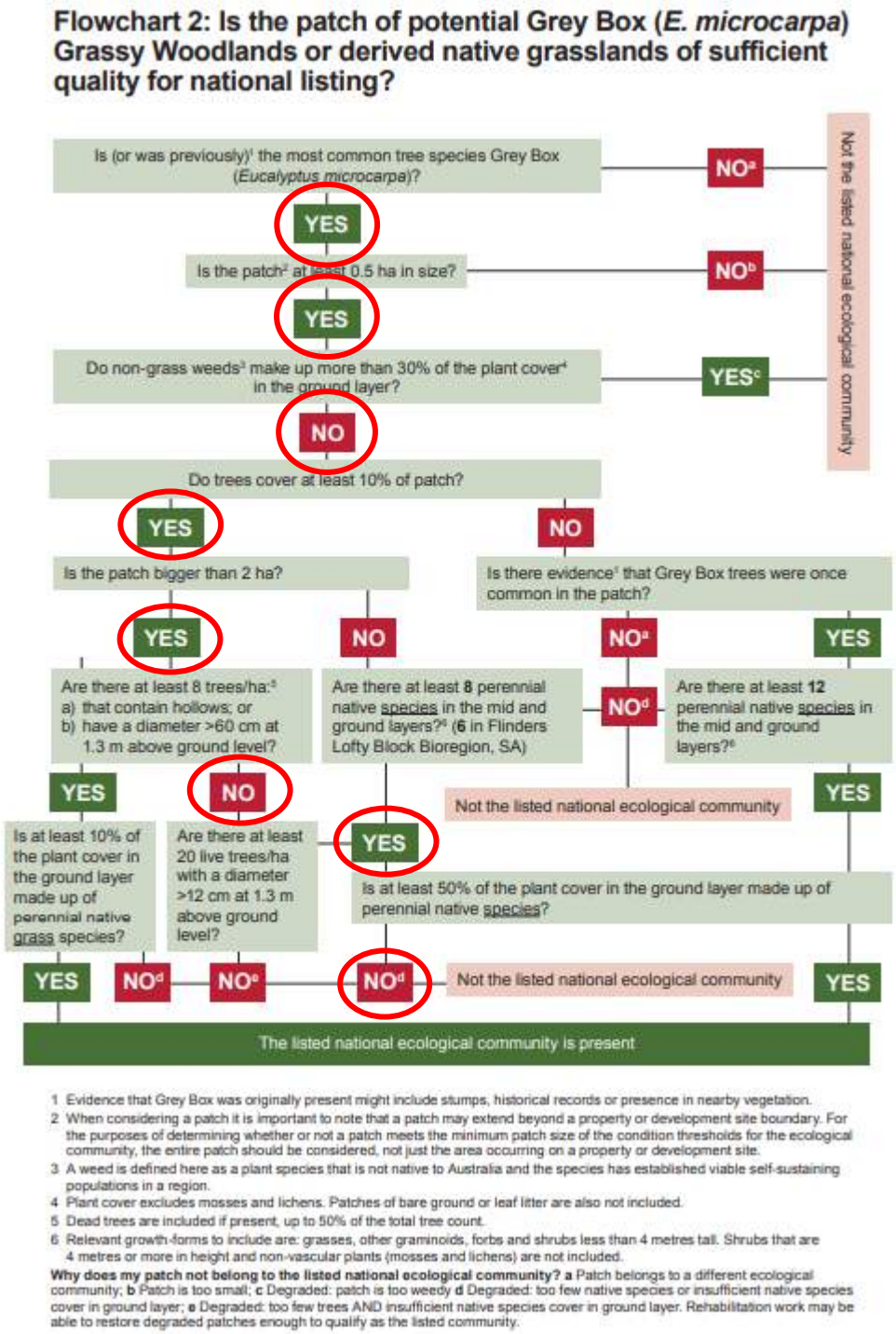


Figure 4-5. PCT 237_Mod assessed against the EPBC Guidelines for the TEC (Flowchart 2)

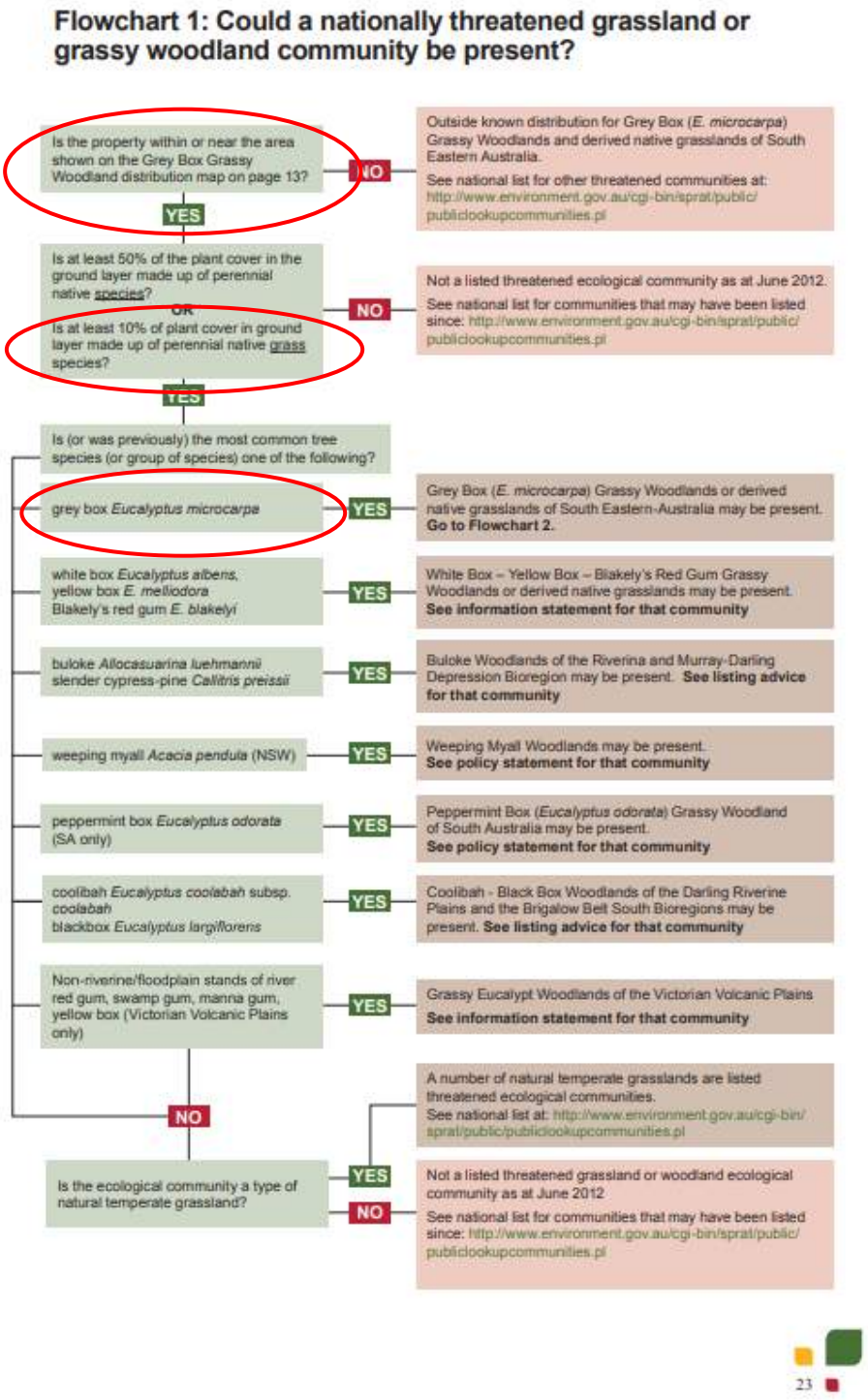
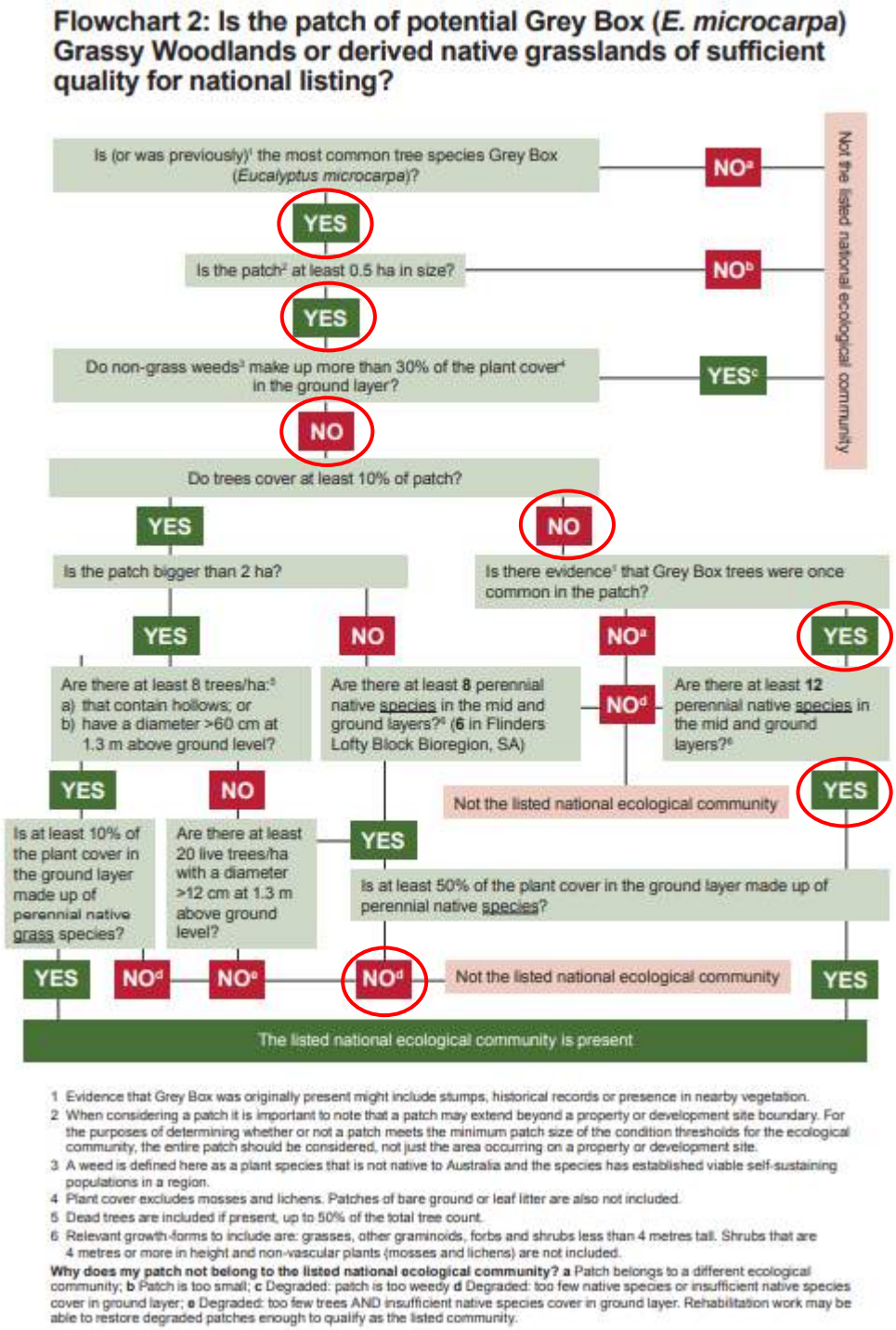


Figure 4-6. PCT 237_Poor assessed against the EPBC Guidelines for the TEC (Flowchart 1)



1 Evidence that Grey Box was originally present might include stumps, historical records or presence in nearby vegetation.
2 When considering a patch it is important to note that a patch may extend beyond a property or development site boundary. For the purposes of determining whether or not a patch meets the minimum patch size of the condition thresholds for the ecological community, the entire patch should be considered, not just the area occurring on a property or development site.
3 A weed is defined here as a plant species that is not native to Australia and the species has established viable self-sustaining populations in a region.
4 Plant cover excludes mosses and lichens. Patches of bare ground or leaf litter are also not included.
5 Dead trees are included if present, up to 50% of the total tree count.
6 Relevant growth-forms to include are: grasses, other graminoids, forbs and shrubs less than 4 metres tall. Shrubs that are 4 metres or more in height and non-vascular plants (mosses and lichens) are not included.

Why does my patch not belong to the listed national ecological community? **a** Patch belongs to a different ecological community; **b** Patch is too small; **c** Degraded: patch is too weedy **d** Degraded: too few native species or insufficient native species cover in ground layer; **e** Degraded: too few trees AND insufficient native species cover in ground layer. Rehabilitation work may be able to restore degraded patches enough to qualify as the listed community.

Figure 4-7. PCT 237_Poor assessed against the EPBC Guidelines for the TEC (Flowchart 2)

Figure 4-8. Extent within the development footprint of the BC Act-listed Endangered Ecological Community: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. The unshaded area fits the criteria but is being excluded.

5 Threatened Species

For the purpose of credit calculations, these species are listed as either ecosystem credit species or species credit species, where:

- An ecosystem credit species is a species whose likelihood of occurrence can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. A targeted survey is not required for these species (DPIE, 2020a).
- A species credit species is a species whose likelihood of occurrence cannot be predicted by vegetation surrogates and/or landscape features and can be reliably detected by survey. A targeted survey or expert report is required to confirm presence/absence of these species (DPIE, 2020a).

5.1 Habitat Features Present

The subject land was assessed for its potential to provide habitat for threatened flora and fauna known or predicted to occur in the study area. Habitat features including but not limited to rock outcrops, caves, hollow-bearing trees, nests, wetlands (including dams), and watercourses were searched for and recorded, if present.

The subject land was found to be devoid of caves, outcropping rock and loose surface rock. Hollow-bearing trees with both large (>20cm diameter, denoted by “L” on **Figure 5-1**) and small (<20 cm diameter, denoted by “S” on **Figure 5-1**) hollows were also recorded. There were no stags (standing dead trees) recorded on the subject land, or immediately adjacent. No waterways, natural water bodies or wetlands were present within the subject land; however, one small agricultural dam was noted just outside of the subject land (**Figure 5-1**).

Figure 5-1. Habitat features recorded on (and immediately adjacent to) the subject land.

5.2 Ecosystem Credit Species

In total, 24 ecosystem credit species were generated by the BAM-C. The habitat suitability of the subject land for these species was assessed. Two species were removed from the list due to habitat constraints; therefore, 22 species are assumed present (see **Table 5-1**). A habitat assessment summary for each species listed in **Table 5-1** is detailed in **Appendix D**.

Table 5-1. Ecosystem credit species predicted to occur and the nature of their presence within, or absence from, the subject land.

Common Name	Scientific Name	Presence
Barking Owl	*Ninox connivens*	Assumed Present
Black Falcon	*Falco subniger*	Assumed Present
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	Assumed Present
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	Assumed Present
Diamond Firetail	*Stagonopleura guttata*	Assumed Present
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Assumed Present
Grey Falcon	*Falco hypoleucos*	Assumed Present
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	Assumed Present
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	Assumed Present
Koala	*Phascolarctos cinereus*	Assumed Present
Little Eagle	*Hieraaetus morphnoides*	Assumed Present
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	Assumed Present
Masked Owl	*Tyto novaehollandiae*	Assumed Present
Speckled Warbler	*Chthonicola sagittata*	Assumed Present
Spotted Harrier	*Circus assimilis*	Assumed Present
Square-tailed Kite	*Lophoictinia isura*	Assumed Present
Superb Parrot	*Polytelis swainsonii*	Assumed Present
Swift Parrot	*Lathamus discolor*	Assumed Present
Turquoise Parrot	*Neophema pulchella*	Assumed Present
Varied Sittella	*Daphoenositta chrysoptera*	Assumed Present
White-throated Needletail	*Hirundapus caudacutus*	Assumed Present
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Assumed Present
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Absent (constraint)
Painted Honeyeater	*Grantiella picta*	Absent (constraint)

5.3 Species Credit Species

In total, 21 species credit species were generated by the BAM-C (**Table 5-2**). The habitat suitability of the subject land for these species was assessed. According to the BAM, if suitable habitat for these species occurs on the subject land, they must be the subject of targeted survey according to recommended guidelines, or else assumed present. After consideration of habitat constraints, one species, the Swift Parrot, could be discounted due to distribution, and another species, the White-bellied Sea Eagle, could be discounted due to the subject land being >1km from waterways. Nineteen species credit species still had the potential to occur. Surveys were conducted for 17 of the remaining 19 species determined to potentially occur at the site. Surveys followed relevant and approved BAM survey methodologies (**Section 5.3.1)**. Two further species was assumed present as it was not the appropriate time of year to survey for them (**Table 5-2**).

Table 5-2. Species credit species predicted to occur and the nature of their presence within or absence from the subject land.

Common Name	Scientific Name	Species presence
Sloane's Froglet	*Crinia sloanei*	Present (assumed)
Masked Owl (breeding)	*Tyto novaehollandiae*	Present (assumed)
A spear-grass	*Austrostipa wakoolica*	Absent (surveyed)
Bush Stone-curlew	*Burhinus grallarius*	Absent (surveyed)
Yellow Gum	*Eucalyptus leucoxylon* subsp. *pruinosa*	Absent (surveyed)
Little Eagle (breeding)	*Hieraaetus morphnoides*	Absent (surveyed)
Winged Peppercress	*Lepidium monoplocoides*	Absent (surveyed)
Major Mitchell's Cockatoo (breeding)	*Lophochroa leadbeateri*	Absent (surveyed)
Square-tailed Kite (breeding)	*Lophoictinia isura*	Absent (surveyed)
Southern Myotis	*Myotis macropus*	Absent (surveyed)
Barking Owl (breeding)	*Ninox connivens*	Absent (surveyed)
Squirrel Glider	*Petaurus norfolcensis*	Absent (surveyed)
Brush-tailed Phascogale	*Phascogale tapoatafa*	Absent (surveyed)
Koala (breeding)	*Phascolarctos cinereus*	Absent (surveyed)
Austral Pillwort	*Pilularia novae-hollandiae*	Absent (surveyed)
Superb Parrot (breeding)	*Polytelis swainsonii*	Absent (surveyed)
Prasophyllum sp. Moama	*Prasophyllum sp. Moama*	Absent (surveyed)
Slender Darling Pea	*Swainsona murrayana*	Absent (surveyed)
Silky Swainson-pea	*Swainsona sericea*	Absent (surveyed)
White-bellied Sea-Eagle (breeding)	*Haliaeetus leucogaster*	Absent (constraint)
Swift Parrot (Breeding)	*Lathamus discolor*	Absent (constraint)

5.3.1 Species credit species targeted surveys

Targeted species surveys were conducted according to the methodologies outlined in **Table 5-3**, which were based on the BAM and its associated guidelines and documents. The BioNet species records from within 10 km of the subject land are also displayed in **Table 5-4** for site context.

Table 5-3. Threatened Species Targeted Survey Methodology and Results.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
A spear grass	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the	**DPIE, 2020b**	**October-December**	Surveys were conducted on **1 December 2021**	1. The target species is associated with PCT 237 2. (a) The targeted survey took place in December, within the survey window for this species. (b) November received more rainfall than average (**Figure 3-1**), encouraging flowering in this species, which would increase the likelihood of detection, (c) The entire subject land was searched (**Figure 5-3**). 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for grass species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect the spear grass (*Austrostipa wakoolica*), nor any species which may be mistaken for it. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Bush Stone-curlew	1. The assessor must search the subject site for signs of breeding as follows; (a) presence of male and female **OR** (b) calling to each other (duetting) **OR** (c) find nest. 2. Where signs of breeding on site are present, potential habitat must be recorded, potential habitat for this species included patches of dense vegetation, particularly where logs and dead wood is present. 3. Where potential habitat is identified on site then, night monitoring at the identified potential habitat locations for a minimum of 2 nights (4 or more nights should be conducted to	**DEC, 2006** **DEWHA, 2010b**	**January-December**	Call playback and spotlighting surveys were conducted over five nights (**24-26 September, 30 November, 1 December 2021**). Diurnal bird surveys were also conducted on the same days.	1. (a & b) No individuals were detected on the subject land. (c) No potential nests were recorded on the subject land. 2. No signs of breeding were detected (see above). Potential habitat for the species was surveyed 3. The call playback survey was conducted over five nights to fall within the survey timing window and reach at least 50% probability of detection. Call playback was conducted as per DEC (2004): "Survey points should be approximately 2-4 km apart depending on weather conditions (calm, clear nights are best). Play calls for 30 s followed by 4.5 minutes of listening. Repeat 5 minute cycle three times per site." Due to the small size of the subject land, only one call playback location was selected (**Figure 5-2).** The species was also surveyed via five nights of spotlighting and 1.5 hours of targeted diurnal searches. No bush stone curlews were heard or observed on the

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	reach at least 50% likelihood of detection) should be undertaken to detect the presence of any individual of this species using a potential habitat or demonstrating behaviour focussed on a potential patch of suitable habitat (e.g. territorial calls, persistent presence around a patch of dense vegetation of fallen log). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).				subject land or nearby. **Result: Absent (Surveyed)**
Yellow Gum	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below	**DPIE, 2020b**	**January-December**	Surveys were conducted on **26 September 2021, 01 December 2021**	1. The target species is associated with PCT 237 2. (a) The targeted surveys took place in September and December, within the survey window for this species. (b) Being a tree, this species should be easily detected year round (c) The entire subject land was searched (**Figure 5-3**). 3. (a) Targeted surveys were undertaken using 10 m transects, closer together than required for tree

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect Yellow Gum, nor any species which may be mistaken for it. **Result: Absent (Surveyed)**
Little Eagle (breeding)	1. The surveyor must search the	**OEH 2022f, DEWHA,**	**August - October**	Habitat tree	1. (a-c). No birds and no signs of breeding were detected. However, as several potential nest trees were

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	subject land for potential breeding habitat. Breeding habitat for this species is (a) live (occasionally dead) large old trees (b) within suitable vegetation **AND** (c) the presence of a male and female; or female with nesting material; (d) or an individual on a large stick nest in the top half of the tree canopy. 2. Where there are potential nest trees identified on site, monitor for this species during the breeding season (August-October) to confirm the presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).	**2010b**		watches were conducted over three nights: (**24-26 September, 30**). Diurnal bird surveys were also conducted on the same days.	identified, step 2 was still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, several potential nest trees (but no actual nests) were recorded within, or very close to the subject land. Habitat trees were observed for three nights, beginning 30 minutes prior to sunset and ending 60 minutes after sunset (**Figure 5-2**). The subject land was also searched for the presence of the Little Eagle (90 minutes of targeted diurnal searches concentrated at dawn). No Little Eagles were observed on the subject land, or nearby. **Result: Absent (Surveyed)**
Winged Peppercress	1. Where a PCT associated with the target species is recorded	**DPIE, 2020b**	**November-February**	Surveys were conducted on	1. The target species is associated with PCT 237 2. (a) The targeted survey took place in December,

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	OR the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential			**01 December 2021**	within the survey window for this species. (b) November received more rainfall than average (**Figure 3-1**), encouraging emergence in this species, which enables detection, (c) The entire subject land was searched (**Figure 5-3**). 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for this growth form in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect Winged Peppercress, nor any species which may be mistaken for it. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Major Mitchell's Cockatoo (breeding)	1. Assessors should look for SIGNS OF BREEDING on site as follows; (a) begging birds of any age or sex; or (b) lone individuals of the species identified during the breeding season (August to November); or (c) an occupied nest. 2. Where signs of breeding on site are present, POTENTIAL NEST TREES should be identified. Potential nest trees are trees with hollows >10 cm diameter. 3. Where potential nest trees are identified on site, monitor for this species during the breeding season (August to November) to confirm the presence of any ACTUAL NEST TREES on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best	**OEH 2022g**	**September-December**	**24-27 September** and **30 November – 02 December 2021**	1. (a-c). No Major Mitchell's Cockatoos, and no signs of breeding were detected. However, as several potential nest trees were identified, step 2 was still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, several potential nest trees (but no actual nests) were recorded within, and very close to the subject land. Habitat trees were observed for three nights, beginning 30 minutes prior to sunset and ending 60 minutes after sunset (**Figure 5-2**). The subject land was also searched for the presence of Major Mitchell's Cockatoos (90 minutes of targeted diurnal searches concentrated at dawn). No Major Mitchell's Cockatoos were observed on the subject land, or nearby. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements). 4. If actual nest trees are confirmed on site, then the species polygons are to be drawn around those actual nest trees (i.e. trees that birds of the species are known to have used for nesting). The species polygons should be circular in shape and must include a buffer RADIUS of 200 m around each actual nest tree.				
Square-tailed Kite (breeding)	1. The surveyor must search the subject land for potential breeding habitat. Breeding habitat for this species is (a) live (occasionally dead) large old trees (b) within suitable vegetation **AND** (c) the presence of a male and female; or female with nesting material; (d) or an individual on a large stick nest in the top half of the tree canopy. 2. Where there are potential nest trees identified on site, monitor	**OEH, 2022h** **DEWHA, 2010b**	**September-January**	Habitat tree watches were conducted over five nights: **24-27 September 2021** and **30 November-01 December 2021**. Diurnal bird surveys were also conducted	1. (a-c). No birds and no signs of breeding were detected. However, as several potential nest trees were identified, step 2 was still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, several potential nest trees (but no actual nests) were recorded within, or very close to the subject land. Potential nest trees were observed for three nights, beginning 30 minutes prior to sunset and ending 60 minutes after sunset (**Figure 5-2**). The subject land was also searched for the presence of the Square-tailed Kite (90 minutes of targeted diurnal searches, concentrated at dawn). No Square-tailed Kites were observed on the subject land, or nearby.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	for this species during the breeding season (September-January) to confirm the presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).			over the same period.	**Result: Absent (Surveyed)**
Southern Myotis	1. The surveyor must use harp traps or mist nets, roost searches and/or acoustic detection. a) Harp traps or mist nets should ideally be set over water or under bridges / culverts / overhanging branches. Trapping should take place on a minimum of four nights, to a total effort of 16 trap nights b) Roost searches should involve bridges / tunnels / culverts or other suitable structures. Roost searches should involve inspections using a torch and searches for guano of 30	**DEWHA 2010a, OEH 2018, OEH 2022i**	**October-March**	**30 November – 01 December 2021**	1. a) Harp traps or mist nets were not used because there was no suitable aquatic habitat over which to deploy them. b) Roost searches were not conducted because there were no suitable roosts within the subject site. c) Acoustic recording were undertaken. Although 16 trap nights are recommended, the subject land is small (<5 ha) and contains marginal habitat for this species. There was one small farm dam approximately 20 m to the west of the subject land (**Figure 5-1**), no other waterbodies exist within 200 m of the subject land. Considering the marginal quality of the habitat, only one ultrasonic bat detector (SM4BAT-FS) was deployed on the subject land (~100 m from the dam) for two nights (**Figure 5-2**), set to record from dusk until dawn. 2. Calls were analysed by Lesryk Environmental, using Kaleidoscope Pro, Wildlife Acoustics.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	minutes in duration, per roost. c) Acoustic detection should take place over a minimum of four nights, to a total effort of 16 trap nights.				3. Eight species of microbat were positively identified by their calls, none of which are listed under the EPBC and/or BC Acts. Two further microbat species were tentatively identified (**Appendix C**). The Southern Myotis was not among those positively (or tentatively) identified as being present on the subject land. **Result: Absent (Surveyed)**
Barking Owl (breeding)	1. The assessor must search the subject site for signs of breeding as follows; (a) presence of male and female **OR** (b) calling to each other (duetting) **OR** (c) find nest. 2. Where signs of breeding on site are present, potential nest trees should be identified. Potential nest trees are living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground. 3. Where potential nest trees are identified on site then, night monitoring at the identified potential nest locations for a minimum of 2 nights (4 or more nights should be conducted to	**DEWHA, 2010b, OEH 2022j**	**May-December**	Habitat tree watches, call playback, and spotlighting surveys were conducted over five nights: **24-26 September 2021** and **30 November-01 December 2021**.	1. (a-c). No birds and no signs of breeding were detected. However, as potential nest trees were identified, step 2 and 3 were still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected. However, potential nest trees with hollows >20 cm were recorded within the subject land. 3. Potential nest trees were observed for five nights, beginning 30 minutes prior to sunset and ending 60 minutes after sunset (**Figure 5-2**). Additionally, potential roost trees are searched for evidence of the target species, e.g. dropped feathers, scats, or nest material. Call playback and spotlighting was undertaken on five nights (**Figure 5-2**). The Barking Owl call was played intermittently for 5 minutes, followed by a 10 minute period of listening and spotlighting. The Barn Owl and Southern Boobook were both detected. The Barking Owl was not detected. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	reach at least 50% likelihood of detection) should be undertaken to detect the presence of any owl of this species using a potential nest tree or demonstrating behaviour focussed on a potential nest tree (e.g. investigating the hollow or roosting within 10 m). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).				
Squirrel Glider	No survey guidelines exist for this species. Francis et al. (2015) reported good success using camera traps to detect this species. Smith et al. (1989) reported good success using stag watching to detect arboreal mammals, though its efficacy for squirrel gliders has not been proven in peer reviewed literature.	**Smith et al. (1989), Francis et al. (2015)**	**January-December**	Habitat tree watching and spotlighting surveys were conducted over five nights: **24-26 September 2021** and **30 November-01**	1. Habitat tree watching and spotlighting surveys did not detect any gliders. 2. Camera traps were baited with a mixture of oats, peanut butter, and honey, and the tree was sprayed with honey water. Camera traps were deployed on four large trees within the subject land (**Figure 5-2**). No gliders were detected. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
				December 2021.Three camera traps were deployed between **24-27 September 2021** and one camera trap was deployed between **30 November – 02 December 2021**.	
Brush-tailed Phascogale	Lawton et al. (2021) reported good success using camera traps to detect this species. Smith et al. (1989) reported good success using stag watching to detect arboreal mammals, though its efficacy for phascogales has not been proven in peer reviewed literature.	**Smith et al. (1989), Lawton et al. (2021), OEH 2022k**	**December-June**	Habitat tree watching and spotlighting surveys were conducted over two nights: **30 November-01 December 2021**. One camera trap was	1. Habitat tree watching and spotlighting surveys did not detect any phascogales. 2. Juvenile phascogales disperse during December, increasing the likelihood of detection. Camera traps were baited with a mixture of oats, peanut butter, and honey, and the tree was sprayed with honey water. The trap was deployed on one large tree within the subject land (**Figure 5-2**). No phascogales were detected. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
				deployed between **30 November – 02 December 2021**.	
Koala (breeding)	1. The surveyor must determine if potential habitat exists on the subject land, (a) either through associated PCTs **OR** (b) the presence of known feed trees **OR** (c) the presence of recent historic records. 2. If suitable habitat is recorded on the subject land then the surveyor must utilize the following methodology: (a) using an appropriate handheld spotlight, (b) conduct spotlighting transects of all potential habitat for (c) at least two consecutive nights, (d) over a distance of at least 1km per night.	**Phillips & Callaghan, 2011, OEH 2022l**	**January-December**	Spotlighting surveys were conducted over five nights: **24-26 September 2021** and **30 November-01 December 2021**. Koala SAT conducted **25 September 2021**.	1. (a-c) The species is associated with PCT 237. One Koala food tree species – *Eucalyptus microcarpa* – was recorded on the subject land. No Koala records exist within 10 km of the subject land. The subject land was thus considered unlikely to be Koala habitat. 2. (a-d) Spotlighting transects were conducted using an appropriate head torch over three consecutive nights between the 24th and 26th of September, and two consecutive nights between the 30th of November and the 1st of December. In addition, 30 Koala food trees were assessed for the presence of scratches, scats, or other traces of the Koala (**Figure 5-2**), according to the Koala SAT technique (Phillips and Callaghan 2011). No Koalas, or signs of Koalas, were observed. **Result: Absent (Surveyed)**
Austral Pillwort	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support	**DPIE, 2020b**	**October - December**	Surveys were conducted **01 December 2021**	1. The target species is associated with PCT 237 2. (a) The targeted survey took place in December, within the survey window for this species. (b) November received more rainfall than average

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	the target species then a targeted survey must be conducted using the methodology detailed below such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked				(**Figure 3-1**), increasing the likelihood of detection for this species, (c) The entire subject land was searched. In particular, depressions with dried mud were carefully searched (**Figure 5-3**). 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for this growth form in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect the Austral Pillwort, nor any species which may be mistaken for it. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	transects should be recorded using a suitable GPS device.				
Superb Parrot (breeding)	1. The assessor must determine whether appropriate habitat is present as follows; (a) determine the presence of eucalypt woodland, (b) particularly where the following species are present; *Eucalyptus camaldulensis, E. melliodora, E. microcarpa*. (c) determine if hollow bearing trees are present on the subject land. 2. DPIE does not provide targeted survey methodology for threatened birds under the BC Act however as this species is also listed as vulnerable under the EPBC act, surveys were conducted as per DAWE guidelines (DEWHA, 2010b) which are as follows; Where potential habitat is present the surveyor must conduct at least 12 hours either (a) Area searches or (b) transect surveys of suitable habitat, (c) preferably in the early morning (sunrise to 10 am) and evening	**DEWHA, 2010b, OEH 2022m**	**September - November**	Habitat watches were conducted over three nights: (**24-26 September, 30**). Diurnal bird surveys were also conducted on the same days.	1. (a-b) Small areas of eucalypt woodland, containing hollow bearing *Eucalyptus macrocarpa*, occurs within the subject land. (c) Several potential nest trees were recorded both on and immediately adjacent to the subject land. 2. (a-d) In addition to the 4.5 hours spent habitat tree watching (**Figure 5-2**), 1.5 hours were spent doing targeted bird surveys at dawn within the subject land. Considering the small size of the site, this survey effort should be sufficient to establish presence or absence of breeding Superb Parrots. No Superb Parrots were observed within the subject land or nearby. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	(4 pm to sunset), to determine foraging habitat (d) and 12 hours of targeted habitat survey (habitat tree watching) to determine if individuals are accessing hollows on the subject land to determine if breeding habitat is present.				
Prasophyllum sp. Moama	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be	**DPIE, 2020b**	**September**	Surveys were conducted **26 September 2021**	1. The target species is associated with PCT 237 2. (a) The targeted survey took place in September, within the flowering period and short survey window for this species. (b) The survey was conducted in September, which coincides with the flowering period of this species, therefore increasing the likelihood of its detection (c) The entire subject land was searched (**Figure 5-3**). (a) Targeted surveys were undertaken using 10 m transects, as is recommended for this growth form in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect *Prasophyllum* sp. Moama, nor any species which may be mistaken for it. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Slender Darling Pea	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below given that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey	**DPIE, 2020b**	**September**	Surveys were conducted on **26 September 2021**	1. The target species is associated with PCT 237. 2. (a) The targeted survey took place in September, within the narrow survey window for this species. (b) Rainfall during the two months prior to the survey was somewhat below average; however, rainfall during the winter growth period for this species was above average and good cool-season rains are reported to trigger significant spring flowering (OEH, 2018). (c) The entire subject land was searched (**Figure 5-3**). 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for species of this growth form in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using a handheld GPS device (**Figure 5-3**). This survey did not detect the Slender Darling Pea, nor any species (for example, other *Swainsona* species) which may be mistaken for it. **Result: Absent (Surveyed)**
Silky Swainson-pea	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a	**DPIE, 2020b**	**September - November**	Surveys were conducted on **26 September 2021**	1. The target species is associated with PCT 237. 2. (a) The targeted survey took place in September, within the survey window for this species. (b) Rainfall during the two months prior to the survey was somewhat below average; however, rainfall during the winter growth period for this species was above

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	targeted survey must be conducted using the methodology detailed below given that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded				average and the subsequent minor rainfall deficit is unlikely to have prevented the species from being detected. (c) The entire subject land was searched. 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for forb species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using handheld GPS devices (**Figure 5-3**). 4. This survey did not detect the Silky Swainson-pea, nor any species (for example, other *Swainsona* species) which may be mistaken for the Silky Swainson-pea. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	using a suitable GPS device.				

Figure 5-2. Targeted fauna surveys: Bat logger, call playback, camera trap, Koala SAT and habitat tree watch locations. Trees both on and adjacent to the subject land were surveyed to assist in determining likelihood of occurrence.

Figure 5-3. Targeted flora surveys: Parallel flora transects conducted in September and December.

Table 5-4. BioNet species records from within 10 km of the subject land.

Scientific Name	Common Name	NSW Status	Comm. Status	No. records
Amphibromus fluitans	River Swamp Wallaby-grass	V	V	1
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		1
Burhinus grallarius	Bush Stone-curlew	E1,P		1
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		5
Chthonicola sagittata	Speckled Warbler	V,P		1
Crinia sloanei	Sloane's Froglet	V,P	E	2
Glossopsitta pusilla	Little Lorikeet	V,P		1
Lathamus discolor	Swift Parrot	E1,P,3	CE	1
Melanodryas cucullata cucullate	Hooded Robin (south-eastern form)	V,P		1
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		1
Ninox connivens	Barking Owl	V,P,3		1
Petaurus norfolcensis	Squirrel Glider	V,P		1
Polytelis swainsonii	Superb Parrot	V,P,3	V	1
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		2
***Prasophyllum* sp. Moama**	*Prasophyllum* sp. Moama	E4A,P,2		448
Pterostylis despectans	Lowly Greenhood	E4A,P,2	E	1
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		1
Sclerolaena napiformis	Turnip Copperburr	E1	E	586
Stagonopleura guttata	Diamond Firetail	V,P		1
Swainsona murrayana	Slender Darling Pea	V	V	5

5.3.2 Species credit species assumed present

Two Species Credit Species generated by the BAM-C – the Masked Owl (*Tyto novaehollandiae*) and Sloane's Froglet (*Crinia sloanei*) – were assumed present, as their indicated survey periods (May to August and July to August, respectively) fell outside of the window of opportunity for targeted surveys. Species polygons for these species are given in **Figure 5-4** and **Figure 5-5**. The remaining species were determined to be absent based on the results of targeted field surveys or due to habitat constraints (See **Section 5.3.1** and **Appendix D**). Credits generated by the Masked Owl and Sloane's Froglet are given in **Table 5-5** below.

Table 5-5. Species credit summary for species assumed present.

Common Name	Scientific Name	Species presence	Impacted area	Biodiversity risk weighting	Potential SAII	Species credits generated
Masked Owl	*Tyto novaehollandiae*	Assumed Present	0.31 ha (237_mod) 0.71 ha (237_poor)	2	False	10
Sloane's Froglet	*Crinia sloanei*	Assumed Present	0.46 ha (237_mod) 4.39 ha (237_poor)	1.5	True	8

Figure 5-4. Species polygon for the Masked Owl (*Tyto novaehollandiae*), incorporating all land within 100 m of trees bearing large (> 20 cm) hollows.

Figure 5-5. Species polygon for Sloane's Froglet (*Crinia sloanei*), incorporating all land within 500 m of wet areas

6 Impact Summary

6.1 Offset Scheme Threshold

The proposal will not impact on land mapped on the Biodiversity Values Map (**Appendix A**). The Proposal has been assessed against the relevant vegetation clearing thresholds under the NSW Biodiversity Offsets Scheme (BOS). The thresholds applicable to different lot size categories for the land zoning are provided in **Table 6-1** (NSW Office of Environment & Heritage, 2017). The subject land is currently zoned R1 General Residential, with a minimum lot size of 0.04 ha. Clearing of 0.25 ha or more of native vegetation will require entry into the BOS. The proposal will clear up to 4.85 ha of native vegetation; thus, entry into the BOS is required.

Table 6-1. Area clearing thresholds for entry into the Biodiversity Offsets Scheme.

LEP Minimum Lot Size	Threshold Area of Clearing
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

6.2 Avoidance, minimisation and mitigation

The following avoidance measures have been integrated into the design and/or are suggested for the implementation of the project:

- The proposed impact area has been reduced in the planning phase to minimise impact to native vegetation on the subject land. Several of the higher-quality wooded areas have been excluded from the impact footprint entirely. Specifically, a patch of grey box trees in the northwestern corner will be avoided (**Figure 1-4**).

In addition, the following minimisation methods have been or will be implemented:

- Impacts are primarily within areas of vegetation with the lowest vegetation integrity scores.
- Vegetation will be removed in a manner that avoids damage to surrounding vegetation, ensuring disturbance to vegetation and soil is kept to a minimum.

Table 6-2 outlines recommended environmental safeguards to reduce impacts on vegetation, soil and biodiversity.

Table 6-2. Recommended environmental safeguards.

Impact	Environmental Safeguard	Timing
Clearing and prevention of over-clearing	1. All personnel are to be inducted to be aware that disturbance of any stand of native vegetation outside the development footprint, or otherwise unauthorised disturbance, could have legislative consequences if done without approval. Evidence of all personnel receiving an induction would be kept on file (signed induction sheets).	Pre-disturbance

Impact	Environmental Safeguard	Timing
	2. Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation. Fencing or bunting installed to demarcate 'no go zones' where vegetation is to be retained.	Pre-disturbance
	3. A pre-clearing process and unexpected threatened species finds procedure is recommended. All personnel involved with the construction should be made aware of potential threatened flora and fauna present e.g., those in **Table 5-4**. In the event that threatened flora is discovered on site, works should cease in that location and a qualified ecologist should be consulted. Any fauna found during the disturbance are to be allowed (or assisted) to relocate into adjoining habitat. Any vegetation containing threatened fauna may not be removed until the fauna has dispersed.	Pre-disturbance / during construction
	4. A suitably qualified ecologist must be employed to conduct pre-clearance surveys at least 24 hours prior to any vegetation removal. The ecologist must identify and mark any potential habitat trees that may be impacted by the proposed vegetation removal works.	Pre-disturbance
	5. A suitably qualified ecologist must be present for the removal of all identified habitat trees to ensure any fauna can be relocated safely.	During disturbance
	6. Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation.	Pre-disturbance
	7. Where possible, vegetation to be removed will be mulched or placed on-site and re-used to stabilise disturbed areas.	During and after disturbance
Bushfire protection	8. Ensure vegetation management for bushfire protection is consistent, as far as practicable, with biodiversity protection and remove only the necessary vegetation to achieve fuel reduction.	Ongoing
Soil management	9. An erosion and sediment control plan will be addressed within an Environmental Management Plan	Pre-disturbance
Damage to native vegetation outside of impact zone	10. Stockpile and compound sites are to be located within the assessed subject land and preferentially according to the following criteria: o At least 40 m away from the nearest waterway. o In areas of low ecological conservation significance (i.e. previously disturbed land). o On relatively level ground.	During construction
	11. Stockpiling of materials and equipment, and parking of vehicles, is to be avoided within the dripline (extent of foliage cover) of any tree.	During construction
Introduction and spread of significant weeds and pathogens	12. Construction machinery (bulldozers, excavators, trucks, loaders and graders) would be clean, and soil- and weed-free, before entry to the work site.	Pre-disturbance
	13. Protocols must be in place to ensure that weeds are not spread throughout the site. In particular, the High Threat Exotic: Treasure Flower (*Gazania rigens)* is present on the subject land and must be managed.	Pre-disturbance, during disturbance, ongoing
	14. Weed-free fill only to be used for on-site earthwork, if required.	During disturbance, Ongoing
	15. Any herbicide use is to be in accordance with the requirements on the label. Any person carrying out herbicide application would be appropriately trained and competent in its use.	Ongoing

Impact	Environmental Safeguard	Timing
Disturbance to fallen timber, dead wood, bush rock and anthropogenic habitat	16. Bush rock encountered on site is to be relocated to the edge of the disturbance area to enhance habitat. Where possible, dead wood and hollow logs should be relocated to the edge of the disturbance area to enhance habitat.	Pre-disturbance and during disturbance
	17. A suitably qualified ecologist / fauna spotter catcher must be present for the removal of all identified potential fauna habitat to ensure any fauna can be relocated safely.	During disturbance
	18. If fauna is detected, stop work immediately and either leave the area undisturbed until the individuals have dispersed or engage suitably qualified personnel to facilitate their removal.	During disturbance
Threatened species	19. A suitably qualified ecologist / fauna spotter catcher must search habitat and animal breeding places for fauna prior to clearing to relocate animals or mark habitat as “do not disturb”. A suitably qualified ecologist / fauna spotter catcher must also be present during clearing to inspect tree hollows following felling.	Pre-disturbance
	20. No new areas to be cleared without further assessment, as threatened flora species may occur in any unassessed impact area.	Ongoing
	21. If the impact footprint changes from the current extent assessed in the study, re-assessment of the potential impact of the activity would be needed to ensure impacts to threatened species are not inadvertently caused, given that suitable habitat for threatened species occurs elsewhere on the property.	Ongoing

6.3 Impacts to Wetlands, Watercourses and Aquatic habitat

There are no wetlands on the subject land; however, the floodplain wetlands associated with the Murray River extend into the study area. Any potential for indirect impacts to these wetlands, or to the Murray River itself, from erosion and sedimentation related to construction activities, will be avoided and minimised by developing and implementing an erosion and sediment control plan.

6.4 Impacts to Native Vegetation

There is one PCT (237) within the subject land, with up to 4.85 ha of native vegetation to be removed. One vegetation zone (237_Mod) was found to meet the condition criteria to be considered an EEC under the BC Act. As such, 0.46 ha of the BC Act-listed EEC will be impacted by the current proposal. No zones fitted the criteria to be an EEC under the EPBC Act, as such, no EPBC Act-listed ecological community will be impacted by the current proposal.

The entire subject land was searched for threatened flora in September, November, and December of 2021 (**Section 5.3.1**) and no threatened flora species were recorded. As such no impacts to threatened flora are anticipated.

6.5 Serious and Irreversible Impacts

The Guidance to assist a decision-maker to determine a serious and irreversible impact (NSW Office of Environment and Heritage, 2017) and the NSW threatened species data collection has been used to determine which threatened entities require further assessment for Serious and

Irreversible Impacts (SAII). No species or ecological communities present on the subject land, or assumed present, are SAII entities. As such, no further consideration is given to this matter.

6.6 Cumulative Impacts

The potential impacts of this proposal must be regarded as a contribution to the wider loss of biodiversity in the local area and across NSW. The incremental effects of multiple impacts – past, present, and future – are referred to as cumulative impacts. This BDAR provides an opportunity to consider the impacts associated with this proposal within a wider context.

Land adjacent to the proposed Blessed Carlo College has been earmarked for development under a separate Development Application (DA). This separate proposal concerns a 266-lot residential subdivision ("Arthurs Estate"), which will occupy Lots 131-132 DP 751152, Lots 74-75 DP 751159, and Lot 1301 DP 1186616. The DA for this proposal also extends to Lot 76 DP 751159, which contains the proposed Blessed Carlo College assessed in this BDAR; the remaining lots border the proposed college. The DA for the Arthurs Estate proposal has been submitted and determined. Conditions of consent for this proposal have been issued and state the following:

- "There must be no clearing of any vegetation (including within Council's road reserve)."

However, this does not consider all impacts to nearby vegetation likely to result from increasing urbanisation. Edge effects, including the proliferation of weeds and alterations to drainage patterns, are common impacts of development. There is the potential, therefore, for the Arthurs Estate proposal to cause adverse impacts to the same vegetation communities identified in this BDAR. The likely severity of these impacts is difficult to quantify. Future impacts associated with required infrastructure (roads, pipelines, power connections and similar) are likewise difficult to quantify.

The Major Projects Portal does not identify any additional proposals within the Murray River Council area; however, minor infrastructure works and the ongoing impacts of urbanisation are likely to result in an overall decline in biodiversity values in the local area. Considered on its own, the present proposal is unlikely to result in significant adverse impacts to biodiversity at either local or state level. Taken cumulatively, however, the impacts of this and other local development activities represent contributions to the ongoing decline in biodiversity values across the state.

6.7 Prescribed impacts

The *Biodiversity Conservation Regulation 2017* lists eleven impacts as prescribed impacts that must be avoided, minimised and mitigated. These prescribed impacts and their relevance to the Proposal are described in **Table 6-3.**

Table 6-3. Prescribed impacts of the proposal.

Prescribed Impacts	Site Assessment	Mitigation Measure
Impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices,	No karsts, caves, crevices, cliffs or other features of geological significance present on the subject land or within the study area.	None required.

cliffs and other features of geological significance.		
Impacts of development on the habitat of threatened species or ecological communities associated with rocks.	No areas of loose surface rock or outcropping rock occur within the development footprint.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with human made structures.	No human-made structures occur within the development footprint.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	Non-native vegetation on the subject land, may still provide habitat for species or ecosystem credit species, and mitigations associated with fauna interactions still apply.	**Table 6.2.**
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The proposal will largely impact land that has already undergone extensive clearing. The loss of vegetation within the road corridor may slightly reduce connectivity between larger patches in the local landscape, however, connectivity is already poor (see **Section 3.12**).	**Table 6-2.**
Impacts of the development on movement of threatened species that maintains their life cycle.	Due to the limited connectivity and few habitat features offered by the site, no significant impacts to the movement of any threatened species are expected as a result of this proposal.	**Table 6-2.**
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.	No waterways are mapped as occurring within the subject land. No threatened species or ecological were identified in association with the farm dams that occur within the subject land. No impacts to watercourses outside of the subject site are anticipated. Sediment runoff (caused by ground disturbance/vegetation removal by the proposal) may flow into the Murray River and cause indirect impacts. However, as the river is a minimum of 1.3 km from the subject land, and assuming standard mitigation measures are implemented, the likelihood of this occurring is low.	**Table 6-2.**
Impacts of wind turbine strikes on protected animals.	None associated with the proposal.	None required**.**
Impact of vehicle strikes on threatened species of animals or on animals that are part of a TEC.	An increase in overall traffic movement is anticipated due to the construction and ongoing operation of the proposal. Maintaining suitably low speed limits on site will help to mitigate impacts that arise from this increase.	**Table 6-2.**

6.8 Indirect impacts

Potential indirect impacts associated with the proposal are explored further in **Table 6-4**. The main impacts of the proposal are expected to be contained within the subject land, provided there is adequate demarcation between operational and non-operational areas. Disturbance from machinery and operational activities will occur, such as noise and dust. However, these impacts will be minimised by following the environmental safeguards proposed in **Table 6-2**.

Table 6-4. Potential indirect impacts of the proposal

Nature of impact	Timing	Frequency	PCTs, threatened species and/or TECs impacted	Consequence of impact on biodiversity
Inadvertent impacts on adjacent habitat or vegetation	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land • Threatened species assumed present	Increased edge effects, loss of foraging habitat, potential mortality to neighbouring fauna
Reduced viability of adjacent habitat due to edge effects	Construction and Operation phase	Constant	• Native vegetation surrounding the subject land • Threatened species assumed present	Degradation of native vegetation and habitat for threatened flora and fauna.
Reduce viability of adjacent habitat due to noise, dust or light spill	Construction and Operation phase	Common	• Threatened species assumed present	Minor foraging and breeding habitat for fauna may be altered or removed.
Transport of weeds and pathogens from the site to adjacent vegetation	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land	Degradation of native vegetation.
Increased risk of starvation or exposure, and loss of shade or shelter	Construction and Operation phase	Rare	• Threatened species assumed present	Minor loss of foraging and refuging habitat
Loss of breeding habitat	Construction and Operation phase	Possible	• Threatened species assumed present	Minor loss of potential breeding habitat
Trampling of threatened flora species	Construction and Operation phase	Rare	• No threatened flora species were detected or assumed present, so no impacts are likely.	Possible minor loss of threatened flora
Rubbish dumping	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land • Threatened species assumed present	Degradation of native vegetation and habitat for threatened species

6.9 Key threatening processes

Some Key Threatening Processes (KTPs) at the NSW State and Federal level will be exacerbated by the proposal. A summary of those KTPs that may be exacerbated by the current proposal is given in **Table 6-5**. **Appendix F** lists all KTP and includes explanations as to why many have been assessed as not being present in the study area or exacerbated by the proposal.

Threats exacerbated by poor biosecurity controls will potentially be exacerbated by the proposal. However, implementing the measures for preventing the introduction and spread of pathogens and weeds described in **Table 6-2**, this potential is reduced.

Table 6-5. Key threatening processes likely to be exacerbated by the proposal.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by proposal?
Anthropogenic Climate Change	KTP	KTP	**Likely**	**YES** Some unavoidable emissions will occur from machinery and operation.
Clearing of native vegetation	KTP	KTP	**Very likely**	**YES** Up to 4.85 ha of native vegetation will be impacted by the proposal
Competition from feral honey bees, *Apis mellifera* L.	KTP		**Likely**	**YES** Some tree hollows will be removed and the loss of hollows increases competition between hollow-reliant native fauna and feral honey bees.
Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks, though Moama is likely too cold for Red Imported Fire Ants to establish
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	**Unlikely**	**POSSIBLY** Some tree hollows will be removed, the loss of hollows increases crowded in tree hollows and may exacerbate this threat.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks though no water bodies will be impacted and the disease is likely already in the study area.
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks though Moama is close to the climatic limit that this pathogen is modelled to be able to survive at.
Invasion and establishment of exotic vines and scramblers	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.

Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion of native plant communities by exotic perennial grasses	KTP		**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion, establishment and spread of *Lantana* (*Lantana camara* L. sens. Lat)	KTP		**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Landscaping can exacerbate this risk
Loss of Hollow-bearing Trees	KTP		**Very likely**	**YES** Several hollow bearing trees will be removed as a result of this proposal
Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)	KTP	KTP	**Likely**	**POSSIBLY** Loss of vegetation exposes native fauna to predation by feral pests.
Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	**Likely**	**POSSIBLY** Loss of vegetation exposes native fauna to predation by feral pests.
Removal of dead wood and dead trees	KTP		**Likely**	**YES** A small amount of dead wood exists on the subject land and will be removed. It is recommended that this be relocated to nearby habitat.

6.10 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government DoEE.

The EPBC Act protected matters search has identified seven Wetlands of International Importance, five TECs, 34 threatened species, 12 listed migratory species and 19 listed

marine species with the potential to occur in the 10 km search area (**Appendix A**). Of these, eight threatened species possibly occur, based on habitat available on the subject land (**Appendix E**). Of these eight, four were targeted during targeted survey and not detected. Nonetheless, as precautionary measure, an assessment of impact significance has been undertaken for these threatened species following EPBC guidelines, as detailed in **Appendix E**.

A summary of these matters and whether the proposal is likely to impact them is provided in **Table 6-6**. It is concluded that no MNES will be significantly impacted by the proposal.

Table 6-6. Impacts to Matters of National Environmental Significance.

Factor	Potential impact
Any impact on a World Heritage property?	NIL
Any impact on a National Heritage place?	NIL
Any impact on a wetland of international importance?	NIL
Any impact on a listed threatened species or communities?	Non-significant impact (**Appendix E**).
Any impacts on listed migratory species?	NIL
Any impact on a Commonwealth marine area?	NIL
Does the proposal involve a nuclear action (including uranium mining)?	NIL
Additionally, any impact (direct or indirect) on Commonwealth land?	NIL Commonwealth Land is mapped within 10 km but not within the study area or subject land.
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	NIL

7 Biodiversity Credit and Offset Report

7.1 Management Zones

The BAM considers future vegetation condition of different areas of the development footprint when calculating biodiversity credits and offsets. It has been assumed that all vegetation within the subject land will be managed the same, i.e., cleared (besides the exclusion zones). Therefore, offset requirements have been assessed assuming only one management zone. As indicated in **Section 6.2**, certain areas possessing remnant woody vegetation (part of zone 237_mod) will be excluded from the direct impacts of the proposal.

7.2 Vegetation Integrity Assessment

Vegetation integrity (VI) scores have been calculated for each vegetation zone based on patch size, area to be impacted, vegetation composition, structure and function, as defined below.

Patch size – Area in hectares of total vegetation zone patch (i.e. the connected woody and non-woody vegetation).

Area – Area within the property that will be subject to clearing, modification or other treatment by the Proposal. There is only one management zone as described above.

Composition – Score calculated based on species richness, i.e. the number of native species present.

Structure – Score calculated based on the cover (%) of each native species growth form.

Function – Score calculated based on habitat features, i.e. presence of tree sizes, hollow trees, coarse woody debris, litter cover (%) and high threat weed cover (%).

Benchmark data for the PCTs is also used in this calculation.

Data required for the calculation was collected in the field using the BAM, as described above. The VI assessment for each vegetation zone including the loss of VI due to the Proposal, averaged across the construction and any APZ areas, is shown in **Table 7-1**.

Table 7-1. Vegetation Integrity (VI) assessment.

Vegetation Zone	PCT	Area of Zone to be Impacted (ha)	Assessed VI Score	Management Zone	Future VI Score	Change in VI Score
237_Mod	237	0.46	45.3	Development footprint	0	-45.3
237_Poor	237	4.39	8.8	Development footprint	0	-8.8

7.3 Ecosystem Credit Summary

Based on the VI score and area of PCT impacted, 10 Ecosystem Credits are required to be offset for the proposal. The ecosystem credits required for the proposal are summarised in **Table 7-2**. The full biodiversity credit summary report is provided in **Appendix G**.

Table 7-2. Ecosystem credits requiring offsetting (copied from BAM-C).

Vegetation zone name	TEC name	Current vegetation integrity score	Change in Vegetation integrity (loss/ gain)	Area (ha)	BC Act listing status	EPBC Act listing status	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
237_Mod	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	45.3	-45.3	0.46	EEC	Does not fit the EPBC Act-listing	High Sensitivity to Potential Gain	2.0	False	10
237_Poor	Not a TEC	8.8	-8.8	4.39			High Sensitivity to Potential Gain	2.0	False	0

7.4 Species Credit Summary

In total, two species credit species were assumed to be present, generating an obligation to retire 32 species credits. The species credits required for the proposal are summarised in **Table 7-3**. The full biodiversity credit summary report is provided in **Appendix G.**

Table 7-3. Species credit summary.

Common Name	Scientific Name	Species presence	Impacted area	Biodiversity risk weighting	Potential SAII	Species credits generated
Masked Owl	*Tyto novaehollandiae*	Assumed Present	1.0 ha	2	False	10
Sloane's Froglet	*Crinia sloanei*	Assumed Present	4.9 ha	1.5	False	22

7.5 Offset Requirement

Offsetting is required for the 10 Ecosystem Credits and 32 Species Credits listed above.

The proponent intends to purchase and retire the necessary number of credits on the open market or, if not available, offset credits through a direct payment into the Biodiversity Conservation Fund.

8 Summary and conclusions

The Wilcannia-Forbes Diocese (the proponent) proposes to develop a new Catholic School in Moama, New South Wales, to be known as Blessed Carlo College (the proposal). OzArk Environment & Heritage (OzArk) was engaged by Clarke Hopkins Clarke (the client), on behalf of the proponent, to prepare the biodiversity assessment for the proposal. The proposal will clear up to 4.85 ha of native vegetation on Lot 76 DP751159, on the outskirts of Moama. The native vegetation clearing threshold for the relevant lot is 0.25 ha; as such, the proposal will trigger entry into the Biodiversity Offsets Scheme (BOS) and a Biodiversity Development Application Report (BDAR) is required.

The proposal will also require the removal of vegetation from adjacent road corridors for the purposes of site access, with the most pronounced impacts being to the Lignum Road corridor. Minor impacts to the corridor on Kiely Road are also anticipated. These impacts are included in the figure of 4.85 ha. The proponent has resolved to retain higher-quality vegetation where possible by implementing exclusion zones.

The native vegetation present on the subject land consists of one Plant Community Type (PCT), in two condition states (zones: poor and moderate):

- PCT 237 - Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone

PCT 237 is associated with the following TECs:

- *Biodiversity Conservation Act 2016* (BC Act)-listed Endangered Ecological Community (EEC): Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)-listed EEC: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

The higher quality zone (237_Mod) met the relevant thresholds to be considered the EEC under the BC Act, but the lower quality zone (237_Poor) did not. Neither zone met the criteria to be considered a component of the EPBC Act community. Therefore, up to up to 0.46 ha of the BC Act-listed EEC will be removed by the current proposal.

In total, 24 ecosystem credit species were generated by the Biodiversity Assessment Method Calculator (BAM-C). The habitat suitability of the subject land for these species was assessed. Two species were removed from the list due to habitat constraints; therefore, 22 ecosystem credit species are assumed present, generating a total of 10 Ecosystem Species Credits. In addition, 21 species credit species were generated by the BAM-C. After consideration of habitat constraints, two species, the Swift Parrot and the White-bellied Sea Eagle, could be discounted, while 19 species credit species still had the potential to occur. Surveys were conducted for 17 of the 19 species. None of the targeted species were detected, as such, they are considered absent from the subject land. Two further species, the Masked Owl (*Tyto novaehollandiae*) and Sloane's Froglet (*Crinia sloanei*), were assumed present as it was not the appropriate time of year to survey for them. Species credits for the Masked Owl and the Sloane's Froglet will be required to be offset, totalling 32 Species Credits.

The proponent intends to satisfy their Ecosystem and Species credit obligations by buying and retiring the necessary Ecosystem Credits from the open market or, if not available, paying directly into the Biodiversity Conservation Fund.

The significance of the proposed impact to EPBC Act-listed threatened, migratory, wetland and marine species, populations and communities predicted to occur within a 10 km search area was assessed. No significant impact to any threatened entity likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated and offset using the management actions recommended and the offset requirements detailed within this BDAR. Therefore, a referral of the proposal to the Federal Department of Agriculture, Water and the Environment for these matters is not required.

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment.

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Appendix A: Database search results

BC Act Biodiversity Values Map

NSW GOVERNMENT

Biodiversity Offset Scheme (BOS) Entry Threshold Map

321.1 0 160.55 321.1 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

NSW GOVERNMENT

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	06/01/2022 2:28 PM		**BDAR Required***
Total Digitised Area	4.89	ha	
Minimum Lot Size Method	LEP		
Minimum Lot Size	0.04	ha	
Area Clearing Threshold	0.25	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

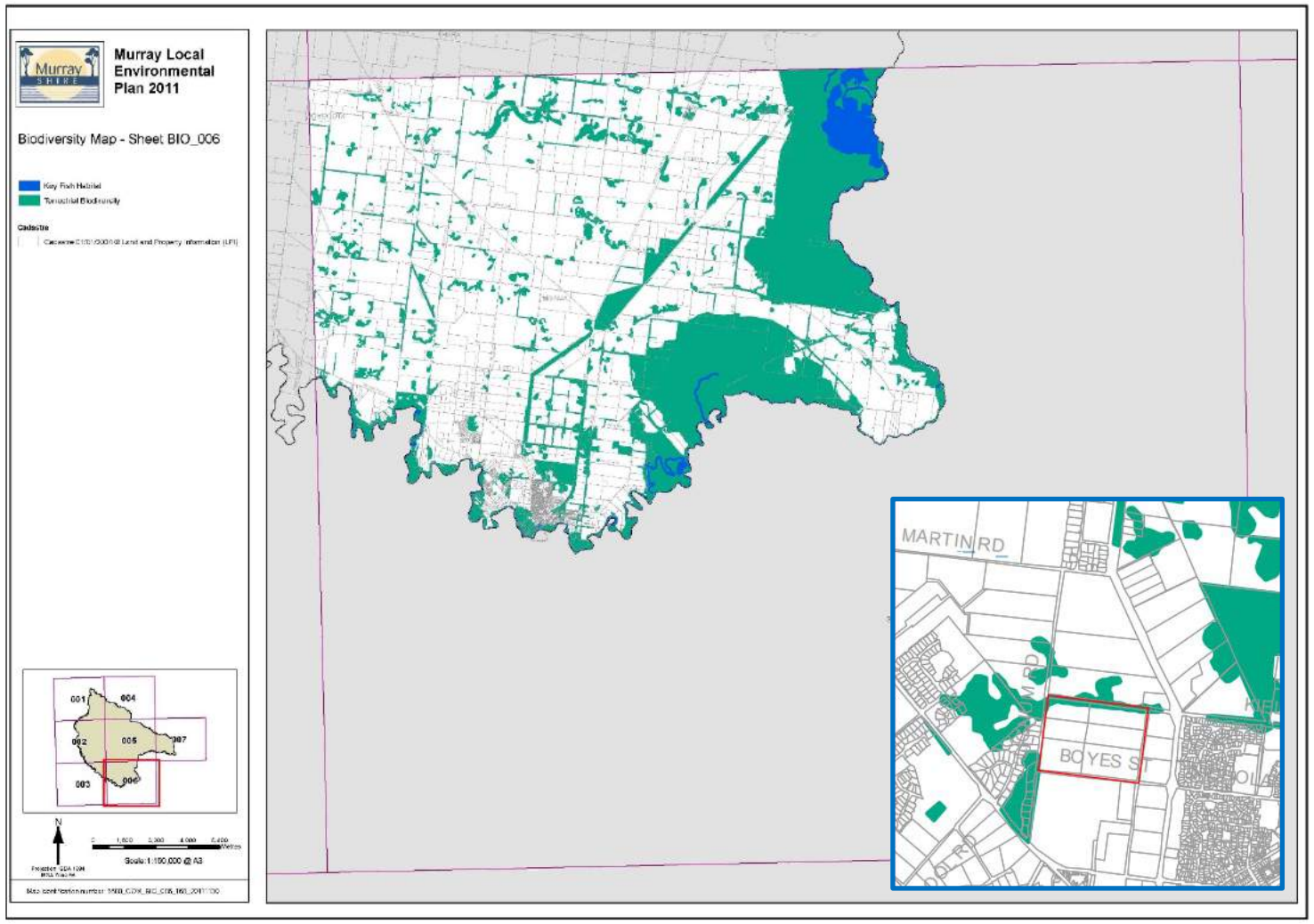
Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

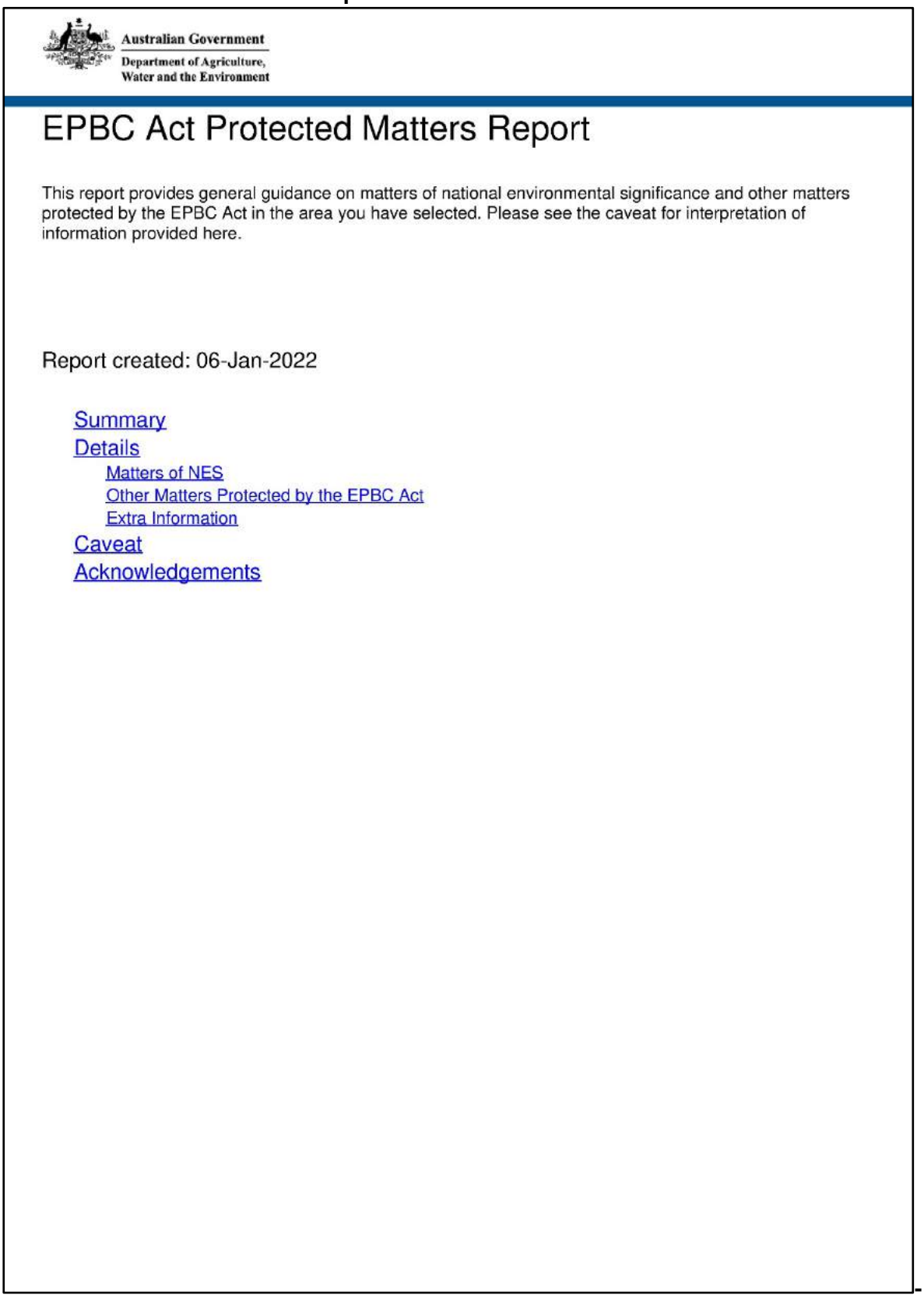
Signature_____ Date: 06/01/2022 02:28 PM

Murray Local Environmental Plan 2011. Terrestrial Biodiversity Values.

Magnified inset: Red polygon shows the location of the subject land.



EPBC Act Protected Matters Report



Australian Government
Department of Agriculture, Water and the Environment

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: 06-Jan-2022

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:	1
Wetlands of International Importance (Ramsar	7
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	34
Listed Migratory Species:	12

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

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

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

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	19
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:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	7
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Echuca Wharf	VIC	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	400 - 500km upstream from Ramsar site	In feature area
Barmah forest	Within 10km of Ramsar site	In buffer area only
Gunbower forest	10 - 20km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	200 - 300km upstream from Ramsar site	In feature area
Nsw central murray state forests	Within 10km of Ramsar site	In feature area
Riverland	400 - 500km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream from Ramsar site	In feature area

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
Buloke Woodlands of the Riverina and Murray-Darling Depression 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

Community Name	Threatened Category	Presence Text	Buffer Status
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community may 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

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			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may 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 likely 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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In buffer area only
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
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Craterocephalus fluviatilis Murray Hardyhead [56791]	Endangered	Species or species habitat may occur within area	In feature area
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat known to occur within area	In buffer area only
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 feature area
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
INSECT			
Synemon plana			
Golden Sun Moth [25234]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may 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]	Vulnerable	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 may occur within area	In feature area
PLANT			
Amphibromus fluitans			
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area	In feature area
Brachyscome muelleroides			
Mueller Daisy [15572]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides			
Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area	In feature area
Maireana cheelii			
Chariot Wheels [8008]	Vulnerable	Species or species habitat may occur within area	In feature area
Myriophyllum porcatum			
Ridged Water-milfoil [19919]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pimelea spinescens subsp. spinescens			
Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis despectans Lowly Greenhood [6272]	Endangered	Species or species habitat may occur within area	In buffer area only
Sclerolaena napiformis Turnip Copperburr [11742]	Endangered	Species or species habitat known to 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 buffer area only
Swainsona plagiotropis Red Darling-pea, Red Swainson-pea [10804]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	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 likely to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In buffer area only

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 Telecommunications Corporation [14994]	NSW	In buffer area only
Defence		
Defence - BOBDUBI BARRACKS - ECHUCA [20166]	VIC	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
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 likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		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 overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only
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
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		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
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Echuca West B.R.	Natural Features Reserve	VIC	In buffer area only
Goulburn River	Heritage River	VIC	In buffer area only
Murray Valley	Regional Park	NSW	In buffer area only
River Murray Reserve	Natural Features Reserve	VIC	In buffer area only
River Murray Reserve (non-PV)	Natural Features Reserve	VIC	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Lower Goulburn River Floodplain	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construction of a second Murray River crossing Echuca-Moama, Vic	2013/6850	Controlled Action	Post-Approval	In buffer area only
The Modified Operation of the Goulburn Murray Irrigation District	2009/5123	Controlled Action	Post-Approval	In feature area
Not controlled action				
arrowhead weed infestations control	2004/1875	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
The refurbishment of Echuca Wharf to its original 19th century design	2007/3924	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	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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BioNET Atlas search – threatened species predicted to occur within the Murray Fans subregion of the Riverina Bioregion

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable.
'Records: Number of records, P = predicted to occur.
^^ = Category 2 sensitive species.

Class	Scientific Name	Common Name	*NSW status	+Comm. status	'Records
Amphibia	*Crinia sloanei*	Sloane's Froglet	V,P	E	22
Amphibia	*Litoria raniformis*	Southern Bell Frog	E1,P	V	24
Aves	*Anseranas semipalmata*	Magpie Goose	V,P		5
Aves	*Oxyura australis*	Blue-billed Duck	V,P		12
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		23
Aves	*Apus pacificus*	Fork-tailed Swift	P	C,J,K	2
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	1
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	82
Aves	*Circus assimilis*	Spotted Harrier	V,P		12
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		74
Aves	*Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		P
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		30
Aves	*Lophoictinia isura*	Square-tailed Kite	V,P,3		3
Aves	^^*Falco hypoleucos*	Grey Falcon	E1,P,2		1
Aves	*Falco subniger*	Black Falcon	V,P		26
Aves	*Grus rubicunda*	Brolga	V,P		28
Aves	*Ardeotis australis*	Australian Bustard	E1,P		3
Aves	*Burhinus grallarius*	Bush Stone-curlew	E1,P		48
Aves	*Pluvialis fulva*	Pacific Golden Plover	P	C,J,K	3
Aves	*Pluvialis squatarola*	Grey Plover	P	C,J,K	2
Aves	*Pedionomus torquatus*	Plains-wanderer	E1,P	CE	57
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	5
Aves	*Actitis hypoleucos*	Common Sandpiper	P	C,J,K	3
Aves	*Arenaria interpres*	Ruddy Turnstone	P	C,J,K	3
Aves	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	24

Class	Scientific Name	Common Name	*NSW status	+Comm. status	‘Records
Aves	*Calidris canutus*	Red Knot	P	E,C,J,K	1
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	5
Aves	*Calidris melanotos*	Pectoral Sandpiper	P	J,K	12
Aves	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	5
Aves	*Calidris subminuta*	Long-toed Stint	P	C,J,K	3
Aves	*Calidris tenuirostris*	Great Knot	V,P	CE,C,J,K	2
Aves	*Gallinago hardwickii*	Latham's Snipe	P	J,K	6
Aves	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	1
Aves	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	5
Aves	*Numenius phaeopus*	Whimbrel	P	C,J,K	1
Aves	*Philomachus pugnax*	Ruff	P	C,J,K	7
Aves	*Tringa glareola*	Wood Sandpiper	P	C,J,K	3
Aves	*Tringa nebularia*	Common Greenshank	P	C,J,K	8
Aves	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	11
Aves	*Chlidonias leucopterus*	White-winged Black Tern	P	C,J,K	2
Aves	*Gelochelidon nilotica*	Gull-billed Tern	P	C	7
Aves	*Hydroprogne caspia*	Caspian Tern	P	J	12
Aves	^^*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		14
Aves	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	V,P,3		3
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		1
Aves	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	14
Aves	*Neophema pulchella*	Turquoise Parrot	V,P,3		2
Aves	*Polytelis anthopeplus monarchoides*	Regent Parrot (eastern subspecies)	E1,P,3	V	25
Aves	*Polytelis swainsonii*	Superb Parrot	V,P,3	V	611
Aves	*Ninox connivens*	Barking Owl	V,P,3		19
Aves	*Ninox strenua*	Powerful Owl	V,P,3		3
Aves	*Tyto novaehollandiae*	Masked Owl	V,P,3		2
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		972
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		10
Aves	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	12

Class	Scientific Name	Common Name	*NSW status	+Comm. status	‘Records
Aves	*Certhionyx variegatus*	Pied Honeyeater	V,P		1
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		20
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	6
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern	V,P		38
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		498
Aves	*Cinclosoma castanotum*	Chestnut Quail-thrush	V,P		1
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		113
Aves	*Pachycephala inornata*	Gilbert's Whistler	V,P		41
Aves	*Pachycephala olivacea*	Olive Whistler	V,P		1
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		212
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		65
Aves	*Petroica boodang*	Scarlet Robin	V,P		206
Aves	*Petroica phoenicea*	Flame Robin	V,P		3586
Aves	*Cecropis daurica*	Red-rumped Swallow	P	C,J,K	1
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		68
Mammalia	*Antechinomys laniger*	Kultarr	E1,P		1
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	2
Mammalia	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		2
Mammalia	*Phascolarctos cinereus*	Koala	V,P	V	79
Mammalia	*Lasiorhinus krefftii*	Northern Hairy-nosed Wombat	E4,P	E	1
Mammalia	*Petaurus norfolcensis*	Squirrel Glider	V,P		51
Mammalia	*Petrogale penicillata*	Brush-tailed Rock-wallaby	E1,P	V	1
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		100
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		2
Mammalia	*Myotis macropus*	Southern Myotis	V,P		9
Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	1
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		1
Mammalia	*Conilurus albipes*	White-footed Tree-rat	E4,P	X	1
Flora	*Brachyscome muelleroides*	Claypan Daisy	V	V	P

Class	Scientific Name	Common Name	*NSW status	+Comm. status	‘Records
Flora	*Lepidium monoplocoides*	Winged Peppercress	E1	E	1
Flora	*Lepidium pseudopapillosum*	Formbe Peppercress	E1	V	P
Flora	*Maireana cheelii*	Chariot Wheels	V	V	9
Flora	*Sclerolaena napiformis*	Turnip Copperburr	E1	E	1044
Flora	*Wilsonia rotundifolia*	Round-leafed Wilsonia	E1		2
Flora	*Eriocaulon australasicum*	Austral Pipewort	E1	E	P
Flora	*Cullen parvum*	Small Scurf-pea	E1		3
Flora	*Swainsona murrayana*	Slender Darling Pea	V	V	14
Flora	*Swainsona plagiotropis*	Red Darling Pea	V	V	P
Flora	*Swainsona sericea*	Silky Swainson-pea	V		2
Flora	*Pilularia novae-hollandiae*	Austral Pillwort	E1,3		2
Flora	*Eucalyptus leucoxylon subsp. pruinosa*	Yellow Gum	V		18
Flora	^^*Prasophyllum sp. Moama*		E4A,P,2		555
Flora	^^*Pterostylis despectans*		E4A,P,2	E	1
Flora	*Amphibromus fluitans*	River Swamp Wallaby-grass	V	V	779
Flora	*Austrostipa metatoris*	A spear-grass	V	V	21
Flora	*Austrostipa wakoolica*	A spear-grass	E1	E	37

BioNET Atlas search – threatened ecological communities predicted to occur within the within the Murray Fans subregion of the Riverina Bioregion

*NSW Status: E3=Endangered Ecological Community, E4B= Critically Endangered Ecological Community

+Comm. Status: CE=Critically Endangered, E=Endangered.

‘Records: K = known.

Common Name	*NSW status	+Comm. status	‘Records
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	E3		K
Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	E3	E	K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3	E	K
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3	E	K
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	E3		K
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	E4B	CE	K

BioNET Atlas search – key threatening processes (KTPs) predicted to occur within the within the Murray Fans subregion of the Riverina Bioregion

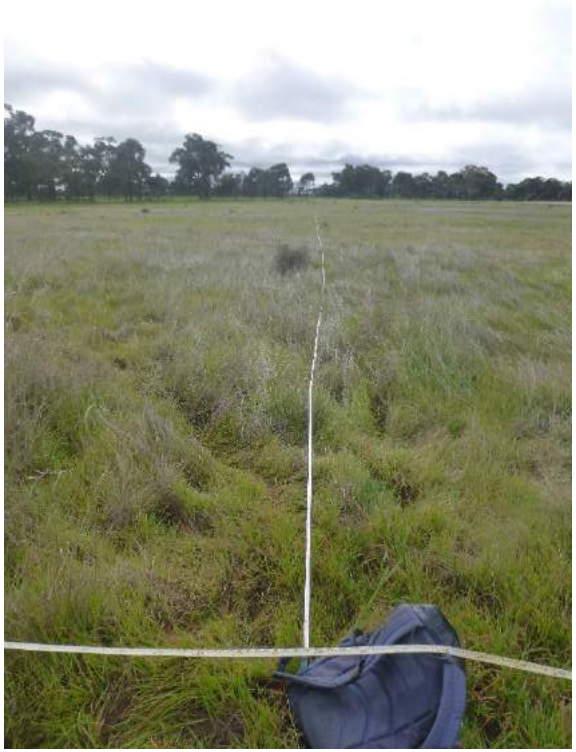
Common Name	NSW status	Comm status	Records
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	P
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		P
Anthropogenic Climate Change	KTP	KTP	P
Bushrock removal	KTP		P
Clearing of native vegetation	KTP	KTP	P
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	KTP	KTP	P
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	KTP	KTP	P
Competition from feral honey bees, *Apis mellifera* L.	KTP		P
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		P
Herbivory and environmental degradation caused by feral deer	KTP		P
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		P
Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	P
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	P
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	P
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	P
Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.)	KTP		P
Invasion and establishment of exotic vines and scramblers	KTP		P
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		P
Invasion and establishment of the Cane Toad (Bufo marinus)	KTP	KTP	P
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		P
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		P
Invasion of native plant communities by exotic perennial grasses	KTP		P
Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW	KTP		P
Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat)	KTP		P
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	P
Loss of Hollow-bearing Trees	KTP		P
Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		P
Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		P
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		P
Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)	KTP	KTP	P

Common Name	NSW status	Comm status	Records
Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	P
Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758	KTP	KTP	P
Removal of dead wood and dead trees	KTP		P

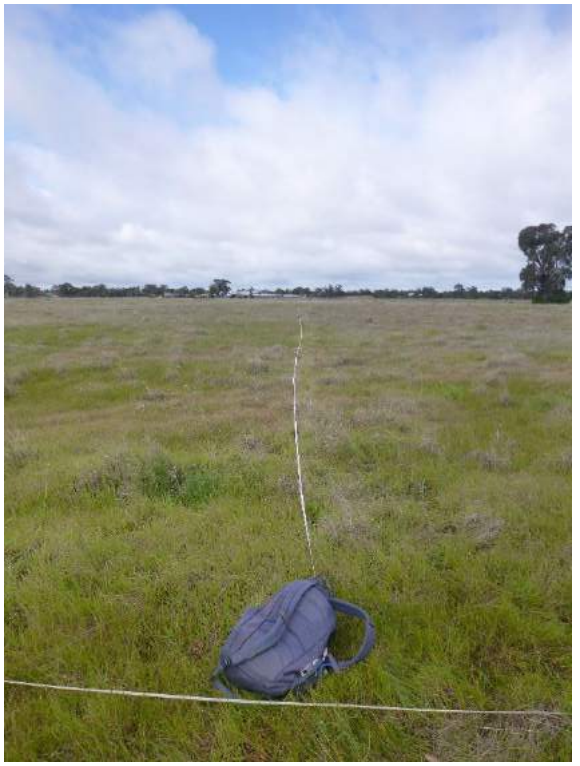
Appendix B: Vegetation plot locations

Plot Name	PCT	Condition	Easting (Zone 55)	Northing (Zone 55)	Photographs	
BC01	237	Moderate	296802	6003262		

BC02	237	Poor	296818	6003167		

BC03	237	Poor	296937	6003148		

BC04	237	Poor	297062	6003211		

BC05	237	Moderate	296912	6003217		

BC06	237	Poor	296823	6003233		

Appendix C: Field survey results

BAM Data Sheets

BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo		
Recorders	M. Walsh		**Plot ID #** BC01	**Zone ID**	237_Mod
Photo #	-		**Plot dimensions**		20 × 50
Datum	GDA94	**Zone** 55	**Plot bearing along midline**		320
Easting	296802	**Northing** 6003262	Record magnetic bearing along midline from 0 m point		

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237

Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	1
	Shrubs	5
	Grasses etc	2
	Forbs	0
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	40
	Shrubs	51
	Grasses etc	11
	Forbs	0
	Ferns	0
	Other	0
High threat weed cover		60

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)	
>80	1
50 - 79	-
30 - 49	+
20 - 29	+
10 - 19	+
5 - 9	-
< 5	+

Notes on function attributes:

- Stem size class records # large trees (cf. benchmark)
- Record stems for living trees only, and for all species
- For multistemmed trees, record only the largest stem
- Presence of <5cm stems records regeneration
- Record # trees with hollows, not number of hollows
- Count as one stem where tree is multistemmed
- Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	5	Total #
2	>20cm**	0	5

Length of logs	Total (m)
	3

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	10	5	5	15	10	9
	Bare ground	5	5	-	2	5	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	Plain
Clearing (incl. logging)	2	0	Microrelief	-
Cultivation	-	-	Slope	-
Grazing (native / stock)	1	R	Aspect	-
Soil erosion	-	-	Soil surface texture	Sandy loam - some clay
Firewood removal	-	-	Soil colour	Brown
Fire (ground stratum, mid, canopy burnt?)	-	-	Site drainage	-
Storm damage	-	-	Distance to nearest water	-
Weediness	3	R	Distance to nearest rock outcrop /cave	-

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

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BAM Plot - Field Survey Sheet

Date	4/08/2021	Survey Name	Blessed Carlo			
Recorders	M. Walsh		Plot ID #	BC01	Zone ID	237_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus microcarpa		40	12	N	
SG	Sclerolaena muricata		20	100	N	
SG	Atriplex semibaccata		5	20	N	
GG	Rytidosperma setaceum		10	100	N	
SG	Sclerolaena sp. 1		10	100	N	
SG	Sclerolaena sp. 2		15	100	N	
	Bromus diandrus		60	700	HTE	
SG	Maireana excavata		1	10	N	
	Echium plantagineum		0.5	20	E	
GG	Chloris truncata		1	20	N	
	Crepis sp.		0.1	5	E	
	Malva parviflora		0.5	10	E	
	Brassica rapa		1	20	E	

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo		
Recorders	M. Walsh		**Plot ID #** BC02	**Zone ID**	237_Poor
Photo #	-		**Plot dimensions**		20 × 50
Datum	GDA94	**Zone** 55	**Plot bearing along midline**		330
Easting	296818	**Northing** 6003167	Record magnetic bearing along midline from 0 m point		

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237

Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	0
	Shrubs	2
	Grasses etc	3
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	20
	Grasses etc	40
	Forbs	1.6
	Ferns	0
	Other	0
High threat weed cover		70

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	-	Stem size class records # large trees (cf. benchmark)
50 - 79	-	Record stems for living trees only, and for all species
30 - 49	-	For multistemmed trees, record only the largest stem
20 - 29	-	Presence of <5cm stems records regeneration
10 - 19	-	Record # trees with hollows, not number of hollows
5 - 9	-	Count as one stem where tree is multistemmed
< 5	-	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	0	Total #
0	>20cm**	0	0
Length of logs			Total (m)
			0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	5	10	5	2	5	5.4
	Bare ground	-	-	5	-	-	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	
Clearing (incl. logging)	3	O	Microrelief	
Cultivation	-	-	Slope	
Grazing (native / stock)	1	R	Aspect	
Soil erosion	-	-	Soil surface texture	Clay
Firewood removal	-	-	Soil colour	Light brown
Fire (ground stratum, mid, canopy burnt?)	-	-	Site drainage	
Storm damage	-	-	Distance to nearest water	
Weediness	3	R	Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

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BAM Plot - Field Survey Sheet

Date	4/08/2021	Survey Name	Blessed Carlo				
Recorders	M. Walsh			Plot ID #	BC02	Zone ID	237_Poor
GF code	*Genus species* (tick if photographed or sample taken)			Cover %	Abund (count)	N, E, HTE	Stratum
	Bromus diandrus			70	800	HTE	
GG	Rytidosperma setaceum			20	200		
SG	Sclerolaena sp. 2			10	100		
	Aira elegantissima			2	50		
FG	Vittadinia gracilis			1	20		
	Lepidium africanum			1	20		
FG	Oxalis perennans			0.5	50		
	Brassica rapa			0.1	30		
GG	Chloris truncata			10	100		
GG	Austrostipa scabra			10	100		
FG	Sida trichopoda			0.1	5		
SG	Sclerolaena muricata			10	30		
	Sisymbrium orientale			0.1	5		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo				
Recorders	M. Walsh			**Plot ID #**	BC03	**Zone ID**	237_Poor
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			340
Easting	296937	**Northing**	6003148	Record magnetic bearing along midline from 0 m point			

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237
Condition state	Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)		
Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	**Sum values***
Native Richness (count of native species)	**Trees**	0
	Shrubs	3
	Grasses etc	5
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	18
	Grasses etc	47
	Forbs	2
	Ferns	0
	Other	0
High threat weed cover		40

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)			
Dimensions (circle applicable size)			
20 x 50 m	10 x 100 m		
Tree stem DBH (cm)		Notes on function attributes:	
>80	-	Stem size class records # large trees (cf. benchmark)	
50 - 79	-	Record stems for living trees only, and for all species	
30 - 49	-	For multistemmed trees, record only the largest stem	
20 - 29	-	Presence of <5cm stems records regeneration	
10 - 19	-	Record # trees with hollows, not number of hollows	
5 - 9	-	Count as one stem where tree is multistemmed	
< 5	-	Hollow bearing stem may be a dead stem (incl. stag)	
# Trees with hollows		<20cm 0	Total #
0		>20cm** 0	0
Length of logs			Total (m)
			0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	10	2	10	2	2	5.2
	Bare ground	5	5	5	-	10	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	
Clearing (incl. logging)	3	O	Microrelief	
Cultivation	-		Slope	
Grazing (native / stock)	3	R	Aspect	
Soil erosion	-		Soil surface texture	Clay
Firewood removal	-		Soil colour	Brown
Fire (ground stratum, mid, canopy burnt?)	-		Site drainage	
Storm damage	-		Distance to nearest water	
Weediness	3	R	Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

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BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo				
Recorders	M. Walsh			**Plot ID #**	BC03	**Zone ID**	237_Poor
GF code	***Genus species*** (tick if photographed or sample taken)			**Cover %**	**Abund** (count)	**N, E, HTE**	**Stratum**
GG	Austrostipa aristiglumis			5	30		
SG	Sclerolaena muricata			2	2		
GG	Rytidosperma setaceum			30	300		
GG	Chloris truncata			10	100		
SG	Sclerolaena sp. 2			10	50		
	Aira elegantissima			2	50		
GG	Austrostipa scabra			2	20		
FG	Rumex brownii			1	5		
FG	Vittadinia gracilis			0.5	2		
	Echium plantagineum			1	20		
	Hypochaeris sp.			2	50		
SG	Maireana excavata			5	20		
SG	Atriplex semibaccata			1	10		
	Erodium botrys			1	30		
	Lepidium africanum			0.1	1		
FG	Sida corrugata			0.5	20		
	Bromus diandrus			40	400	HTE	

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo		
Recorders	M. Walsh	**Plot ID #**	BC04	**Zone ID**	237_Poor
Photo #	-	**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**	240
Easting	297062	**Northing**	6003211	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237
Condition state	Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m^2)		
Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	**Sum values***
Native Richness (count of native species)	**Trees**	0
	Shrubs	2
	Grasses etc	5
	Forbs	0
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	7
	Grasses etc	26.5
	Forbs	0
	Ferns	0
	Other	0
High threat weed cover		100.1

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m^2)			
Dimensions (circle applicable size)			
20 x 50 m 10 x 100 m			
Tree stem DBH (cm)		Notes on function attributes:	
>80	-	Stem size class records # large trees (cf. benchmark)	
50 - 79	-	Record stems for living trees only, and for all species	
30 - 49	-	For multistemmed trees, record only the largest stem	
20 - 29	-	Presence of <5cm stems records regeneration	
10 - 19	-	Record # trees with hollows, not number of hollows	
5 - 9	-	Count as one stem where tree is multistemmed	
< 5	-	Hollow bearing stem may be a dead stem (incl. stag)	
# Trees with hollows		<20cm 0	Total #
0		>20cm** 0	0
Length of logs			Total (m)
			0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	5	10	15	5	5	8
	Bare ground	-	-	-	-	-	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	
Clearing (incl. logging)	3	O	Microrelief	
Cultivation	-	-	Slope	
Grazing (native / stock)	1	R	Aspect	
Soil erosion	-	-	Soil surface texture	Clay
Firewood removal	-	-	Soil colour	Brown - darker
Fire (ground stratum, mid, canopy burnt?)	-	-	Site drainage	
Storm damage	-	-	Distance to nearest water	
Weediness	3	R	Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

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BAM Plot - Field Survey Sheet

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Date	4/08/2021	Survey Name	Blessed Carlo			
Recorders	M. Walsh		Plot ID #	BC04	Zone ID	237_Poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
SG	Sclerolaena muricata		2	1		
GG	Chloris truncata		5	50		
	Bromus diandrus		100	700	HTE	
GG	Austrostipa scabra		10	100		
GG	Cynodon dactylon		1	20		
SG	Sclerolaena sp. 2		5	30		
	Sisymbrium orientale		1	20		
	Erodium botrys		1	20		
GG	Rytidosperma setaceum		10	100		
GG	Panicum coloratum		0.5	1		
	Aira elegantissima		10	200		
	Lepidium africanum		1	10		
	Gazania rigens		0.1	1	HTE	
	Echium plantagineum		0.5	10		
	Marrubium vulgare		0.5	10		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo		
Recorders	M. Walsh			**Plot ID #** BC05	**Zone ID** 237_Mod
Photo #	-			**Plot dimensions**	20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**	270
Easting	296912	**Northing**	6003217	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237
Condition state	Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	1
	Shrubs	2
	Grasses etc	5
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	5
	Shrubs	3
	Grasses etc	26
	Forbs	4
	Ferns	0
	Other	0
High threat weed cover		70

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	-	Stem size class records # large trees (cf. benchmark)
50 - 79	-	Record stems for living trees only, and for all species
30 - 49	-	For multistemmed trees, record only the largest stem
20 - 29	-	Presence of <5cm stems records regeneration
10 - 19	+	Record # trees with hollows, not number of hollows
5 - 9	-	Count as one stem where tree is multistemmed
< 5	-	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	0	Total #
0	>20cm**	0	0
Length of logs			Total (m)
			0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	5	2	5	5	5	4.4
	Bare ground	-	-	-	-	-	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	
Clearing (incl. logging)	3	O	Microrelief	
Cultivation	-	-	Slope	
Grazing (native / stock)	1	R	Aspect	
Soil erosion	-	-	Soil surface texture	Clay
Firewood removal	-	-	Soil colour	Brown
Fire (ground stratum, mid, canopy burnt?)	-	-	Site drainage	
Storm damage	-	-	Distance to nearest water	
Weediness	3	R	Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

BAM Plot - Field Survey Sheet

Date	4/08/2021	Survey Name	Blessed Carlo				
Recorders	M. Walsh			Plot ID #	BC05	Zone ID	237_Mod
GF code	*Genus species* (tick if photographed or sample taken)			Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus microcarpa			5	1		
GG	Chloris truncata			5	50		
GG	Austrostipa scabra			5	50		
GG	Rytidosperma setaceum			10	100		
	Aira elegantissima			20	300		
FG	Oxalis perennans			0.5	30		
	Echium plantagineum			0.5	20		
	Bromus diandrus			70	800	HTE	
FG	Sida trichopoda			1.5	100		
SG	Sclerolaena sp. 2			2	50		
	Erodium botrys			2	50		
	Vittadinia gracilis			0.5	2		
SG	Maireana excavata			1	10		
FG	Rumex brownii			2	10		
GG	Juncus amabilis			1	3		
	Marrubium vulgare			2	50		
GG	Cynodon dactylon			5	100		
	Lepidium africanum			0.5	2		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Date	4/08/2021	**Survey Name**	Blessed Carlo				
Recorders	M. Walsh			**Plot ID #**	BC06	**Zone ID**	237_Poor
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			330
Easting	296823	**Northing**	6003233	Record magnetic bearing along midline from 0 m point			

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Riverina
Subregion	Murray Fans
Likely Vegetation Class	
Plant Community Type	237
Condition state	Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)		
Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	**Sum values***
Native Richness (count of native species)	**Trees**	0
	Shrubs	2
	Grasses etc	2
	Forbs	0
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	3
	Grasses etc	10
	Forbs	0
	Ferns	0
	Other	0
High threat weed cover		80

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)				
Dimensions (circle applicable size)				
20 x 50 m	10 x 100 m			
Tree stem DBH (cm)		Notes on function attributes:		
>80	-	Stem size class records # large trees (cf. benchmark)		
50 - 79	-	Record stems for living trees only, and for all species		
30 - 49	-	For multistemmed trees, record only the largest stem		
20 - 29	-	Presence of <5cm stems records regeneration		
10 - 19	-	Record # trees with hollows, not number of hollows		
5 - 9	-	Count as one stem where tree is multistemmed		
< 5	-	Hollow bearing stem may be a dead stem (incl. stag)		
# Trees with hollows		<20cm	0	Total #
0		>20cm**	0	0
Length of logs				Total (m)
				0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	5	10	5	5	5	6
	Bare ground	-	-	-	-	-	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	-	-	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	-	-	Microrelief
Cultivation	-	-	Slope
Grazing (native / stock)	-	-	Aspect
Soil erosion	-	-	Soil surface texture
Firewood removal	-	-	Soil colour
Fire (ground stratum, mid, canopy burnt?)	-	-	Site drainage
Storm damage	-	-	Distance to nearest water
Weediness	-	-	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Date	4/08/2021	Survey Name	Blessed Carlo				
Recorders	M. Walsh			Plot ID #	BC06	Zone ID	237_Poor
GF code	*Genus species* (tick if photographed or sample taken)			Cover %	Abund (count)	N, E, HTE	Stratum
	Bromus diandrus			80	100	HTE	
	Lepidium africanum			0.1	1		
SG	Sclerolaena muricata			2	2		
	Polygonum aviculare			1	50		
GG	Rytidosperma setaceum			5	70		
GG	Chloris truncata			5	50		
	Marrubium vulgare			10	30		
	Malva parviflora			1	20		
SG	Maireana excavata			1	20		
	Sclerolaena sp. 2			1	20		
	Aira elegantissima			3	100		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

Flora species list

The species listed here were detected during the initial BAM survey (August 2021) and/or during subsequent targeted surveys (September, November, December 2021).

Growth form: FG = Forb, GG = Grass and Grass-like, SG = Shrub, TG = Tree
Status: N = Native, E = Exotic, HTE = High Threat Exotic

Growth form	Species name	Common name	Status
TG	*Eucalyptus microcarpa*	Grey Box	N
SG	*Atriplex semibaccata*	Creeping Saltbush	N
SG	*Maireana excavata*	Bottle Bluebush	N
SG	*Sclerolaena calcarata*	Redburr	N
SG	*Sclerolaena deserticola*		N
SG	*Sclerolaena muricata*	Rolypoly	N
FG	*Brassica rapa*	Field Mustard	E
FG	*Crepis* sp.	Hawksbeard	E
FG	*Echium plantagineum*	Paterson's Curse	E
FG	*Erodium botrys*	Long Storksbill	E
FG	*Gazania rigens*	Treasure Flower	HTE
FG	*Hypochaeris* sp.	Flatweed	E
FG	*Lepidium africanum*	African Peppercress	E
FG	*Malva parviflora*	Small-flowered Mallow	E
FG	*Marrubium vulgare*	White Horehound	E
FG	*Oxalis perennans*	Native Oxalis	N
FG	*Polygonum aviculare*	Wireweed	E
FG	*Rumex brownii*	Swamp Dock	N
FG	*Sida corrugata*	Corrugated Sida	N
FG	*Sida trichopoda*	Hairy Sida	N
FG	*Sisymbrium orientale*	Indian Hedge Mustard	E
FG	*Vittadinia gracilis*	Woolly New Holland Daisy	N
GG	*Aira elegantissima*	Delicate Hairgrass	N
GG	*Austrostipa aristiglumis*	Plains Grass	N
GG	*Austrostipa scabra*	Rough Speargrass	N
GG	*Bromus diandrus*	Great Brome	N
GG	*Chloris truncata*	Windmill Grass	N
GG	*Cynodon dactylon*	Couch	N
GG	*Enteropogon acicularis*	Curly Windmill Grass	N
GG	*Juncus amabilis*	Hollow Rush	N
GG	*Panicum coloratum*	Coolah Grass	E
GG	*Rytidosperma setaceum*	Smallflower Wallaby Grass	N

Fauna species list

The species listed here were detected during the initial BAM survey and/or during subsequent targeted surveys.

BC Act/EPBC Act: V = Vulnerable. Status: N = Native, E = Exotic

Class	Species Name	Common Name	BC Act	EPBC Act	Status
Aves	*Anas superciliosa*	Pacific Black Duck	-	-	N
Aves	*Anthochaera carunculata*	Red Wattlebird	-	-	N
Aves	*Cacatua tenuirostris*	Long-billed Corella	-	-	N
Aves	*Chenonetta jubata*	Australian Wood Duck	-	-	N
Aves	*Corcorax melanorhamphos*	White-winged Chough	-	-	N
Aves	*Corvus coronoides*	Australian Raven	-	-	N
Aves	*Entomyzon cyanotis*	Blue-faced Honeyeater	-	-	N
Aves	*Eolophus roseicapilla*	Galah	-	-	N
Aves	*Falco cenchroides*	Nankeen Kestrel	-	-	N
Aves	*Glossopsitta concinna*	Musk Lorikeet	-	-	N
Aves	*Grallina cyanoleuca*	Magpie-lark	-	-	N
Aves	*Gymnorhina tibicen*	Australian Magpie	-	-	N
Aves	*Hirundo neoxena*	Welcome Swallow	-	-	N
Aves	*Manorina melanocephala*	Noisy Miner	-	-	N
Aves	*Milvus migrans*	Black Kite	-	-	N
Aves	*Ninox novaeseelandiae*	Southern Boobook	-	-	N
Aves	*Ocyphaps lophotes*	Crested Pigeon	-	-	N
Aves	*Pardalotus striatus*	Striated Pardalote	-	-	N
Aves	*Petrochelidon nigricans*	Tree Martin	-	-	N
Aves	*Platycercus elegans flaveolus*	Crimson (Yellow) Rosella	-	-	N
Aves	*Platycercus eximius*	Eastern Rosella	-	-	N
Aves	*Strepera graculina*	Pied Currawong	-	-	N
Aves	*Tyto alba*	Barn Owl	-	-	N
Reptilia	*Cryptoblepharus australis*	Snake-eyed Skink	-	-	N
Reptilia	*Morethia boulengeri*	Boulenger's Snake-eyed Skink	-	-	N
Reptilia	*Pseudonaja textilis*	Eastern Brown Snake	-	-	N
Mammalia	*Austronomus australis*	White-striped Freetail Bat	-	-	N
Mammalia	*Chalinolobus gouldii*	Gould's Wattled Bat	-	-	N
Mammalia	*Chalinolobus morio*	Chocolate Wattled Bat	-	-	N
Mammalia	*Mormopterus* sp. 4	Southern Freetail Bat	-	-	N
Mammalia	*Mus musculus*	House Mouse	-	-	E

Class	Species Name	Common Name	BC Act	EPBC Act	Status
Mammalia	*Scotorepens balstoni*	Inland Broad-nosed Bat	-	-	N
Mammalia	*Scotorepens greyii**	Little Broad-nosed Bat	-	-	N
Mammalia	*Trichosurus vulpecula*	Common Brushtail Possum	-	-	N
Mammalia	*Vespadelus baverstocki**	Inland Forest Bat	V	-	N
Mammalia	*Vespadelus darlingtoni*	Large Forest Bat	-	-	N
Mammalia	*Vespadelus regulus*	Southern Forest bat	-	-	N
Mammalia	*Vespadelus vulturnus*	Little Forest Bat	-	-	N

* Tentative identification, based on call analysis.

Appendix D: Habitat Suitability Assessment

The habitat suitability of the subject land was assessed for all ecosystem credit species and species credit species generated by the BAM-C. Unless otherwise indicated, species background information has been sourced from OEH Threatened Biodiversity Profiles, available at https://www.environment.nsw.gov.au/threatenedSpeciesApp/.

Ecosystem Credit Species

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.

+Commonwealth Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
Aves	*Ninox connivens*	Barking Owl (foraging)	V,P,3		The Barking Owl is found throughout continental Australia except for the central arid regions. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. 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 on these fertile riparian soils. **There is one record of this species within 10 km of the subject land. Considering the Barking Owl's broad habitat use for foraging purposes, this species is Assumed Present (for foraging). Targeted surveys did not detect this species breeding on site, as such, it is considered Absent (Surveyed) for breeding.**
Aves	*Falco subniger*	Black Falcon	V, P		The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres. The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring. **There are no records of this species within 10 km of the subject land. However, considering the Black Falcon's broad habitat use, it is Assumed Present.**

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW. The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa),* Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. **There is one record of this species within 10 km of the subject land. *Eucalyptus microcarpa* is present on the subject land, as such, the Black-chinned Honeyeater is Assumed Present.**
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus* which then occupies the remaining parts of the state. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands.

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					Declines have occurred in remnant vegetation fragments smaller than 300 hectares, that have been isolated or fragmented for more than 50 years. **There are five records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present.**
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		The Diamond Firetail 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 from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. 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. **There is one record of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		Dusky Woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. 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. **Habitat broadly appropriate for this species, Assumed Present**
Aves	*Falco hypoleucos*	Grey Falcon	E1,P,2		The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					There are no records of this species within 10 km of the subject land. However, considering the Grey Falcon's broad habitat use, it is Assumed Present.
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		The eastern subspecies (*temporalis*) occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. 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. Lives in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen individuals. Feed on invertebrates and nests in several conspicuous, dome-shaped stick structures that are about the size of a football. A nest is used as a dormitory for roosting each night. Nests are maintained year-round, and old nests are often dismantled to build new ones. **There are two records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **There is one record of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Mammalia	*Phascolarctos cinereus*	Koala (foraging)	V,P	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. **There are no records of this species within 10 km of the subject land. *Eucalyptus microcarpa* is a known forage tree for koalas and was recorded on site. Although targeted surveys did not detect this species, it is Assumed Present for foraging but is considered Absent (Surveyed) for breeding.**
Aves	*Hieraaetus morphnoides*	Little Eagle (foraging)	V,P		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. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present for foraging. Targeted survey did not detect this species breeding on the subject land so it is considered Absent (Surveyed) for breeding.**
Aves	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo (foraging)	V,P,2		Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. 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. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present for foraging. Targeted survey did not detect this species breeding on the subject land**

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					so it is considered Absent (Surveyed) for breeding.
Aves	*Tyto novaehollandiae*	Masked Owl (foraging)	V,P,3		Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. Some cooperative breeding occurs. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills. **There is one record of this species within 10 km of the subject land. Assumed Present**
Aves	*Circus assimilis*	Spotted Harrier	V,P		The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse 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

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Aves	*Lophoictinia isura*	Square-tailed Kite (foraging)	V,P,3		The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. 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 is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. **There are no records of this species within 10 km of the subject land. Proximity to the Murray River and remnant woodland within the subject land is broadly suitable for this species, Assumed Present (for foraging). Targeted survey did not detect this species breeding on the subject land so it is considered Absent (Surveyed) for breeding.**
Aves	*Polytelis swainsonii*	Superb Parrot (foraging)	V,P,3	V	The Superb Parrot 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 Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, and feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. **There is one record of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present (for foraging). Targeted survey did not detect this species breeding on the subject land so it is considered Absent (Surveyed) for breeding.**

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
Aves	*Lathamus discolor*	Swift Parrot (foraging)	E1,P,3	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 they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens.* **There is one record of this species within 10 km of the subject land. Although there are no favoured feed trees present this species is Assumed Present**
Aves	*Neophema pulchella*	Turquoise Parrot	V,P,3		The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		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. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. **There are no records of this species within 10 km of the subject land. Assumed Present**
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle (foraging)	V,P	C	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland,

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days. **There are no records of this species within 10 km of the subject land. The subject land is greater than 1km from rivers, lakes, large dams, creeks, wetlands and coastlines. The nearest water courses are very small dams. Absent (constraint)**
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	The White-throated Needletail is widespread in eastern and south-eastern. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. **There are no records of this species within 10 km of the subject land. Habitat broadly appropriate for this species, Assumed Present**
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March,

Class	Scientific Name	Common Name	*NSW status	+Comm status	Habitat Assessment
					when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn. **There is one record of this species within 10 km of the subject land. Habitat broadly appropriate for this species. Although not detected by the bat logger, data was only recorded for two nights, therefore this species is Assumed Present.**
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. **There are no records of this species within 10 km of the subject land. The species is associated with the vegetation community recorded on the subject land; however, the scarcity of mistletoes within the subject land make it unsuitable for use by this species. Absent (constraint)**

Species credit species

V = Vulnerable, E = Endangered, CE = Critically Endangered

Scientific Name	Common Name	NSW status	Comm. status	Habitat Assessment	Species presence
Austrostipa wakoolica	A spear-grass	E	E	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Burhinus grallarius	Bush Stone-curlew	E		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Crinia sloanei	Sloane's Froglet	V	E	A targeted survey was not conducted for this species as the survey window had passed. The subject land is near to some farm dams, and possesses some depressions that would become flooded after heavy rains, as such, the habitat is broadly appropriate for this species.	Assumed present
Eucalyptus leucoxylon* subsp. *pruinosa	Yellow Gum	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Haliaeetus leucogaster	White-bellied Sea-Eagle (breeding)	V	C	No substantial waterway or waterbody exists within 1km of the subject land. The small farm dams nearby are unlikely to be sufficient for this species.	Absent (constraint)
Hieraaetus morphnoides	Little Eagle (breeding)	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Lepidium monoplocoides	Winged Peppercress	E	E	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Lophochroa leadbeateri	Major Mitchell's Cockatoo (breeding)	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Lophoictinia isura	Square-tailed kite (breeding)	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Myotis macropus	Southern Myotis	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Ninox connivens	Barking Owl (breeding)	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Petaurus norfolcensis	Squirrel Glider	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Phascogale tapoatafa	Brush-tailed Phascogale	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)

Scientific Name	Common Name	NSW status	Comm. status	Habitat Assessment	Species presence
Phascolarctos cinereus	Koala (breeding)	V	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Pilularia novae-hollandiae	Austral Pillwort	E		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Polytelis swainsonii	Superb Parrot (breeding)	V	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Prasophyllum sp. Moama	Prasophyllum sp. Moama	CE		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Swainsona murrayana	Slender Darling Pea	V	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Swainsona sericea	Silky Swainson-pea	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Tyto novaehollandiae	Masked Owl (breeding)	V		A targeted survey was not conducted for this species as the survey window had passed. Trees with large hollows, suitable for the Masked Owl, do occur on the subject land.	Assumed present
Lathamus discolor	Swift Parrot (breeding)	E	CE	Subject land does not fall within the Important Habitat Map for the Swift Parrot.	Absent (constraint)

Appendix E: EPBC Act Habitat Assessment and Matters of National Environmental Significance

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

A Protected Matters Search identified five Endangered Ecological Communities, 34 threatened species, 12 migratory and 19 marine species as potentially occurring within 10 km of the subject land.

The following tables give an overview of the assessments of these threatened entities and shows that the Proposed activity:

1. Is not likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance are:
    i. World heritage properties.
    ii. National heritage places.
    iii. Wetlands of international importance.
    iv. Threatened species and ecological communities.
    v. Migratory species.
    vi. Commonwealth marine areas.
    vii. The Great Barrier Reef Marine Park. and;
    viii. Nuclear actions (including uranium mines).
    ix. A water resource, in relation to coal seam gas development and large coal mining development.
2. Is not likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

Notes:

Important Population as determined by the *Environment Protection and Biodiversity Conservation Act 1999*, is one that for a vulnerable species:

a) is likely to be key source populations either for breeding or dispersal
b) is likely to be necessary for maintaining genetic diversity
c) is at or near the limit of the species range.

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013).

Wetlands of International Importance			
Name	**Proximity**	**Assessment**	**Assessment of significance required (Yes/No)**
Banrock Station Wetland Complex	Subject land is 400-500 km upstream	The proposal is not within close proximity of the Banrock Station Wetland Complex	No
Barmah Forest	Subject land is 10 km upstream	The proposal is within close proximity of the Barmah Forest, however no impacts on watercourses are expected providing adequate mitigation measures are followed (**Table 6-2**)	No
Gunbower Forest	Subject land is 10-20 km upstream	The proposal is within close proximity of the Gunbower Forest, however no impacts on watercourses are expected providing adequate mitigation measures are followed (**Table 6-2**)	No
Hattah-Kulkyne Lakes	Subject land is 200-300 km upstream	The proposal is not within close proximity of the Hattah-Kulkyne Lakes	No
NSW Central Murray State Forests	Subject land is within 10 km	The proposal is within close proximity of the NSW Central Murray State Forests, however no impacts on watercourses are expected providing adequate mitigation measures are followed (**Table 6-2**)	No
Riverland	Subject land is 400-500 km upstream	The proposal is not within close proximity of the Riverland	No
The Coorong, and Lakes Alexandrina and Albert Wetland	Subject land is 400-500 km upstream	The proposal is not within close proximity of the Coorong and Lakes Alexandrina and Albert Wetland	No

Threatened Ecological Communities			
Name	**Status**	**Habitat Assessment**	**Assessment of significance (Yes/No)**
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	E	Community not present within subject land.	No
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	Community not present within subject land (see **Section 4.4**).	Yes
Natural Grasslands of the Murray Valley Plains	CE	Community not present within subject land.	No
Weeping Myall Woodlands	E	Community not present within subject land.	No
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	Community not present within subject land.	No

Threatened species					
Species name	**Common Name**	***Status**	**Records within 10km?**	**Habitat Assessment**	**Assessment of Significance required (Yes/No)**
Botaurus poiciloptilus	Australasian Bittern	E	No	The Australasian Bittern favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and. Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands).**	No
Calidris ferruginea	Curlew Sandpiper	CE	No	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one-year old birds remain in Australia rather than migrating north. 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. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical wet habitat characteristics required by this species.**	No
Falco hypoleucos	Grey Falcon	V	No	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. **Low – The species is not associated with any plant communities recorded within the subject land. The subject land is at the eastern limit of the known range of this species.**	No
Grantiella picta	Painted Honeyeater	V	No	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is	No

				more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema.* **Low – The species is associated with the plant community recorded within the subject land but requires a density of mistletoes that the subject land was found to lack.**	
Hirundapus caudactus	White-throated Needletail	V	No	White-throated Needletails are non-breeding migrants, occurring in Australia only between late spring and early autumn, but mostly in summer, when they sometimes form large flocks, appearing as a swirling cloud of birds. Aerial birds; however, will roost in trees. **Low – The species is not associated with any plant communities recorded within the subject land.**	No
Lathamus discolor	Swift Parrot	CE	Yes	The species 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. **Moderate – The species is associated with PCT 237. The subject land is outside the known important breeding areas of this species, but it has been recorded within 10 km of the site, which may provide some marginal foraging habitat.**	Yes
Numenius madagascariensis	Eastern Curlew	CE, M	No	The Eastern Curlew is widespread in coastal regions in the north-east and south of Australia, including Tasmania, and scattered in other coastal areas. It is rarely seen inland. It breeds in Russia and north-eastern China. On passage, they are commonly seen in Japan, Korea and Borneo. Small numbers visit New Zealand. The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons. The Eastern Curlew eats mainly small crabs and molluscs. Foraging by day and night, it is slow and deliberate, stalking slowly on sandy and muddy flats, picking from the surface or probing deep with its long bill. Eastern Curlews breed in the northern hemisphere on swampy moors and boggy marshes. Both sexes have similar plumage, with the males using their haunting calls and display flights to attract a mate and defend their territory. The nest is a shallow depression lined with grass. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands). Species is chiefly coastal.**	No
Pedionomus torquatus	Plains-wanderer	CE	No	Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species. The Plains-wanderer has declined greatly since European settlement. Areas where the species was formerly common and is now so reduced in numbers that it is effectively extinct include eastern NSW, south-western Victoria, and south-eastern South Australia. Its current stronghold is the western Riverina of southern NSW. Areas of secondary importance include north-central Victoria and central-western Queensland. The bird was formerly fairly common until about 1920 on the Slopes and Tablelands, and there are two earlier records of birds near Sydney. The main reason for the decline in the numbers and	No

				distribution of Plains-wanderers in all eastern States has been the conversion of native grasslands to dense introduced pasture or croplands. If native grasslands are not overgrazed or cultivated then Plains-wanderers are largely sedentary, though there is some recent evidence to suggest that birds may not remain sedentary during prolonged drought conditions. **Low – The species is not associated with any plant communities recorded within the subject land.**	
Pezoporus occidentalis	Night Parrot	E	No	The distribution of the Night Parrot has not been well documented, but it is known to be restricted to arid and semi-arid Australia. Twenty-two museum specimens existed prior to 1990, all but one taken in the 19th century. Of the specimens, three were collected in north-west and north-central Western Australia (including the only 20th century specimen in 1912) and the remainder in South Australia. A specimen was apparently taken in south-west New South Wales in 1897 and a number of recent sightings, including a carcass by the roadside in 1990, came from north-western Queensland. Prior to the discovery of the 1990 specimen, the Night Parrot was widely considered to be extinct. **Low – The species is not associated with any plant communities recorded within the subject land and is presumed extinct in the region.**	No
Polytelis swainsonii	Superb Parrot	V	Yes	The Superb Parrot 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. It is estimated that there are less than 5000 breeding pairs left in the wild. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. **Moderate – The species is not associated with any plant communities recorded within the subject land but has been recorded within 10 km of the site. The species was not detected on the subject land during targeted surveys.**	Yes
Rostratula australis	Australian Painted-snipe, Australian Painted snipe	E	No	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	No

				Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands or still water bodies with vegetated margins).	
Bidyanus bidyanus	Silver Perch	CE	No	Silver Perch were once widespread and abundant throughout most of the Murray-Darling river system. They have now declined to low numbers or disappeared from most of their former range. Only one remaining secure and self sustaining population occurs in NSW in the central Murray River downstream of Yarrawonga weir, as well as several anabranches and tributaries. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Craterocephalus fluviatilis	Murray Hardyhead	E	No	Murray Hardyhead is a species of small freshwater fish, native to inland parts of south-eastern Australia. They were once widespread and abundant in the Murray and Murrumbidgee river systems in southern NSW and northern Victoria; however, they have suffered a serious population decline, and now seem to be limited to a few sites, mainly in northern Victoria. There are very few recent records of Murray Hardyhead in NSW. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Galaxias rostratus	Flathead Galaxias	CE	No	Flathead Galaxias, also known as Murray jollytail are a small native fish that are known from the southern part of the Murray Darling Basin. They have been recorded in the Macquarie, Lachlan, Murrumbidgee and Murray Rivers in NSW. Despite extensive scientific sampling over the past 15 years there have been very few recorded sightings of Flathead Galaxias. They have not been recorded and are considered locally extinct in the lower Murray, Murrumbidgee, Macquarie and Lachlan Rivers. The species is now only known from the upper Murray River near Tintaldra and wetland areas near Howlong. Flathead Galaxias are found in still or slow moving water bodies such as wetlands and lowland streams. The species has been recorded forming shoals. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation. Flathead Galaxias spawn in spring and lay slightly adhesive demersal eggs. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Maccullochella macquariensis	Trout Cod	E	No	The Trout Cod is endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. The species was once widespread and abundant in these areas but has undergone dramatic declines in its distribution and abundance over the past century. The last known reproducing population of Trout Cod is confined to the Murray River below Yarrawonga downstream to Tocumwal. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Maccullochella peelii	Murray Cod	V	No	The iconic Murray Cod is the largest freshwater bony fish in Australia. This elongate, deep bodied fish has a broad, depressed head, a short rounded snout and a large mouth with the lower jaw protruding slightly, and jaws extending beyond the eyes. The soft dorsal, anal and caudal fins are large and rounded. Murray Cod are brownish to yellowish-green with a mottled pattern of darker and paler markings above and a pale belly.	No

				Absent – No suitable aquatic habitat occurs on the subject land.	
Macquaria australasica	Macquarie Perch	E	No	Habitat critical to the survival of the Macquarie perch can be described as all areas within the species' range which are characterized by flowing runs or riffles and small complex rock piles, and in some waterways, instream woody habitats. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Crinia sloanei	Sloane's Froglet	E	Yes	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 has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. **Moderate – The species is not associated with any plant communities recorded within the subject land, however, it has been recorded within 10 km.**	Yes
Litoria raniformis	Southern Bell Frog	V	No	In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few yet unconfirmed records have also been made in the Murray Irrigation Area in recent years. The species is also found in Victoria, Tasmania and South Australia, where it has also become endangered. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	No
Synemon plana	Golden Sun Moth	V	No	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia* spp. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	No
Nyctophilus corbeni	Corben's Long-eared Bat	V	No	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin, with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, Bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-	No

				pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	
Phascolarctos cinereus	Koala	V	No	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. **Moderate – The species is associated with PCT 237. The subject land contains known Koala food trees, though typically at low densities, and may provide some habitat for this species. The species was not detected on the subject land during targeted surveys.**	Yes
Pteropus poliocephalus	Grey-headed Flying Fox	V	No	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	No
Amphibromus fluitans	River Swamp Wallaby-grass	V	Yes	There are many historic collections in the City of Greater Albury. It has been recorded recently in lagoons beside the Murray River near Cooks Lagoon (Shire of Greater Hume), Mungabarina Reserve, East Albury, at Ettamogah, Thurgoona (Charles Sturt University Campus), near Narranderra, and also further west along the Murray River (near Mathoura) and in Victoria. There is a recent record of this species near Laggan in Upper Lachlan Shire. It is also found in Victoria and in Tasmania. *Amphibromus fluitans* grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels. Habitats in south-western NSW include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with Potamogeton and Chamaeraphis species. **Moderate – The species is not associated with any plant communities recorded within the subject land, however there are records within 10 km.**	Yes
Brachyscome muelleroides	Mueller Daisy	V	No	The Claypan Daisy occurs in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Also occurs in north-central Victoria (only along the Murray from Tocumwal to the Ovens River). **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Lepidium monoplocoides	Winged Pepper-cress	E	No	*Lepidium monoplocoides* is widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since	No

				1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km. The species was not detected on the subject land during targeted surveys.**	
Maireana cheelii	Chariot Wheels	V	No	Restricted to the southern Riverina region of NSW, mainly in the area between Deniliquin and Hay. Also has a limited distribution in Victoria where very rare. NSW collections have mainly been from the Moulamein, Deniliquin and Hay districts, including Tchelery and Zara Stations. There is an outlying record from "Wangareena east of Wanaaring". **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Myriophyllum porcatum	Ridged Water-milfoil	V	No	This species is endemic to Victoria. Numbers fluctuate depending on availability of habitat, but current information suggests there are about 4,400 plants remaining in 15 wild populations. Major threats to populations include wetland drainage and modification, weed invasion, grazing and climate change. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Pimelea spinescens* subsp. *spinescens	Plains Rice-flower	CE	No	This species is endemic to western Victoria, where it is known from about 20 wild populations containing up to 12,000 plants. Major threats include weed invasion, road works and grazing. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Pterostylis despectans	Lowly Greenhood	E	Yes	In New South Wales the species is known only from a single population discovered in 2005 near Moama, in the Riverina Bioregion (*sensu* Thackway and Cresswell 1995). The site is within the Murray Local Government Area. Several surveys of Riverina grassland and regional Travelling Stock Reserves (TSR), including McDougall *et al*. (1993), Benson *et al.* (1997), Webster (1999), and McNellie *et al*. (2005), did not record *P. despectans* and it seems likely that the species is extremely rare in New South Wales. The species also occurs as very small fragmented populations in central Victoria (Maryborough-Avoca region, and a disjunct occurrence at Terrick Terrick) and in South Australia (Northern Lofty region near Mt Bryan) (Bickerton and Robertson 2000; Coates *et al*. 2003; Jones 2006). Coates *et al*. (2003) estimate the total number of individuals in the Victorian and South Australian populations as less than 1500. **Moderate – The species is not associated with the vegetation communities recorded within the subject land, however, it has been recorded within 10 km.**	Yes
Sclerolaena napiformis	Turnip Copperburr	E	Yes	Known from only a few small populations in remnant grassland in the southern Riverina of NSW and north-central Victoria. NSW populations are confined to the area between Jerilderie and Moama on travelling stock routes and road reserves.	Yes

				Moderate – The species is not associated with the vegetation communities recorded within the subject land, however, it has been recorded within 10 km.	
Swainsona murrayana	Slender Darling-Pea	V	Yes	Found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. **Moderate – The species is not associated with the vegetation communities recorded within the subject land, however, it has been recorded within 10 km. The species was not detected on the subject land during targeted surveys.**	Yes
Swainsona plagiotropis	Red Darling-Pea	V	No	Occurs in the upper Murray River valley in the south-western plains of NSW and into Victoria. Most NSW records are from the Jerilderie area, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 km NW of Warren. Also rare in Victoria, restricted to a few sites in the central north, mostly between Bendigo and the Murray River south of Echuca. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Delma impar	Striped Legless Lizard	V	No	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Apus pacificus	Fork-tailed Swift	M	No	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide; however, a few populations have been found west of the Great Divide. The Fork-tailed Swift is almost exclusively aerial, flying from < 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No

Motacilla flava	Yellow Wagtail	M	No	Mostly utilises well-watered open grasslands and the fringes of wetlands. Roosts in mangroves and other dense vegetation. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Myiagra cyanoleuca	Satin Flycatcher	M	No	In NSW, they are widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Found in tall forests and wetter habitats, such as forested gullies, but not rainforests. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Rhipidura rufifrons	Rufous Fantail	M	No	The Rufous Fantail is found in northern and eastern coastal Australia, being more common in the north. It is also found in New Guinea, the Solomon Islands, Sulawesi and Guam. The Rufous Fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. The Rufous Fantail feeds on insects, which it gleans from the middle and lower levels of the canopy. It is a very active feeder and constantly fans tail and flicks wings and body while foraging. The Rufous Fantail builds a small compact cup nest, of fine grasses bound with spider webs, that is suspended from a tree fork about 5 m from the ground. The bottom of the nest is drawn out into a long stem. Both sexes share nest-building, incubation and feeding of the young. One or two broods may be raised in a season. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Actitis hypoleucos	Common Sandpiper	M	No	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	No
Calidris acuminata	Sharp-tailed Sandpiper	M	No	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps,	No

				lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. **Low – The species is not associated with any plant communities recorded within the subject land and there are no records within 10 km.**	
Calidris ferruginea	Curlew Sandpiper	M, CE	No	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one-year old birds remain in Australia rather than migrating north. In NSW, they are widespread east of the Great Divide, especially in coastal regions. They are occasionally recorded in the Tablelands and are widespread in the Riverina and south-west NSW, with scattered records elsewhere. 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 saltworks 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. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Calidris melanotos	Pectoral Sandpiper	M	No	In NSW, the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Gallinago hardwickii	Latham's Snipe	M	No	Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Tringa nebularia	Common Greenshank	M	No	The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries,	No

				deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (*Himantopus himantopus*) in pasture, but are generally not found in dry grassland. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	

* V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory

EPBC Act-listed Critically Endangered and Endangered Species

Swift Parrot	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential Swift Parrot habitat. As the subject is outside of the known breeding areas of this species, and as the species undergoes large-scale nomadic movements, impacts to the subject land are unlikely to significantly impact the Swift Parrot, except through a minor loss of connectivity provided by isolated paddock trees. This is unlikely to have a deleterious impact on the species leading to a long-term decrease in the size of the population at a regional scale.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land and has only been recorded once within 10 km of the proposal footprint. Consequently, it is unlikely that the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha. The subject land does not occur within a mapped important area for the species.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential foraging habitat. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the species has only been recorded once locally and the subject land is outside the known important areas for this species.

Swift Parrot	
Disrupt the breeding cycle of a population	As no local populations are known and the subject land is outside of the mapped important habitat for this species, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of foraging habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), and cats (*Felis catus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Sloane's Froglet	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential habitat.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land but has been recorded twice within 10 km of the proposal footprint (in 2008). Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential foraging habitat. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	As no local populations are known and no wet areas exist within the subject land, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of foraging habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), and cats (*Felis catus*). The proposal would be unlikely to result in new invasive species becoming established.

Sloane's Froglet	
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Lowly Greenhood	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential habitat.
Reduce the area of occupancy of the species	The species is not known to occur on the subject land but has been recorded once within 10 km of the proposal footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential recovery. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of potential habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including rabbits (*Oryctolagus cuniculus*). The proposal would be unlikely to result in new invasive species becoming established.

Lowly Greenhood	
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Turnip Copperburr	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential habitat.
Reduce the area of occupancy of the species	The species is occur on the subject land (and was not detected during targeted surveys) but has been recorded within 10 km of the proposal footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential recovery. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as it was not detected on the subject land.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of potential habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.

Turnip Copperburr	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including rabbits (*Oryctolagus cuniculus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

EPBC Act-listed Vulnerable Species

Superb Parrot	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. As the site is neither at the limit of the species' range nor within a core breeding area for the species, it is unlikely that an important population, as defined here, is present within the subject land. Further, it was not detected on the subject land during targeted surveys. It is unlikely that any impacts resulting from this proposal will lead to a long-term decline in any local population.
Reduce the area of occupancy of an important population	The proposal will reduce the potential occupancy of this species by 4.85 ha. This figure is largely comprised of heavily modified derived grasslands, which are at most marginally suitable for this species. It is unlikely that an important population occurs locally and it is similarly unlikely that the proposal will significantly impact the known local population.
Fragment an existing important population into two or more populations	As the species is highly mobile and demonstrably capable of moving between existing remnants, no fragmentation is likely.
Adversely affect habitat critical to the survival of a species	The subject land falls outside the core breeding habitat of the species. For this reason, it is unlikely to constitute critical habitat for this species.
Disrupt the breeding cycle of an important population	Some potential breeding habitat for this species will be removed; however, the scale of this impact is not likely to disrupt the breeding cycle of this species to a significant degree.

Superb Parrot	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove 4.85 ha of associated native habitat for this species. The proposal will reduce overall habitat connectivity and foraging habitat; however, it will not isolate patches or dissect habitat features to the degree that the species may decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), and cats (*Felis catus*). The proposal is unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 6.2**).
Interfere with the recovery of the species.	A recovery plan has been prepared for the Superb Parrot the specific objective of this being to: 1. Determine population trends in the Superb Parrot. 2. Increase the level of knowledge of the Superb Parrot's ecological requirements. 3. Develop and implement threat abatement strategies 4. Increase community involvement in and awareness of the Superb Parrot recovery program. The proposal will not directly interfere with these aims.
Conclusion	**Non-significant impact**

Koala	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range. The subject land is unlikely to support an important population as there are no records for the species exists within 10km. Targeted searches of suitable food trees within and adjacent to the subject land did not identify any evidence of occupation by Koalas.
Reduce the area of occupancy of an important population	No. The subject land is unlikely to support an important population (see above).
Fragment an existing important population into two or more populations	No. The subject land is unlikely to support an important population (see above).
Adversely affect habitat critical to the survival of a species	Application of the Koala Habitat Assessment Tool (**Appendix H**) determined that habitat present at the site would not constitute "core Koala habitat," returning a score of 1 (5 being the minimum score considered to be "core" habitat). For this reason, the subject land is not considered critical to the survival of the species.
Disrupt the breeding cycle of an important population	No. The subject land is unlikely to support an important population (see above).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove 4.85 ha of associated native habitat for this species, much of which is heavily modified and of doubtful utility to the Koala. The proposal may slightly reduce landscape connectivity, which is already of uncertain suitability for this species (see **Appendix H**).

Koala	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), and cats (*Felis catus*). The proposal is unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 6.2**).
Interfere with the recovery of the species.	According to the EPBC Act Referral Guidelines for the Koala, impacts which are likely to substantially interfere with the recovery of the koala may include one or more of the following: • Increasing koala fatalities in habitat critical to the survival of the koala due to dog attacks to a level that is likely to result in, an ongoing source of mortality. • Increasing koala fatalities in habitat critical to the survival of the koala due to vehicle-strikes to a level that is likely to result in an ongoing source of mortality. • Facilitating the introduction or spread of disease or pathogens for example Chlamydia or *Phytophthora cinnamomi*, to habitat critical to the survival of the koala, that are likely to significantly reduce the reproductive output of koalas or reduce the carrying capacity of the habitat. • Creating a barrier to movement to, between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala. • Changing hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term. As the subject land does not constitute critical habitat, the proposal will not interfere with the recovery of the species, according to these criteria.
Conclusion	**Non-significant impact**

River Swamp Wallaby-Grass	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential habitat.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land but has been recorded within 10 km of the proposal footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential recovery. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the species.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of potential habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.

River Swamp Wallaby-Grass	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including rabbits (*Oryctolagus cuniculus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Slender Darling Pea	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.85 ha of potential habitat.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land (and was not detected during targeted surveys) but has been recorded within 10 km of the proposal footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 4.85 ha.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential recovery. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6.2**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the species.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.85 ha of potential habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.

Slender Darling Pea	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including rabbits (*Oryctolagus cuniculus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6.2**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Appendix F: Key Threatening Processes

Key Threatening Processes (KTP) predicted as acting on the study area that may be exacerbated by the proposal.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by the proposal?
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	**Unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		**Unlikely**	**NO** Impact on the flow regimes of nearby rivers / streams is not expected as the Murray River is at least 1.3 km away and mitigation measures will be implement to prevent runoff.
Anthropogenic Climate Change	KTP	KTP	**Likely**	**YES** Some unavoidable emissions will occur from machinery and operation.
Bushrock removal	KTP		**Very unlikely**	**NO** No bushrock was present so none will be removed
Clearing of native vegetation	KTP	KTP	**Very likely**	**YES** Up to 4.85 ha of native vegetation will be impacted by the proposal
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	KTP	KTP	**Unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	KTP	KTP	**Unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by the proposal?
Competition from feral honey bees, *Apis mellifera* L.	KTP		**Likely**	**YES** Some tree hollows will be removed, the loss of hollows increases competition with hollow-reliant native fauna and feral honey bees.
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		**Unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Herbivory and environmental degradation caused by feral deer	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks though Moama is likely too cold for Red Imported Fire Ants to establish
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	**Unlikely**	**POSSIBLY** Some tree hollows will be removed, the loss of hollows increases crowded in tree hollows and may exacerbate this threat.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks though no water bodies will be impacted and the disease is likely already in the study area.
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	**Unlikely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks though Moama is close to the climatic limit that this pathogen is modelled to be able to survive at.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by the proposal?
Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.)	KTP		**Very unlikely**	**NO** This species only occurs on Tasmania, so the likelihood it being introduced to the subject land is very low.
Invasion and establishment of exotic vines and scramblers	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion and establishment of the Cane Toad (*Bufo marinus*)	KTP	KTP	**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat. Moama is likely too cold for the Cane Toad to establish.
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		**Likely**	**POSSIBLY** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Invasion of native plant communities by exotic perennial grasses	KTP		**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by the proposal?
Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat. Moama is likely too cold for the Yellow Crazy Ant to establish.
Invasion, establishment and spread of *Lantana* (*Lantana camara* L. sens. Lat)	KTP		**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Ground disturbance encourages the spread of weeds.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	**Very likely**	**YES** Machinery used on site can potentially act as a transport for biosecurity risks. Landscaping can exacerbate this risk
Loss of Hollow-bearing Trees	KTP		**Very likely**	**YES** Several hollow bearing trees will be removed as a result of this proposal
Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat. The subject land is bottom land.
Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)	KTP	KTP	**Likely**	**POSSIBLY** Loss of vegetation exposes native fauna to predation by feral pests.
Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	**Likely**	**POSSIBLY** Loss of vegetation exposes native fauna to predation by feral pests.

Name	NSW status	Comm. Status	Likelihood of Occurrence	Exacerbated by the proposal?
Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758	KTP	KTP	**Very unlikely**	**NO** The proposal does not include any activities that would exacerbate this threat.
Removal of dead wood and dead trees	KTP		**Likely**	**YES** A small amount of dead wood exists on the subject land and will be removed. It is recommended that this be relocated to nearby habitat.

Appendix G: BAM Credit Summary Report

NSW GOVERNMENT

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00027290/BAAS21028/22/00030782	Blessed Carlo College	24/11/2021
Assessor Name	Report Created	BAM Data version *
Madeline Walsh	12/04/2022	50
Assessor Number	BAM Case Status	Date Finalised
BAAS21010	Finalised	07/04/2022
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

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BAM Credit Summary Report

Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone												
1	237_Mod	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	45.3	45.3	0.46	PCT Cleared - 73%	High Sensitivity to Potential Gain	Endangered Ecological Community	Endangered	2.00		10
											Subtotal	**10**
Riverine Western Grey Box grassy woodland of the semi-arid (warm) climate zone												
2	237_Poor	Not a TEC	8.8	8.8	4.4	PCT Cleared - 73%	High Sensitivity to Potential Gain			2.00		0
											Subtotal	**0**
											Total	**10**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Crinia sloanei / Sloane's Froglet (Fauna)									
237_Mod	45.3	45.3	0.46			Vulnerable	Endangered	False	8

Assessment Id
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BAM Credit Summary Report

237_Poor	8.8	8.8	4.4			Vulnerable	Endangered	False	14
								Subtotal	**22**
Tyto novaehollandiae / Masked Owl (Fauna)									
237_Mod	45.3	45.3	0.31			Vulnerable	Not Listed	False	7
237_Poor	8.8	8.8	0.71			Vulnerable	Not Listed	False	3
								Subtotal	**10**

Assessment Id
00027290/BAAS21028/22/00030782

Proposal Name
Blessed Carlo College

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Appendix H: Koala Habitat Assessment

Table 4: Koala habitat assessment tool

Attribute	Score	Inland	Coastal
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	Evidence of one or more koalas within the last 2 years.
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years.	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.
	0 (low)	None of the above.	None of the above.
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	Has forest or woodland with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present.	Has forest or woodland with only 1 species of known koala food tree present.
	0 (low)	None of the above.	None of the above.
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	Area is part of a contiguous landscape ≥ 500 ha.
	+1 (medium)	Area is part of a **contiguous landscape** < 1000 ha, but ≥ 500 ha.	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha.
	0 (low)	None of the above.	None of the above.
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	

Koala Occurrence – 0. There are no BioNet records of Koalas within 10 km of the subject land. Targeted surveys (Koala SAT and spotlighting) for koalas on the subject land did not reveal any signs of koala occurrence on the subject land.

Vegetation Composition – 1. While the vegetation within the subject land is highly disturbed, it nevertheless contains areas of sparse woodland with one secondary Koala food tree species: Grey Box (*Eucalyptus microcarpa*).

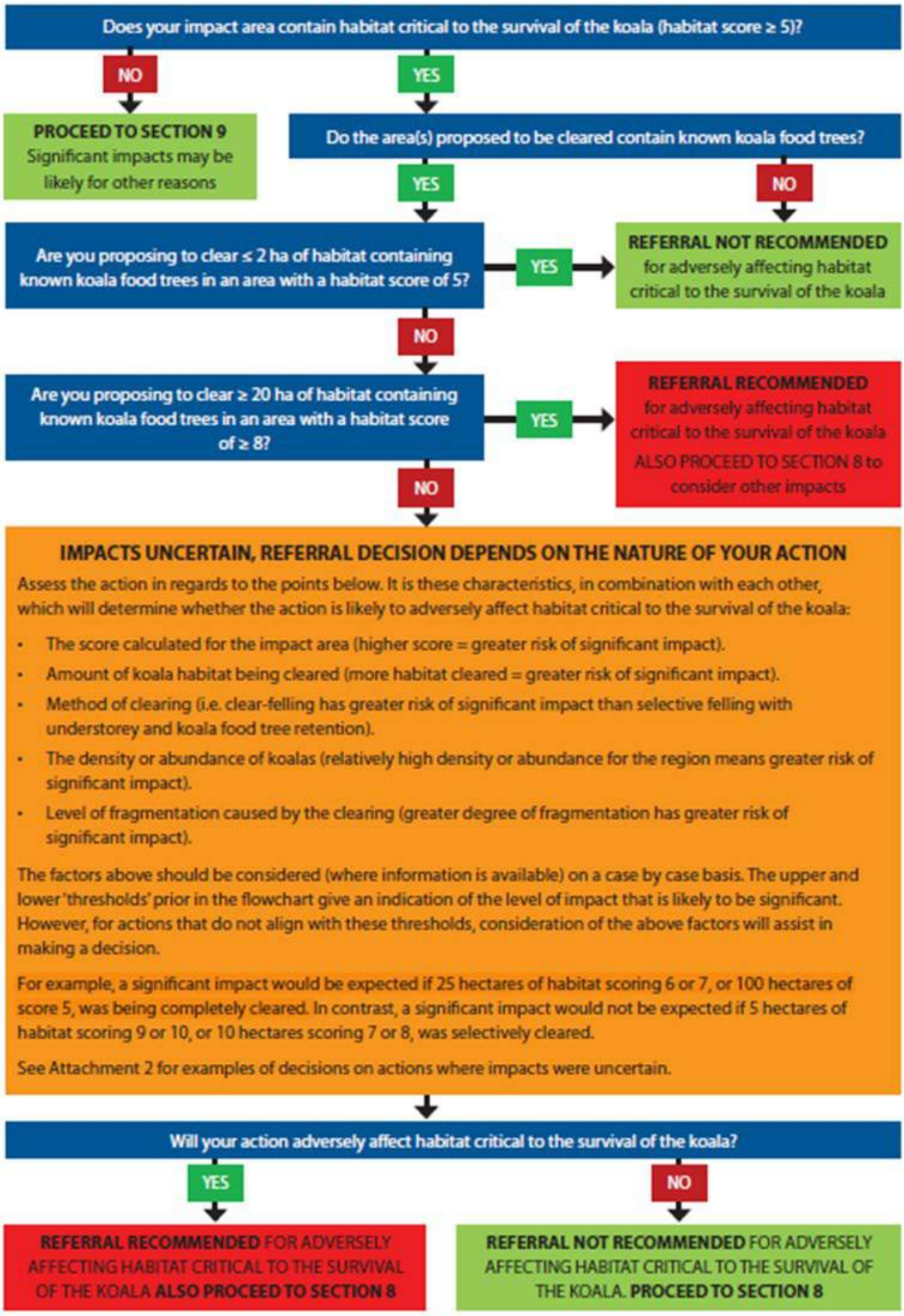
Habitat Connectivity – 0. Some connectivity is provided by vegetation in the road corridor, though it is unclear whether this is wide enough to be useful to Koalas. In addition, there are no records of koalas within 10 km.

Key Existing Threats – 0. No koalas have been recorded locally, consequently, no evidence of mortality is known. As the site is in an agricultural/urban landscape and adjacent to a road, it is likely that there is significant dog and vehicle threat.

Recovery Value – 0. As the habitat to be directly impacted by this proposal consists of a small number of trees, in a highly modified landscape, it is unlikely to be important for the recovery of the Koala.

TOTAL SCORE = 1. The subject land does not constitute critical habitat for the Koala.

Figure 2: Assessing adverse effects on habitat critical to the survival of the koala



Based on the EPBC Act referral guidelines for the vulnerable koala, the proposal is not likely to significantly impact current or future populations of Koalas and therefore does not require referral.

Appendix I: Terms and abbreviations

Terms and abbreviations used in this report

Abbreviation	Terminology	Description
BC Act	*Biodiversity Conservation Act 2016* (NSW)	The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. This Act contains schedules relating to the listing of threatened species, populations and communities in NSW. It also outlines the framework regulating development impact assessments in relation to biodiversity.
	Biosecurity Act 2015 (NSW)	The broad objectives for biosecurity in NSW are to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants by • Preventing their entry into NSW • Quickly finding, containing and eradicating any new entries • Effectively minimising the impacts of those pests, diseases, weeds and contaminants that cannot be eradicated through robust management arrangements. The *Biosecurity Act 2015* provides a statutory framework to help achieve these objectives.
CAMBA	China-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with China entered into in 1986. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
	Cumulative impacts	Impacts, when considered together, lead to a stronger impact than any impact in isolation.
	Direct impacts	Directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.
DoEE	Australian Government Department of Environment and Energy	The Department of the Environment designs and implements the Australian Government's policies and programmes to protect and conserve the environment, water and heritage and promote climate action.
DP	Deposited Plan	A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.
EEC	Endangered Ecological Community	An ecological community identified by relevant legislation likely to become extinct or is in immediate danger of extinction.
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW).	Provides the legislative framework for land use planning and development assessment in NSW.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).	Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
FM Act	*Fisheries Management Act 1994* (NSW)	The objects of this Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. This Act protects aquatic habitats and species which are not protected under the BC Act.
IBRA	Interim Biogeographic	The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian

	Regionalisation of Australia	Government's Department of the Environment. Each region is a land area made up of a group of interacting ecosystems repeated in similar form across the landscape.
	Indirect impacts	Occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.
JAMBA	Japan-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with Japan entered into in 1974. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
KTP	Key Threatening Process	A key threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. A requirement of their listing on the TSC Act is that the process adversely affects two or more threatened species, populations or ecological communities, or may cause species, populations or ecological communities not threatened to become threatened.
	Native Vegetation	1. For the purposes of this Part, native vegetation means any of the following types of plants native to New South Wales: a. trees (including any sapling or shrub or any scrub), b. understorey plants, c. groundcover (being any type of herbaceous vegetation), d. plants occurring in a wetland. 2. A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible. 3. For the purposes of this Part, native vegetation extends to a plant that is dead or that is not native to New South Wales if: a. the plant is situated on land that is shown on the native vegetation regulatory map as category 2-vulnerable regulated land, and b. it would be native vegetation for the purposes of this Part if it were native to New South Wales. 4. For the purposes of this Part, native vegetation does not extend to marine vegetation (being mangroves, seagrasses or any other species of plant that at any time in its life cycle must inhabit water other than fresh water). A declaration under Section 14.7 of the BC Act that specified vegetation is or is not marine vegetation also has effect for the purposes of this Part.
	Local population (species)	A local population of a threatened plant species comprises those individuals occurring in a defined area or a cluster of individuals extend into habitat adjoining and contiguous with the study area where the individuals could reasonably be expected to cross-pollinate. A local population of fauna species comprises those individuals known or likely to occur in in a defined area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the study area from time to time.
	Local occurrence (EEC)	The ecological community present within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of the ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

	Low condition (vegetation)	Vegetation in low condition means: a) woody native vegetation with native over-storey percent foliage cover less than 50% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and where either: – less than 50% of ground cover vegetation is indigenous species, or – greater than 90% of ground cover vegetation is cleared OR b) native grassland, wetland or herbfield where either: – less than 50% of ground cover vegetation is indigenous species, or – more than 90% of ground cover vegetation is cleared If native vegetation is not in low condition, it is in moderate to good condition. The percentages for the ground cover calculations must be made in a season when the proportion of native ground cover vegetation compared to non-native ground cover vegetation in the area is likely to be at its maximum. NOTE: Clearing the habitat of threatened species, populations or communities for the purposes of reducing its condition prior to assessment under the methodology may be a breach of environmental legislation, including sections 118A and 118D of the *National Parks and Wildlife Act 1974* (NPW Act), the *Native Vegetation Act 2003* (NV Act) and/or the *Environmental Planning and Assessment Act 1979* (EP&A Act).
MNES	Matters of national environmental significance	Refers to the seven matters of national environmental significance outlined under the EPBC Act.
NPW Act	*National Parks and Wildlife Act 1974* (NSW)	The objects of this Act are as follows: • The conservation of nature, including, but not limited to, the conservation of: • habitat, ecosystems and ecosystem processes, and • biological diversity at the community, species and genetic levels, and • landforms of significance, including geological features and processes, and • landscapes and natural features of significance including wilderness and wild rivers, The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to: • places, objects and features of significance to Aboriginal people, and • places of social value to the people of New South Wales, and • places of historic, architectural or scientific significance, • Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, • Providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation. The objects of this Act are to be achieved by applying the principles of ecologically sustainable development.
PoEO Act	*Protection of the Environment Operations Act 1997*	The objects of this Act are as follows: • to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development, • to provide increased opportunities for public involvement and participation in environment protection, • to ensure the community has access to relevant and meaningful information about pollution, • to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms promoting: • pollution prevention and cleaner production, • the reduction to harmless levels of the discharge of substances likely to cause harm to the environment, • the elimination of harmful wastes, • the reduction in the use of materials and the re-use, recovery or recycling of materials,

		• the making of progressive environmental improvements, including the reduction of pollution at source, • the monitoring and reporting of environmental quality on a regular basis, • to rationalise, simplify and strengthen the regulatory framework for environment protection, • to improve the efficiency of administration of the environment protection legislation, • to assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.
RAMSAR	Convention on Wetlands of International Importance	The Ramsar Convention's broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those remaining. This requires international cooperation, policy making, capacity building and technology transfer.
	Risk of extinction	The likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with the Republic of Korea entered into in 2007. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
RF Act	*Rural Fires Act 1997*	The objects of this Act are to provide: • for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and • for the co-ordination of bush firefighting and bush fire prevention throughout the State, and • for the protection of persons from injury or death, and property from damage, arising from fires, and • for the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and • for the protection of the environment by requiring certain activities referred to in paragraphs (a)-(c1) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the *Protection of the Environment Administration Act 1991*.
Significant impact		A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity.
SIS	Species Impact Statement	A document included with an Environmental Impact Statement which details a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section. The requirements as to the contents of an SIS for different categories of protected species are given in section 110 of the TSC Act.
Strahler stream order		Strahler stream order and are used to define stream size based on a hierarchy of tributaries.