Abel Ecology

Prescribed Ecological Actions Report (PEAR)

for

Tamworth Hospital – Dean Street, Tamworth NSW 2340

Lot 1, DP 1181268

Proposed extension to existing building

Prepared for:	Tom Kelly of Capital Insight on behalf of Health Infrastructure NSW
Report No:	AE25- 2759-PEAR-ISS 2
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Document History

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					Method	Date
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List of Abbreviations

AHD	Australian Height Datum
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	Biodiversity Conservation Regulation 2017
BSA	Biodiversity Stewardship Site
BV Map	Biodiversity Values Map
Tamworth RLEP 2010	*Tamworth Regional Local Environmental Plan 2010*
cm, m, ha	Centimetre, metre, hectare
Commonwealth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
BOS	Biodiversity Offset Scheme
CEEC	Critically Endangered Ecological Community
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
KPoM	Koala Plan of Management
MNES	Matters of National Environmental Significance
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PEAR	Prescribed Ecological Actions Report
PCT	Plant Community Type
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community

Note regarding maps in this report

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Executive summary

The proposal is for an extension to an existing hospital building (Figure 2, Figure 3).

The area proposed for development was landscaped as part of the major hospital redevelopment which was completed in 2016. The landscaped vegetation consists of a mix of exotic species and Australian natives from across the country. The trees present within the proposal area are semi-mature due to their relatively recent planting. Many plants show indications of stress (epicormic growth, poor form/structure, pests and disease).

A biodiversity survey was carried out at Tamworth Hospital to assess the likely impacts of the proposal on species and ecological communities present on the site, and whether the proposal will trigger entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016*.

This report also describes whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) (Commonwealth legislation).

The following three considerations are triggers for entry into the Biodiversity Offsets Scheme:

- Threshold 1: The proposal does not exceed the clearing threshold area as described in clause 7.2 of the *BC Regulation 2017 (NSW).*
- Threshold 2: The proposal does not undertake clearing of native vegetation or any prescribed activities (clause 6.1 of the BC Regulation 2017) on land shaded in the Biodiversity Values Land Map.
- Threshold 3: The proposal is not likely to significantly affect any threatened species or Endangered or Critically Endangered Species.

There is no impediment to this proposal in the scope of this report. None of the three thresholds for entry into the Biodiversity Offsets Scheme are triggered by the proposal.

A report prepared using the Biodiversity Assessment Method is not recommended.

The provisions of the EPBC Act 1999 do not apply to this proposal and it does not require referral to the Commonwealth.

Abel Ecology does not recommend any specific conditions of consent for the proposal.

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1. Introduction

1.1 Purpose of this report

Health Infrastructure NSW (the applicant) proposes to construct a building extension (the proposal) at Tamworth Hospital, (Lot 1, DP 1181268) (Figure 1).

This Prescribed Ecological Actions Report (PEAR) meets the requirements of the *NSW Biodiversity Conservation Act 2016* (BC Act) and *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to enable Department of Health Infrastructure to assess the proposal under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Throughout this report 'threatened' refers to those species and ecological communities listed as 'endangered' or 'vulnerable' under the BC Act and EPBC Act.

Department of Health Infrastructure must consider the following three Biodiversity Offsets Scheme (BOS) triggers:

- Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation (Does not apply to Part 5 Approvals)
- Threshold Trigger 2: Development is carried out on land included in the Biodiversity Values Land Map (Does not apply to Part 5 Approvals)
- Threshold Trigger 3: A "significant effect" on threatened species or ecological communities

A biodiversity survey of the development footprint was undertaken on 30 October 2024. The proposal was assessed against the three triggers listed above.

The proposal was also assessed to find if it would have a significant effect on any threatened species or ecological communities listed under the EPBC Act.

1.2 Associated reporting

This report should be read in conjunction with the following reports:

- Site Arborist Report (ARB) – Abel Ecology, AE25-2760-REP-ISS 2
- Site Bushfire Report (BAL) - Abel Ecology, AE25-REP-2758-ISS 1

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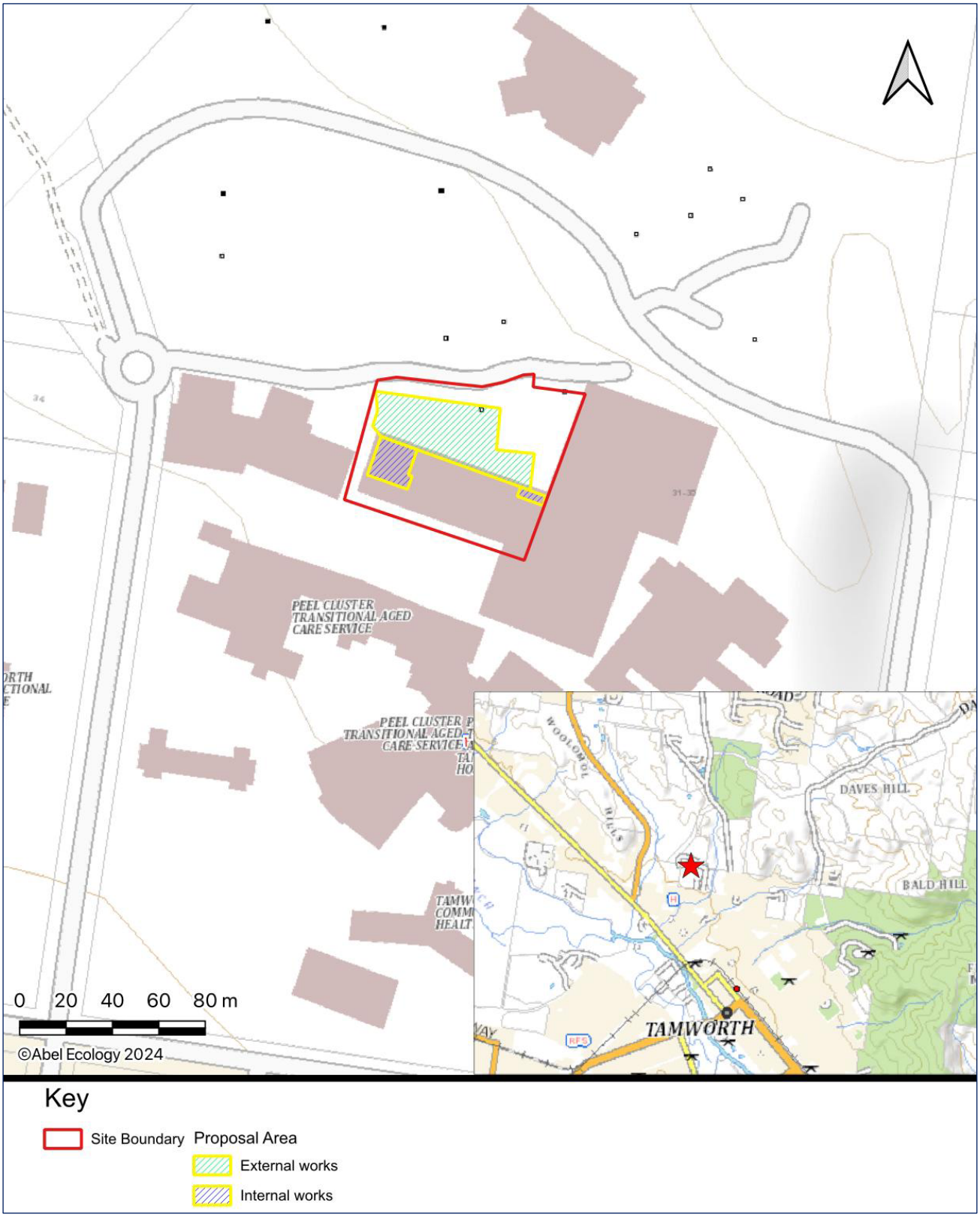

Figure 1. Locality map of site.

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1.3 The proposal

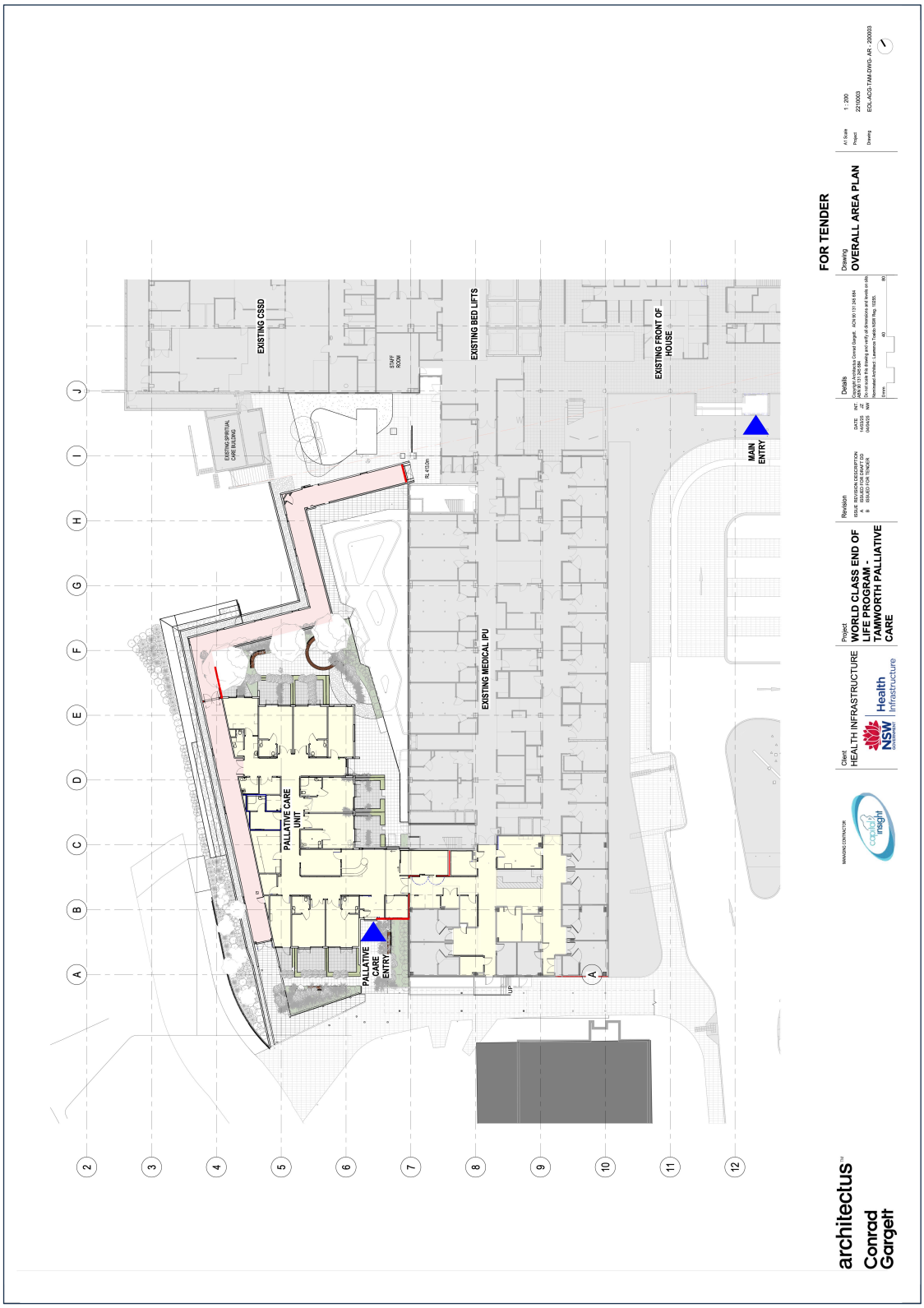

Figure 2. Proposal diagram

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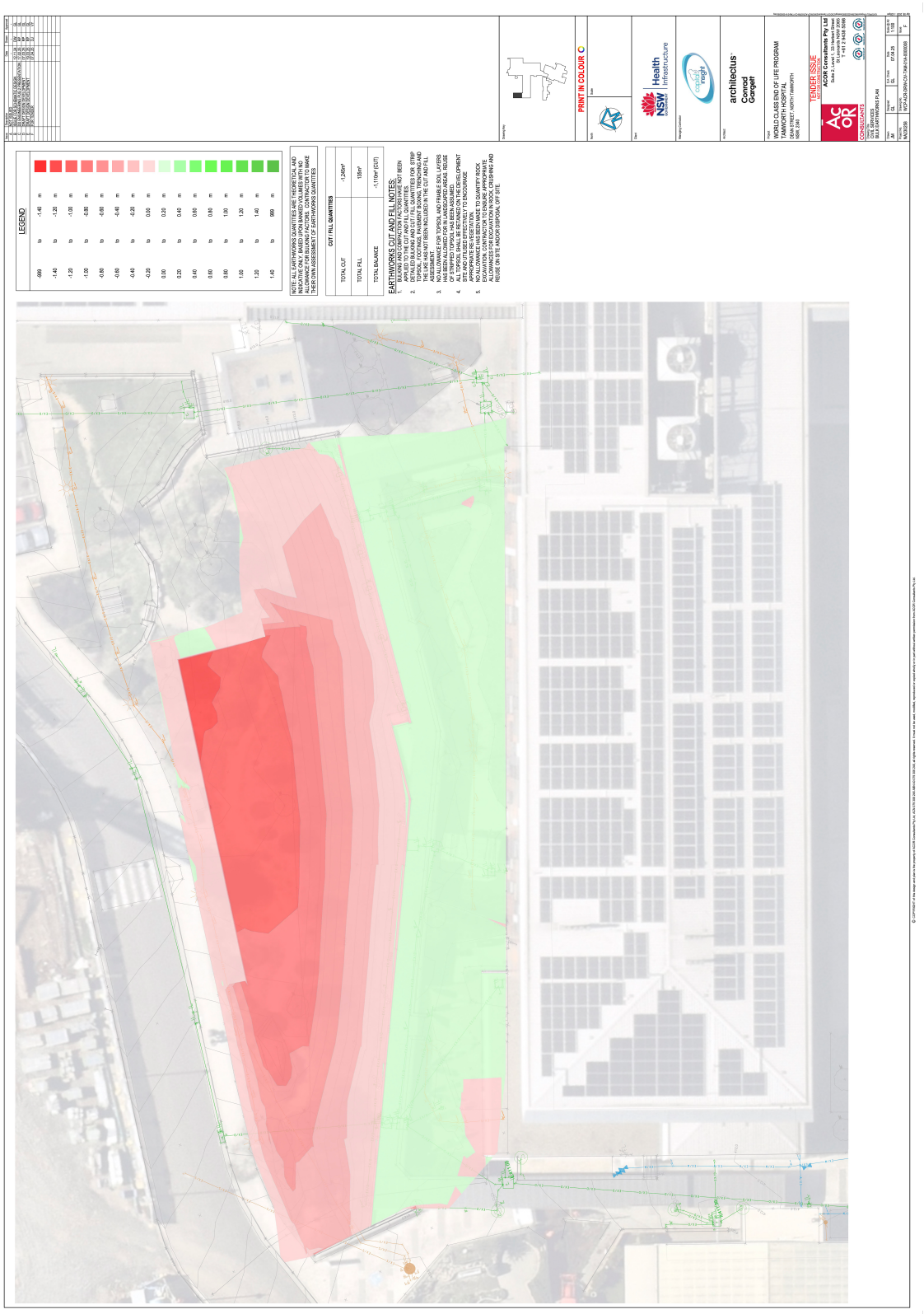

Figure 3. Bulk earthworks cut and fill plan

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2. Landscape features of the site and the locality

2.1 Site description

For the purposes of this report, the site (Figure 4) is part of lot 1 DP111268 and is bound by the north and eastern sides by the main emergency department building and to the north by the internal access road. It is approximately 0.15 ha. and the elevation is approximately 400 m above sea level.

https://www.planningportal.nsw.gov.au/find-a-property/

The site is mostly flat with a gentle slope southwards to the main hospital building

There are no water bodies or creeks.

Stormwater management is by engineered structures and overland flow.

The adjacent properties (Figure 5) are a mix of medical, correctional, residential and rural land uses.

The vegetation (Figure 8) and fauna habitat are described in detail in Section 4 below.

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Figure 4. Aerial of site.

Source: Nearmap

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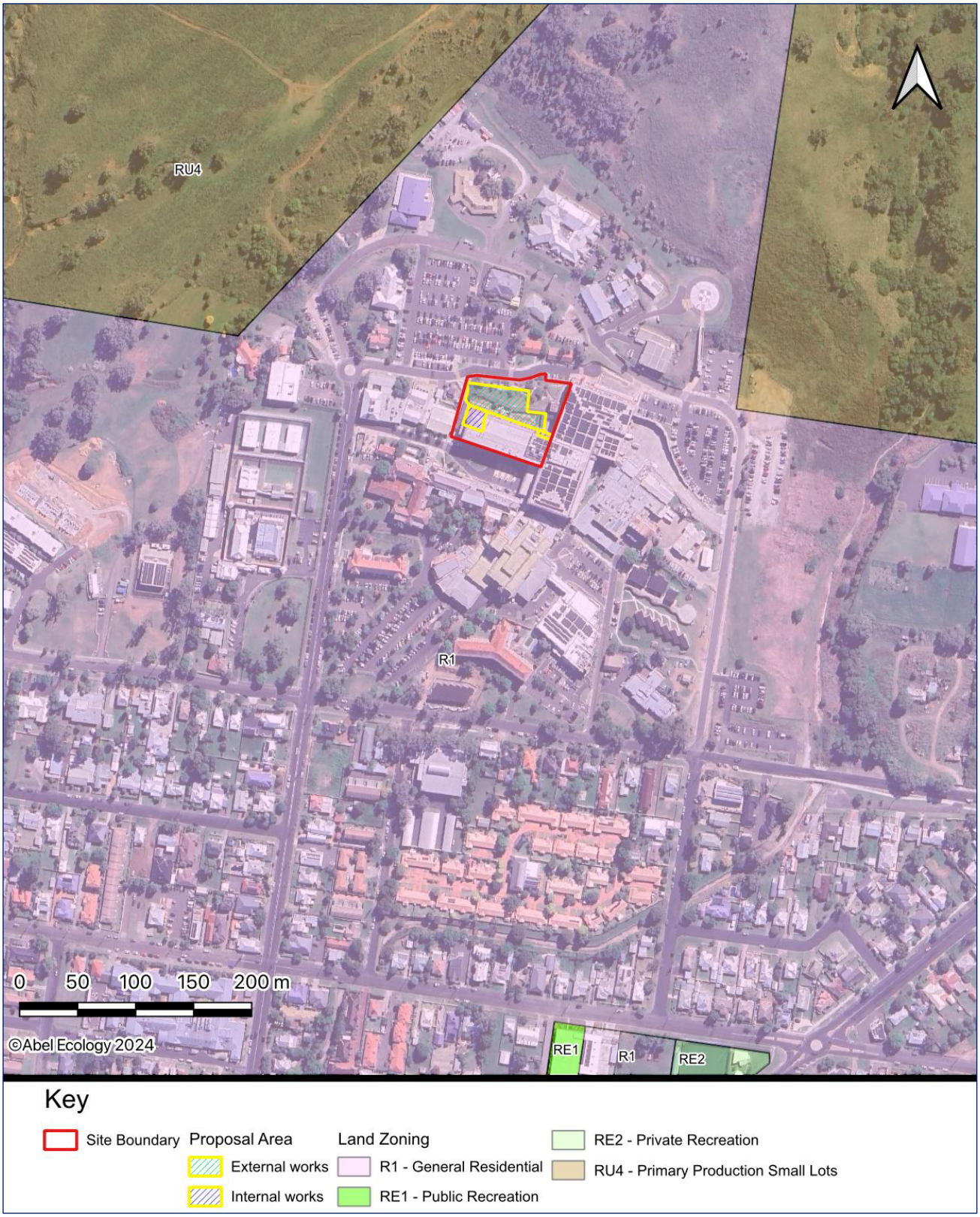

Figure 5. Land Zoning map of site.

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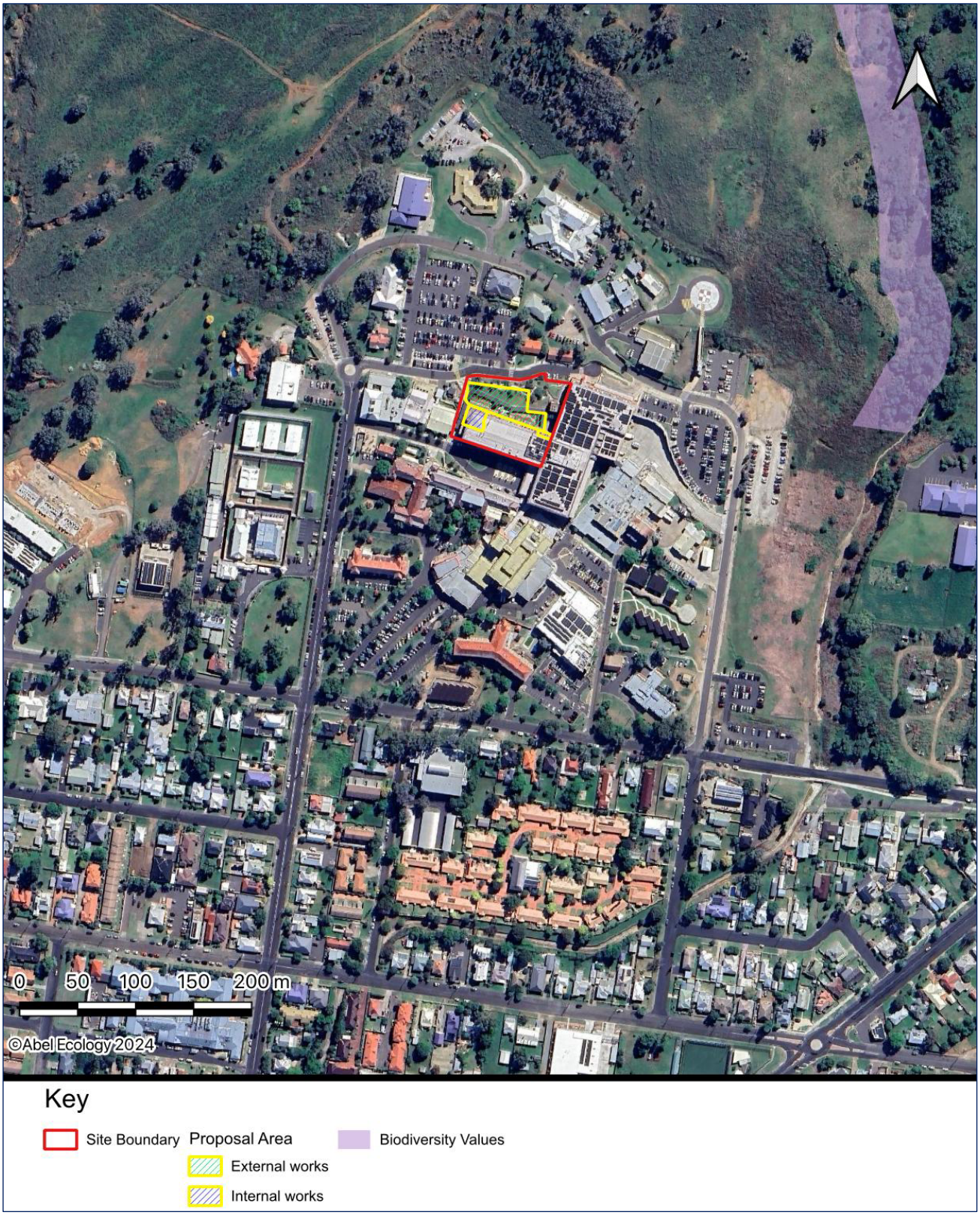

Figure 6. Biodiversity Values map of site.

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2.2 History of the site

The Tamworth Hospital was first constructed on the site in 1884. It has been in operation and growing ever since.

The area proposed for development was landscaped as part of the major hospital redevelopment which was completed in 2016.

2.3 Geology and Soils

The Geology on site is mapped as "Orchard Creek" in the Soil Landscapes of the Tamworth 1:100 000 Sheet, (Banks, Robert G. 2001, Department of Land and Water Conservation, Sydney). Although due to the history of construction on the site, the soils are likely to be highly disturbed.

Geology

Alluvium and colluvium (dominant) derived from Devonian argillite, cherty argillite and greywacke of the Baldwin Formation and the Yarrimie Formation (Geological map codes Dub and Dty). Steeper footslope areas are characterised by a gravel and cobble lag on the surface.

Soils

Soils have low variability; soil type is determined by slope, with soils generally becoming deeper and more sodic downslope. Mid to upper footslopes are dominated by moderately deep to very deep, moderately well-drained Red Chromosols (Non-calcic Brown Soils on upper slopes; Red-brown Earths on mid-footslopes). Giant, imperfectly drained Brown Sodosols (Solonetz ; Solodic Soils) occur on lower footslopes.

The mapped soil landscapes for the site and locality are displayed in Figure 7.

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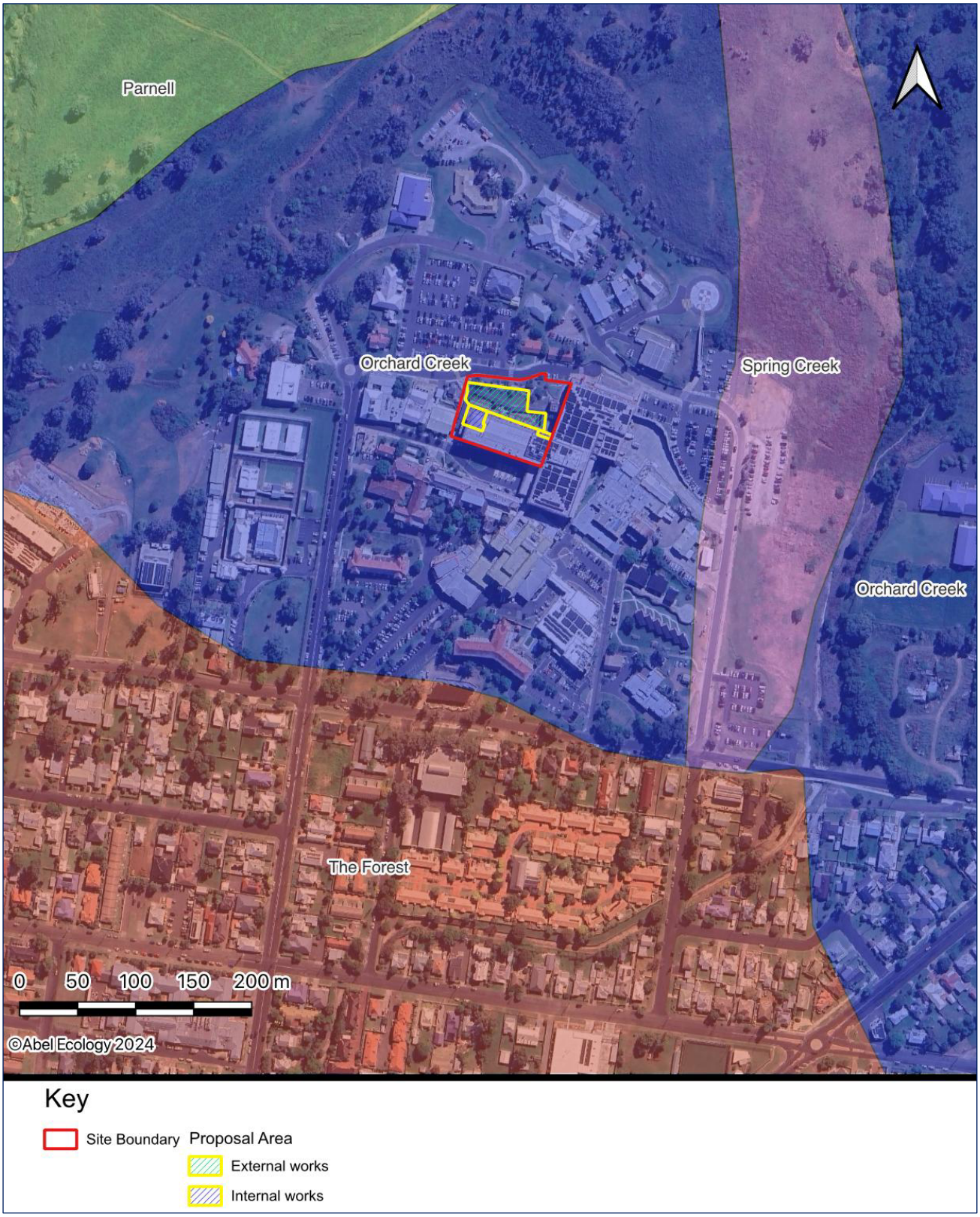

Figure 7. Site Soil landscapes

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2.4 Landscape features

2.4.1 Site landscape features

The following landscape features are present on the site (Table 1).

Table 1. Site landscape features

Vegetation	The entire site has been cleared or disturbed. There are no remnant local native trees, any local trees have been planted on site.
Non-native vegetation	The landscape has potential for foraging habitat for threatened species of bats and birds.
Human structures	Human structures in the in the vicinity of the project are new and not suitable habitat for fauna.
Wetlands/dams/watercourse	There are no waterbodies or watercourses on site
Karst, caves, crevices and other geological features of significance	There are no karsts, caves, crevices and other geological features of significance.
Vehicle traffic and road mortality	No road kill was observed on the site.

3. Field survey methods

3.1 BioNet Atlas of NSW Wildlife website search

Records from the BioNet Atlas of NSW Wildlife website were accessed using the following search criteria:

> Licensed Report of all Valid Records of Threatened (listed on *BC Act 2016*) or Commonwealth listed Entities for a 10 x 10 km square centred on the site (selected area [North: -31.02 West: 150.88 East: 150.98 South: -31.12]). Records since 01 Jan 2000 until 29 Oct 2024 returned a total of 198 records of 26 threatened flora and fauna species.
>
> Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°). Copyright the State of NSW through the Office of Environment and Heritage.

These species (Table 2) were considered in designing field survey targets and methods. Unsuitable candidates were eliminated on the basis of habitat requirements (Appendix 4 and Appendix 5).

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Table 2. BioNet threatened flora & fauna species records for a 5 km radius of the site since 1 Jan 2000

Scientific Name	**Common Name**	**NSW status**	**Comm. status**	**Habitat Present**
Aprasia parapulchella	Pink-tailed Legless Lizard	V,P	V	No
Alectura lathami	Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions	E2,P		No
Hirundapus caudacutus	White-throated Needletail	V,P	V,C,J,K	No
Circus assimilis	Spotted Harrier	V,P		No
Hieraaetus morphnoides	Little Eagle	V,P		No
Falco subniger	Black Falcon	V,P		No
Gallinago hardwickii	Latham's Snipe	V,P	V,J,K	No
Glossopsitta pusilla	Little Lorikeet	V,P		Foraging
Lathamus discolor	Swift Parrot	E1,P	CE	No
Neophema pulchella	Turquoise Parrot	V,P,3		Foraging
Ninox strenua	Powerful Owl	V,P,3		No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	V	No
Chthonicola sagittata	Speckled Warbler	V,P		No
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		Foraging
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		Foraging
Stagonopleura guttata	Diamond Firetail	V,P	V	Foraging
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	No
Phascolarctos cinereus	Koala	E1,P	E	No
Petaurus norfolcensis	Squirrel Glider	V,P		No
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	No
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	No
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		Foraging
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Foraging
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	No
Dichanthium setosum	Bluegrass	V	V	No

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Species for which suitable habitat occurs on the site within the range of the species but which did not appear in the Atlas record were added to Appendix 4 and Appendix 5.

Targeted surveys were made for relevant threatened species (Table 12).

3.2 Field work effort

Over the one day of fieldwork a total of six (6) hours were spent undertaking survey work on the site and surrounding habitat areas.

Table 3. Survey dates and weather conditions

Date	Time	Temperature (°C)	Weather	Task	Hours (hrs x no. people)
30/10/24	9:30-12:30	21°C	Clear, Calm	Flora & Fauna Surveys	3 hrs x 2 people

Survey effort was concentrated within the site boundaries, although adjacent surrounding vegetation was noted (Figure 4)

3.3 Flora survey method, vegetation community and habitat classification

A flora survey was conducted to compile a species list and vegetation descriptions. Targeted surveys were not made for threatened species (See Appendix 5) since the site is entirely disturbed and landscaped.

Vegetation quality is assessed as described below (Section 3.4). As the site is planted for aesthetics no determination of plant community type could be made.

3.4 Simplified vegetation integrity assessment

On-site vegetation may be described according to a simplified vegetation integrity classification for each vegetation zone / habitat type. The simplified vegetation integrity assessment is based upon a modified version of the vegetation integrity assessment described in the NSW Biodiversity Assessment Method (BAM) 2017. This simplified assessment is based upon a qualitative assessment; no quantitative assessment was undertaken and no vegetation integrity score is calculated. The assessment requires the assessor to compare the observed vegetation with the vegetation type presumed to be present prior to 1750 (high quality native vegetation). Vegetation with good or moderate integrity usually provide higher quality habitat for a diverse range of indigenous species.

Four main qualitative classes of vegetation integrity are recognised. There is variation within each class, and in addition the class boundaries are somewhat fluid where one grades into the other.

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Good integrity vegetation

Characteristics: Relatively high indigenous species diversity, diversity of flora species growth form (mix of trees, shrubs and groundcovers etc), diversity of tree size, canopy layer regeneration observed, fallen logs present on the ground, dead vegetative litter (leaves, twigs etc) cover present, weed invasion absent or minimal

Moderate integrity vegetation

Characteristics: Remnants and regenerating areas that have experienced disturbance but appear to retain the capability of recovery. Weed invasion may be moderate.

Poor integrity vegetation

Characteristics: The vegetation is highly disturbed. It typically consists of scattered trees/shrubs or clumps of trees and shrubs. Tree size diversity significantly reduced. The groundcover layer is comprised of a mix of indigenous species and exotic species. Fallen logs rare to absent, ground vegetative litter lacking.

Cleared class

Characteristics: Indigenous canopy species are absent and the indigenous understorey (shrubs/climbers/ scramblers/groundcovers) is approximately less than 50%.

Note: some vegetation types naturally lack some of the characteristics. For example, trees are rare to absent in saltmarshes, sedge swamps, alpine herbfields and arid shrublands. However, providing the other characteristics are consistent with a natural undisturbed area of the same vegetation type then these vegetation types are classified as having “good integrity”.

3.5 Fauna survey method

The methods of survey undertaken to detect the various faunal groups or their habitat are outlined below. General surveys were made for threatened species based on records of sightings from the BioNet Atlas website, and the Ecologist’s knowledge.

Roads and road verges were searched for road-kill fauna. Surveys for mammals, reptiles and frogs are generally run concurrently.

Dates, weather and temperatures of all fieldwork were recorded and are tabulated in Table 3 above.

3.5.1 Diurnal fauna searches

Searching, opportunistic observations and call recording provides an indication of types of species using a site. These methods are used to identify and record live animals, or record indirect evidence of animal presence on the site. On occasions, specific surveys may be conducted for a targeted group or species, such as searching the margins of a dam for frogs. Generally though, birds, reptiles, frogs and mammals, or evidence of them, may all be

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present in the same habitat at the time of survey, therefore searching for these faunal groups is generally run concurrently. This involved:

a. Searching shelter sites, basking sites, opportunistic observation, and assessment of shelter site diversity suitability for reptiles.

b. Searching shelter sites, calling sites, egg deposition sites, spotlighting and triangulation on calling males for frogs.

c. Opportunistic observations and identification of calls of species, and search for indirect evidence such as nests, feathers, scratchings and feeding signs for birds.

d. Searching for indirect evidence, such as diggings, droppings, runways and burrows, and opportunistic observations for mammals.

While rigorous surveys are likely to find more species, high species richness for birds can be recorded in a relatively short amount of time. Bird surveys are used as a simple indicator of other parameters, such as biodiversity and the functioning of the ecosystem.

3.6 Species likely to occur

Species to be listed as 'likely to occur' or 'expected' (see Appendix 3), are common fauna and flora species generally found in the region, which are likely to occur on site if suitable habitat is present.

Native flora may include species local to the area (occurring in local remnants). Structure and species composition will depend upon locally occurring communities.

Expected species are common and, by definition, are not threatened species.

3.7 Limitations of the survey

This survey was conducted in the spring season. This was not suitable for winter migrants or species of winter-flowering orchids that lose their aerial stems after fruiting.

The weather conditions were warm with clear skies and no wind.

Species that may use the site were not detected during the survey for the following reasons:

a) The species was present during the survey but was not detected due to dormancy, inactivity or cryptic habits.
b) The species use the site at other times of the year, but was not present during the survey due to being nomadic or migratory.

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3.8 Staff associated with the field work

Table 4. Staff associated with field work and analysis of field work

Staff member	Field work	Analysis of field work
Nicholas Tong	Flora and fauna survey	Fauna - Nicholas Tong
Erin Parker	Flora and fauna survey	Flora - Erin Parker

4. Survey Results: Vegetation and habitat description

4.1 Site vegetation and habitat

The site contains one vegetation and habitat zone which is described below. The distribution of vegetation/habitat on the site and surrounding areas is shown in Figure 8.

No potential habitat trees of were observed on the site.

There was no fallen logs or dead wood/coarse woody debris present on the site.

Other site habitat characteristics are described below.

Appendix 2 shows the list of flora found on the site.

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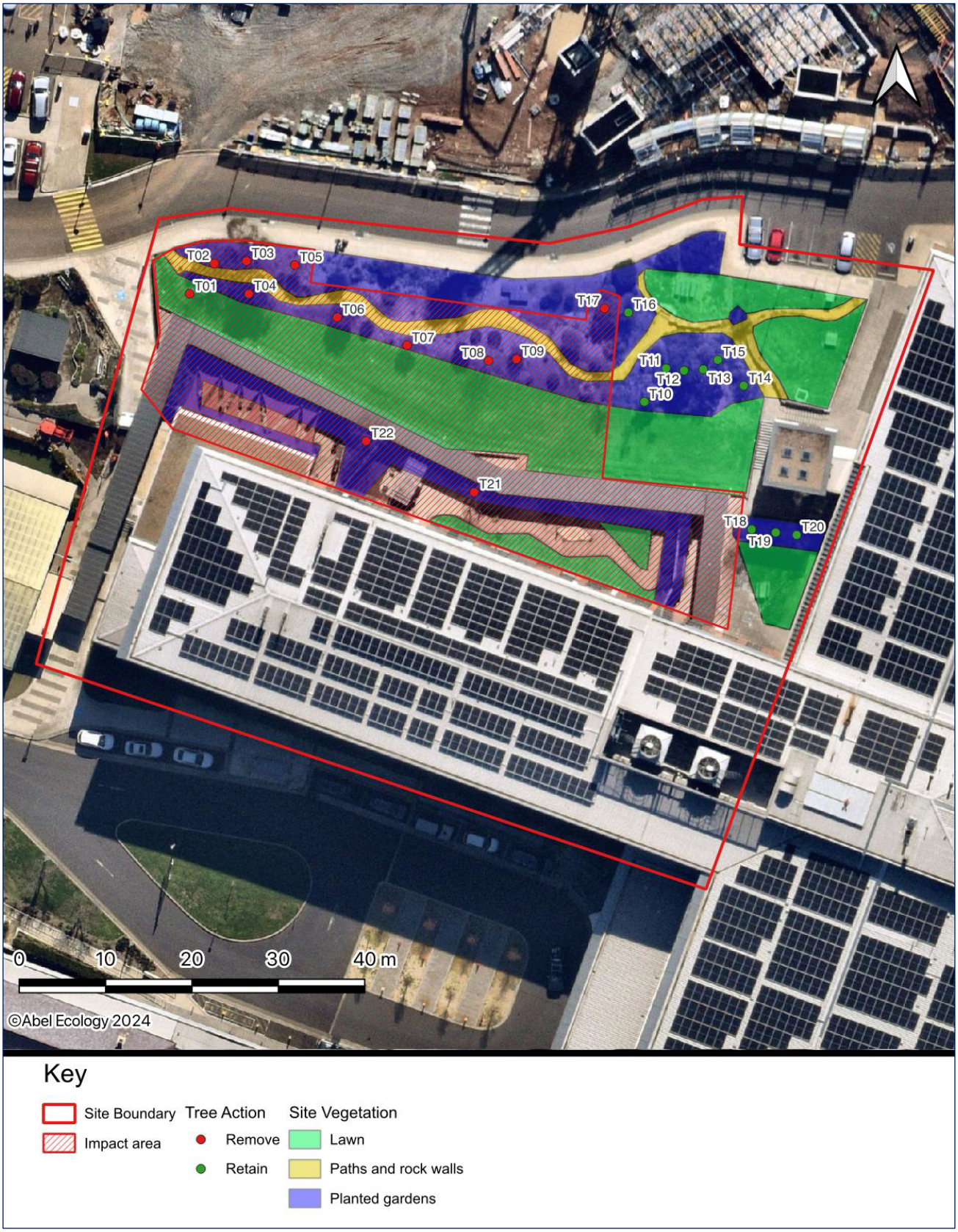

Figure 8. Impacts to vegetation.

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4.1.1 Vegetation and habitat- Zone 1 – Planted landscaping

The vegetation on site is planted landscape vegetation consisting of a mix of exotic species and Australian natives from across the country.

Table 5. Vegetation and habitat in Zone 1

Common Name	***Scientific Name***	***Family***	**Origin**
Knife-leaved Wattle	*Acacia cultriformis*	*Fabaceae (Mimosoideae)*	Local
Western Silver Wattle	*Acacia decora*	*Fabaceae (Mimosoideae)*	Local
Crimson citrinus 'Kings Park Special'	*Callistemon citrinus 'Kings Park Special'*	*Myrtaceae*	NSW Cultivar
River Bottlebrush	*Callistemon sieberi*	*Myrtaceae*	Local
Callistemon 'Little John'	*Callistemon viminalis 'Little John'*	*Myrtaceae*	NSW Cultivar
Californian lilac	*Ceanothus papillosus 'Blue Pacific' **	*Rahamnaceae*	North America Cultivar
Common Couch	*Cynodon dactylon*	*Poaceae*	NSW
Blueberry Lily	*Dianella revoluta*	*Phormiaceae*	NSW
Fortnight Lily	*Dietes grandiflora**	*Iridaceae*	South Africa
Sticky Hop-bush	*Dodonea viscosa subsp. angustifolia*	*Sapindaceae*	Local
Eremophila 'Wild Berry'	*Eremophila maculata x alternifolia 'Wild Berry'*	*Myoporaceae*	Australia Cultivar
Eremophila 'fairy floss'	*Eremophila racemosa x maculata 'fairy floss'*	*Myoporaceae*	Australia Cultivar
Red-capped Gum	*Eucalyptus erythrocorys*	*Myrtaceae*	WA
Yellow gum	*Eucalyptus leucoxylon subsp. leucoxylon*	*Myrtaceae*	SA, VIC, south-west NSW
Gum Tree	*Eucalyptus spp.*	*Myrtaceae*	Most likely WA
Wilga	*Geijera parviflora*	*Rutaceae*	Local
Spiny Cream Spider Flower	*Grevillea anethifolia*	*Proteaceae*	NSW
Rosemary Grevillea 'Scarlet Sprite'	*Grevillea rosmarinifolia 'Scarlet Sprite'*	*Proteaceae*	NSW Cultivar
Grevillea 'Honey Jo'	*Grevillea sericea x linearifolia 'Honey Jo'*	*Proteaceae*	NSW Cultivar
False Sarsaparilla	*Hardenbergia violacea*	*Fabaceae (Faboideae)*	Local
Crepe-Myrtle	*Lagerstoemia indica**	*Lythraceae*	China

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Common Name	*Scientific Name*	*Family*	Origin
Spiny-headed Mat-rush	*Lomandra longifolia*	*Lomandraceae*	NSW
Small-flowered Mallow	*Malva parviflora**	*Malvaceae*	Europe
Black Mulberry	*Morus nigra**	*Moraceae*	West Asia
Chinese Pistachio	*Pistacia chinensis**	*Anacardiaceae*	China
Indian Hawthorn	*Rhaphiolepis indica**	*Rosaceae*	Asia
Rosemary	*Salvia rosmarinus** *(syn. Rosmarinus officinalis)*	*Lamiaceae*	Europe
Star Jasmine	*Trachelospermum jasminoides**	*Apocynaceae*	Asia
Coastal Rosemary	*Westringia fruticosa*	*Lamiaceae*	NSW

Important habitat features that have significance for fauna occupation of the site are discussed below (Table 6). These include both site disturbance and natural features.

Table 6. Significant features and observations for Zone 1

Significant features	Observations
Frequency of large trees (approx. > 80 cm DBH)	absent
Tree regeneration and Tree stem-size diversity	No canopy regeneration. Trees are planted and semi mature ~ 8 years old
Logs, woody debris and litter cover	Logs, woody debris and leaf litter – absent
Food resources	Eucalyptus, Acacia and other trees and shrubs provide food resources of blossoms and seeds.

The vegetation within this zone qualifies as Cleared class.

No threatened flora was observed or is expected to occur within the site.

4.2 Species and Communities of conservation concern

No threatened flora species or Endangered Ecological Communities were observed on the site.

4.3 Weeds

The NSW Noxious Weeds Act 1993 has been repealed and the Biosecurity Act 2015 has replaced it. The Biosecurity Act 2015 requires each landholder and/or occupier to control biosecurity matter (weeds) on their property. The landholder and/or occupier is to develop an effective control strategy and plan to ensure they meet their General Biosecurity Duty.

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The General Biosecurity Duty (GBD) is imposed on any person who deals with biosecurity matter (weeds), and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity duty to ensure that the risk associated with those weeds is prevented, eliminated or minimised - so far as is reasonably practicable. A requirement is that all public and private land owners or managers and all other people who deal with weed species (biosecurity matter) must use the most appropriate approach to prevent, eliminate or minimise the negative impact (biosecurity risk) of those weeds.

Council may issue a Biosecurity Direction when any owner/occupier fails in their biosecurity duty to control weeds on their land. The owner/occupier must comply with this biosecurity direction. A penalty notice or prosecution may follow if the owner/occupier fails to comply with the Biosecurity Direction.

Table 7. Weeds Of National Significance (WONS), Priority Weeds (PW) and High threat Exotics (HTE) present on the site

Common Name	***Scientific Name***	**Family**	**Status**
Capeweed	*Arctotheca calendula**	Asteraceae	
Cobbler's Pegs	*Bidens pilosa**	Asteraceae	HTE
Praire Grass	*Bromus catharticus**	Poaceae	
Kikuyu Grass	*Cenchrus clandestinus**	Poaceae	HTE
	*Conyza spp.**	Asteraceae	
Slender Celery	*Cyclospermum leptophyllum**	Apiaceae	
Galenia	*Galenia pubescens**	Aizoaceae	HTE
Two Row Barley	*Hordeum distichon**	Poaceae	
Catsear	*Hypochaeris radicata**	Asteraceae	
Prickly Lettuce	*Lactuca serriola**	Asteraceae	
Cretan Weed	*Leontodon rhagadioloides**	Asteraceae	
Small-flowered Mallow	*Malva parviflora**	Malvaceae	
	*Petrorhagia dubia**	Caryophyllaceae	
Lamb's Tongues	*Plantago lanceolata**	Plantaginaceae	
Common Sowthistle	*Sonchus oleraceus**	Asteraceae	PW
Johnson Grass	*Sorghum halepense**	Poaceae	HTE
	*Stellaria pallida**	Caryophyllaceae	
Dandelion	*Taraxacum officinale**	Asteraceae	
Salsify	*Tragopogon porrifolius**	Asteraceae	
Haresfoot Clover	*trifolium arvense**	Fabaceae (Faboideae)	
Hop Clover	*trifolium campestre**	Fabaceae (Faboideae)	
Yellow Suckling Clover	*trifolium dubium**	Fabaceae (Faboideae)	
White Clover	*Trifolium repens**	Fabaceae (Faboideae)	

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5. Survey Results: Fauna

5.1 Species of conservation concern

No threatened fauna were observed on site and are not considered likely to breed on site. The vegetation on site provides limited foraging opportunities for threatened fauna.

5.2 Fauna results

A total of seven (7) species were detected, including six (6) birds and one (1) reptile.

Species listed as 'likely to occur' in the area are presented in Appendix 4. Note that the majority of the 'Expected Species' would not occur on the site due to the lack of habitat but do occur in the area. All the species listed as 'likely to occur' are common throughout the locality and the region. It is unlikely that protected species will be affected at a local, regional or state-wide scale by the proposal.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

Table 8. List of fauna detected on the site

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Reptiles			
Eastern Brown Snake	*Pseudonaja textilis*		O (off-site nearby)
N=	1		

Common Name	*Scientific Name*	Conservation Status	Recorded AE
Birds			
Nankeen Kestrel	*Falco cenchroides*		O
Rock Dove*	*Columba livia*		O
Sulphur-crested Cockatoo	*Cacatua galerita*		O
Musk Lorikeet	*Glossopsitta concinna*		O
Australian Raven	*Corvus coronoides*		O
Common Starling*	*Sturnus vulgaris*		O
N =	6		

Key

* = Introduced fauna O = Observed

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5.3 Fauna Summary

Species from each faunal group which are 'likely to occur' on the site can be seen in Appendix 3.

Mammals

No mammal species was detected on the site.

No mammal species are expected to occur on site, it is possible that the site could be used for foraging by microbats or small mammal such as antechinus or rodents.

Reptiles

No reptile species were detected on the site.

An Eastern Brown Snake was observed near the western boundary of the hospital grounds.

Small skinks (eg *Lampropholis* sp. or *Cryptoblepharus* sp.) may be present on site, but were not observed during the surveys.

Frogs

No frog species were detected on the site.

No frogs are expected to occur on site, due to lack of habitat.

Birds

Six (6) bird species were detected within the vicinity of the site.

The birds that were observed in the vicinity of the site are common to the area.

5.4 Feral fauna

No evidence of feral fauna other than birds was observed on the site.

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6. Discussion of results

The proposal area (Figure 4) is characterised by a mix of exotic dominated lawn space, landscaped vegetation/gardens and lightly gravelled pathways (Figure 8), located adjacent to existing hospital buildings. The planted vegetation contains exotic and native species sourced from around the country (Appendix 3) and Section 4.1.1). There are a number of exotic weeds present as listed in Section 4.3 including High Threat Exotics, Cobbler's Pegs (*Bidens Pilosa*), Galenia (*Galenia pubescens*) and Johnson Grass (*Sorghum halepense*). The planted trees are semi-mature, and no nests or hollows were observed. This area of planted vegetation could not be attributed to any ecological community.

The site does provide some potential foraging opportunity to threatened bird and bat species known to the local area (Table 2), in the form of blossoms and seeds of the various planted natives (e.g., Acacia and Eucalyptus species). No threatened species were observed during the site visit and are unlikely to rely on the site for breeding purposes.

Locally common fauna species were observed in the proposal area and surrounding hospital grounds. They are listed in Table 8.

Up to approximately 508 m^2 of planted vegetation (including twelve (12) semi-mature trees to be removed (AE25-2760-REP-ISS 2) and approximately 472 m^2 of lawn space is expected to be impacted for the purpose of the proposal (Figure 8).

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7. Impact on biodiversity: Threshold 3

7.1 Threshold 3: Five-part test summary

Habitat requirements for locally occurring threatened faunal species, and the presence or absence of such habitat on the site, is tabulated in Appendix 4. Threatened plant species, listed in the BC Act and the EPBC Act, are shown in Appendix 5.

Under Section 7.3 of the *Biodiversity Conservation Act* several factors (listed in Appendix 1) need to be considered in deciding whether there is likely to be a Significant effect on threatened species, populations or ecological communities, or their habitats. If there is likely to be a significant effect on threatened species, etc., the proposal must be accompanied by a Biodiversity Development Assessment Report.

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the five-part tests.

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Table 9. Summary of the five-part tests shown in full in Appendix 1.

Scientific Name	Common Name	NSW status	Comm. status	Recorded on site	Result
Glossopsitta pusilla	Little Lorikeet	V,P		No	Insignificant
Neophema pulchella	Turquoise Parrot	V,P,3		No	Insignificant
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		No	Insignificant
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		No	Insignificant
Stagonopleura guttata	Diamond Firetail	V,P	V	No	Insignificant
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		No	Insignificant
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		No	Insignificant

There is no significant effect, so a Biodiversity Development Assessment Report is not required.

8. Planning Instruments

8.1 Avoid, minimise and offset under s 6.4(1) of the BC Act

6.4. Biodiversity conservation offsets under scheme

1. For the purposes of the biodiversity offsets scheme, the biodiversity conservation measures to offset or compensate for impacts on biodiversity values **after** any steps taken to avoid or minimise those impacts are as follows—

a) the retirement of biodiversity credits,

b) other actions that benefit the biodiversity values of the impacted land or other biodiversity values.

The hierarchy of avoid, minimise and offset applies once a project has triggered entry into the Biodiversity Offset Scheme (BOS). However, even though this proposal does not require entry into the BOS, to avoid confusion, the considerations are addressed here.

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The objectives of avoid, minimise and offset are addressed in this proposal as follows.

- Avoid: The clearing of native bushland is avoided by siting the proposal within the existing hospital grounds, in an area of planted vegetation.
- Minimise: The proposal minimises tree removal by being located within the existing hospital grounds.
- Offset: in view of the avoid and minimise considerations above, and that the proposal does not trigger entry into the BOS, no offset is required.

8.2 Tamworth Regional Local Environmental Plan 2010

The proposal is classified as *development permitted without consent* under SEPP (Transport and Infrastructure) 2021. In accordance with section 2.7 of the SEPP, the provisions of the SEPP prevail over those of the *Tamworth Regional Local Environmental Plan 2010* (Tamworth RLEP 2010). Therefore, the provisions of the LEP do not apply to the proposal.

The site is zoned R1 General Residential under the LEP.

It is noted that the LEP does not contain a terrestrial biodiversity clause.

8.3 SEPP (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure) 2021) aims to facilitate the effective delivery of infrastructure across the State.

The proposal is classified as *development permitted without consent*, as defined by section 2.61 of the SEPP.

8.4 SEPP Biodiversity and Conservation 2021 - Koala habitat protection

State Environmental Planning Policy (Biodiversity and Conservation) 2021. 'Biodiversity and Conservation SEPP'. (Commenced 1 March 2022; supersedes Koala SEPPs 2020, 2021)

From the associated Fact Sheet (March 2022) for the Biodiversity and Conservation SEPP:

> 'Chapter 4 – Koala habitat protection 2021' contains the land-use planning and assessment framework from the Koala SEPP 2021 for koala habitat within Metropolitan Sydney and the Northern Tablelands and applies to all zones except RU1, RU2 and RU3 in the short term – it will apply to all zones once the Koala SEPP 2020 is repealed.'

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The site is zoned 'R1 General Residential'.

The site falls within the Northern Tablelands Koala management area.

Twelve (12) Koala records have been made to Bionet since Jan 2000, occurring approximately 2.3 km from the site. However, Koalas, or evidence of Koalas, was not seen on site and it is unlikely that any Koalas use the site. The site is not considered core Koala habitat.

No Koalas are known to the site. The site is not Potential or Core Koala Habitat.

The following five species were found in the proposal area: *Eucalyptus leucoxylon* subsp. *leucoxylon*, *Eucalyptus erythrocorys*, *Geijera parviflora*, *Eucalyptus* spp., and *Eucalyptus* spp. (*E.rugosa*/*E.leptocalyx*/*E.cooperiana* ?), (Table 10).

No Scheduled Koala feed trees for the Northern Tablelands occur naturally on the site. None of the above species are listed in Table 11. However, *Geijera parviflora* is listed as a koala use tree species under the Far West koala management area.

The result is **negative**. Less than 15% of the trees within the proposal area and on the site are Scheduled SEPP species (Table 11). The site is not potential Koala habitat.

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Table 10. Site Koala tree survey results

Species	Count	Percentage of trees within PDA	Feed tree or use
Eucalyptus leucoxylon subsp. leucoxylon	3	13	Not listed
Eucalyptus erythrocorys	1	4.5	Not listed
Geijera parviflora	2	9	Low Use - Listed under the Far West koala management area
Eucalyptus spp.	4	18	-
Eucalyptus spp. (E.rugosa/E.leptocalyx/E.cooperiana ?)	1	4.5	Not listed
Total (exotics not shown)	**2 of 22**	**9%**	

Table 11. Koala tree species for the Northern Tablelands Koala management area

Common name	***Species name***
Preferred (primary) use	
Wattle-leaved peppermint	*Eucalyptus acaciiformis*
White box	*Eucalyptus albens*
Grey gum	*Eucalyptus biturbinata*
Blakely's red gum	*Eucalyptus blakelyi*
River red gum	*Eucalyptus camaldulensis*
Mountain gum	*Eucalyptus dalrympleana*
Tumbledown red gum	*Eucalyptus dealbata*
Yellow box	*Eucalyptus melliodora*
Tallowwood	*Eucalyptus microcorys*
Grey box	*Eucalyptus moluccana*
Narrow-leaved black peppermint	*Eucalyptus nicholii*
White Sally or Snow gum	*Eucalyptus pauciflora*
Forest red gum	*Eucalyptus tereticornis*
Ribbon gum	*Eucalyptus viminalis*

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Common name	*Species name*
High use	
Apple box	*Eucalyptus bridgesiana*
Mountain blue gum	*Eucalyptus brunnea*
Broad-leaved stringybark	*Eucalyptus caliginosa*
Silvertop stringybark	*Eucalyptus laevopinea*
Forest ribbon gum	*Eucalyptus nobilis*
Narrow-leaved peppermint	*Eucalyptus radiata*
Black Sally	*Eucalyptus stellulata*
Youman's stringybark	*Eucalyptus youmanii*
Significant use	
Rough-barked apple	*Angophora floribunda*
Broad-leaved apple	*Angophora subvelutina*
Cabbage gum	*Eucalyptus amplifolia*
Drooping ironbark	*Eucalyptus caleyi*
Red stringybark	*Eucalyptus macrorhyncha*
New England peppermint	*Eucalyptus nova-anglica*
Orange gum	*Eucalyptus prava*
Eucalyptus williamsiana	*Eucalyptus williamsiana*
Occasional use	
Black she-oak	*Allocasuarina littoralis*
White cypress pine	*Callitris glaucophylla*
New England blackbutt	*Eucalyptus campanulata*
Narrow-leaved ironbark	*Eucalyptus crebra*
Narrow-leaved or thin-leaved stringybark	*Eucalyptus eugenioides*
Silver-leaved ironbark	*Eucalyptus melanophloia*
Brittle gum	*Eucalyptus michaeliana*
Messmate	*Eucalyptus obliqua*
Sydney blue gum	*Eucalyptus saligna*
Mugga ironbark	*Eucalyptus sideroxylon*

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8.5 Environment Protection and Biodiversity Conservation Act 1999

https://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf

8.5.1 Protected matters

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site. The outputs are shown in (Appendix 6) and summarised below.

World heritage properties: There are no World Heritage Properties listed in the vicinity of the proposal.

National heritage places: There are no National Heritage Places listed in the vicinity of the proposal.

Wetlands of international importance: There are three (3) Wetland/Wetlands of international importance listed in the Protected Matters Search including 'Riverland', 'Banrock Station Wetland Complex' and the 'Coorong, and Lakes Alexandrina and Albert Wetland'. The site is located at least 900 km upstream from these three wetlands and it is unlikely for there to be a significant direct or indirect impact as a result of the proposal.

Commonwealth listed threatened ecological communities: There are two (2) threatened ecological communities listed as likely to occur in the vicinity of the proposal: '*Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland*', and '*White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*'.

No threatened ecological communities were observed on site

Commonwealth listed threatened species: There are fifteen (15) threatened species known from the vicinity of the proposal: Swift Parrot (*Lathamus discolor*), Regent Honeyeater (*Anthochaera phrygia*), Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*), Booroolong Frog (*Litoria booroolongensis*), Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus* (SE mainland population)), Koala (*Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)), Diamond Firetail (*Stagonopleura guttata*), Murray Cod (*Maccullochella peelii*), Bluegrass (*Dichanthium setosum*), Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko (*Uvidicolus sphyrurus*), Brown Treecreeper (*Climacteris picumnus victoriae* (south-eastern population)), Grey-headed Flying-fox (*Pteropus poliocephalus*), White-throated Needletail (*Hirundapus caudacutus*), Narrow-leaved Peppermint, Narrow-leaved Black Peppermint (*Eucalyptus nicholii*), and Pink-tailed Worm-lizard, Pink-tailed Legless Lizard (*Aprasia parapulchella*).

No threatened species were observed on site.

Commonwealth listed migratory species: There are two (2) migratory species known or likely to occur in the vicinity of the proposal: Fork-tailed Swift (*Apus pacificus*), and White-throated Needletail (*Hirundapus caudacutus*).

No migratory species were observed on site.

Nuclear action: The proposed activity will/will not involve any nuclear activities.

Commonwealth marine areas: The proposed activity would not be undertaken in or affect any Commonwealth marine areas.

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There were no Critically Endangered or Endangered species or communities, or Vulnerable species recorded on the site. The provisions of the EPBC Act do not apply to this proposal.

8.6 Planning for Bushfire Protection

No additional clearing requires for APZ compliance. Landscaping is to be maintained to IPA conditions as per Bushfire Assessment Report (AE25-REP-2758-ISS 1)

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9. Conclusion and Recommendations

None of the three thresholds are triggered as follows:

1. Area of clearing vegetation **(Does not apply to Part 5 Approvals)**
2. Biodiversity Land Map – clearing or prescribed biodiversity impacts **(Does not apply to Part 5 Approvals)**
3. Five Part Tests

Therefore, a Biodiversity Development Assessment Report (BDAR) is not required.

A consent or approval may be issued with the following conditions:

- Landscaping within the APZ is to meet the conditions specified within Appendix 4 – Asset Protection Zone Requirements of Planning for Bushfire Protection 2019 (PBP).
- If possible, when conducting plantings, use locally native species. Consider using plants listed in Australian Plant Suitable for Tamworth Regional Council Areas (July 2007) available below:

  https://www.tamworth.nsw.gov.au/ArticleDocuments/350/Australian%20Plants%20for%20the%20North%20West%20Slopes.pdf.aspx

- Install construction fencing at limit of proposed disturbance to prevent accidental damage to surrounding vegetation.

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Appendix 1. Five-part tests

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the **five-part** tests.

The Assessment of Significance (Office of Environment and Heritage (OEH)) states that:

> *"Proposed measures that mitigate, improve or compensate for the action, development or activity should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation."*

Species addressed are as follows:

Table 12. Summary of the five-part tests

Scientific Name	**Common Name**	**NSW status**	**Comm. status**
Glossopsitta pusilla	Little Lorikeet	V,P	
^^Neophema pulchella	Turquoise Parrot	V,P	
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P	
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P	
Stagonopleura guttata	Diamond Firetail	V,P	V
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P	
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P	

Key

P = Protected

V = Vulnerable

E = Endangered

E1 = Endangered Species

CE = Critically Endangered

C = China-Australia Migratory Bird Agreement

J = Japan-Australia Migratory Bird Agreement

K = Republic of Korea-Australia Migratory Bird Agreement

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Clause 7.2 (BC Act) Development or activity "likely to significantly affect threatened species"

(1) For the purposes of this Part, development or an activity is **"likely to significantly affect threatened species"** if:

a. it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

b. the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

c. it is carried out in a declared area of outstanding biodiversity value.

(2) To avoid doubt, subsection (1) (b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the *Environmental Planning and Assessment Act 1979*.

Clause 7.3 (BC Act) Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

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

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

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

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

c. in relation to the habitat of a threatened species or ecological community:

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

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

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

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

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

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Woodland Birds and Nocturnal Raptors

Scientific name	Common name	NSW status	Comm. status
Glossopsitta pusilla	Little Lorikeet	V,P	-
Neophema pulchella	Turquoise Parrot	V,P	-
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P	-
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P	-
Stagonopleura guttata	Diamond Firetail	V,P	V

Key

CE = Critically Endangered

E1 = Endangered Species

E = Endangered

V = Vulnerable

P = Protected

Little Lorikeet *Glossopsitta pusilla*

http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20111

- Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.
- Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.
- Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards.
- Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries.
- Roosts in treetops, often distant from feeding areas.
- Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*.

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Turquoise Parrot *Neophema pulchella*

https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10555

- Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.
- Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals.
- Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter.
- Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed.
- Nests in tree hollows, logs or posts, from August to December. It lays four (4) or five (5) white, rounded eggs on a nest of decayed wood dust.

Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*

https://threatenedspecies.bionet.nsw.gov.au/profile?id=10523

- 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.
- Two or three eggs are laid and both parents occasionally help feed the young.

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Dusky Woodswallow *Artamus cyanopterus cyanopterus*

http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20303

- 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.
- Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed.
- Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while Tasmanian birds migrate to southeastern NSW after breeding.
  Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding. Although dusky woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species.
- Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.

Diamond Firetail *Stagonopleura guttata*

https://threatenedspecies.bionet.nsw.gov.au/profile?id=10768

- Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands.
- Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.
- Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.
- Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).
- Usually encountered in flocks of between 5 to 40 birds, occasionally more.
- Groups separate into small colonies to breed, between August and January.
- Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests.
- Birds roost in dense shrubs or in smaller nests built especially for roosting.
- Appears to be sedentary, though some populations move locally, especially those in the south.
- Has been recorded in some towns and near farm houses.

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Five Part Test

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

No. The vegetation on site is planted landscape vegetation consisting of a mix of exotic species and Australian natives from across the country. The planted vegetation does offer some limited foraging opportunities for the listed woodland bird species in the form of flowering trees and shrubs. However, due to the landscaped nature of the site, there is a lack of complex groundcover and woody debris that would support litter dwelling invertebrate prey. The planted tree species are semi mature and do not contain any hollows required by some of these species for nesting. None of these species were directly observed during the site visit and no clear evidence of nests were found. It is unlikely that these woodland bird species would depend on the site for breeding purposes. As such, the proposal is unlikely to have any adverse effect on the life cycle of these threatened bird species.

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

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

Not applicable. This test is for a group of threatened species.

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

Not applicable. This test is for a group of threatened species.

c. in relation to the habitat of a threatened species, population or ecological community:

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

Up to approximately 508 m^2 of planted vegetation (including twelve (12) semi-mature trees to be removed (AE25-2760-REP-ISS 2) and approximately 472 m^2 of lawn space is expected to be impacted for the purpose of the proposal (Figure 8). Additional area to be affected includes existing pathways.

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

No. The proposal will involve construction on an already predominately cleared and landscaped area. The proposal area therefore does not provide key connectivity and is already largely fragmented from other areas of vegetation. The proposal will not significantly fragment this habitat further.

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

Negligible.

Criterion	Comment
Area and quality of habitat within the locality	The locality is an agricultural, residential and woodland matrix. Areas of degraded or cleared natural vegetation occur on and surrounding agricultural landscape used for grazing for crops. Vegetation within the residential landscape largely consists of roadside and landscaped plantings. Areas of woodland remain bordering riparian areas and to the north and northeast of Tamworth provide habitat for local fauna species.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Habitat on site is consistent with surrounding habitat found within the residential landscape. It consists of exotic dominated lawn and landscape plantings of exotic and native tree and shrub species from around Australia. There are large areas of quality habitat north and northeast of the site.
Role of habitat to be affected in sustaining habitat connectivity in the locality	The proposal will involve construction on an already predominately cleared and landscaped area. The habitat on site is limited and does not provide substantial connectivity to other habitat in the area. Development of the site is not expected to affect these species' ability to move across the landscape.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The habitat on site is within historically disturbed grounds of a hospital. The vegetation on site is relatively young planted landscape vegetation consisting of a mix of exotic species and Australian natives from across the country. This is of low integrity and security.

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

No. The proposal will have no direct or indirect effect on the area of outstanding biodiversity value.

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e. whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the *Biodiversity Conservation Act 2016* and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and contained to the area of landscaped vegetation.

Conclusion

The proposed activity is unlikely to have a significant effect on Little Lorikeet, Turquoise Parrot, Black-chinned Honeyeater (eastern subspecies), Dusky Woodswallow, or Diamond Firetail.

Therefore, a BDAR is not required.

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Insectivorous bats

Scientific name	Common name	NSW status	Comm. status
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P	-
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P	-

Key

V = Vulnerable P = Protected

Eastern Coastal Freetail-bat *Micronomus norfolkensis*

https://threatenedspecies.bionet.nsw.gov.au/profile?id=10544

- Eastern Freetail-bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.
- Roost mainly in tree hollows but will also roost under bark or in man-made structures.
- Usually solitary but also recorded roosting communally, probably insectivorous.

Large Bent-winged bat *Miniopterus orianae oceanensis*

https://threatenedspecies.bionet.nsw.gov.au/profile?id=10534

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.
- This species has recently been renamed to *Miniopterus orianae oceanensis* or the large bent-winged bat, from *Miniopterus schreibersii* subsp. *oceanensis* or the eastern bent-wing bat.

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Five Part Test

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

No. The vegetation on site is planted landscape vegetation consisting of a mix of exotic species and Australian natives from across the country. The site does offer some foraging opportunities for the listed insectivorous bat species. The planted tree species are semi mature and do not contain any hollows suitable for roosting. It is unlikely that these insectivorous bats would depend on the site for breeding purposes. As such, the proposal is unlikely to have any adverse effect on the life cycle of these threatened species. The area of habitat modification is minor, and these species will continue to forage on site and in the surrounding area.

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

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

Not applicable. This test is for a group of threatened species.

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

Not applicable. This test is for a group of threatened species.

c. in relation to the habitat of a threatened species, population or ecological community:

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

Up to approximately 508 m^2 of planted vegetation (including twelve (12) semi-mature trees to be removed (AE25-2760-REP-ISS 2) and approximately 472 m^2 of lawn space is expected to be impacted for the purpose of the proposal (Figure 8). Additional area to be affected includes existing pathways.

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

No. The proposal will involve construction on an already predominately cleared and landscaped area. The proposal area therefore does not provide key connectivity and is already largely fragmented from other areas of vegetation. The proposal will not significantly fragment this habitat further.

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

Negligible.

Criterion	Comment
Area and quality of habitat within the locality.	The locality is an agricultural, residential and woodland matrix. Areas of degraded or cleared natural vegetation occur on and surrounding agricultural landscape used for grazing for crops. Vegetation within the residential landscape largely consists of roadside and landscaped plantings. Areas of woodland remain bordering riparian areas and to the north and northeast of Tamworth and provide habitat for local fauna species.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality.	Habitat on site is consistent with surrounding habitat found within the residential landscape. It consists of exotic dominated lawn and landscape plantings of exotic and native tree and shrub species from around Australia. There are large areas of quality habitat north and northeast of the site.
Role of habitat to be affected in sustaining habitat connectivity in the locality.	The proposal will involve construction on an already predominately cleared and landscaped area. The habitat on site is limited and does not provide substantial connectivity to other habitat in the area. Development of the site is not expected to affect these species' ability to move across the landscape.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The habitat on site is within historically disturbed grounds of a hospital. The vegetation on site is relatively young planted landscape vegetation consisting of a mix of exotic species and Australian natives from across the country. This is of low integrity and security.

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

No. The proposal will have no direct or indirect effect on the area of outstanding biodiversity value.

e. whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

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Yes. The proposed development will require the "Clearing of native vegetation", which is a key threatening process relevant to these species. Key threatening processes are listed under the *Biodiversity Conservation Act 2016* and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is minimal and contained to the area of landscaped vegetation.

Conclusion

The proposed activity is unlikely to have a significant effect on the Eastern Coastal Freetail-bat, or Large Bent-winged Bat.

Therefore, a BDAR is not recommended.

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Appendix 2. Flora species list

The grid reference for this locality is 302017.5 East, 6560465.2 North (Geographic)

Family	*Scientific name*	Common name
Aizoaceae	*Galenia pubescens** HTE	Galenia
Anacardiaceae	*Pistacia chinensis** HTE	Chinese Pistachio
Apiaceae	*Cyclospermum leptophyllum**	Slender Celery
Apocynaceae	*Trachelospermum jasminoides**	
Asteraceae	*Arctotheca calendula**	Capeweed
	*Bidens pilosa** HTW	Cobbler's Pegs
	*Conyza spp.**	
	*Hypochaeris radicata**	Catsear
	*Lactuca serriola**	Prickly Lettuce
	*Leontodon rhagadioloides**	Cretan Weed
	*Sonchus oleraceus**	Common Sowthistle
	*Taraxacum officinale**	Dandelion
	*Tragopogon porrifolius**	Salsify
Caryophyllaceae	*Petrorhagia dubia**	
	*Stellaria pallida**	
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla
	*Trifolium arvense**	Haresfoot Clover
	*Trifolium campestre**	Hop Clover
	*Trifolium dubium**	Yellow Suckling Clover
	*Trifolium repens**	White Clover
Fabaceae (Mimosoideae)	*Acacia cultriformis*	Knife-leaved Wattle
	Acacia decora	Western Silver Wattle
Iridaceae	*Dietes grandiflora**	
Lamiaceae	*Salvia rosmarinus** (syn. *Rosmarinus officinalis*)	Rosemary
	Westringia fruticosa	Coastal Rosemary
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Lythraceae	*Lagerstoemia indica*	Crepe Myrtle
Malaceae	*Rhaphiolepis indica**	Indian Hawthorn
Malvaceae	*Malva parviflora**	Small-flowered Mallow

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Family	*Scientific name*	Common name
Moraceae	*Morus nigra**	Black Mulberry
Myrtaceae	*Callistemon citrinus* 'Kings Park Special'	
	Callistemon sieberi	River Bottlebrush
	Callistemon viminalis 'Little John'	
	Eucalyptus erythrocorys	Red-capped Gum
	*Eucalyptus leucoxylon subsp. leucoxylon**	
	Eucalyptus spp.	
Oleaceae	*Jasminum suavissimum*	
Phormiaceae	*Dianella revoluta*	Blueberry Lily
Plantaginaceae	*Plantago lanceolata**	Lamb's Tongues
Poaceae	*Bromus catharticus**	Praire Grass
	*Cenchrus clandestinus** HTE	Kikuyu Grass
	Chloris truncata	Windmill Grass
	Cynodon dactylon	Common Couch
	*Hordeum distichon**	Two Row Barley
	*Sorghum halepense** HTE	Johnson Grass
Proteaceae	*Grevillea* ('Honey Jo')	
	Grevillea anethifolia	Spiny Cream Spider Flower
Proteaceae	*Grevillea rosmarinifolia* 'Scarlet Sprite'	
Rhamnaceae	*Ceanothus papillosus*	Californian lilac
Rutaceae	*Geijera parviflora*	Wilga
Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush
Scrophulariaceae	*Eremophila maculata x alternifolia* 'Wild Berry'	
	Eremophila racemosa x maculata 'fairy floss'	
Aizoaceae	*Galenia pubescens**	Galenia
Anacardiaceae	*Pistacia chinensis**	Chinese Pistachio
Apiaceae	*Cyclospermum leptophyllum**	Slender Celery
Apocynaceae	*Trachelospermum jasminoides**	
Asteraceae	*Arctotheca calendula**	Capeweed
	*Bidens pilosa**	Cobbler's Pegs
	*Conyza spp.**	
	*Hypochaeris radicata**	Catsear

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Family	*Scientific name*	Common name
	*Lactuca serriola**	Prickly Lettuce
	*Leontodon rhagadioloides**	Cretan Weed
	*Sonchus oleraceus** PW	Common Sowthistle
	*Taraxacum officinale**	Dandelion
	*Tragopogon porrifolius**	Salsify
Caryophyllaceae	*Petrorhagia dubia**	
	*Stellaria pallida**	
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla
	*Trifolium arvense**	Haresfoot Clover
	*Trifolium campestre**	Hop Clover
	*Trifolium dubium**	Yellow Suckling Clover
	*Trifolium repens**	White Clover
Fabaceae (Mimosoideae)	*Acacia cultriformis*	Knife-leaved Wattle
	Acacia decora	Western Silver Wattle
Iridaceae	*Dietes grandiflora**	
Lamiaceae	*Rosmarinus officinalis**	Rosemary
	Salvia rosmarinus	Rosemary
	Westringia fruticosa	Coastal Rosemary
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Lythraceae	*Lagerstoemia indica*	Crepe Myrtle
Malaceae	*Rhaphiolepis indica**	Indian Hawthorn
Malvaceae	*Malva parviflora**	Small-flowered Mallow
Moraceae	*Morus nigra**	Black Mulberry
Myrtaceae	*Callistemon citrinus* 'Kings Park Special'	
	Callistemon sieberi	River Bottlebrush
	Callistemon viminalis 'Little John'	
	Eucalyptus erythrocorys	Red-capped Gum
	*Eucalyptus leucoxylon subsp. leucoxylon**	
	Eucalyptus spp.	
Oleaceae	*Jasminum suavissimum*	
Phormiaceae	*Dianella revoluta*	Blueberry Lily
Plantaginaceae	*Plantago lanceolata**	Lamb's Tongues
Poaceae	*Bromus catharticus**	Praire Grass
	*Cenchrus clandestinus**	Kikuyu Grass

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Family	*Scientific name*	Common name
	Chloris truncata	Windmill Grass
	Cynodon dactylon	Common Couch
	*Hordeum distichon**	Two Row Barley
	*Sorghum halepense**	Johnson Grass
Proteaceae	*Grevillea ('Honey Jo')*	
	Grevillea anethifolia	Spiny Cream Spider Flower
Proteaceae	*Grevillea rosmarinifolia* 'Scarlet Sprite'	
Rhamnaceae	*Ceanothus papillosus*	Californian lilac
Rutaceae	*Geijera parviflora*	Wilga
Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush
Scrophulariaceae	*Eremophila maculata x alternifolia* 'Wild Berry'	
	Eremophila racemosa x maculata 'fairy floss'	

Key

* introduced species

PW – Priority weeds

WONS – Weeds Of National significance

HTE – High threat Exotic

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Appendix 3. Expected fauna species in the Tamworth Regional LGA

Mammals

Common name	*Scientific name*
Platypus	*Ornithorhynchus anatinus*
Short-beaked Echidna	*Tachyglossus aculeatus*
Spotted-tailed Quoll	*Dasyurus maculatus*
Koala	*Phascolarctos cinereus*
Bare-nosed Wombat	*Vombatus ursinus*
Sugar Glider	*Petaurus breviceps*
Squirrel Glider	*Petaurus norfolcensis*
Common Ringtail Possum	*Pseudocheirus peregrinus*
Common Brushtail Possum	*Trichosurus vulpecula*
Eastern Grey Kangaroo	*Macropus giganteus*
Red-necked Wallaby	*Notamacropus rufogriseus*
Common Wallaroo	*Osphranter robustus*
Brush-tailed Rock-wallaby	*Petrogale penicillata*
Swamp Wallaby	*Wallabia bicolor*
Grey-headed Flying-fox	*Pteropus poliocephalus*
Little Red Flying-fox	*Pteropus scapulatus*
White-striped Freetail-bat	*Austronomus australis*
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*
Inland Free-tailed Bat	*Ozimops petersi*
Eastern Free-tailed Bat	*Ozimops ridei*
Gould's Wattled Bat	*Chalinolobus gouldii*
Gould's Long-eared Bat	*Nyctophilus gouldi*
Inland Broad-nosed Bat	*Scotorepens balstoni*
Eastern Broad-nosed Bat	*Scotorepens orion*
Southern Forest Bat	*Vespadelus regulus*
Little Forest Bat	*Vespadelus vulturnus*
Large Bent-winged Bat	*Miniopterus orianae oceanensis*
House Mouse	*Mus musculus**
Black Rat	*Rattus rattus**

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Common name	*Scientific name*
Dog	*Canis familiaris**
Fox	*Vulpes vulpes**
Cat	*Felis catus**
Brown Hare	*Lepus capensis occidentalis**
Rabbit	*Oryctolagus cuniculus**
Horse	*Equus caballus**
Pig	*Sus scrofa**
European cattle	*Bos taurus**
Fallow Deer	*Dama dama**

Amphibians

Common Name	*Scientific Name*
Common Eastern Froglet	*Crinia signifera*
Smooth Toadlet	*Uperoleia laevigata*
Wrinkled Toadlet	*Uperoleia rugosa*
Eastern Banjo Frog	*Limnodynastes dumerilii*
Long-thumbed Frog	*Limnodynastes fletcheri*
Brown-striped Frog	*Limnodynastes peronii*
Spotted Grass Frog	*Limnodynastes tasmaniensis*
Booroolong Frog	*Litoria booroolongensis*
Green Tree Frog	*Litoria caerulea*
Bleating Tree Frog	*Litoria dentata*
Broad-palmed Frog	*Litoria latopalmata*
Peron's Tree Frog	*Litoria peronii*
Desert Tree Frog	*Litoria rubella*
Eastern Stony Creek Frog	*Litoria wilcoxii*

Reptiles

Common Name	*Scientific Name*
Eastern Snake-necked Turtle	*Chelodina longicollis*
Macquarie River Turtle	*Emydura macquarii macquarii*
Robust Velvet Gecko	*Nebulifera robusta*

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Common Name	*Scientific Name*
Dubious Dtella	*Gehyra dubia*
Pink-tailed Legless Lizard	*Aprasia parapulchella*
Burton's Snake-lizard	*Lialis burtonis*
Red-throated Skink	*Acritoscincus platynotus*
Southern Rainbow-skink	*Carlia tetradactyla*
Cream-striped Shinning-skink	*Cryptoblepharus virgatus*
Robust Ctenotus	*Ctenotus robustus*
Tree Skink	*Egernia striolata*
South-eastern Morethia Skink	*Morethia boulengeri*
Eastern Blue-tongue	*Tiliqua scincoides*
Eastern Water Dragon	*Intellagama lesueurii*
Bearded Dragon	*Pogona barbata*
Gould's Goanna	*Varanus gouldii*
Lace Monitor	*Varanus varius*
Carpet & Diamond Pythons	*Morelia spilota*
Yellow-faced Whip Snake	*Demansia psammophis*
Tiger Snake	*Notechis scutatus*
Spotted Black Snake	*Pseudechis guttatus*
Red-bellied Black Snake	*Pseudechis porphyriacus*
Eastern Brown Snake	*Pseudonaja textilis*
Bandy-bandy	*Vermicella annulata*

Birds

Common Name	*Scientific Name*
Australian Brush-turkey	*Alectura lathami*
Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions	*Alectura lathami*
Stubble Quail	*Coturnix pectoralis*
Indian Peafowl	*Pavo cristatus**
Brown Quail	*Synoicus ypsilophora*
Chestnut Teal	*Anas castanea*
Grey Teal	*Anas gracilis*

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Common Name	*Scientific Name*
Mallard	*Anas platyrhynchos**
Australasian Shoveler	*Anas rhynchotis*
Pacific Black Duck	*Anas superciliosa*
Pacific Black Duck Mallard Hybrid	*Anas superciliosa x platyrhynchos**
Hardhead	*Aythya australis*
Musk Duck	*Biziura lobata*
Australian Wood Duck	*Chenonetta jubata*
Black Swan	*Cygnus atratus*
Pink-eared Duck	*Malacorhynchus membranaceus*
Great Crested Grebe	*Podiceps cristatus*
Hoary-headed Grebe	*Poliocephalus poliocephalus*
Australasian Grebe	*Tachybaptus novaehollandiae*
Rock Dove	*Columba livia**
Diamond Dove	*Geopelia cuneata*
Bar-shouldered Dove	*Geopelia humeralis*
Peaceful Dove	*Geopelia placida*
Peaceful Dove	*Geopelia striata*
Crested Pigeon	*Ocyphaps lophotes*
Common Bronzewing	*Phaps chalcoptera*
Spotted Turtle-Dove	*Spilopelia chinensis**
Tawny Frogmouth	*Podargus strigoides*
Australian Owlet-nightjar	*Aegotheles cristatus*
Fork-tailed Swift	*Apus pacificus*
White-throated Needletail	*Hirundapus caudacutus*
Australasian Darter	*Anhinga novaehollandiae*
Little Pied Cormorant	*Microcarbo melanoleucos*
Great Cormorant	*Phalacrocorax carbo*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Pied Cormorant	*Phalacrocorax varius*
Australian Pelican	*Pelecanus conspicillatus*
Intermediate Egret	*Ardea intermedia*
White-necked Heron	*Ardea pacifica*

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Common Name	*Scientific Name*
Cattle Egret	*Bubulcus ibis*
Eastern Great Egret	*Casmerodius modesta*
Little Egret	*Egretta garzetta*
White-faced Heron	*Egretta novaehollandiae*
Nankeen Night Heron	*Nycticorax caledonicus*
Yellow-billed Spoonbill	*Platalea flavipes*
Royal Spoonbill	*Platalea regia*
Australian White Ibis	*Threskiornis moluccus*
Straw-necked Ibis	*Threskiornis spinicollis*
Collared Sparrowhawk	*Accipiter cirrocephalus*
Brown Goshawk	*Accipiter fasciatus*
Grey Goshawk	*Accipiter novaehollandiae*
Wedge-tailed Eagle	*Aquila audax*
Swamp Harrier	*Circus approximans*
Spotted Harrier	*Circus assimilis*
Black-shouldered Kite	*Elanus axillaris*
Whistling Kite	*Haliastur sphenurus*
Little Eagle	*Hieraaetus morphnoides*
Square-tailed Kite	*Lophoictinia isura*
Black Kite	*Milvus migrans*
Brown Falcon	*Falco berigora*
Nankeen Kestrel	*Falco cenchroides cenchroides*
Australian Hobby	*Falco longipennis*
Peregrine Falcon	*Falco peregrinus*
Black Falcon	*Falco subniger*
Eurasian Coot	*Fulica atra*
Dusky Moorhen	*Gallinula tenebrosa*
Purple Swamphen	*Porphyrio porphyrio*
Australian Spotted Crake	*Porzana fluminea*
Black-winged Stilt	*Himantopus himantopus*
Black-fronted Dotterel	*Elseyornis melanops*
Masked Lapwing	*Vanellus miles*

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Common Name	*Scientific Name*
Banded Lapwing	*Vanellus tricolor*
Latham's Snipe	*Gallinago hardwickii*
Red-chested Button-quail	*Turnix pyrrhothorax*
Painted Button-quail	*Turnix varius*
Silver Gull	*Chroicocephalus novaehollandiae*
Sulphur-crested Cockatoo	*Cacatua galerita*
Little Corella	*Cacatua sanguinea*
Long-billed Corella	*Cacatua tenuirostris*
Galah	*Eolophus roseicapilla*
Cockatiel	*Nymphicus hollandicus*
Yellow-tailed Black-Cockatoo	*Zanda funerea*
Australian King-Parrot	*Alisterus scapularis*
Red-winged Parrot	*Aprosmictus erythropterus*
Musk Lorikeet	*Glossopsitta concinna*
Little Lorikeet	*Glossopsitta pusilla*
Swift Parrot	*Lathamus discolor*
Budgerigar	*Melopsittacus undulatus*
Turquoise Parrot	*Neophema pulchella*
Pale-headed Rosella	*Platycercus adscitus*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Red-rumped Parrot	*Psephotus haematonotus*
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*
Rainbow Lorikeet	*Trichoglossus haematodus*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Pheasant Coucal	*Centropus phasianinus*
Horsfield's Bronze-Cuckoo	*Chalcites basalis*
Shining Bronze-Cuckoo	*Chalcites lucidus*
Black-eared Cuckoo	*Chalcites osculans*
Eastern Koel	*Eudynamys orientalis*
Pallid Cuckoo	*Heteroscenes pallidus*
Channel-billed Cuckoo	*Scythrops novaehollandiae*

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Common Name	*Scientific Name*
Southern Boobook	*Ninox novaeseelandiae*
Powerful Owl	*Ninox strenua*
Eastern Barn Owl	*Tyto javanica*
Azure Kingfisher	*Ceyx azureus*
Laughing Kookaburra	*Dacelo novaeguineae*
Forest Kingfisher	*Todiramphus macleayii*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
Dollarbird	*Eurystomus orientalis*
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*
White-throated Treecreeper	*Cormobates leucophaea*
Satin Bowerbird	*Ptilonorhynchus violaceus*
Superb Fairy-wren	*Malurus cyaneus*
Variegated Fairy-wren	*Malurus lamberti*
Inland Thornbill	*Acanthiza apicalis*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Striated Thornbill	*Acanthiza lineata*
Yellow Thornbill	*Acanthiza nana*
Brown Thornbill	*Acanthiza pusilla*
Buff-rumped Thornbill	*Acanthiza reguloides*
Speckled Warbler	*Chthonicola sagittata*
Western Gerygone	*Gerygone fusca*
White-throated Gerygone	*Gerygone olivacea*
White-browed Scrubwren	*Sericornis frontalis*
Weebill	*Smicrornis brevirostris*
Spotted Pardalote	*Pardalotus punctatus*
Striated Pardalote	*Pardalotus striatus*
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Red Wattlebird	*Anthochaera carunculata*
Little Wattlebird	*Anthochaera chrysoptera*
Regent Honeyeater	*^^Anthochaera phrygia*

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Common Name	*Scientific Name*
Yellow-faced Honeyeater	*Caligavis chrysops*
Blue-faced Honeyeater	*Entomyzon cyanotis*
Yellow-tufted Honeyeater	*Lichenostomus melanops*
Brown Honeyeater	*Lichmera indistincta*
Yellow-throated Miner	*Manorina flavigula*
Noisy Miner	*Manorina melanocephala*
Bell Miner	*Manorina melanophrys*
Brown-headed Honeyeater	*Melithreptus brevirostris*
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*
White-naped Honeyeater	*Melithreptus lunatus*
Scarlet Honeyeater	*Myzomela sanguinolenta*
White-eared Honeyeater	*Nesoptilotis leucotis*
Little Friarbird	*Philemon citreogularis*
Noisy Friarbird	*Philemon corniculatus*
Striped Honeyeater	*Plectorhyncha lanceolata*
Fuscous Honeyeater	*Ptilotula fusca*
White-plumed Honeyeater	*Ptilotula penicillata*
Eastern Shrike-tit	*Falcunculus frontatus frontatus*
Varied Sittella	*Daphoenositta chrysoptera*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
White-bellied Cuckoo-shrike	*Coracina papuensis*
White-winged Triller	*Lalage sueurii*
Grey Shrike-thrush	*Colluricincla harmonica*
Golden Whistler	*Pachycephala pectoralis*
Rufous Whistler	*Pachycephala rufiventris*
Olive-backed Oriole	*Oriolus sagittatus*
Australasian Figbird	*Sphecotheres vieilloti*
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*
White-breasted Woodswallow	*Artamus leucorynchus*
White-browed Woodswallow	*Artamus superciliosus*
Pied Butcherbird	*Cracticus nigrogularis*
Grey Butcherbird	*Cracticus torquatus*

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Common Name	*Scientific Name*
Australian Magpie	*Gymnorhina tibicen*
Pied Currawong	*Strepera graculina*
Grey Fantail	*Rhipidura albiscapa*
Willie Wagtail	*Rhipidura leucophrys*
Australian Raven	*Corvus coronoides*
Little Raven	*Corvus mellori*
Torresian Crow	*Corvus orru*
Magpie-lark	*Grallina cyanoleuca*
Restless Flycatcher	*Myiagra inquieta*
Leaden Flycatcher	*Myiagra rubecula*
White-winged Chough	*Corcorax melanorhamphos*
Apostlebird	*Struthidea cinerea*
Eastern Yellow Robin	*Eopsaltria australis*
Jacky Winter	*Microeca fascinans*
Red-capped Robin	*Petroica goodenovii*
Eurasian Skylark	*Alauda arvensis**
Golden-headed Cisticola	*Cisticola exilis*
Australian Reed-Warbler	*Acrocephalus australis*
Brown Songlark	*Cincloramphus cruralis*
Rufous Songlark	*Cincloramphus mathewsi*
Little Grassbird	*Poodytes gramineus*
White-backed Swallow	*Cheramoeca leucosterna*
Welcome Swallow	*Hirundo neoxena*
Fairy Martin	*Petrochelidon ariel*
Tree Martin	*Petrochelidon nigricans*
Eurasian Blackbird	*Turdus merula**
Common Myna	*Acridotheres tristis**
Common Starling	*Sturnus vulgaris**
Silvereye	*Zosterops lateralis*
Mistletoebird	*Dicaeum hirundinaceum*
Chestnut-breasted Mannikin	*Lonchura castaneothorax*
Plum-headed Finch	*Neochmia modesta*

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Common Name	*Scientific Name*
Red-browed Finch	*Neochmia temporalis*
Diamond Firetail	*Stagonopleura guttata*
Double-barred Finch	*Stizoptera bichenovii*
Zebra Finch	*Taeniopygia guttata*
House Sparrow	*Passer domesticus**
Australian Pipit	*Anthus novaeseelandiae*

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Appendix 4. Habitat requirements for locally-occurring threatened fauna species

Birds

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Dusky Woodswallow *Artamus cyanopterus cyanopterus* BC Act Sch. 1, Vul.	Often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests.	Suitable foraging habitat occurs on the site.
Spotted Harrier *Circus assimilis* BC Act Sch. 1, Vul.	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	No suitable natural habitat occurs on the site.
Varied Sittella *Daphoenositta chrysoptera* BC Act Sch. 1, Vul.	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	No suitable natural habitat occurs on the site. Requires mature forest.
Little Lorikeet *Glossopsitta pusilla* BC Act, Sch. 1, Vul.	Inhabits the open forests and dead timber alongside watercourses. Also occurs in eucalypt forest in mountainous regions.	Suitable foraging habitat occurs on the site.
Little Eagle *Hieraaetus morphnoides* BC Act Sch. 1, Vul.	Occupies open Eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands are also used. Builds a stick nests in winter in tall living trees within remnant patches	No suitable natural habitat occurs on the site.
White-throated Needletail *Hirundapus caudacutus* BC Act, Sch. 1, Vul. EPBC Act, Crit. Vul.	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Penninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (eg termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More common in coastal areas, less so inland.	No suitable natural habitat occurs on the site.
Swift Parrot *Lathamus discolor* BC Act, Sch. 1, End. EPBC Act, Crit. End.	Occurs in a variety of Eucalypt forests. Migrates from Tasmania to the mainland during the winter/autumn months to feed mostly on winter flowering Eucalypts	No suitable natural habitat occurs on the site.

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Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Square-tailed Kite *Lophoictinia isura* BC Act, Sch. 1, Vul.	Inhabits coastal forest and woodlands. Most commonly associated with ridge and gully forests dominated by Woollybutt, Spotted Gum or Peppermint Gum.	No suitable natural habitat occurs on the site.
Powerful Owl *Ninox strenua* BC Act, Sch. 1, Vul.	Pairs occupy permanent territories in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands and scrubs.	No suitable natural habitat occurs on the site.
Diamond Firetail *Stagonopleura guttata* BC Act Sch. 1, Vul	Mostly inhabits grassy eucalypt woodlands, also occurring in open forest and riparian areas within these. Feeds exclusively on the ground, occurring in flocks between five to 40+ birds	Suitable foraging habitat occurs on the site.
Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions *Alectura lathami* BC Act Sch. 1, End	Prefers dry rainforest that is found within the Semi-evergreen Vine Thicket. Nests are built in areas of dense vegetation providing ample litter for the mound building and decomposition process, as well as shade to reduce moisture loss from the mound. Tall trees such as eucalypts are used for nocturnal and diurnal roosting (15 - 20m above the ground). Feeds on a variety of food types including seeds, fruits, grain, insects, earthworms, and occasionally reptiles and carrion.	No suitable natural habitat occurs on the site.
Black Falcon *Falco subniger* BC Act Sch. 1, Vul	The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded (eucalypt dominated) watercourses; it also uses agricultural land with scattered remnant trees. The Falcon is often associated with streams or wetlands, visiting them in search of prey. It uses standing dead trees as lookout posts.	No suitable natural habitat occurs on the site.
Latham's Snipe *Gallinago hardwickii* BC Act Sch. 1, Vul EPBC Act, Vul. C, J, K	Latham's snipe is omnivorous and feeds in soft mudflats or shallow water typically at night, early morning, or evening. They shelter during the day in small wetlands including urban water bodies, saltmarshes, as well as creek edges, where there is adequate shallow flooded or inundated substrate. They also use crops and pasture. They breed in Hokkaido and highland areas of Honshu in Japan, and in Sakhalin and the nearby Kuril Islands of far eastern Russia	No suitable natural habitat occurs on the site.
Turquoise Parrot *Neophema pulchella* BC Act, Sch. 1, Vul.	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. Nests in tree hollows, logs or posts, from August to December.	Suitable foraging habitat occurs on the site.
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts,	No suitable natural habitat occurs on the site.

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Common name *Scientific name* Schedule listing	Preferred habitat	Comment
BC Act Sch. 1, Vul EPBC Act, Vul.	usually with an open grassy understorey, sometimes with one or more shrub species. fallen timber is an important habitat component for foraging.	
Speckled Warbler *Chthonicola sagittate* BC Act Sch. 1, Vul	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. 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.	No suitable natural habitat occurs on the site.
Regent Honeyeater *Anthochaera Phrygia* BC Act Sch. 1, Crit. End. EPBC Act, Crit. End.	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar.	No suitable natural habitat occurs on the site.
Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis* BC Act Sch. 1, Vul	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*).	Suitable foraging habitat occurs on the site.

Mammals

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Spotted-tailed Quoll *Dasyurus maculatus* BC Act, Sch. 1, Vul. EPBC Act, End.	Occurs mostly in sclerophyll forest and woodlands as well as coastal heath lands and rainforests. Requires suitable den sites such as hollows or caves and large areas of intact vegetation.	No suitable natural habitat occurs on the site.
Eastern Coastal Free-tail Bat *Micronomus norfolkensis* BC Act, Sch. 1, Vul.	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Suitable foraging habitat occurs on the site.

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Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Large Bent-winged Bat *Miniopterus orianae oceanensis* BC Act, Sch. 1, Vul.	Well-timbered valleys. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	Suitable foraging habitat occurs on the site.
Squirrel Glider *Petaurus norfolcensis* BC Act, Sch. 1, Vul.	Inhabits dry sclerophyll forest and woodland. Requires abundant hollow-bearing trees and a mix of Eucalypts, acacias and Banksias. At least one floral species should flower heavily in the winter and one or more species of Eucalypts need to be smooth-barked.	No suitable natural habitat occurs on the site.
Koala *Phascolarctos cinereus* BC Act, Sch. 1, End. EPBC Act, End.	Eucalypt forests rich in Swamp Mahogany (E. robusta), Forest Red Gum (E. tereticornis), and Grey Gum (E. punctata).	No suitable natural habitat occurs on the site.
Grey-headed Flying-fox *Pteropus poliocephalus* BC Act, Sch. 1, Vul. EPBC Act, Vul.	Found in rainforest, wet and dry sclerophyll forest and mangroves. Camps are usually in gullies, close to water and in vegetation with a dense canopy. Feeds on a wide variety of flowering and fruiting plants.	No suitable natural habitat occurs on the site.
Brush-tailed Rock-Wallaby *Petrogale penicillate* BC Act, Sch. 1, End. EPBC Act, Vul.	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	No suitable natural habitat occurs on the site.

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Amphibians

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Booroolong Frog *Litoria booroolongensis* BC Act, Sch. 1, End. EPBC Act, End.	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge. Sometimes bask in the sun on exposed rocks near flowing water during summer. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.	No suitable natural habitat occurs on the site.

Reptiles

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Pink-tailed Legless Lizard *Aprasia parapulchella* BC Act, Sch. 1, Vul. EPBC Act, Vul.	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	No suitable natural habitat occurs on the site.

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10.1 Likelihood of Occurrence

Factors determining the likelihood of occurrence for a particular species include:

- Specific habitat requirements (e.g. aquatic, seasonal, tree hollows, rock outcrop, woody debris, etc),
- Geological / edaphic (soil) characteristics,
- Known distribution (records),
- Climate.

Probability	Description
Unlikely (none)	No suitable habitat or connectivity to suitable habitat offsite. Not known from local area. Not detected on site.
Low	Low value suitable habitat (e.g. highly disturbed conditions; Small habitat/forage areas; High-level weed-invasion; Cleared with fragmented regrowth). Not known from local area. Not detected on site.
Moderate	Moderate value suitable habitat (e.g. Disturbed, weed-invaded; Foraging/roosting habitat present; Habitat corridor). Not detected on site.
High	High value suitable habitat (e.g. breeding/foraging/roosting habitat present; Low or nil weed presence; Habitat corridor). Not detected on site.
Known	Species known to occur within the site (e.g. breeding and foraging habitat; foraging habitat; Habitat corridor). Detected on or adjacent to the site.

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Appendix 5. Habitat requirements for locally-occurring threatened plant species

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Eucalyptus nicholii BC Act, Sch. 1, Vul. EPBC Act, Vul.	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. Tends to grow on lower slopes in the landscape.	No
Dichanthium setosum BC Act, Sch. 1, Vul. EPBC Act, Vul.	Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched).	No
Syzygium paniculatum BC Act, Sch. 1, End. EPBC Act, Vul.	Rainforest and open forest near riparian zones.	No

Key

BC Act 2016:

Sch1 = Schedule 1: Endangered species

Part 1: endangered species

Part 2: endangered populations

Part 3: endangered ecological communities

Part 4: species presumed extinct

Sch2 = Schedule 2: Vulnerable species

EPBC Act 1999:

CE = Critically Endangered

E = Endangered

V = Vulnerable

EP = Endangered Population

ROTAP Codes

1 Known by one collection only

2 Geographic range in Australia < 100Km

3 Geographic range in Australia > 100Km

E Endangered

V Vulnerable

R Rare

X Extinct

K Poorly known

C Reserved

a > or = 1000 plants reserved

i < 1000 plants reserved

t Total known population reserved

- Reserved population size unknown

+ Overseas occurrence

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Appendix 6. Matters of National Environmental Significance

Australian Government
Department of Climate Change, Energy, the Environment and Water

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: 29-Oct-2024

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Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	44
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	44
Commonwealth Heritage Places:	1
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	14
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

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Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1000 - 1100km upstream from Ramsar site	In feature area
Riverland	900 - 1000km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km 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
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community may 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			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	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
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may 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 known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
FROG			
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
Acacia pubifolia			
Velvet Wattle [19799]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cadellia pentastylis			
Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Callistemon pungens			
[55581]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dichanthium setosum			
bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus nicholii			
Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat known to occur within area	In feature area
Euphrasia arguta			
[4325]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Homoranthus prolixus			
[55198]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii			
Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In feature area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area
Myuchelys belli Western Sawshelled Turtle [86075]	Endangered	Species or species habitat may occur within area	In buffer area only
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat known to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

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Scientific Name	Threatened Category	Presence Text	Buffer Status
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 known to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	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]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Commonwealth Bank of Australia		
Commonwealth Land - Commonwealth Bank of Australia [12980]	NSW	In buffer area only
Commonwealth Trading Bank of Australia		

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Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Commonwealth Trading Bank of Australia [16080]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia [12972]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia [12958]	NSW	In buffer area only
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [12964]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [12993]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian & Overseas Telecommunications Corporation [12962]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12965]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12963]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12953]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12955]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12954]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12956]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12973]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [12957]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [15957]	NSW	In buffer area only
Defence		
Commonwealth Land - Defence Service Homes Corporation [12969]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12968]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12967]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12966]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12970]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12979]	NSW	In buffer area only

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Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Defence Service Homes Corporation [12975]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12951]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [12971]	NSW	In buffer area only
Commonwealth Land - Director of Defence Service Homes [12978]	NSW	In buffer area only
Defence - TAMWORTH GRES DEPOT ; BEERSHEBA BARRACKS-TAMWORTH [11202]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [12960]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16158]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16070]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12976]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12977]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15428]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15429]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15427]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16101]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16100]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16069]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16102]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16103]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12981]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12959]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [12961]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [12974]	NSW	In buffer area only

Commonwealth Heritage Places			[Resource Information]
Name	State	Status	Buffer Status
Historic			
Tamworth Post Office	NSW	Listed place	In buffer area only

Listed Marine Species	[Resource Information]

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	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 known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Pterodroma cervicalis White-necked Petrel [59642]		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 feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status

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Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Chaffey Dam Pipeline Project	2022/09314		Completed	In feature area
Controlled action				
Hills Plain subdivision	2005/2432	Controlled Action	Completed	In buffer area only
One Tree Hill Estate - Stage 13	2003/1142	Controlled Action	Post-Approval	In feature area
Operation of Peel River Drought Protection Works	2019/8590	Controlled Action	Post-Approval	In buffer area only
Rosewood Estate (Stage 3) Rural Residential Subdivision	2013/7060	Controlled Action	Post-Approval	In buffer area only
Rural residential subdivision, Rosewood Estate, Moore Creek, NSW	2013/6905	Controlled Action	Completed	In buffer area only
Vegetation clearing for a residential subdivision	2013/6812	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Dubbo - Tamworth Natural Gas Pipeline	2000/32	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Replacement Pipeline between Dungowan Village and Calala	2021/9091	Not Controlled Action	Completed	In buffer area only
Residential Development & Assoc Infrastructure 31 & 41 Panorama Road	2005/2115	Not Controlled Action	Completed	In feature area
Residential Subdivision, Warramunga Avenue	2005/2201	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Rural residential subdivision, Lots 172 and 180 DP753851 Barakula Drive, Moore Creek, NSW	2016/7736	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

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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 is 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 on the contents of this report.

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 point locations and environmental data layers.

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 when time permits.

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 breeding sites; and
- 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.

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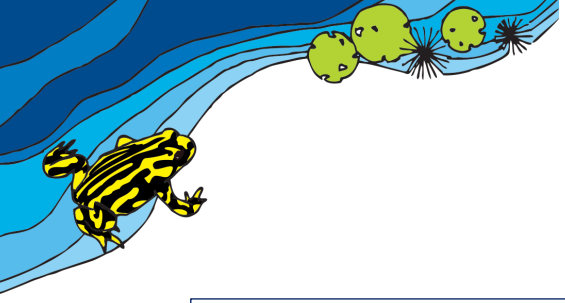

Acknowledgements

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.

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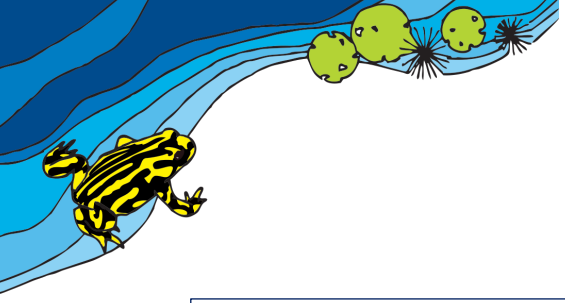

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Appendix 7. Soil Landscapes Report

oc ORCHARD CREEK

Landscape— 18.9 km² gently to moderately inclined footslopes on alluvium and colluvium derived from Devonian argillite and greywacke hills and mountains in the steeper north-eastern Duri Hills physiographic region. Local relief <120 m; slopes 8 – 20%; elevation 370 – 550 m. Woodland, mostly cleared for grazing.

Soils— soils are have low variability; soil type is determined by slope, with soils generally becoming deeper and more sodic downslope. Mid to upper footslopes are dominated by moderately deep to very deep, moderately well-drained Red Chromosols (Non-calcic Brown Soils on upper slopes; Red-brown Earths on mid-footslopes). Giant, imperfectly drained Brown Sodosols (Solonetz; Solodic Soils) occur on lower footslopes.

Qualities and Limitations— gully erosion risk; inherent erosion risk; potential recharge area; high run-on; sheet erosion risk. Soil materials have hardsetting surfaces; locally low wet strength; organic topsoils; localised sodicity (subsoils); locally high erodibility; low permeability; and structural decline hazard.

LOCATION AND SIGNIFICANCE

Gently to moderately inclined footslopes on alluvium and colluvium derived from Devonian argillite and greywacke hills and mountains in steep north-eastern Duri Hills. Type location is at "Daruka" (Grid Reference 3 05500E, 65 64600N).

LANDSCAPE

Geology and Regolith

Alluvium and colluvium (dominant) derived from Devonian argillite, cherty argillite and greywacke of the Baldwin Formation and the Yarrimie Formation (Geological map codes Dub and Dty). Steeper footslope areas are characterised by a gravel and cobble lag on the surface.

Terrain

Gently to moderately inclined, long (<1000 m) footslopes on alluvial/colluvial parent material. Local relief <120 m; slopes range 8 – 20%; elevation range 370 – 550 m. Drainage is unidirectional and continuous on steeper slopes, becoming discontinuous on lower angle slopes. Soil surface is characterised by gravel and cobble lag derived from colluvial landscapes upslope.

Vegetation

Woodland almost entirely cleared for cultivation and grazing. Relict tree species include *Eucalyptus albens* (white box) and *Angophora floribunda* (rough-barked apple). Other species encountered include *Notelaea microcarpa* (native olive), *Brachychiton populneus* (kurrajong), *Senna barclayana* (smooth senna), *Bursaria spinosa* (blackthorn), *Dodonaea viscosa* (giant hopbush), *Acacia salicina* (cooba), *Acacia decora* (western golden wattle), *Schinus areira* (pepper tree) (introduced), *Eremophila deserti* (turkeybush), *Lycium ferocissimum* (African boxthorn), *Olearia elliptica* (sticky daisy bush), *Ailanthus altissima* (tree of heaven) (introduced), *Callitris glaucophylla* (white cypress pine), *Cassinia laevis* (cough bush) and *Melichrus* sp. (urn heath).

Grass species commonly found in this unit include *Bothriochloa ambigua* (red grass), *B. decipiens* (red grass), *Chloris truncata* (windmill grass), *Eragrostis* spp. (love grasses), *Stipa setacea* (corkscrew grass), other *Stipa* spp. (speargrasses), *Danthonia* sp. (wallaby grass), *Sporobolus* sp. (rat's tail grass) and *Digitaria brownii* (cotton panic grass).

Land Use

Predominantly used for grazing although some cropping is still carried out on lower slopes. This landscape is being

Banks, Robert G. 2001, Soil Landscapes of the Tamworth 1:100 000 Sheet, Department of Land and Water Conservation, Sydney

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progressively subdivided in many areas for residential and rural residential areas of Tamworth City.

Land Degradation

Much of this landscape has had a long history of continuous cropping. There is evidence of extensive sheet, rill and gully erosion from this period. Structural decline is evident in topsoils in many old cultivation paddocks with dense plough pans observed. Long perennial pasture rotations and stock management have largely stabilised these problems, although localised severe sheet and rill erosion can still be found in areas of heavy stocking and along stock trails.

LANDSCAPE QUALITIES AND LIMITATIONS

Gully erosion risk; inherent erosion risk; potential recharge area; high run-on; sheet erosion risk.

Erodibility

	Non-concentrated flows	Concentrated flows	Wind
oc1	moderate – high	high	very low
oc2	very high	high	very low
oc3	high	high	very low
oc4	very high	high	very low

Erosion Hazard

	Sheetflow	Concentrated Flow	Wind
Grazing	low	high	low
Cropping	very high	very high	low

SOILS

Variation and Distribution

Soils are have low variability and soil type is determined by slope, with soils generally becoming deeper and more sodic downslope. Soil map confidence is 75%. Mid to upper footslopes are dominated by moderately deep to very deep, moderately well-drained Red Chromosols (Non-calcic Brown Soils on upper slope; Red-brown Earths on mid-footslope), with giant, imperfectly drained Brown Sodosols (Solonetz, Solodic Soils) occurring on lower footslopes.

Dominant Soil Materials

oc1—Hardsetting dark clay loam topsoils (A1, Ap horizons).
Dark reddish brown (5YR 2/3 – 3/3) to dark brown (7.5YR 3/2) clay loam to silty clay loam; massive, earthy; occasionally moderately pedal, occasionally with angular blocky peds (10 – 20 mm); common (10 – 20%) cobbles, very few to common (<2 – 20%) coarse gravels and gravels; field pH 5.5 – 7.0.

oc2—Bleached silty clay loam A2 horizons (A2e horizons).
Brown (7.5YR 4/3 – 4/4) (dry colours almost white) silty clay loam; massive, earthy; common to many (10 – 50%) cobbles and coarse gravels; field pH 6.0 – 7.0.

oc3—Structured reddish brown clay subsoils (B2, B21 horizons).
Dark reddish brown (2.5YR 3/4; 5YR 3/4) to dark brown (7.5YR 3/4) strongly subplastic medium to heavy clay; strong pedality, angular blocky to prismatic peds (10 – 50 mm); few to common (2 – 20%) cobbles, coarse gravels and gravels; field pH 5.5 – 7.5.

oc4—massive buried B horizons (2B2, 2B2b horizons).
Dark reddish brown (5YR 3/4) to dark brown and brown ((7.5YR 3/4 – 4/4) silty clay to sandy clay; massive, earthy; abundant (50 – 90%) cobbles; field pH 6.5 – 9.0, with pH increasing downslope.

TYPE PROFILES

Type Profile 1: upper footslope.

Dominance: 55% of soil landscape
Soil classification: moderately well-drained, moderately deep, Vertic Eutrophic Red Chromosol (Non-calcic Brown Soil)
Depth: 25 cm
Rooting depth: >100 cm
Location: Tamworth 1:25 000 map sheet, upper slope "Daruka Station" (Grid Reference 305075E, 6564900N). Soil Data Card 117

Layer 1, A1 **oc1**, 0 – 10 cm	very dark reddish brown (5YR 2/3) clay loam; moderately pedal, angular blocky smooth-faced peds (10 – 20 mm); moderately moist: moderately firm force; common (10 – 20%) parent material gravels (6 – 20 mm); common (10 – 25/10x10 cm) fine roots; field pH 6.5; abrupt (5 – 20 mm) boundary to…
Layer 2, B **oc3**, 10 – 25 cm	dark reddish brown (2.5YR 3/4) medium-heavy clay; strongly pedal, angular blocky smooth-faced peds (20 – 50 mm); moderately moist: moderately strong force; common (10 – 20%) parent material gravels (6 – 20 mm); common (10 – 25/10x10 cm) fine roots; field pH 7.0; layer continues. (Profile probably underlain by layers of rocky colluvium beyond 150 cm).

Banks, Robert G. 2001, Soil Landscapes of the Tamworth 1:100 000 Sheet, Department of Land and Water Conservation, Sydney

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Type Profile 2: mid-lower footslope.

Dominance: 20% of soil landscape
Soil classification: imperfectly drained, giant, Eutrophic Mesonatric Brown Sodosol (Solonetz)
Surface condition: loose
Depth: 550 cm
Rooting depth: >550 cm
Location: Tamworth 1:25 000 map sheet, gully north-west of "Wyllena" (Grid Reference 307625E, 6560100N). Soil Data Card 36. Timber/scrub/unused

Layer 1, A1 **oc1**, 0 – 15 cm	dark brown (7.5YR 3/2), silty clay loam; massive, earthy; dry: very firm force; common (10 – 20%) parent material cobbles (60-200 mm); common (10 – 25/10x10 cm) fine roots; field pH 5.5; clear (20 – 50 mm) boundary to…
Layer 2, A2 **oc2**, 15 – 25 cm	brown (7.5YR 4/4) silty clay loam; massive, earthy; dry: moderately firm force; common (10 – 20%) parent material cobbles (60 – 200 mm); common (10 – 25/10x10 cm) fine roots; field pH 7.0; clear (20 – 50 mm) boundary to…
Layer 3, B21 **oc3**, 25 – 90 cm	dark brown (7.5YR 3/4) medium clay; strongly pedal, prismatic smooth-faced peds (20 – 50 mm); dry: moderately firm force; common (10 – 20%) parent material cobbles (60 – 200 mm); common (10 – 25/10x10 cm) fine roots; field pH 7.0; clear (20 – 50 mm) boundary to…
Layer 4, B22 **oc4**, 90 – 350 cm	brown (7.5YR 4/4) silty clay loam; massive, earthy; dry: moderately weak force; abundant (50 – 90%) parent material cobbles (60 – 200 mm); few (1 – 10/10x10 cm) fine roots; field pH 9.0; clear (20 – 50 mm) boundary to…
Layer 5, 3B2 **oc4**, 350 – 550 cm	dark brown (7.5YR 3/4) silty clay loam; massive, earthy; dry: moderately weak force; abundant (50 – 90%) parent material cobbles (60 – 200 mm); few (1 – 10/10x10 cm) fine roots; field pH 9.0; layer continues.

Notes on soil test results

Due to a sample storage problem at Gunnedah Research Centre, Exchangeable Sodium Percentage (ESP) values may not reflect the true sodicity of soil materials analysed.

SOIL QUALITIES AND LIMITATIONS

Soil Conservation Earthworks (Small Farm Dams)

The Chromosols that dominate this landscape tend to have highly aggregated subsoils, requiring the incorporation of a dispersant as well as taking care to achieve maximum compaction for dam construction. Field dispersion tests should determine if this is going to be a problem. Sodosols and Chromosols on absolute lower slopes generally have more suitable soils for earthworks construction.

Rural Capability and Sustainable Land Management Recommendations

Low limitations for grazing. High limitations for cropping.

The Chromosols and Sodosols of this landscape have moderate fertility, but moisture storage in much of the landscape is limited by high gravel content and the strong aggregation of clayey subsoils (Chromosols). Erosion hazard under cropping is high. Grazing on native or improved pastures is recommended. Retain or promote by planting or regeneration of 10% tree cover, preferably in shelter belts to increase soil moisture storage. Tree cover should be retained at significant breaks of slope (e.g., at the bottom of the footslope and along drainage lines).

Urban Capability

Low to moderate limitations for urban development due to slope and soil engineering hazards. Adjacent (lower) landscapes have known salinity outbreaks or significant salinity risk. These factors should be considered in building location and design of footings. Drainage should be designed so as not to increase recharge to shallow groundwater in adjacent landscapes.

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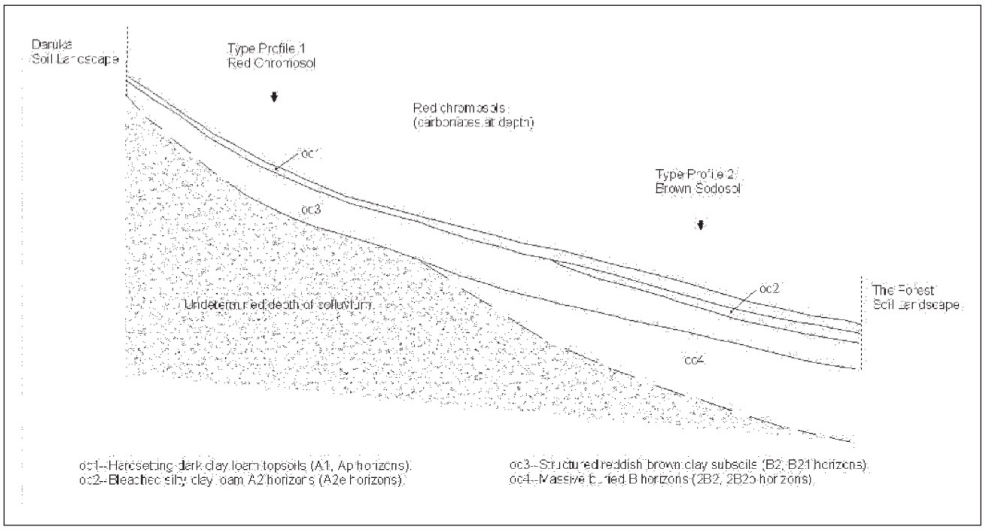

■ ***Distribution diagram of Orchard Creek soil landscape illustrating occurrence and relationship of dominant soil materials.***

Banks, Robert G. 2001, Soil Landscapes of the Tamworth 1:100 000 Sheet, Department of Land and Water Conservation, Sydney

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Appendix 8. Company Profile

Abel Ecology has been in the biodiversity consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements, Biodiversity Development Assessment Reports and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of eight scientists and four administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780
NPWS GIS data licence number is CON95034
NSW Dept of Primary Industries Secretary's Animal Care and Ethics Committee Approval: 18/575
NSW Dept of Primary Industries Animal Research Authority. Accreditation No: 84207

The Consultancy Team

Dr Danny Wotherspoon

BSc, DipEd, MA, PhD, Grad Dip Bushfire Protection,
MECA NSW, MEPLA, MNELA, MESA, MEIANZ, White card.

Danny has practised as an ecological and bushfire consultant since 1991. He is a consulting ecologist to private developers, State Government agencies and various City Councils on a regular basis, for development applications, government projects, and as expert witness in the NSW Land and Environment Court.

Danny's PhD researched fragmented vegetation and fauna habitat use. He has special expertise in fauna habitat use. Danny has presented invited papers at international conferences since 2001 in Australia, China, South Africa, Sri Lanka and Israel on his PhD and other research, including golf course habitat management. Danny's scientific papers have been published in both international and Australian academic journals.

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Koala survey qualification Dr Danny Wotherspoon

Requirements of SEPP Koala habitat Protection 2021

Surveys Must be Carried Out by a Suitably Qualified Person.

This is taken to mean a person with:

Criterion	Dr Wotherspoon
A minimum undergraduate qualification in natural sciences, ecology, environmental management forestry or similar from a university and	BSc (zoology and ecology) PhD (animal ecology)
A minimum 3 years experience in environmental assessment including field identification of plant and animal species and habitat.	Ecological consultant since 1991 Certified Practicing Ecological Consultant (ECA NSW registration no. 1).

This includes having as a minimum the following experience in conducting koala surveys:

Criterion	Dr Wotherspoon
• Greater than 10 surveys	Many surveys over more than 20 years. LGAs include Hawkesbury, Campbelltown, Port Macquarie, Blue Mountains, Pittwater, Snowy Monaro etc.
• Experience in using the koala presence survey methods identified below	Yes. Training workshop AKF annual Conference Philip Island 1999. NSW LEC expert witness.
• Can accurately identify preferred koala use trees	Yes. Arborist expert witness, so experience in identifying trees.
• Can distinguish between koala faecal pellets and those from other species that may present similar characteristics	Yes. Training workshop AKF annual Conference Philip Island 1999. Museum collection of pellets held in our office.

The person's skills in koala survey should be demonstrable by relevant qualifications and the following:

Criterion	Dr Wotherspoon
• a history of experience in koala habitat / population assessments and associated survey methods and/or	Research paper published by Australian Koala Foundation (AKF) (1999). Paper presented AKF annual Conference Philip Island 1999 Wotherspoon, D, (2021, in press) Koala survey and the SEPP (Koala Habitat Protection) 2019. *Consulting Ecology.*
• a resume giving details of koala survey projects conducted over the previous 10 years including employers' names and periods of employment (where relevant).	Owner and founder of Abel Ecology P/L (previously Blue Mountain Wilderness Services P/L) since 1991.

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Mark Mackinnon

B Env. Sci. (Hons); Grad. Dip. in Bushfire Protection
Bushfire Planning & Design (BPAD), Accredited Practitioner Level 3. Accreditation number 36395.
MEIANZ, White Card

Mark is a passionate and enthusiastic scientist who thrives in the field of natural resource management. Mark has worked for a number of inter-state government agencies and environmental consultancies. He has experience in threatened species, fire ecology, bushfire management, pest plant and animals, and landscape restoration. In particular, he specializes in ornithology and bushfire management. Mark has a number of specialized field-based skills including simple and complex tree climbing, working at heights, general firefighter departmental fire accreditation, venomous snake and reptile handling, immunization to handle bat species, and an A - class bird banding license with mist-net endorsement. Mark is also skilled in ArcGIS mapping, first-aid, four -wheel-driving.

Mark Sherring

BM, MAABR, Cert. Hort., Cert. Bush Regen, Cert. Rural Ops, White Card.

Member of the Australian Association of Bush Regenerators

Mark has extensive knowledge and experience of plant species in New South Wales. He has built up his expert knowledge on NSW native plant species over the many years that he has practised as a Botanist. He is regularly asked to contribute to the extensive (ongoing) flora surveys of the Sydney Basin and Blue Mountains carried out by the Royal Botanic Gardens, Sydney. Mark has extensive field survey experience, having worked for over ten years in various plant-related roles. His role in Abel Ecology is to provide expert advice on flora and on the full range of flora management issues encountered and in the design and management of environmental monitoring projects.

Nick Tong

BSc (Biology), MPhil (Ecology), Cert. III CLM
BAM Accredited Assessor (BAAS22012),
MECA NSW, Snr First Aid, White card.

Nicholas is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment and ecological restoration. In the last six years, he has been a consulting ecologist to private developers and large corporations, for a variety of projecting including State Significant Developments. Nick has extensive field work experience in Sydney, the Blue Mountains and Central West NSW. His Master's project investigated the impacts of exotic predators on herpetofauna in the arid zone. His role at Abel Ecology is to provide expert advice on fauna and the application of the Biodiversity Offset Scheme.

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Emily Barbaro

Ecologist
BA, MPublishing, Grad. Cert. EnvSc, MEScM

Emily has completed a Graduate Certificate in Environmental Science and a Masters of Environmental Science and Management. During her degree, Emily also completed the Volunteer Botanical Training Program at the Australian National Herbarium, Centre for Australian National Biodiversity Research and CSIRO. The Program included both botanical and general herbarium tasks, such as archiving plant specimens, plant identification, and assistance with taxonomic research projects. Emily has previously worked as a Bush Regenerator and has been volunteering with Bushcare for Blue Mountains City Council for the last three years. She is passionate about continuing to learn more about her local Blue Mountains flora and fauna.

Andy Araya

Botanist / Ecologist
B Env. Sci. M Teach (Env., Marine, Agr., Bio., Chem.), Dip. Marine Operations
First Aid Cert. White Card. ACDC Chemical Licence, NSW Boating Licence, Marine Radio Licence, Security Licence, Chainsaw Licence.

Andy has over 15 year's experience as a bush regeneration supervisor working across a number of environments throughout NSW and QLD from EEC of the Cumberland Plain, riparian and wetland areas, sand dunes and rainforests, to the higher elevations of the Blue Mountains National Park. Managing teams of up to 10 staff in remote areas as well as urban environments has allowed Andy to hone his skills of communication and native species identification. Andy's additional experience as a builder in the building and construction industry gives him a solid understanding of the considerations and legal requirements clients face in mitigating environmental and personal harm.

Erin Parker

Ecologist
B Biodiversity and Conservation, Macquarie University.

Erin has completed a Bachelor of Biodiversity and Conservation at Macquarie University. Erin has previously worked as a bush regeneration team member while completing her degree. There she was able to develop plant ID skills and understanding of the procedures of weed management and restoration. Erin has also taken part in a casual position assisting with threatened species surveys in the Central West of NSW. This involved various tasks including tree hollow surveys for Glossy Black Cockatoos, preparation for reptile surveys, spotlighting, harp trapping surveys of microbats, and Koala SAT plot surveys. Erin is passionate about furthering her knowledge on native Australian flora and fauna, their ecology and impacts.

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Callista Harris

Technical Officer
BPlan (Hons)

White Card, Apply First Aid, Work Safely at Heights, Maintain and Operate Chainsaws, Operate Elevating Work Platform (scissor lift), High Risk Work Licence - Boom-Type Elevating Work Platform (WP) (over 11 metres), Venomous snake handling certificate, Damage Mitigation Permit for Removal and relocation of protected animals, Operate and maintain 4WD.

Callista has 9 years' experience as an urban planner. She has a strong knowledge of NSW environmental legislation and has secured approvals for a wide range of developments, including housing developments, industrial developments, solar farms, and infrastructure. She has recently changed careers and has gained valuable on the ground experience working as a fauna spotter catcher, ecologist, and botanist on various projects.

Dr Stephanie Clark

B Sc (Hons), PhD

Stephanie has over 30 years experience in the collection, identification and taxonomy of marine, estuarine, freshwater and terrestrial molluscs. She has conducted numerous targeted surveys for endangered and threatened species (particularly land and freshwater molluscs) in both Australia and the United States. She is particularly interested in the systematics, taxonomy, morphology (external and internal), population and conservation genetics and conservation of molluscs particularly terrestrial (especially the Helicoidea) and freshwater (especially the Hydrobiidae and related families) groups.

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